Exploring Public Sector Resilience to Emerging Events

دراسة مرونة القطاع العام تجاه الأحداث المستجدة

by

FADI MA'MOUN NABULSI

A thesis submitted in fulfilment

of the requirements for the degree of

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ABSTRACT

There are certain challenges that require the public sector to be more resilient in the face of emerging events. These include the fourth industrial revolution, change in economic structures, security challenges, health pandemics, and other social cohesion challenges. This study aims to explore the concept of resilience and to develop a conceptual framework for governments, public sector leaders, various governmental sectors, researchers, and other relevant stakeholders to. To achieve this purpose, the study, through a content analysis of resilience literature, defined key components of resilience in general to come up with relevant themes and concepts of resilience to draw an initial framework. This framework was then used to conduct an exploratory qualitative study via semi-structured interviews to investigate the insights of 37 subject matter experts in the public sector within UAE. As an outcome of the thematic analysis conducted, four resilience concepts, seven principles, and eight attributes of building resilience in the public sector emerged from the data. A conceptual framework incorporating these components was developed including three resilience strategies, namely, absorptive, adaptive, and transformative strategies were identified to face various emergent events.

This study showed that resilience in the public sector is not a passive, reactionary attribute of organizations that enable them to survive a disruptive event. Rather, building resilience includes taking proactive steps to collaborate, monitor, anticipate, and possibly predict emergent events.

Further studies are required to validate the proposed relationships between the different attributes in the framework and resilience in the public sector by conducting quantitative hypothesis testing or qualitative case-study research.

نبذة مختصرة

يواجه القطاع العام (الحكومي) العديد من التحديات الحالية والمستقبلية التي تفرض عليه أن يكون أكثر مرونة في مواجهة الأحداث المستجدة التي قد تنشأ عنها. ومن بين هذه التحديات تبرز الثورة الصناعية الرابعة، والتغيّر في الهياكل الاقتصادية، والتحديات الأمنية، والأوبئة التي تؤثر على الصحة العامة، فضلاً عن تحديات الحفاظ على الترابط والتماسك المجتمعي، وغيرها من التحديات التي ينبغي على الحكومات التعامل معها في سياساتها الحالية والمستقبلية .

تهدف هذه الدراسة إلى استكشاف مفهوم المرونة في القطاع الحكومي وتوفير إطار مرجعي للحكومات وقادة القطاع العام والقطاعات المختلفة، مثل القطاع الاقتصادي والقطاع الصحي، والباحثين وغيرهم من ذوي العلاقة والمعنيين لمساعدتهم على التعامل مع الأحداث المستجدة. وقد جاء تطوير الإطار عبر اتباع خطوتين رئيستين؛ تمثلت الأولى في مراجعة الأدبيات والمراجع المتعلقة بالمرونة بشكل عام لاستخلاص إطار مبدئي يلخص المفاهيم والمبادئ والمكونات الخاصة بالمرونة في مواجهة الأحداث المستجدة. وتمثلت الخطوة الثانية في توظيف الإطار المبدئي في إجراء مقابلات شبه ممنهجة مع سبعة وثلاثين مختصاً في القطاع الحكومي في دولة الإمارات العربية المتحدة، للخروج بإطار مقترح يعرف المرونة في القطاع الحكومي، ويشتمل على أربعة مفاهيم للمرونة، وسبعة مبادئ رئيسة وثماني سمات. بالإضافة إلى ذلك فقد ساهمت الدراسة في تطوير ثلاث استراتيجيات للتعامل مع الأحداث المستجدة على النحو التالي: الاستراتيجية الاستيعابية، والاستراتيجية التكيفية، والاستراتيجية الانتقالية.

خلصت الدراسة إلى أن المرونة في القطاع العام لا ينبغي أن تقتصر على إجراءات تصحيحية كرد فعل على الأحداث المستجدة فحسب، وإنما تتطلب إيجاد وعي مشترك وحراك إيجابي لضمان قطاع حكومي مرن، عبر اتخاذ خطوات استباقية تستند إلى استشراف المستقبل، والمتابعة المستمرة للمستجدات، واستيعاب الموارد والممكنات والقدرات اللازمة لتطوير المرونة في القطاع الحكومي.

فيما تبرز الحاجة مستقبلاً إلى إجراء المزيد من الدراسات المستندة إلى البيانات الكمية والنوعية ودراسات الحالة للمرونة في القطاع الحكومي للتحقق من صحة العلاقة المقترحة لإطار المرونة الذي تقترحه هذه الدراسة.

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Table of contents

List of Figures

ix

List of Tables

Chapter One: Introduction

1.1 Introduction

This chapter describes the context and background for this research. This study explores the resilience of public sector organisations to emerging events. Also included in this chapter is a description of the research problem, research questions, research aims and objectives, as well as the significance and contributions of the study to knowledge. The final section of this chapter presents an overview of the other chapters contained in this thesis.

1.2 Research Context and Background Information

In recent years, the accelerating pace of change in economic structures, the emergence of future trends like the fourth industrial revolution, and the unpredictable nature of stressors like security and social cohesion challenges are compelling nations and organisations to build their resilience capabilities and capacities (World Economic Forum, 2017). Furthermore, external concerns such as innovative new technologies and new regulatory regimes as well as disruptions arising from within organisations such as turbulences coming from existing infrastructure are pushing organisations to embrace new ways of thinking about business performance (Collier et al., 2016; Kerr, 2015; Suikki, Tromstedt & Haapasalo, 2006). Accordingly, the operationalisation of resilience as a concept has evolved into the building of capacities and capabilities to face internal and external uncertainties that are both epistemological and ontological (Carayannis et al., 2017; Ilmola & Rovenskaya, 2016).

Different definitions have been proposed for resilience. It has been defined as the ability to manage uncertainties and disruptive events in a sustainable way or the power to bounce back after disruptive events (Edgeman, Neely, & Eskildsen, 2015; Kolay, 2017; Meng et al., 2019;

Sahebjamnia, Torabi & Mansouri, 2018; Sawalha, 2015). Other researchers have defined resilience as an inherited capability needed to survive and prosper in fragile and unstable operating environments (Dhakal, 2015; Xiao & Cao, 2017). However, there is currently no consensus definition for resilience. This is due to the different conceptualisations of resilience adopted by researchers depending on their field of study and the origins of the concept in psychology, ecology, natural philosophy, and physics (Annarelli & Nonino, 2016; Manfield & Newey, 2018; Rodríguez-Sánchez & Vera Perea, 2015; Teoh, Yeoh & Zadeh, 2017). For instance, in the field of management science, resilience is viewed as a construct of organisational theories with roots in studies of crisis and disaster management, risk management, and more recently, strategic management (Duit, 2016; Kantur & Say, 2015; Koronis & Ponis, 2018).

In strategic management literature, resilience is positioned as: 1) the capacity for continuous anticipation and adaptation to in-depth, irregular trends that can negatively affect the core business, and 2) the ability to adapt to change without incurring too much cost due to inaction (Denyer, 2017; Hamel & Välikangas, 2003). Recent definitions of resilience place more emphasis on responding to emerging events that thrust businesses and organisations into unfamiliar territory where the risk of insolvency is higher. Though these events are often disruptive, the business or organisation has built adequate capacity to deal with such events that there is almost no threat to the performance and survival of the organisation. In essence, resilience is what enables an organisation to adapt, innovate, and turn threats and challenges into opportunities for growth (Castellacci, 2015; Megele, 2014; Nussbaum, 2016; Tengblad, 2018). Both private sector organisations and public sector organisations are experiencing a resilience gap which makes them unable to effectively respond and adapt when faced with uncertainties and chaotic situations (Hamel & Välikangas, 2003).

Defining the boundaries of the public sector in the United Arab Emirates (UAE) is a complicated task; UAE is a constitutional federation of seven Emirates, namely: Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah and Fujairah. The UAE is run by a federal government and local governments of the seven emirates. Their powers and roles are defined by the UAE constitution. This Constitution explains the main rules of the political and constitutional organisation of the country. It demonstrates the main purpose of the establishment of the federation and its objectives at the local and regional levels (UAE Government, 2021). UAE as a country has a structure headed by the president of the UAE and has four main functions representing the supreme court, Crown princes of the seven Emirates, Prime Minister, and the legislative council as shown in Figure 1-1 below:

```
                        ┌─────────────────┐
                        │  UAE President  │
                        └─────────────────┘
                  ┌───────────────┐
                  │   UAE Vice    │
                  │   President   │
                  └───────────────┘
   ┌──────────────┐ ┌──────────────┐ ┌──────────────┐ ┌──────────────┐
   │ Supreme Court│ │Crown Princes │ │Prime Minister│ │   Federal    │
   │              │ │of the seven  │ │              │ │  National    │
   │              │ │  Emirates    │ │              │ │   Council    │
   └──────────────┘ └──────────────┘ └──────────────┘ └──────────────┘
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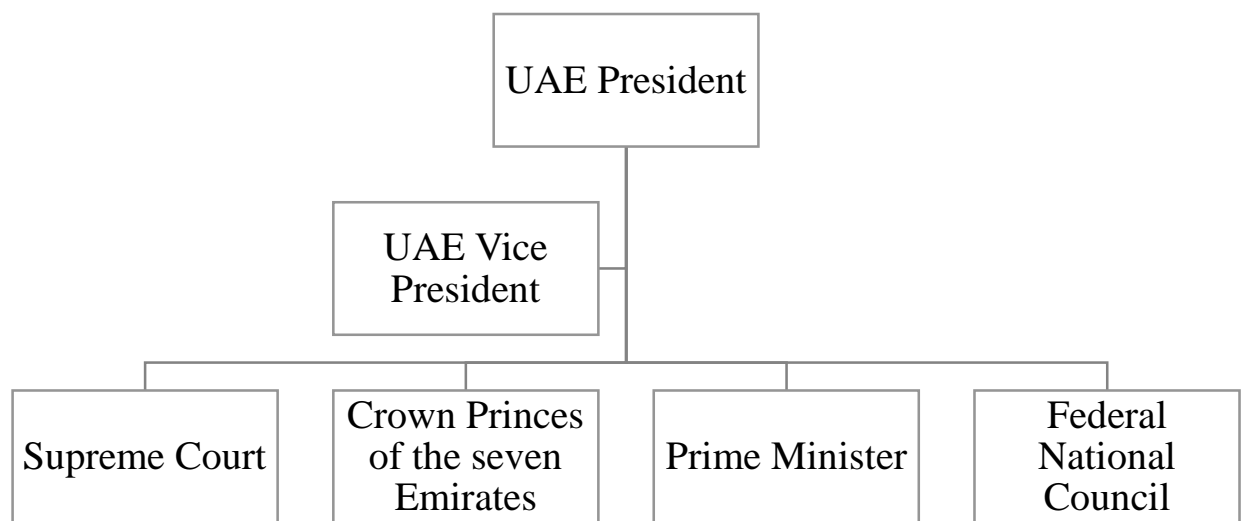
Figure 1-1: The UAE country structure.

The Cabinet of the United Arab Emirates is the executive branch of the federation, handling the execution of all internal and external affairs related to the federation as per the UAE Constitution and the federal laws, under the supervision of the President and the Federal

National Council (Ministry of Cabinet Affairs, 2020). The UAE cabinet consists of the Prime

Minister, two deputy Prime Ministers, and the ministers of the UAE. The existing hierarchical

structure of the UAE cabinet end of 2020 is shown in Figure 1-2:
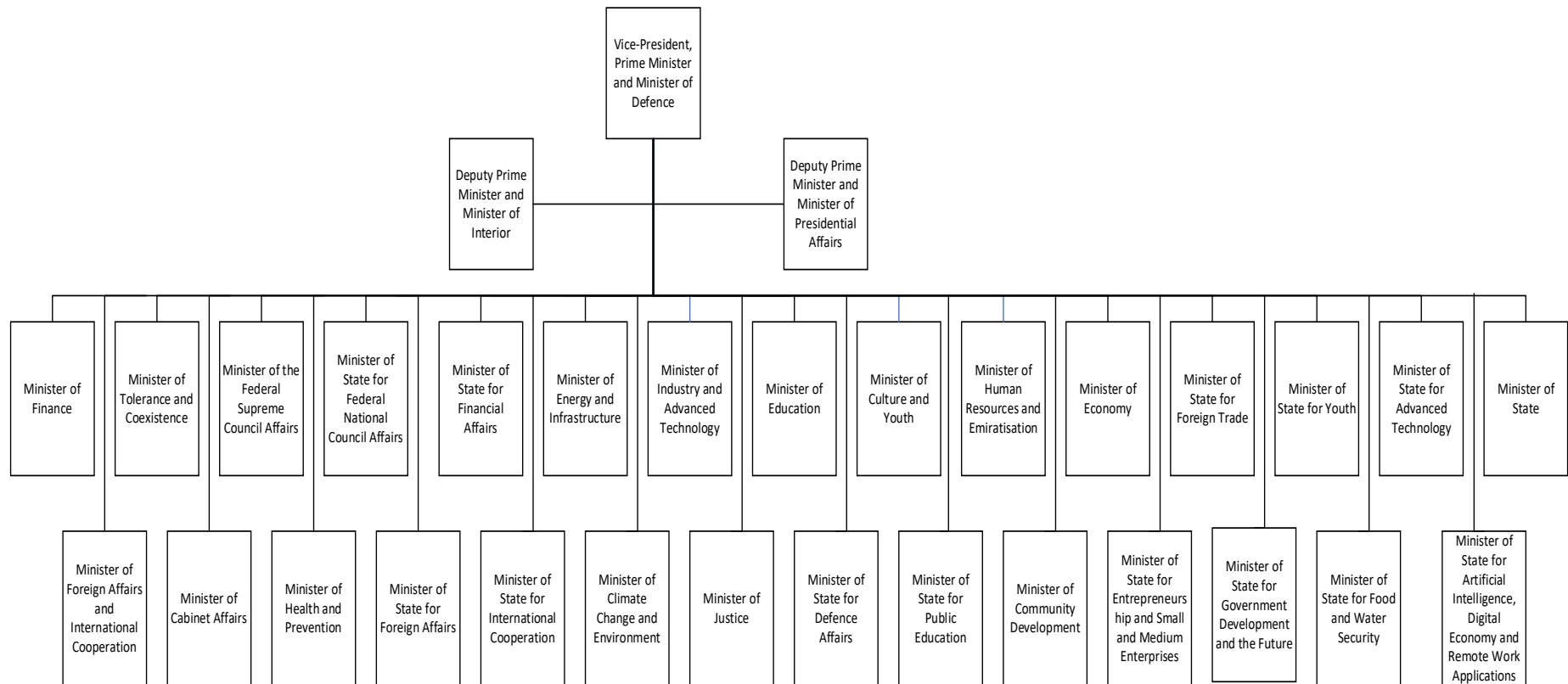
Figure 1-2: The hierarchical structure of UAE cabinet end of 2020.

UAE cabinet itself and each ministry have their own mandates based on the UAE constitution. Moreover, the national body in UAE responsible for emergency response is the National Emergency, Crisis and Disasters Management Authority (NCEMA), which is under the responsibility of the Supreme Council for National Security. Its mandate, based on the Federal Decree-Law No. (8) of 2015, to achieve the State's policy regarding the procedures necessary for the management of emergencies, crises, and disasters (National Emergency, Crisis and Disasters Management Authority (NCEMA), 2015).

At the local level, there is an executive council for each of the seven Emirates responsible for developing strategies and legislations for local government entities to ensure proper growth and governance for each Emirate. In addition, Emirates like Dubai have a central body called Al Diwan that coordinates the affairs of local agencies such as the Department of finance, Department of Human Resources, and the Legal affairs department. There are also local government entities in Dubai that are responsible for providing public services. These public sector agencies include the Dubai Police, Road and Transport Authority (RTA), Dubai Water and Electricity and Water Authority (DEWA), Dubai Courts, and Dubai Customs. In addition to that, there is a specialised committee for disaster management in Dubai called the "Supreme Committee of Crisis and Disaster Management" that works in coordination with the National Emergency, Crisis and Disasters Management Authority (NCEMA).

In addition to the government-owned public sector agencies mentioned above, the UAE, at both the federal government or local government level has an ownership stake in some companies such as Emirates Telecommunication company and Emirates Transport (federal level), and Dubai Transport and Dubai Duty-Free owned by the local government in Dubai.

Defining what is meant by a public sector seems to be a complicated task and differs from one country to another. Mansour (2008) tried to reach a definition for the public sector in UAE by trying to define its boundaries and concluded that the public sector in UAE could be operationally defined as including all organisations that are funded by the government's public budget and are directly involved in providing some sort of goods or services to the public. Therefore, we can conclude that there are three different levels of bodies that the public sector in UAE is consists of. These levels are: 1) The Federal level- represented by the UAE cabinet and the bodies associated with it; 2) The Local level- represented by government entities funded by local governments; 3) all other organisations that are funded either the Federal or the Local governments.

Taher, Krotov & Silva, (2015) highlighted key challenges the public sector in UAE is facing while going into a change management process or facing future emergent events. These challenges are lack of organisational maturity and stability, social culture in the UAE may result in bureaucracy in some of the aspects of the public sector operations, lack of management commitment and sponsorship at the public sector organisational level, and lack of communication. Furthermore, Al-Obthani & Ameen (2019) think that UAE has a low individualism trait and higher power distance and claim that the people of the UAE are less likely to take the risk. However, a study of the strategic management systems at the Federal and the Local levels in UAE showed that there is a good strategic awareness of tools and systems that are implemented (Elbanna, 2013).

The earlier discussions illustrated that the public sector structure in UAE is of a complicated nature that requires a lot of coordination, communication, and proper responsibility definition while facing an emergent event, especially at the national level. This is due to some overlap

between responsibilities at the Federal and Local levels, the large number of ministries at the national level, and the organisation of the public sector at the local level. Accordingly, this requires strong national-level leadership and coordination that is evidenced through the implementation of the national UAE agenda (UAE Vision 2021, 2020) and The UAE Centennial 2071 (The Official Portal of the UAE Government, 2020). Maintaining this strategic momentum will require UAE to have an advanced role of the NCEMA at the national level or the Supreme Committee of Crisis and Disaster Management at Dubai level as there should be some advancement in providing solutions to existing challenges such as COVID-19 or future challenges such as cyber security challenges for the future IT infrastructure besides the current overlapping structures and multi-responsibility mandates and systems. This will be facilitated through having a framework for resilience to cope with public sector challenges as the responsibility for resilience is collective, involving all parties, and the effect of built resilience can be felt if sustainable decisions are taken in the face of emergent events.

UAE and the world have experienced and is still experiencing waves of emergent events that result in socio-economic and geo-political disruptions. Examples of these events are the global financial crisis of 2008 and in 2020, the cyber security threats, and the on-going COVID-19 pandemic (Barasa, Mbau & Gilson, 2018; Liu, Reed & Girard, 2017). At the same time, the current trends like big data, the internet of things, fouth industrial revolution, geo-political tensions between world super powers, artificial intelligence, and many more are revolutionising the way organisations, cities, and nations operate in the global economy (Ali Hashmi, 2019; Awamleh, 2019; World Economic Forum, 2017).

One unique attribute of the public sector is that disruptive events tend to affect almost all public sector organisations and agencies collectively. This is because public sector organisations are like branches or divisions of one big system that is controlled by the central government, and

the operations of one organisation is usually intricately linked to the operations of another organisation. Consider a disruptive event like a cybersecurity breach of public sector organisations. This kind of event affects multiple public sector organisations that often share the same databases or collect the same kind of information for their operations (Harris & General, 2016). For example, a 2019 cybersecurity breach of US defense agency led to the theft of the Social Security Number (SSN) of millions of Americans (Hautala, 2020). This breach in one public sector agency collectively affected other aspects of the public sector like healthcare, financial systems, and educational institutions, putting customers at risk of identity theft and potential financial losses as the SSN is intricately linked to every aspect of public life in the US (Conaty-Buck, 2017; Kuhn, 2018).

Furthermore, lack of resilience in the public sector, if left unaddressed, will have long term repercussions that will affect not only the delivery of public services to consumers but also as private sector organisations. For instance, consider an emergent event like the COVID-19 pandemic. Even though it is generally regarded as a public health crisis and has put enormous strain on emergency and health services primarily provided by the public sector, the pandemic has also affected the private sector. While aspects of the public sector like health workers who are at the frontline of fighting the pandemic are experiencing burnout, and local government entities are running out of resources to respond effectively to the pandemic, the private sector has also been affected by policies like mandatory lock downs and restriction of movements and gatherings which has resulted in business closures, loss of revenue, and bankruptcy for private organisations (Azoulay et al., 2020; Wang et al., 2020; Yıldırım & Solmaz, 2020).

Countries that quickly galvanised a robust and comprehensive public sector response to the pandemic were able to minimise its impact, while countries that delayed their response due to

a lack of effective coordination among the relevant public sector organisations were worst hit by the pandemic. Though the long-term impacts are still being studied, the prognosis looks bad for these countries whose public sector responded poorly, and the road to recovery is expected to be long and difficult (Al Saidi et al., 2020; Imtyaz, Haleem & Javaid, 2020; Oh et al., 2020).

These scenarios emphasise the importance of building resilience in the public sector to enhance its readiness and preparedness for effective response to various disruptions and threats. Building resilience will also equip the public sector for continuous monitoring and anticipation of emergent events and position public sector organisations to learn and improve performance following an emergent event (Hollnagel, 2015; Kantur & Say, 2015; Patriarca et al., 2017).

In summary, resilience is gaining an advanced strategic position as an integrating concept to enable different sectors, particularly the public sector, not only to respond to disruptions and recover, but also to learn from such experiences and become more competitive, innovative, and agile.

1.3 Research problem

Building resilience capacities and capabilities will enable public sector organisations to respond and adapt to uncertainties and disruptive emergent events in a way that engenders sustainability and better performance (Edgeman, Neely, & Eskildsen, 2015; Kolay, 2017). However, relative to private sector organisations, public sector organisations are known to adapt slowly to change due to their large bureaucracies and their attachment to traditional organisational reform recipes. These recipes typically prioritise adherence to rigid standard operating procedures that make for high operating efficiency but leave little room for innovative capacity (Van de Walle, 2014). In addition, public sector organisations are less amenable to the tensions that arise from

the paradox of the need to deviate from the rules to innovate in a rules-based bureaucratic system (Linnenluecke, 2017;Duit, 2016). Building resilience in public sector organisations will equip them to deal innovatively with the ever-evolving techno-socio-economic conditions of the 21ˢᵗ century and empower them to efficiently manage emergent events that arise from internal and external uncertainties (Barasa, Mbau & Gilson, 2018; Hamel & Välikangas, 2003; Marston & Marston, 2018).

In Dubai, the public sector is under continuous pressure from the leadership to achieve more and to provide superior services than the private sector (Al Maktoum & Bishtawi, 2006). This is reflected through the many initiatives launched by the government of Dubai to prepare the city for the future. Some of these initiatives are Dubai 10X initiative designed to make government agencies in Dubai the model for other cities in the world to emulate on how public sector enterprises should be run, and Dubai Future Now; an initiative aimed at digitalising all transactions of the city government by 2021 (Dubai Future Foundation, 2017).

Despite these initiatives by the government of Dubai to spur innovation and performance improvement, current government systems lack a constructive approach towards managing disruptive events resulted from external uncertainties like the global financial crisis of 2008 and the Address Hotel fire in downtown Dubai in New Year's Eve of 2016 (Chulov, Shaheen & McKee, 2016). The effective management of such disruptive events requires more emphasis on resilience thinking to build internal capabilities and capacities within Dubai public sector organisations. These resilience capabilities include the ability to respond to regular and irregular threats, flexibility to adapt and innovate, predictive ability to anticipate disruptions, and mechanisms to learn and develop organisational memory from such experiences (Hollnagel, 2015; Kantur & Say, 2015; Patriarca et al., 2017). Focusing only on these capabilities will work

only with traditional leadership, but with inspiring leaders, that are looking to number one as the only choice, the equation is different. There should be a shift in thinking from building resilience based on the current practices and capabilities into a more strategic paradigm where resilience is constructed based on enhancing the organisational enablers to understand the future outlooks better and build the transformative capacity to deal with the various challenges related to ontological and epistemological uncertainties (Ilmola & Rovenskaya, 2016).

In summary, Building resilience within public sector organisations will have a positive impact at a national level, as it will enhance competitiveness, construct coherence, improve efficiency and effectiveness, enhance reputation, and leverage response to ever-evolving techno-socio-economic condition to strengthen societal and community resilience (The British Standard Institution, 2014).

This section discussed the problem for the public sector in general and the public sector in Dubai in particular. The following section will present the research aim, objectives, and questions.

1.4 Research aim, objectives, and questions

1.4.1   Research aim

The aim of this research is to develop and validate an adaptive resilience framework for the public sector that will be used to enhance decision making in response to disruptive emerging events. The framework will have components and how to activate them to optimise decision making process.

1.4.2 Research objectives

To achieve this aim, the following research objectives will be pursued.

1- Systematic review of literature to extract resilience characteristics and strategies applicable to the public sector.

2- Identify emerging events that are stressors for public sector organisations and map these events unto resilience strategies.

3- Develop and validate an adaptive framework to imbue resilience into the decision- making process of public sector organisations when faced with disruptive events.

1.4.3 Research purpose and research questions

The purpose of this study is to explore how public sector organisations can build resilience capacities and capabilities into their decision making and planning processes as part of their preparedness to confront disruptive events and future uncertainties. The study will be guided towards achieving this purpose using the following research questions:

1. How can public sector organisations anticipate and recognise emerging events?

2. What strategies do public sector organisations use to deal with emerging events?

3. How can public sector organisations build their resilience capabilities and capacities to anticipate, monitor, respond effectively to, and learn from emerging events?

1.5 Research Novelty and Significance

While scientific literature is replete with research on resilience in private sector organisations, little is known about resilience in public sector organisations, and there is currently no research

that has studied resilience within the context of Federal and local governments in the United Arab Emirates (UAE). This research presents a unique opportunity to fill this gap in knowledge. In addition, the findings of this study will provide a framework that leaders and decision makers in public sector organisations can use to identify disruptive events, anticipate future occurrence of such events, and better prepare their organisations to respond effectively when these events occur either due to internal factors, external factors, or a combination of both. Furthermore, |this research is expected to contribute to the body of evidence required to drive the implementation of the initiatives announced by His Highness Sheikh Mohammed Bin Rashed Al Maktoum in 2019 aimed at making the government of Dubai more resilient, and its operations sustainable, in the face of global socio-economic disruption.

1.6 Research Structure

The thesis has seven chapters in addition to references and appendices. Figure 1-3 below illustrates its structure:
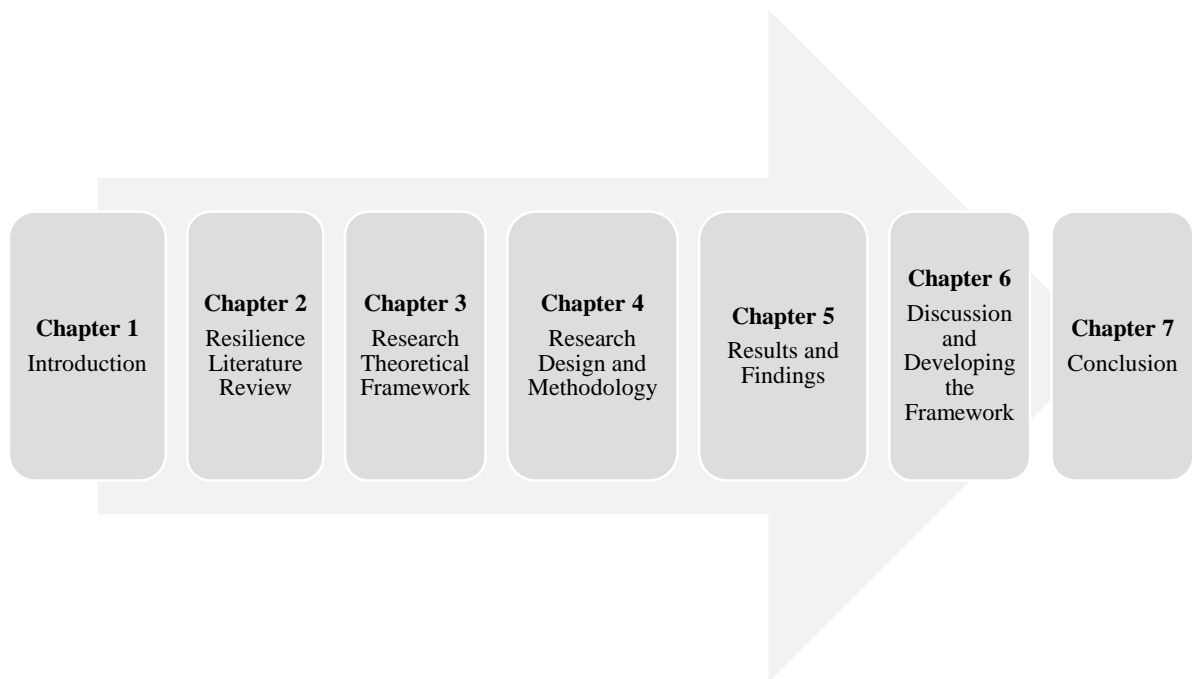
Figure 1-3: Illustration of the thesis structure.

Chapter Two: Resilience Literature Review

2.1 Introduction

This chapter discusses resilience definition, the evolution of resilience concept in the management field, organisational resilience, resilience models, resilience measurement and maturity, resilience in the public sector, disruptive events, resilience and risk, resilience capacities, and finally theories underpinning resilience (Complexity science theory).

2.2 Defining resilience

The etymological origin of resilience has been traced to the Latin word '*resilire'* which means leap or bounce back (Olivos, 2014; Xiao & Cao, 2017). Folke (2006) argued that resilience as a research concept first emerged in the field of ecology in the late 1960s and early 1970s where it was used by researchers to describe the functional response of interacting populations to ecological stability theory. Other researchers have posited that resilience has its roots in psychology research where it is conceptualised as the positive capacity gained by individuals who have experienced adverse conditions (Kantur & Say, 2015; Manfield, 2016; Rodríguez-Sánchez & Vera Perea, 2015). Also, from an engineering perspective, resilience is defined as the ability of elastic materials to stretch and return to their original position without change (Manyena & Gordon, 2015).

Based on the original roots of the *"resilience"* term in psychology, ecology or engineering, researchers have based their resilience research on starting from specific discipline, or they tried to come up with a cross-disciplinary approach where they tried to distill their research base from the three roots and evaluate those that are more appropriate to their research agenda. Table 2-1 illustrates examples of resilience research based on one of the three disciplines; psychology,

ecology, and engineering and examples of research that took a multi-disciplinary approach with

the associated research focus.

Table 2-1: Examples of resilience research based on one of the three disciplines and a multi-disciplinary approach example with the associated research outcome.

Discipline	Publication Title	Research focus
Psychology	On the relationships of resilience with organisational commitments and burnout a social exchange perspective (Meng et al., 2019).	The role of psychological resilience in better understanding the relationship between subordinates and between supervisors and subordinates in human management practice.
Ecology	Resilience Thinking: Sustaining Ecosystems and People in a Changing World (Walker & Salt, 2012).	To apply resilient thinking to understand the dynamic changes in ecological and social systems better
Engineering	On the Definition of Resilience in Systems (Haimes, 2009).	The ability of the system to withstand a significant disruption within acceptable degradation parameters and to recover within an adequate time and composites costs and risks
Multi-Disciplinary	Resilience as an entrepreneurial capability: integrating insights from a cross-disciplinary comparison (Manfield & Newey, 2018).	A cross-disciplinary comparison between the three disciplines (Psychology, ecology, and engineering) helps see how researchers have grappled with the fundamental nature of resilience in their respective fields

The roots of resilience in psychology, ecology or engineering evolved into different sectors like

economy, finance, political, manufacturing, healthcare, education, social, safety, and security.

Table 2-2 illustrates examples of resilience research based on these sectors and scholars'

definition of resilience.

Table 2-2: Examples of resilience research in different sectors and the resilience definition used in the studies.

Discipline	Publication Title	Research focus	Resilience Definition
Economy	Regional economic resilience, hysteresis, and recessionary shocks (Martin, 2012).	Resilience usefulness in understanding regional economies reaction to major recession shocks.	Capacity to reconfigure, that is, to adapt its structure to maintain an acceptable growth path in output, employment, and wealth over time.
Finance	Governmental financial resilience under austerity in Austria, England, and Italy: How do local governments cope with financial shocks? (Barbera et al., 2017).	To highlight and operationalise different patterns of financial resilience, namely, self-regulation, constrained or reactive adaptation, contented or powerless fatalism that is the result of the interaction and development over time of different internal and external dimensions	Governments' ability to anticipate, absorb and react to shocks affecting their finances over time.
Political	Political Resilience and EU Responses to Aviation Terrorism (Argomaniz & Lehr, 2016).	Examines how European authorities have responded to reported threats to aviation resulting from individual terrorist tactics by applying the notion of political resilience.	The capacity of the political system to proactively face a threat and recover through "robustness" and continuity or changes in policy, politicisation, or politicking
Manufacturing	Manufacturing system design for resilience (Gu et al., 2015).	To gain a fundamental understanding of manufacturing systems resilience by developing methods and tools to evaluate capabilities of fault-tolerance, performance recovery and achieving high resilience	The ability of the production system to withstand potentially high-impact disruptions. It is characterised by the capacity to mitigate or absorb the impact of disruption, and quickly recover to normal conditions
Healthcare	Vulnerability and Resilience in Patients with Chronic Pain in Occupational Healthcare: A Pilot Study with a Patient-Centered Approach (Peilot et al., 2018).	To describe vulnerability and resilience and possible subgroups in patients with chronic work-related musculoskeletal pain in occupational healthcare	A person's ability to adapt to and manage stress and harm
Education	Building resilience in teacher education:	To determine factors that may impact teacher education	The capacity of an individual teacher to harness personal and contextual

	An evidenced informed Framework (Mansfield et al., 2016).	to support teacher resilience and ways in which this may occur	resources to navigate through challenges
Social	What is social resilience? Perspective of disaster researchers emergency management practitioners and policy-making in New Zealand (Alan H. Kwok et al., 2016).	To better understand what is social resilience at the community level	The capacity of communities and people to deal with external stresses and shocks
Safety	Expressway crash risk prediction using backpropagation neural network: A brief investigation on safety resilience (Wang, Kong & Fu, 2019).	To introduce the safety resilience theory to learn traffic safety on expressways	The ability of a road section to resist from safety disturbances, such as vehicle violations, driver manoeuvre, and judgment errors, or any other disruptions in traffic which could result in a crash
Security	Defining a Cyber Resilience Investment Strategy in an Industrial Internet of Things Context (Carías et al., 2019).	To identify and model an effective cyber resilience strategy	Broaden the cybersecurity concept from only perimeter security to prevention, detection, response, and recovery point of view.

Despite differences in the definitions of resilience proposed by different scientific disciplines, certain characteristics of the concept are common across board. These characteristics are as follows:

1- The capacity component: This is the potential and capabilities that systems and organisations have acquired in readiness to adapt to change and thrive under chaotic operating circumstances.

2- The disruption component: this refers to the events, both internal and external, that shock, disrupt, challenge, or stress a system, compelling organisations to respond with resilience.

3- The Response component: this refers to the actions that organisations take, and the mechanisms that organisations use to change their behavior in response to stressors to survive and thrive.

2.3 Evolution of resilience as a management concept

The roots of resilience in ecology, psychology, and engineering influenced the evolution of the resilience as a concept in the field of management. Linnenluecke et al. (2017), using a systematic review of literature, traced the emergence of resilience in business and management back to studies conducted in early 1980s to understand how organisations respond to external threats (Bhamra, Dani & Burnard 2011; Linnenluecke, 2017). By the early 2000s, resilience in management research was being operationalised as strategic resilience, defined as the capacity of organisations to proactively reinvent their business models as part of strategy development in anticipation of disruptive events (Hamel & Välikangas, 2003). Subsequently, other researchers have expanded this definition to position strategic resilience as a governing concept that includes the ideas of risk management, crisis management, and business continuity (Capano & Woo, 2017; Koronis & Ponis, 2018; Tracey, 2015). Recent studies have linked strategic resilience to organisational complexity theory and the management of both epistemological uncertainties (known unknowns) and ontological uncertainties (unknowns unknowns) (Barasa, Mbau & Gilson, 2018; Hall & Rowland, 2016; Ilmola & Rovenskaya, 2016; Osterwalder, 2004; Patriarca et al., 2018).

The World Economic Forum projects that future research on resilience will focus on how organisations can become more resilient as part of preparedness for future challenges (World Economic Forum, 2017). On the other hand, experts in the field of management posit that future studies should focus building resilience at a national level by including stakeholders beyond the

boundaries of an organisation who can provide an outsider perspective to help organisations develop robust and effective management strategies to handle future challenges (Sircar et al., 2013). This suggests that future research in resilience will be multi-level and cross-disciplinary in nature (Linnenluecke, 2017).

2.4 Organisational resilience

Organisational resilience is another conceptualisation of resilience in management science that evolved from psychology, ecology, and engineering. According to Denyer (2017), the first use of the term organisational resilience was by Meyer in his 1982 study of how hospitals responded to unexpected doctors' strike. He used the term *"resiliency"* to describe the hospitals to respond to disruptions caused by the doctors strike action and restore order (Denyer, 2017; Meyer, 1982). Other researchers have traced the origins of organisational resilience in the field of management to studies on crisis and disaster management documented in organisational theory literature (Kantur & Say, 2015). Furthermore, Hamel & Välikangas in their 2003 Harvard Business Review article titled "The quest for resilience," defined organisational resilience as the capacity for continuous reconstruction that requires innovate changes to organisational values, processes, and behaviours (Hamel & Välikangas, 2003).

Despite the number of research in the area of organisational resilience, there is still no consensus among researchers on a definition for resilience. This is due to differences in the conceptualisation of resilience by researchers depending on their field, and the roots of the concept in different disciplines (Denyer, 2017; Manfield & Newey, 2018; Xiao & Cao, 2017). Researchers have tried to get around this problem by gathering multiple definitions of organisational resilience and studying them to come up with their own definition. For instance, Koronis & Ponis (2018), using this method, concluded that organisational resilience should be

21

perceived as the capacity of an organisation to survive in the long run and cope effectively with immediate disruptions and hardships. The authors' process for defining resilience is illustrated on table 2-3.

Table 2-3: Organisational resilience definitions as highlighted by Koronis & Ponis (2018)

Definition of organisational resilience	References
"A balancing factor between organisational stiffness and unstructured ambiguity".	(Eisenhardt & Brown, 1998)
"Organisational resilience is the maintenance of positive adjustment under challenging conditions such that the organisation emerges from those conditions strengthened and more resourceful".	(Vogus & Sutcliffe, 2007)
"Organisational resilience refers to a capacity for continuous reconstruction. It requires innovation concerning the organisational values, processes, and behaviors that systematically favor perpetuation over innovation".	(Hamel & Välikangas, 2003)
"The capacity of an enterprise to survive, adapt and grow in the face of turbulent change".	(Fiksel, 2006)
"The firm's ability to effectively absorb, develop situation-specific responses to and ultimately engage in transformative activities to capitalise on disruptive surprises that potentially threaten organisation survival".	(Lengnick-Hall, Beck & Lengnick-Hall, 2011)

Following the same s approach of gathering different definitions of organisational resilience and summarising them to come up with a definition for use in their own research, Teoh, Yeoh & Zadeh, (2017) defined organisational resilience as managerial mindfulness of aspects of organisational vulnerabilities, as shown in Table 2-4.

Table 2-4: Organisational resilience definitions as highlighted by Teoh, Yeoh & Zadeh, (2017).

Definition of organisational resilience	References
"A firm's ability to recover from misfortune or change, and to adjust easily to misfortune or change."	(Lengnick-Hall, Beck & Lengnick-Hall, 2011)
"The ability to rebound from an unexpected, stressful, adverse situation and to pick up where it left off."	(National Research Council, 2007; Powley & Lopes, 2011)
"A firm's capacity for developing resilience derived from a set of specific organisational capabilities, routines, practices, and the processes by which a firm conceptually orientates itself, acts to move forward, and creates a set of diversity and adjustable integration."	(Lengnick-Hall & Beck, 2009)

"A function of an organisation's situational awareness, management of critical vulnerabilities, and its capacity to adapt in a complex, dynamic, and interconnected environment."	(McManus et al., 2007)
"Maintenance of positive adjustment under challenging conditions, such that the organisation emerges from those conditions strengthened and more resourceful."	(Vogus & Sutcliffe, 2007)
"The ability of an organisation's business operations to adapt rapidly and respond to internal or external dynamic changes – opportunities, demands, disruptions or threats – and continue its operations with a limited impact on the business."	(Gaddum, 2004)
"The ability to maintain positive adjustments under challenging conditions."	(Sutcliffe & Vogus, 2003)

As part of efforts towards consensus building on the definition of organisation resilience, two standards were released by the British Standard Institution (British Standard Institution, 2014), and the International Organization for Standardization (International Organization for Standardization, 2017) respectively which provide working definitions for organisational resilience as shown below on table 2-5.

Table 2-5: Definitions of organisational resilience by BSI 65000 & ISO 22316 standards (The British Standard Institution, 2014; International Organization for Standardization, 2017)

Definition of organisational resilience	Standard
"Ability of an organisation to anticipate, prepare for, and respond and adapt to incremental change and sudden disruptions to survive and prosper."	(British Standard Institution, 2014)
"Ability of an organisation to absorb and adapt in a changing environment."	(International Organization for Standardization, 2017)

All these definitions of organisational resilience capture the central idea of resilience being the ability for organisations to bounce back, that is, return to optimum performance when they are faced with unplanned disruptive events. This capacity to return to optimum performance is a system attribute and is illustrated in Figure 2.1 below.
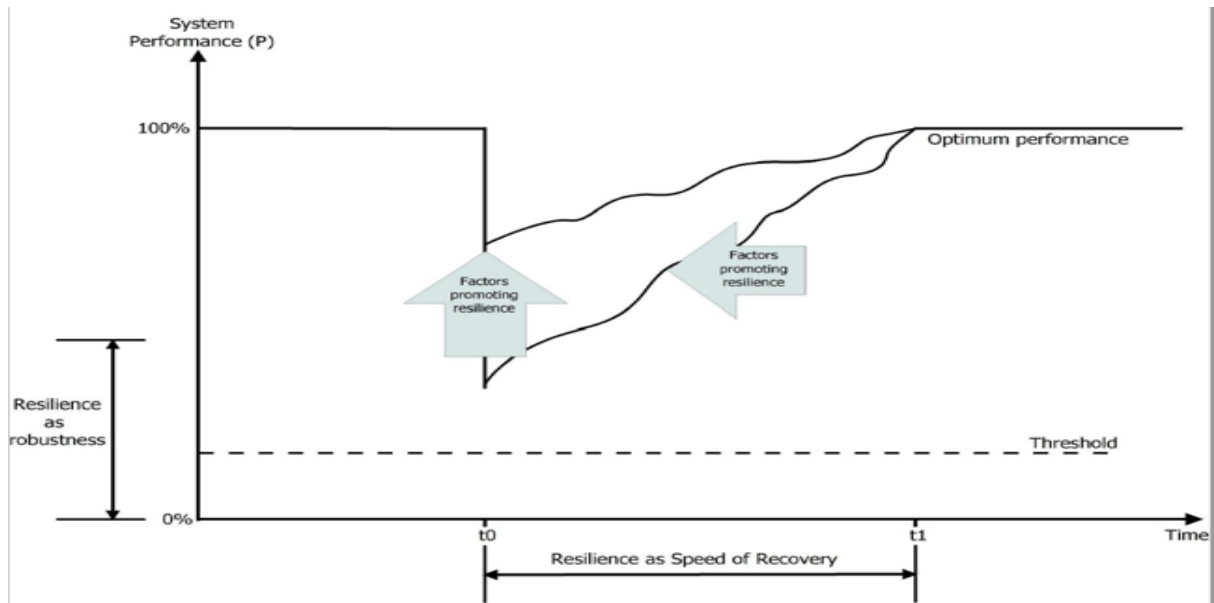
Figure 2-1: Illustration of resilience systems bouncing back to optimum performance (Linnenluecke, 2017).

Furthermore, some researchers have argued that resilience is beyond bouncing back, but also enables an organisation to bounce forward. They describe bouncing forward as the process of learning from chaos and using the insight gained to develop innovative response strategies that when deployed will result in a better performance during and after the disruption compared to the organisation's performance before the disruption (Denyer, 2017; Ilmola & Rovenskaya, 2016; Megele, 2014; Rudrajeet, 2013). Figure 2-2 highlights the new desired capability of resilient organisations.
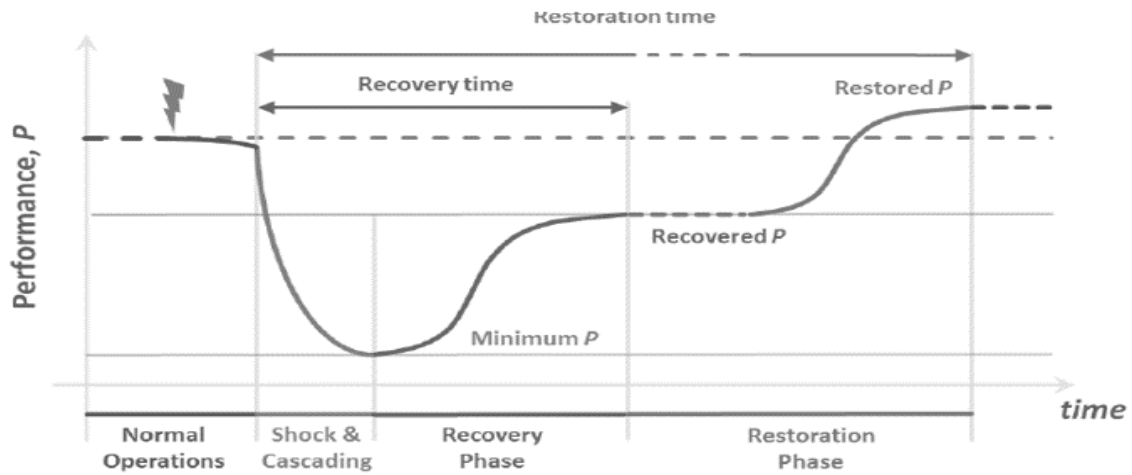
Figure 2-2: Illustration of resilience systems bouncing forward (better than the previous optimum performance (Florin & Linkov, 2016).

A review of literature was done to synthesise a new definition for organisational resilience based on commonalities in the various descriptions and operationalisations of the concept by researchers in different fields. This review process used a cloud software to examine the frequency of occurrence of the words organisational and resilience, and related terms to identify descriptors that best capture what researchers think when they use the term organisational resilience. The results of this review process are shown on Table 2.6, Figure 2.3, and Appendix I respectively.

Figure 2-3: Word cloud outcome of the words and synonyms as illustrated in Appendix I.

Table 2-6: The frequency of the main words and synonyms as listed in Appendix I.

Word or synonyms	organisatio	ability	capacity	adapt	changes	respond	bounce	disrupt	environmen t	survive	absorb	learn	anticipate	conditions	back
Frequency	33	32	23	20	17	17	15	13	10	10	10	10	9	9	9

Based on the findings from this review, the following is proposed as a comprehensive definition of organisational resilience; it is the capacity of an organisation to anticipate, <u>absorb and adapt</u> to changing conditions or <u>disruptions</u> in the <u>internal and external</u> environment, to learn from the experiences and <u>bounce forward,</u> that is, survive and thrive through improved performance.

2.5 Resilience Models

As discussed in the previous section about how different disciplines influence the definition and conceptualisation of organisational resilience, the same approach was taken in developing resilience models. Researchers were initially basing their resilience models on either the

psychological, the ecological, or the engineering perspective. Some researchers based their models on a combination of two or more of these perspectives. As the concept evolved into a management concept, researchers expanded the perspectives used as a basis for building their resilience models from those of the three main disciplines mentioned earlier to include perspectives from fields like disaster recovery, crisis management, risk management, and business continuity. In addition, some researchers thought that bouncing back or returning to optimum performance level is not the only possible outcome for organisations facing emerging events. They posit that organisations can also turn disruptive emergent events into opportunity to boost performance. In the following discussion, a literature review was conducted to give some examples of the researches in the organisational resilience in different fields.

2.5.1 Organisational resilience models based on psychological, ecological, engineering or a combination of two or more of these fields

In psychology, resilience is perceived as the positive adaptive capacity of individuals experiencing adverse conditions. Using this conceptualisation, Kantur & Say (2015) studied the cohesion among employees as a significant dimension in the modeling organisational resilience. In another study by Meng et al. (2019), mechanisms of resilience in the workplace were explored using a social-exchange perspective to develop a resilience model between a Team-Member Exchange and a Leader-Member Exchange. Furthermore, Liu, Reed & Girard (2017) doing research in psychology, developed a resilience model that consists of three factors; intra-individual, interpersonal factors and socio-ecological factors as shown in Figure 2-4.
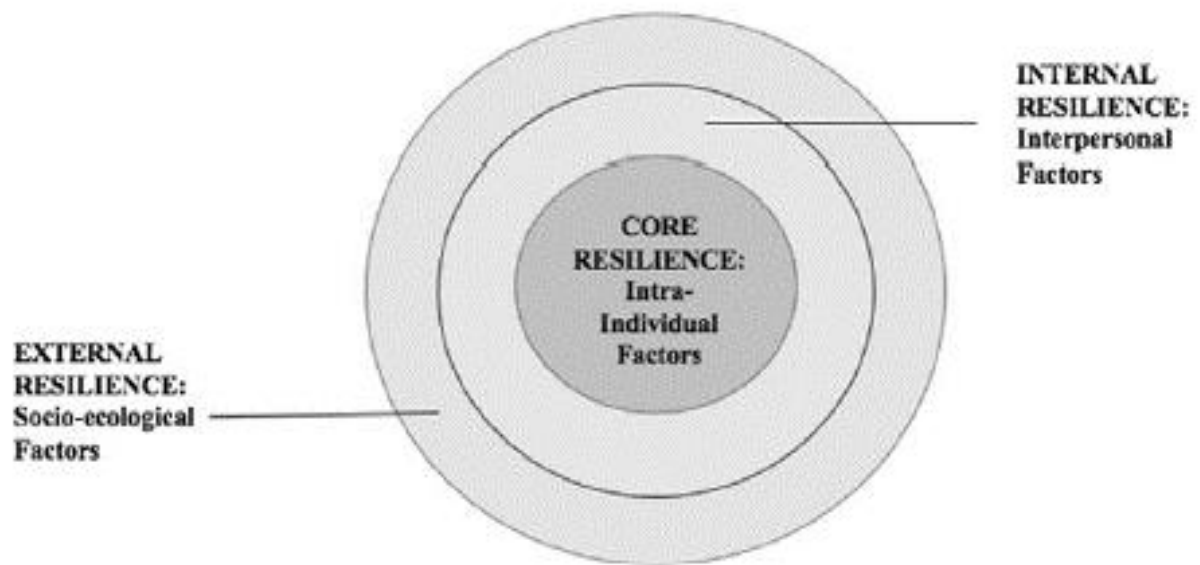
Figure 2-4: Organisational resilience model based on the psychological field (Liu, Reed & Girard, 2017).

In the field of ecology, researchers were mainly focused on stability and equilibrium of ecological systems or models to ensure sustainability. One of the first studies in this field was a 1973 research by Holling on resilience and stability of in which he advocated for a management approach to resilience that emphasises heterogeneity in viewing events in the regional context rather than only the local context (Holling, 1973).

Models of resilience in the engineering field were generated based on stress-strain diagrams. These models have been adapted for use in describing organisational resilience. Figure 2-5 below illustrates an analogy between resilience of structures and organisational resilience (Kolay, 2017).
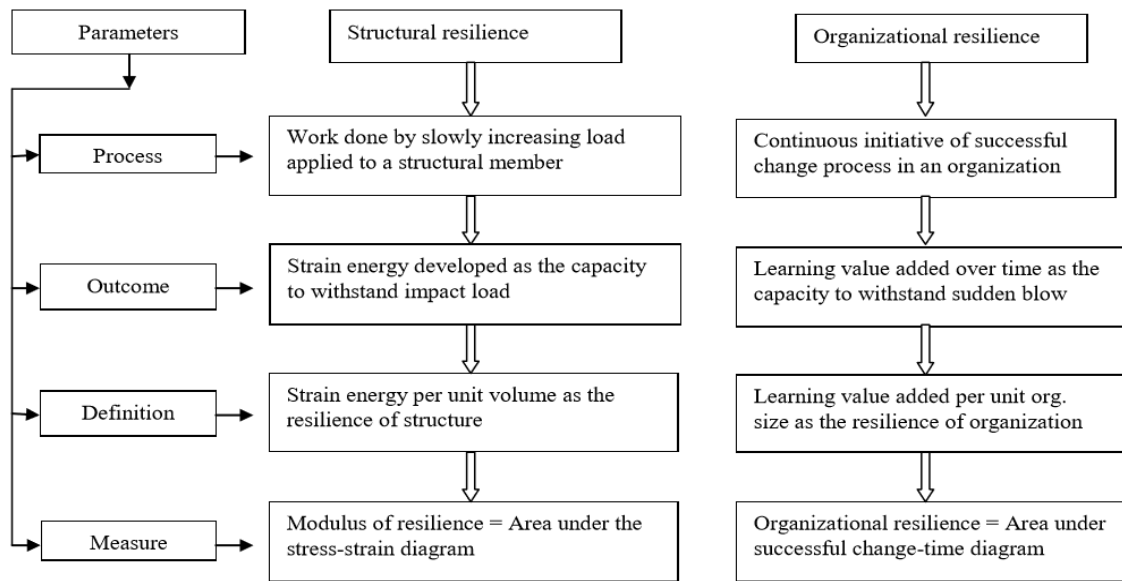
Figure 2-5: Modulus of the energy of engineering structures vs. organisational resilience (Kolay, 2017).

Other resilience models that have been developed include socio-ecological resilience models. Some of these models focus mainly on describing and understanding the dynamics of resilience in social-ecological systems (Folke, 2006), while others relate to the robustness of social-ecological systems (Anderies, Janssen & Ostrom, 2004). Figure 2-6 illustrates two social-ecological models.
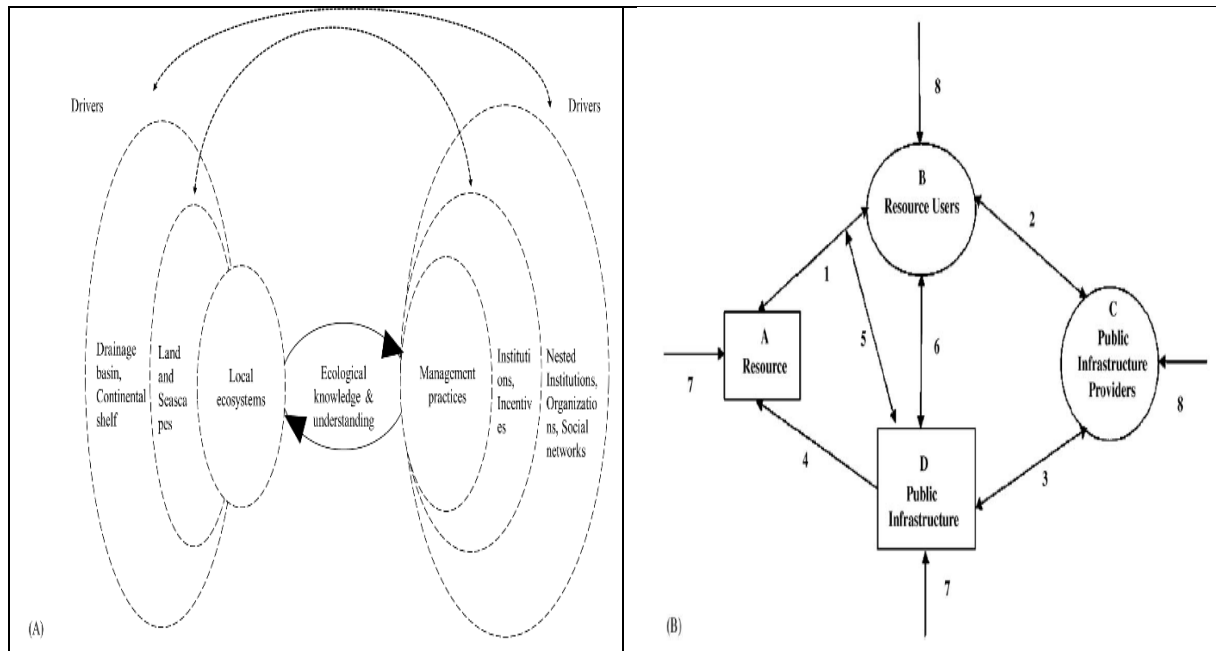
Figure 2-6: Two Models of social-ecological systems (Folke, 2006).

2.5.2 Resilience models in the management field

The question of how to build resilience capability and capacity either in the face of disruptions or to enhance future readiness, and the lack of conceptual frameworks to guide this process spurred research to develop resilience models in the field of management. There are five main categories of resilience models that have been described in management literature. The first category derives from resilience engineering, which is mainly concerned with increasing the ability of organisations to monitor, anticipate, respond, and learn in the face of disruptions (Righi, Saurin & Wachs, 2015; Tengblad & Oudhuis, 2018). The second group of resilience models describe resilience on multiple levels beginning with the individual, followed by resilient teams, then resilient organisations, culminating in resilient communities (Acosta, Chandra & Madrigano, 2017). The relationship between these levels of resilience is illustrated in Figure 2-7.

30
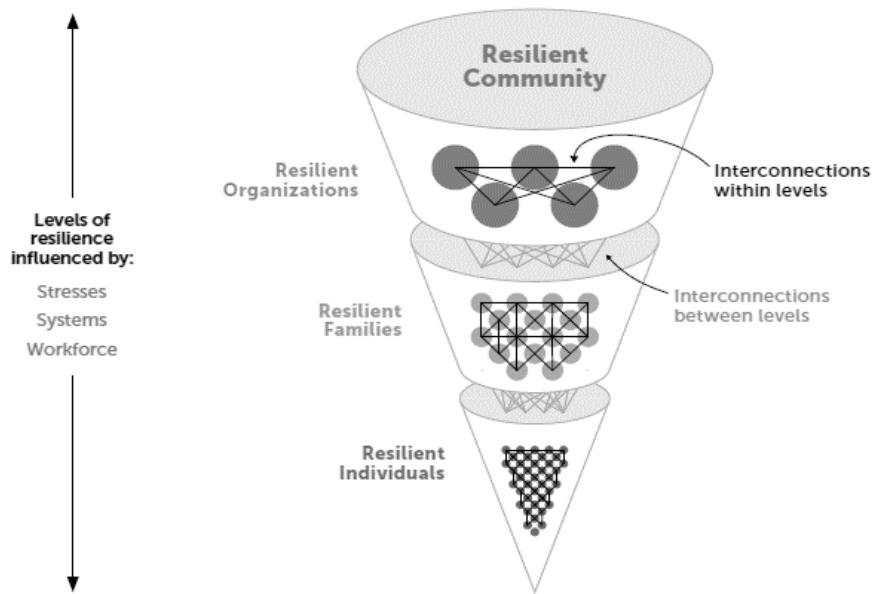
Figure 2-7: Example of organisation resilience Models based on multi-levels (Acosta, Chandra & Madrigano, 2017).

The third group of resilience models is the comprehensive balancing model of reactive and proactive approaches to resilience. In these models, resilience arises when there is a balance between the consistent and predictable plan-do-check-act cycle of conducting business and the flexible foresight-insight-oversight-hindsight cycle that allows for unpredictability and innovation (Denyer, 2017; Florin & Linkov, 2016). See Figure 2-8 for an illustration.
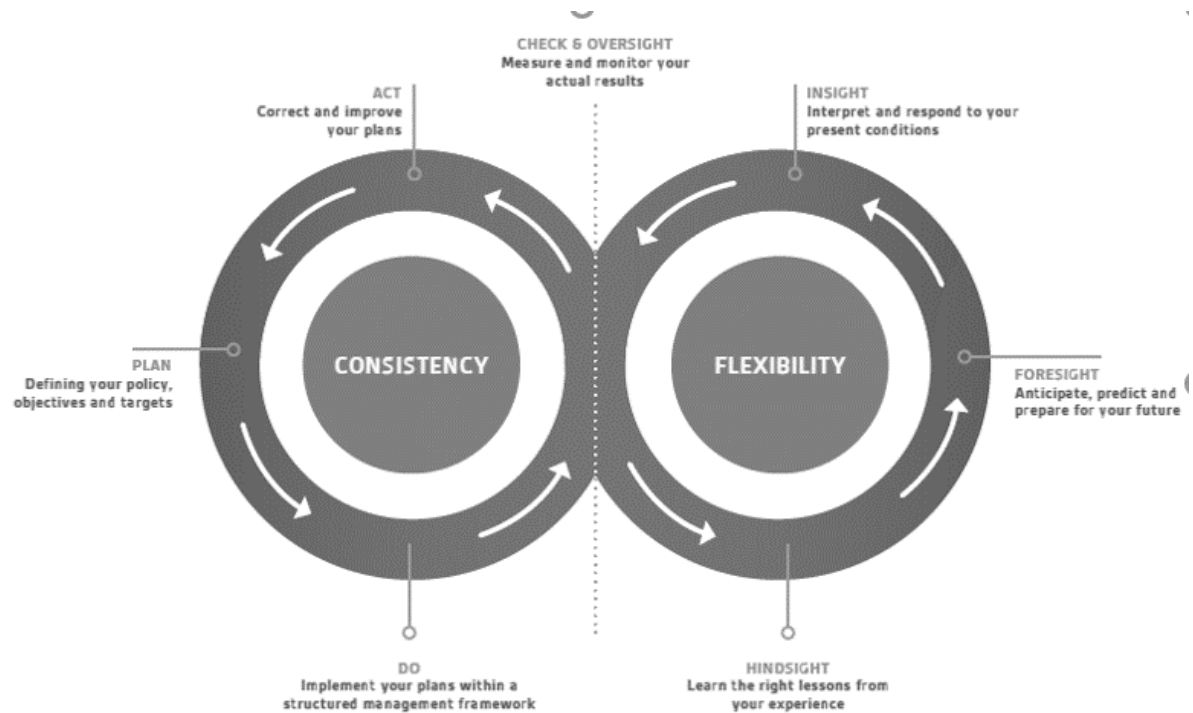
Figure 2-8: Example of organisation resilience models based on balancing consistency and flexibility (Denyer, 2017).

The fourth category include resilience models that are premised on an integration of concepts from business continuity, risk management, crisis management, and more recently, disaster recovery that relate to organisational resilience (Florin & Linkov, 2016; Hillman, 2013). This integration is illustrated in Figures 2-9 and 2-10.
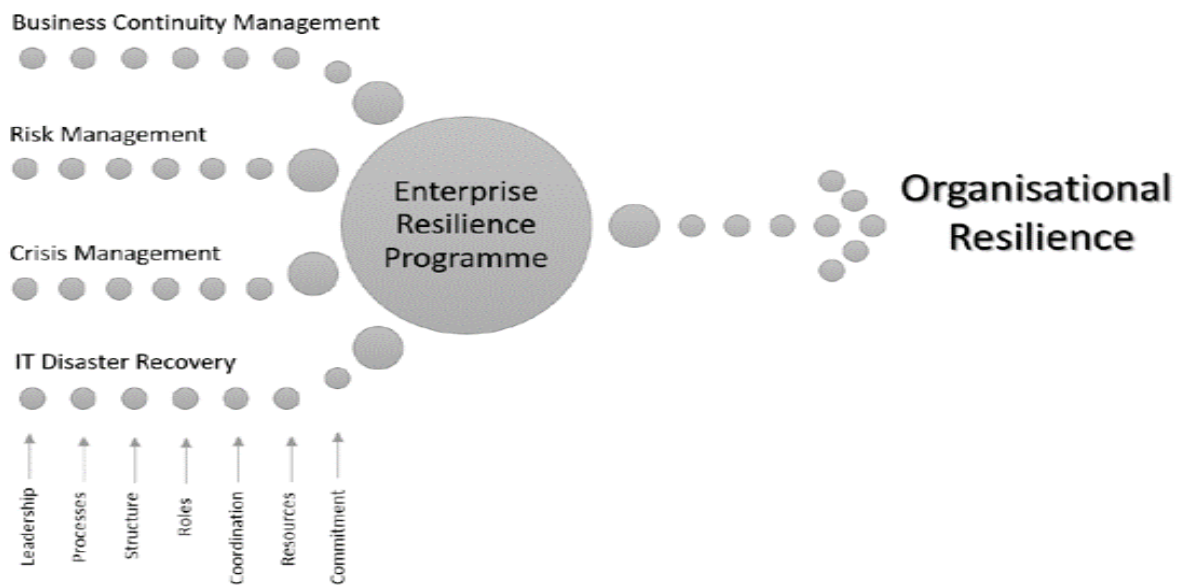
Figure 2-9: Example of Organizational resilience as an advancement of BCM, RM, CM and IT DR (Florin & Linkov, 2016).
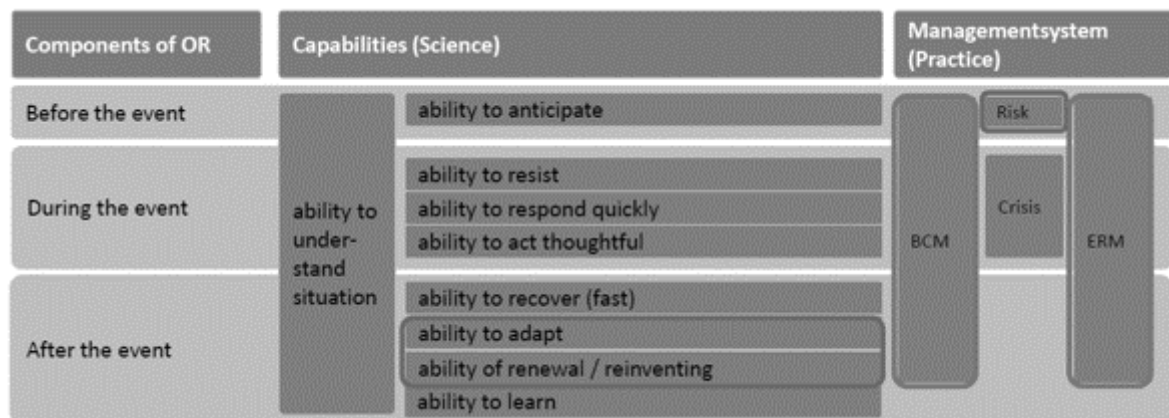
Figure 2-10: Example of Organizational resilience (OR) as an advancement of BCM, RM, CM and ERM (Hillman, 2013).

These models have been used to guide studies of resilience in high-reliability organizations (HRO) such as hospital emergency rooms and nuclear power plants that require proactive management to prevent crises, and ready the organizations to respond effectively to crises and bounce back to the original operating status (Denyer, 2017; Olivos, 2014; Xiao & Cao, 2017).

The fifth group of resilience models comprise the more traditional models concerned with the absorption of, response to, and recovery from disruptions. The climax of resilience is a return of the organization to optimum performance that was in place before the events. See Figure 2-11 for an illustration.
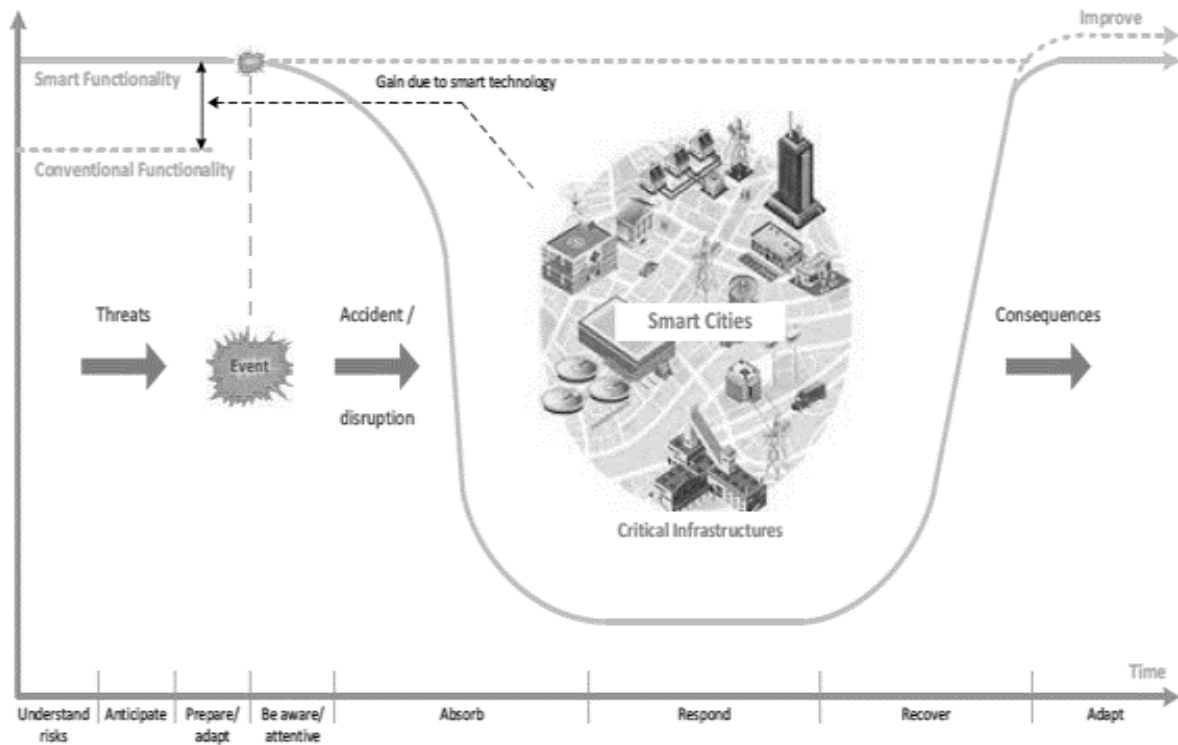
Figure 2-11: Example of a traditional organizational resilience model (Florin & Linkov, 2016).

2.5.3 Resilience Models to Bounce Forward

An emerging way of thinking about resilience conceptualizes resilience as the ability to bounce forward; to end up in a better and stronger position compared to one's state before disruption (Sawalha, 2015). Based on this perspective, a tension quadrant portraying organizational resilience as a state of balance between four organizational behaviors of progressiveness (achieving results), defensiveness (protecting results), consistency (compliance with standard

operating procedures), and flexibility (capacity for making innovative changes as necessary). According to this model, resilient organizations maintain this balance and obtain four major outcomes of preventative control, adaptive innovation, performance optimization, and organizational mindfulness (Denyer, 2017). Figure 2-12 illustrates the organizational behaviors and outcomes that constitute the resilience tension quadrant.
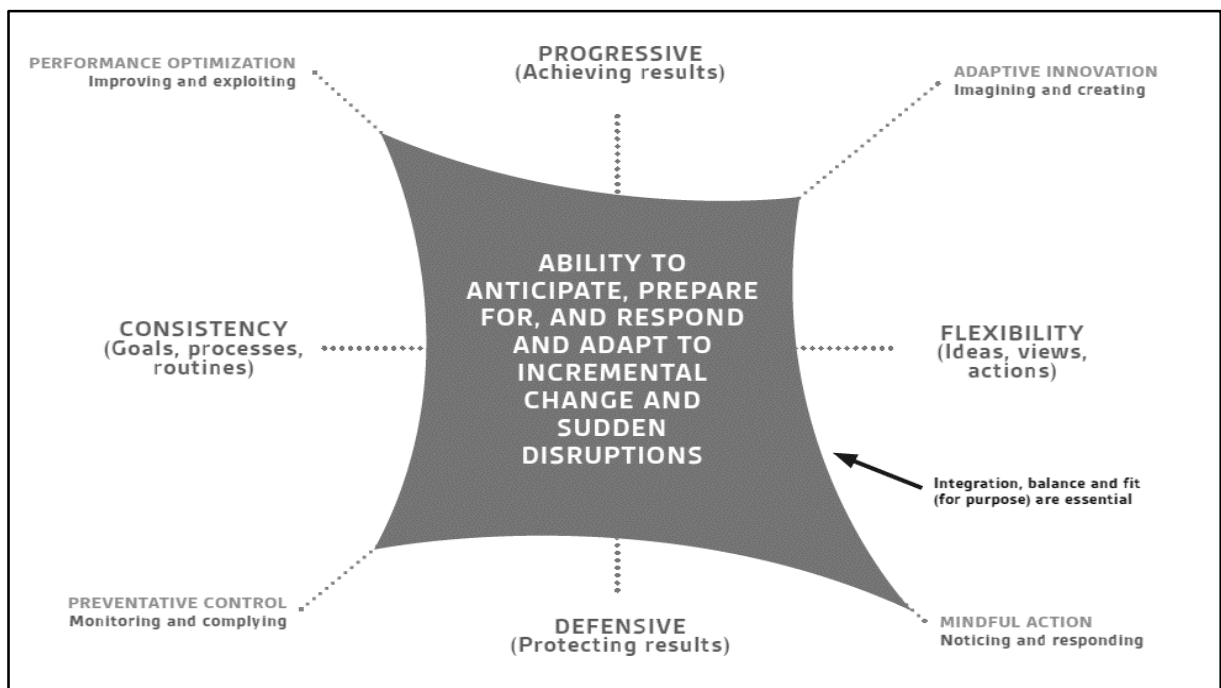
Figure 2-12: Organizational resilience tension quadrant with 4 tendencies (Denyer, 2017).

The 4Sight model of organizational resilience was designed help organizations deal with complex problems. The 4Sights are organized into a cycle of consecutive steps beginning with Foresight (the ability to anticipate, predict and prepare for your future). Next is Insight (the ability to interpret and respond to present conditions) which gives rise to actions that require oversight. Oversight is the (monitoring, review, and assessment of both the disruptive events and the organization's response. The cylce ends with Hindsight- a process of reflective learning

to develop organizational memory as part or readiness for future events (Denyer, 2017). The 4Sight model is illustrated in Figure 2-13.
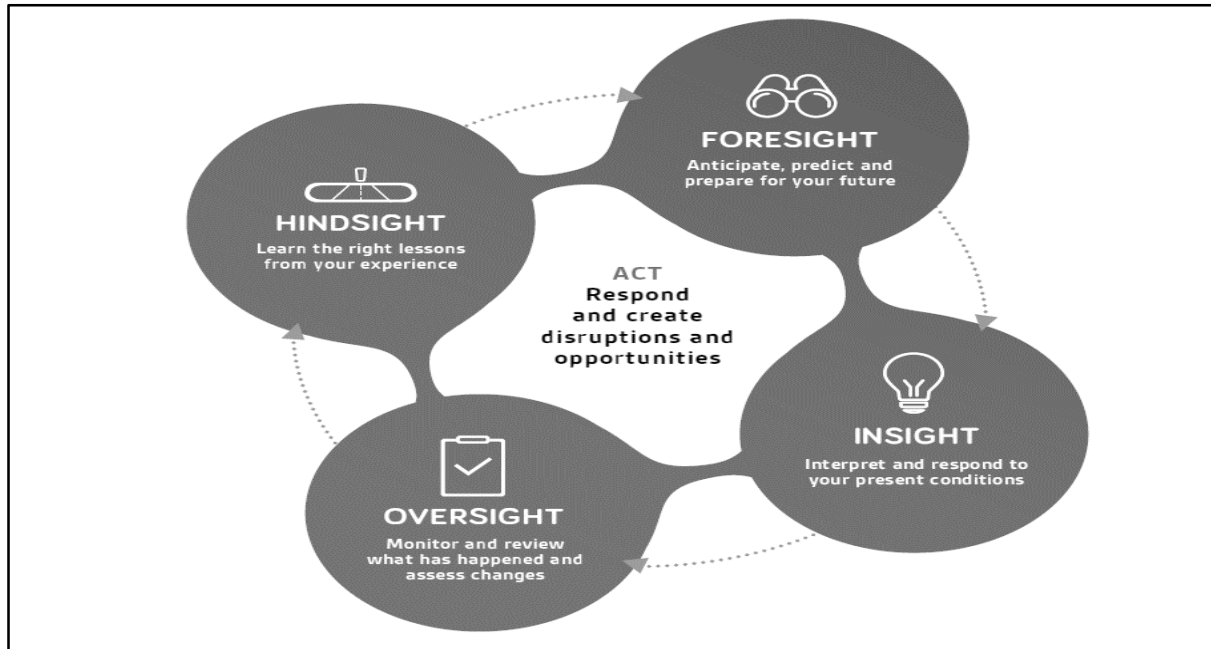
Figure 2-13: The 4Sight model of organization resilience as introduced by Denyer (2017).

A similar version of the 4Sight model has been developed around the perspective of resilience engineering. This model advances four capabilities considered essential for achieving organizational resilience. These capabilities are responding, monitoring, learning, and anticipating, and they form the basis for measures of resilience contained in the Resilience Analysis Grid (RAG) (Hollnagel, 2015; Patriarca et al., 2017; Xiao & Cao, 2017). The plethora of organizational resilience models available in literature underscores the notion that modeling organizational resilience is a-fit-for-purpose exercise that should be tailored to capture the peculiarities of individual organizations or organizations operating in a sector of the economy, including the public sector (Denyer, 2017; International Organization for Standardization, 2017).

2.6 Resilience Measurement and Maturity

The development of indicators and metrics to measure resilience is a rapidly growing area of research, and integrating various types of indicators into a comprehensive measure of resilience is an aspect of resilience measurement research receiving a lot of attention (Acosta, Chandra & Madrigano, 2017; Schipper & Langston, 2015). According to a 2017 study by Zhao, Liu & Zhuo, (2017), the following four factors should be given priority consideration in setting up system for resilience measurement: 1) the dependency and interdependency of system capacities and time-varying, 2) the severity of consequences and potential losses caused by disruptions and their association with uncertainties, 3) the dependency of system performances on resources, dispatch/input strategies, and design attribute, and 4) the incompleteness of historical information on major disaster prevention (Zhao, Liu & Zhuo, 2017). In addition, orgnaizational resilience can be measured by collecting information about as many organizational functions as possiblem, or by using selected indicators to measure organizational management of unexpected events (Ilmola & Rovenskaya, 2016).

There have been efforts to measure the resilience of cities. The Rockerfeller Foundation identified four areas to focus on when measuring city resilience. These areas are city leadership and strategy, city health and wellbeing, economy and society, and infrastructure and ecosystems. As shown in Figure 2.14, within each of these areas are sub-dimensions of city operations that can be targeted for measurement of resilience (The Rockerfeller Foundation, 2015).

Figure 2-14: Framework to measure city resilience (The Rockerfeller Foundation, 2015).

There have been efforts to measure the national resilience of countries. These measurements are based on economic factors, risk assessment, and supply chain characteristics. These indicators are used to determine the position of countries in the global resilience index, and to identify areas where they can focus their improvement efforts to enhance their resilience competitiveness (FM Global, 2017; Melkonyan & Gottschalk, 2017). The main drivers of the global resilience index are shown in Figure 2-15.
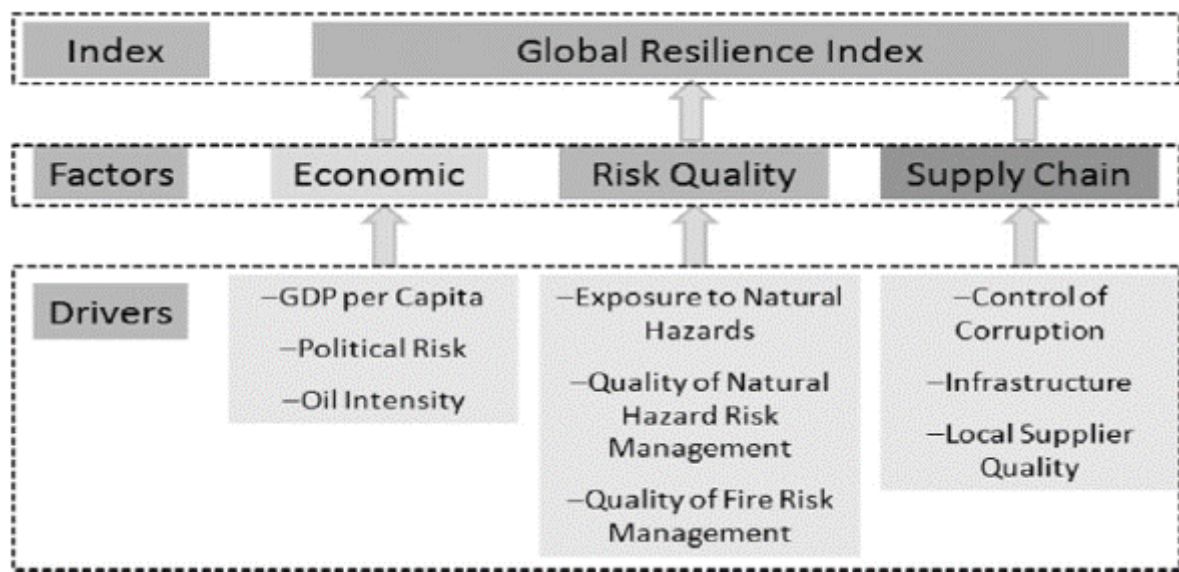
Figure 2-15: The main drivers and factors to measure the global resilience index (Melkonyan & Gottschalk, 2017).

The previous figure illustrates how resilience could be categorized based on different factors and drivers to come up with a unified global resilience index to assess national resilience across different countries. However, there is a challenge in implementing such index as it needs credible and transparent information to be shared across different countries such as the information related to political risks and this will always be a debatable issue to be assessed and being put in numbers.

Meanwhile, some researchers have argued that resilience is not a static quality or organizations, but a characteristic that exists on a continuum such that organizations can increase (mature) or decrease in resilience. Kerr (2015) proposed the following four levels of the resilience maturity continuum: 1) short term level of doing business-as-usual which although is effective, the organization has low resilience capabilities and lacksmechanisms for long-term planning, 2) at this level, the organization has developed some capacity to change and adapt to emergent

39

events, but has no capacity for advanced resilience planning, 3) at this level of maturity, the organization has acquired the ability not only to adapt to change, but to also shape and prepare the organization for future disruptive events through through long-term resilience planning, and 4) at this level, resilience has become part of the organization's DNA and manifests as an advanced ability to shape the external environment of the organization positively. Figure 2-16 illustrates these four levels of resilience maturity that highlighted the importance of building organizational commitment towards building resilience capacity to work their ways to achieve the higher level of organizational maturity, which is having resilience structured as part of the DNA of the organization.

Figure 2-16: Four levels of resilience maturity (Kerr, 2015).

The previous figure shows that organizational commitment will impact performance positively especially in changing conditions. This was also emphasized by Meyer & Allen (1997) and Porter, Allen & Angle (1981) as they also argue the importance of building organizational commitment to be ready for external future challenges such as increasing global competition and the internal challenges such as increased politics within organizations.

Denyer's (2017) approach to describing resilience maturity stipulated the following five levels an organization should go through towards enhancing resilience thinking and adaptation: 1) preventative control or defensive consistency; 2) mindful action or defensive flexibility; 3) performance optimization or progressive compatibility; 4) adaptive innovation or continuous flexibility; and 5) paradoxical thinking or balancing and managing tensions. Figure 2-17 illustrates these five levels of resilience maturity.
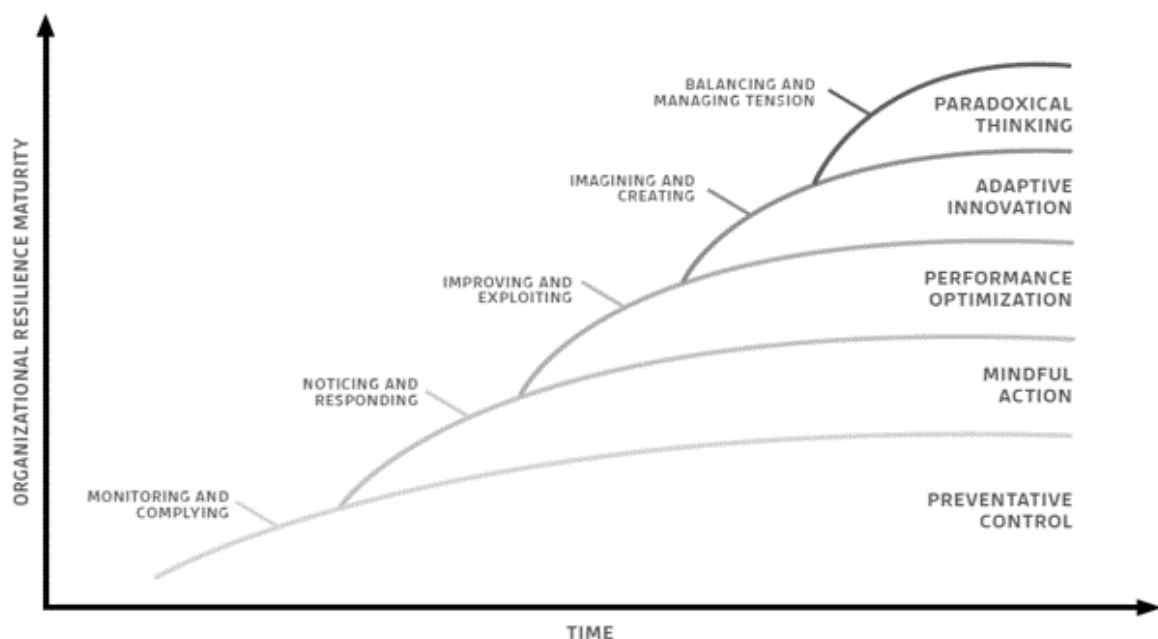
Figure 2-17: Five levels of resilience maturity (Denyer, 2017).

The previous figure illustrates the possibility of having criteria to assess organizational maturity in the face of emergent event. However, there is still the question of whether these criteria will only assess organizational readiness to face an emergent event, or if they will also assess ability to manage emergent events as they occur.

2.7 The importance of resilience for the public sector

The public sector is the part of a country that is owned or controlled by the government (Friedrichsen et al., 1985). Although the study of resilience in public sector organizations have historically focused on crisis management and did not utilize the concept holistically, recently a new paradigm- the resilience thinking paradigm- is being applied to the study of resilience in public sector organizations which emphasizes the development of resilient policies (Duit, 2016; Koronis & Ponis, 2018). Furthermore, resilience thinking has been associated with answering the question of how the resilience of government systems can be strengthened through processes of social learning and adaptation, enhance the ability of public sector organizations to make more effective policies that perform resiliently in that face of uncertainties and disturbances (Duit, 2016; Grafton, 2016). As the paradigm of resilience thinking begins to dominate studies of social-ecological systems, some researchers studying resilience in the public sector are focused on building resilience at the national level by working up from social and community resilience (Castellacci, 2015; Dhakal, 2015; Manyena & Gordon, 2015; Nussbaum, 2016; Sellberg, Wilkinson & Peterson, 2015). Regardless of differences in the perspective of researchers, it is clear that the paradigm of resilience thinking expands the scope of resilience to include governance, public policies, and social and community engagement.

Resilience entered discussions at the national level in the aftermath of catastrophic events like the terrorist attacks and natural disasters. For instance, following the September 11, 2001 terrorist attacks, the US made building a secure and resilient nation a top policy priority (Nussbaum, 2016). In 2014, the UAE issued a seven-year national agenda (UAE Vision 2021, 2020). One of the core objectives of this plan is to achieve a safe and secure nation through economic resilience and stability. To achieve national resilienceeach public sector organization needs to build its own resilience capacities and capabilities, and the interaction between these

organizations must preserve and enhance public sector resilience collectively. This idea has been explored by researchers who have expanded their work in private sector to include public sector organizations (Annarelli & Nonino, 2016; Duit, 2016; Kantur & Say, 2015). However, little is known about organizational resilience as an attribute of public sector organizations in the UAE, and there is currently no existing conceptual framework that models the resilience of UAE public sector organizations.

Advancement of the organizational resilience concept in the public sector of Dubai seems to follow a similar approach to the improvements of the resilience concept elsewhere. Currently, the concept of resilience in Dubai is more associated with risk management, crisis management, and business continuity fields. Efforts to increase public sector resilience in Dubai received a boost by the recent announcement of eight governing principles to strengthen the growth and tolerance of Dubai by His Highness Sheikh Mohammed Bin Rashed Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai in early 2019 (Team KT, 2019). One of these principles highlights credibility, resilience, and excellence in governance three main drivers of Dubai's growth. This statement of direction will spur government-owned organizations in Dubai to consider ways of incorporating these drivers into their policy development and implementation processes as they plan for the future. Furthermore, efforts to embed resilience into every aspect of public sector organizations should 1) be guided by multiple models of resilience, 2) investigate possible trade-offs between implementing resilience models and other dominant values, 3) expand the horizon of resilience models beyond crisis and disaster management, and 4) revisit the existing literature to fall into the non-value researcher repetition trap (Duit, 2016).

In the context of Dubai, these are valid considerations that should be taken into account if efforts to build organization resilience in the public sector are going to be successful. The public sector in Dubai currently uses to asingle model to address a specific issues, like the Fourth Generation Excellence Model and the Dubai Model for Service Improvement designed by the ministry of cabinet affairs to inspire operational excellence, but do not incorporate the idea of resilience (Ministry of Cabinet Affairs and the Future, 2019). This underscores the need for robust resilience models that capture aspects of Dubai government operation beyond crisis and disaster management as these practices are already well developed with standards and implementation committees.. This study is designed to develop dynamic organizational resilience model that can be used to explore, study, and guide efforts to inbue public sector organizations in Dubai.

2.8   What is an emerging event?

An emerging event is defined as " a sudden, urgent, usually unexpected incident or occurrence that requires an immediate reaction or assistance for emergency situations faced by the recipients of public assistance" (Fatma, Ansar-Ul-Haque & Elhadi, 2020). The world has experienced, and is still experiencing waves of emergent events that results in socio-economic and geo-political disruptions. Examples of these events are the global financial crisis of 2008, the Ebola outbreak between 2014 and 2016 and the on-going COVID-19 pandemic (Barasa, Mbau & Gilson, 2018; Liu, Reed & Girard, 2017). At the same time, the current trends like big data, internet of things, fouth industrial revolution, geo-political tensions between world super powers, artificial intelligence, and many more are revolutionizing the way organizations, cities, and nations operate in the global economy, forcing them to build more resilient response strategies that will their growth and development. Figure 2-18 lists the nine categories of

44

emerging events of the 21st century that are considered to be leading cause of uncertainties compeling organizations to invest in resilience preparedness (World Economic Forum, 2017).
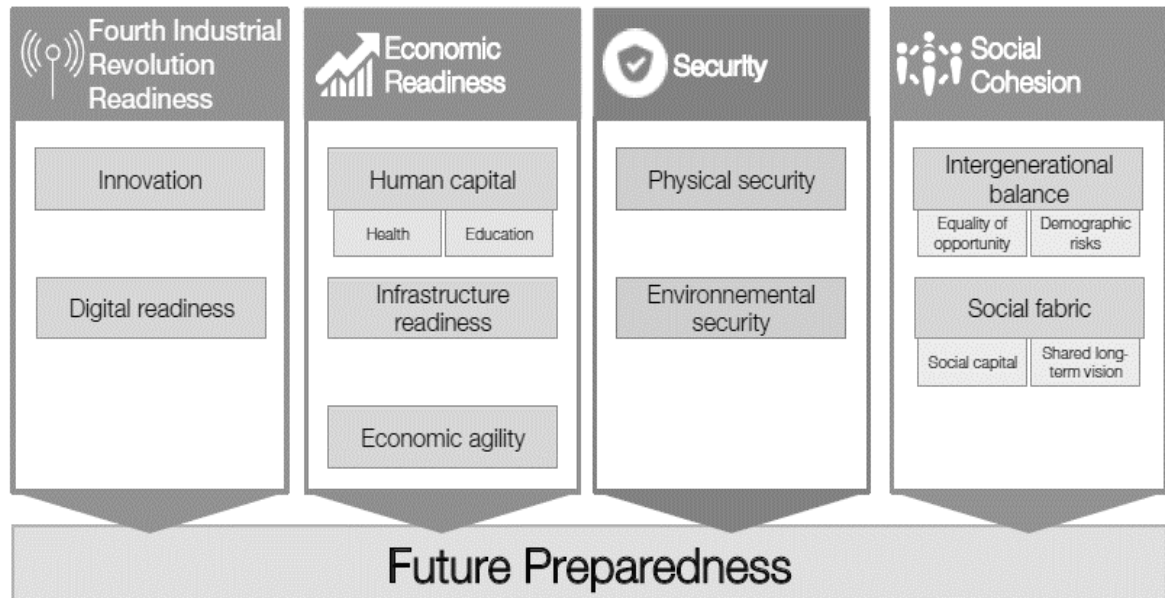
Figure 2-18: The nine categories that require extra preparation in the 21st century (World Economic Forum, 2017).

Models commonly used in the study of organizational resilience often do not incorporate sources of uncertainties and are not designed to help organizations formulate a response when faced with disruptive events that the organization knows nothing about their origins characteristics (ontological uncertainties) (Ilmola & Rovenskaya, 2016). To resolve this issue, some researchers have focused effort on demystifying threats to create more understanding about sources and characteristics of uncertainties (Folke, 2006; Lee, Vargo & Seville, 2013; Teoh, Yeoh & Zadeh, 2017).
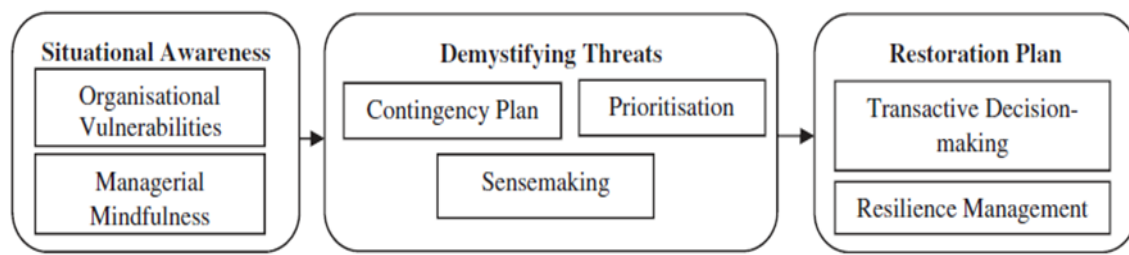
Figure 2-19: Resilience framework to manage threats (Folke, 2006).

Expanding the operationalization of resilience by organizations beyond traditional perspective of epistemological uncertainties (known unknowns) to include ontological uncertainties is crucial to the successful implementation of the UAE Future Foresight Strategy which aims to seize opportunities by anticipating challenges, both predictable and unpredictable, in all of the lively sectors of the UAE, analyzing them, and setting long-term proactive plans on all levels to make future quality achievements, in order to serve the interests of the country (Ministry of Cabinet Affairs and the Future, 2019). Accurately predicting the future is an impossible task. However, the impact of future uncertainties and complexities can be minimized or at least anticipated by identifying and analyzing various parameters, within the scope of our knowledge (Durst et al., 2015).

Furthermore, the ability for fast and constructive reaction by public sector organizations to emerging events is dependent on their bureaucratic structures, and whether their management systems organized around excellence models (Van de Walle, 2014). These systems and structures may perform effectively in response to epistemological uncertainties (known unknowns) that can be quantified but underperform when faced with ontological uncertainties (unknown unknowns) that are difficult to measure and quantify. Therefore, to better prepare for uncertainties, public sector organizations should also focus on future trends that are perceived

as non-probable in their contingency planning (Ilmola & Rovenskaya, 2016). Figure 2-20 illustrates four levels of future uncertainties, as discussed by Osterwalder (2004).

Level 1: clear enough future
Single view of the future

Level 2: alternative futures
Limited set of possible
future outcomes, one of
which will occur

Level 3: range of futures
Range of possible future
outcomes

Level 4: true ambiguity
Not even a range of
possible future outcomes
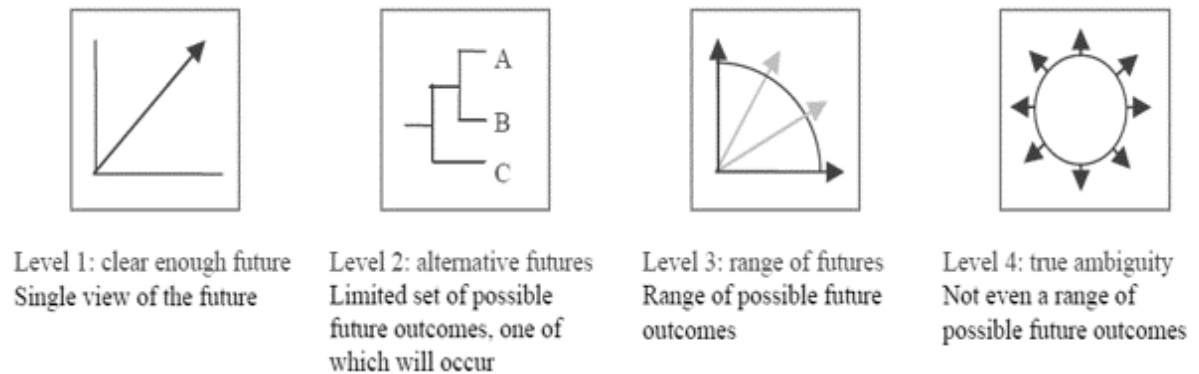
Figure 2-20: Four levels of uncertainty (Osterwalder, 2004).

But how can public sector organizations build resilience capacities and capabilities to respond to emergent events that are unprecedented and totally unfamiliar? Researchers studying this issue have identified four approaches to building more resilient organizations in the face of ontological uncertainties. These approaches are heuristic judgement capabilities (Manfield & Newey, 2018), foresight capability building (Aguirre-Bastos & Weber, 2018; Dufva & Ahlqvist, 2015; Durst et al., 2015; Heiko et al., 2015; Ilmola & Rovenskaya, 2016), scenario planning enhancement, (Hills, 2015; Sircar et al., 2013; Stewart & O'Donnell, 2007), and build metamorphosis capabilities (Morais-Storz & Nguyen, 2017). This study will build on these four approaches in addition to any other approach that emerges during data collection and analysis in order to enhance building the resilience of the public sector organizations in the face of disruptive events.

2.9   Resilience and Risk

One of the critical arguments in literature is how resilience differs from risk. Some scholars consider risk as part of resilience, while others think resilience is part of the risk (Linkov,

Trump & Fox-Lent, 2016). The International Organization for Standardization defines risk as an effect of uncertainty on objective, and this effect can be a negative or a positive deviation from what is expected (International Organization for Standardization, 2018). On the other hand, although resilience has many definitions, as discussed previously in section 2.4. Organizational resilience can be defined as the capacity of an organization to anticipate, absorb, and adapt to changing conditions or disruptions in the internal and external environment, to learn from the experiences and bounce forward, that is, survive and thrive through improved performance (Florin & Linkov, 2016).

Although, based on the above definitions, risk and resilience seem to be interconnected and complementary. However, resilience plays a more crucial role in uncertain environments when traditional risk management techniques fail to provide solutions (Kovalenko & Sornette, 2016). One of the major pitfalls of traditional risk management techniques is the unfeasibility to list all the risks that may face an organization. Also, traditional risk management techniques may fail to provide a solution due to the complex nature of the emergent events unforeseeable in traditional risk management frameworks (Van de Walle, 2014). Linkov, Trump & Fox-Lent (2016) compared the risk analysis framework and resilience analysis framework. They posit that resilience management and risk management should be considered complementary approaches to deal with uncertainties. As shown in Figure 2.21, they considered risk management as a bottom-up approach, while resilience management is a top-down approach. Risk assessment starts with data gathering, while resilience analysis starts with goal identification and problem framing. The process of integrating both frameworks need to be clarified, and a governance mechanism should be in place to help to focus the system on the expected outcome of efficient and effective management of uncertainty. One way to integrate

both frameworks is to use the metrics generated from resilience analysis as inputs for data collection in risk assessment.
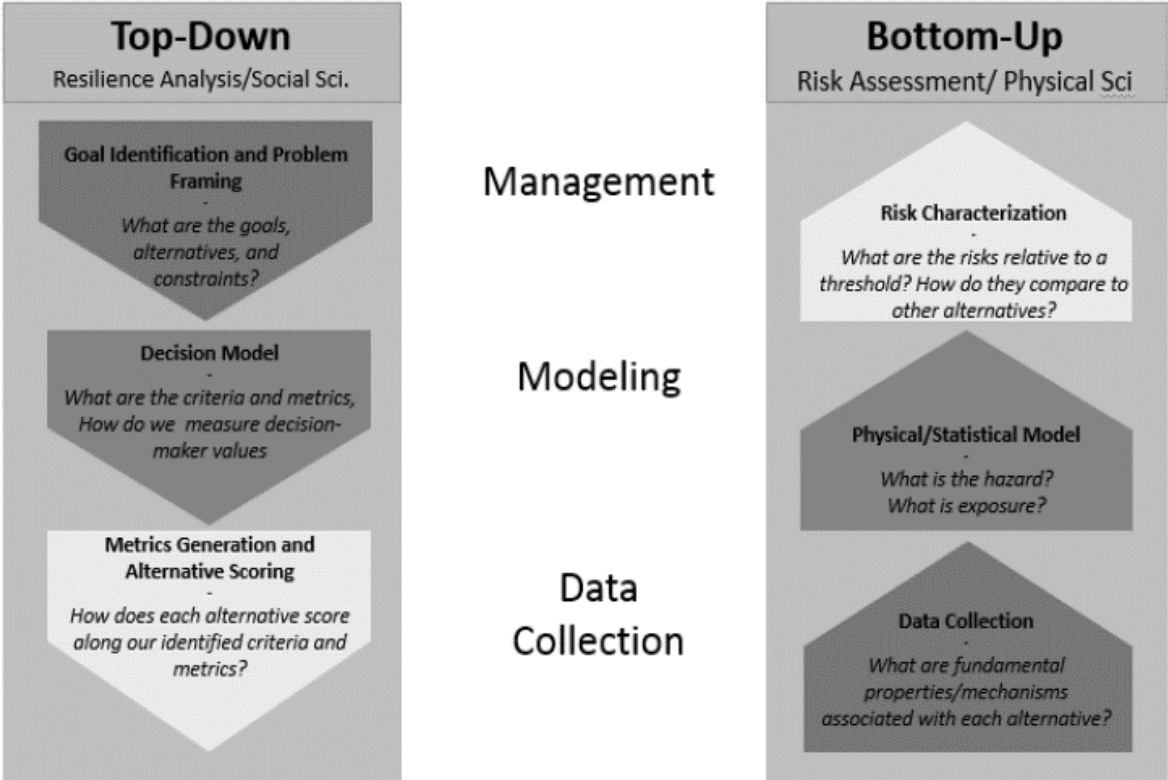
Figure 2-21: The differences between risk analysis and resilience analysis framework (Linkov, Trump & Fox-Lent, 2016).

In another comparison between risk and resilience, Linkov and Trump (2019) concluded that traditional risk management focuses on planning and reducing vulnerabilities, while resilience is focused on the speed of recovery and facilitating adaptation. They think that risk assessment is considered part of resilience as vulnerability, and the consequences are characteristic of disruption event as illustrated in Figure 2-22.
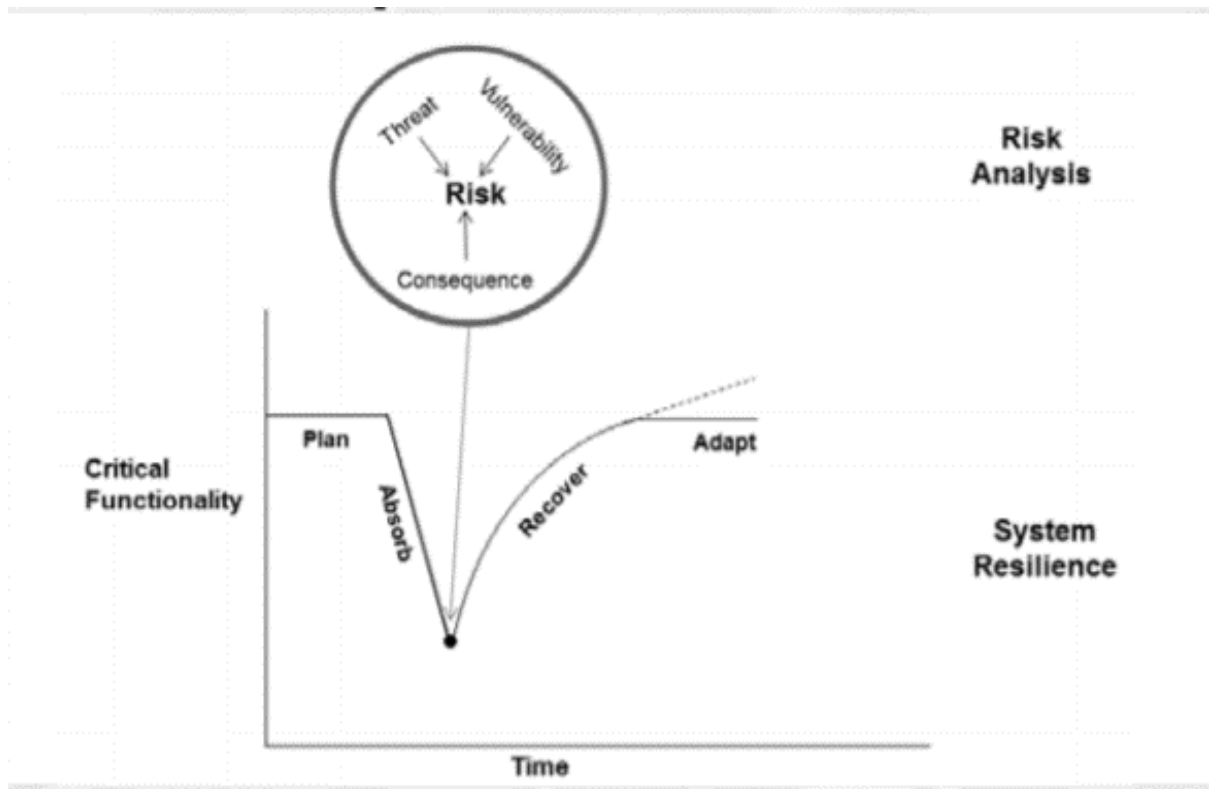
Figure 2-22: Risk assessment is part of resilience since vulnerability, and the consequence are characteristic of disruption event (Linkov & Trump, 2019).

Furthermore, Linkov and Trump (2019) related the distinction between resilience and risk to an iceberg. They considered risk as the top, visible part of an iceberg since risk management is focused on known and quantifiable threats, while resilience, which is about the considerable work to be done on the unknown, uncharacterized, low probability events, is considered the bottom, invisible part of an iceberg. This distinction is illustrated in Figure 2-23.
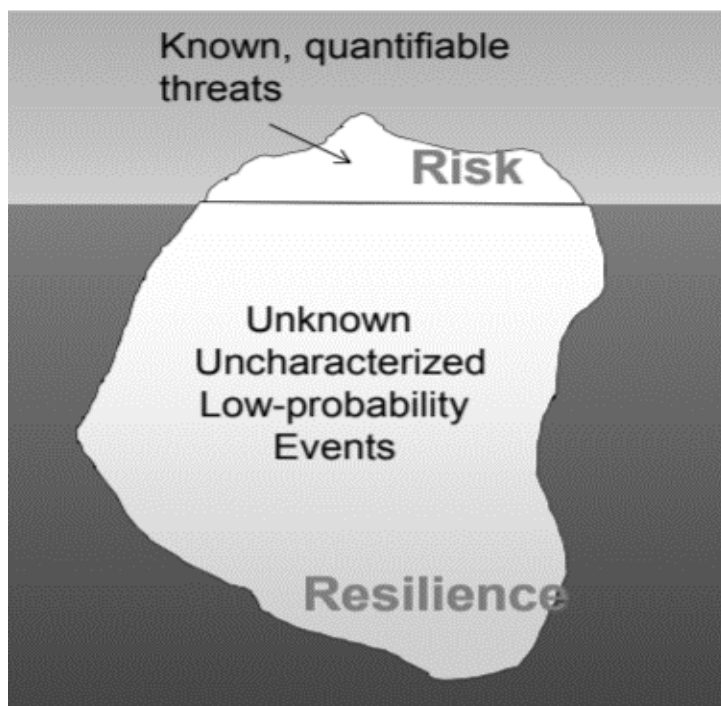
Figure 2-23: Illustration of the difference between risk and resilience as an iceberg (Linkov & Trump, 2019).

This research will focus more on resilience analysis as it is covering traditional risk assessment as well as long term lower probability disruptive events that have a significant negative impact if not managed properly. The main aim is to enhance organizational ability to bounce back and forward and reduce the time required to do that with the most efficient resources through utilizing three capacities: absorptive, adaptive, and transformative.

2.10   Building resilience capacities

Many scholars described resilience as building different capacities to respond to disruptions resulting from uncertainties (Allen, 2011; Engle, 2011; Sherrieb, Norris & Galea, 2010). They argue that resilience should not be considered as a final outcome but as an intermediate stage characterized by a combination of capacities that lead to other positive wellbeing outcomes. Bristow & Healy (2018) highlighted that the thing that distinguishes human and organizational

51

systems from other systems such as ecological ones is the capacity of people or organizations to develop, analyze and respond to forecasts to be able to anticipate disruptions and vulnerabilities and change to mitigate losses. Furthermore, Béné *et al.* (2012) argued that the randomness of events and uncertainty shifts the thinking of organizations from an attempt to control the change and maintain stability into building the capacity of systems within the organization to cope with, adapt to, and shape the change. In another study, Frankenberger *et al.* (2014) highlighted how thinking on resilience has evolved from a characteristics approach to a more capacity-focused approach.

Building organizational resilience requires an understanding of what capacities are required to manage disruptions appropriately (Patriarca et al., 2017). Different points of view on how organizations can build resilience capacities are discussed below.

1- According to Zhao, Liu & Zhuo, (2017), three key capacities needed for any system to face dynamic, disruptive scenarios are; 1) absorptive capacity- the ability of a system structure to absorb the impacts and maintain its function when faced with disruptive events, 2) adaptive capacity- the ability of a system to respond to adverse impacts by self-organization during disruptive events to mitigate loss, and 3) recovery capacity- this refers to how rapidly a disrupted system can return to the desired service level. By integrating these three capacities with disruption scenarios and dispatch strategies, the authors built a system resilience model shown in Figure 2-24.
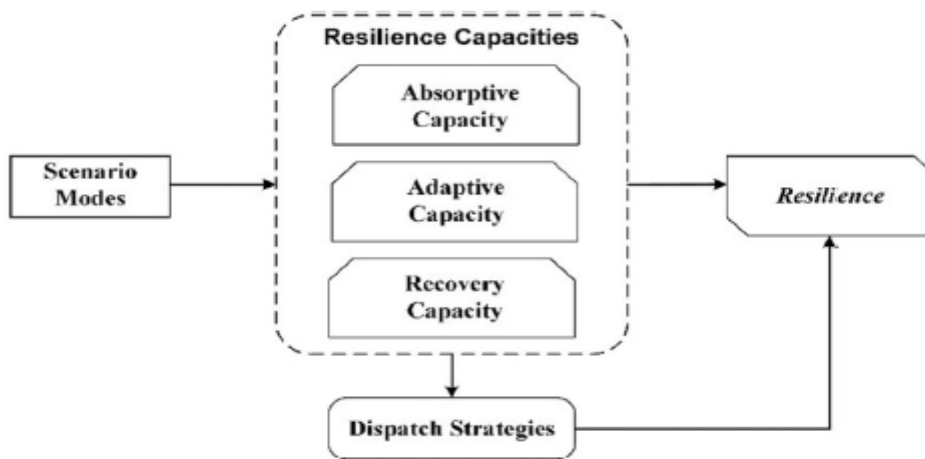
Figure 2-24: Building system resilience through the interaction of disruption scenarios, three capacities types, and dispatched strategies (Zhao, Liu & Zhuo, 2017).

2- d'Errico & Di Giuseppe (2018) identified similar capacities but described them with different terminologies. They posit that absorptive, coping, and transformative capacities are necessary for organizations to bounce back from disruptive events.

3- Bahadur *et al.* (2015) identified 3As for building and measuring resilience capacities. These are anticipatory, adaptive, and absorptive capacities. They added to these three capacities transformation as an important pillar with which organizations can engineer the changes needed to achieve desired outcomes. They argued that though transformation is not a capacity by itself, it is an approach to fundamentally and holistically build resilience capacities. A unique component of this model is the inclusion of anticipatory capacity, which is the ability of a system to anticipate and reduce the impact of extreme disruptive events through planning and preparedness.

4- Engle (2011) argued that adaptive capacity definition is different between invulnerability and resilience literature; He concluded that adaptive capacity in vulnerability literature could be defined as a positive attribute or desirable property of a

system for reducing vulnerability, while in the resilience literature, it can be defined as the capacity of actors in the system to influence and manage resilience. Furthermore, he illustrated two examples of systems with less and more adaptive capacities tendencies, as shown in Figure 2-25 below:
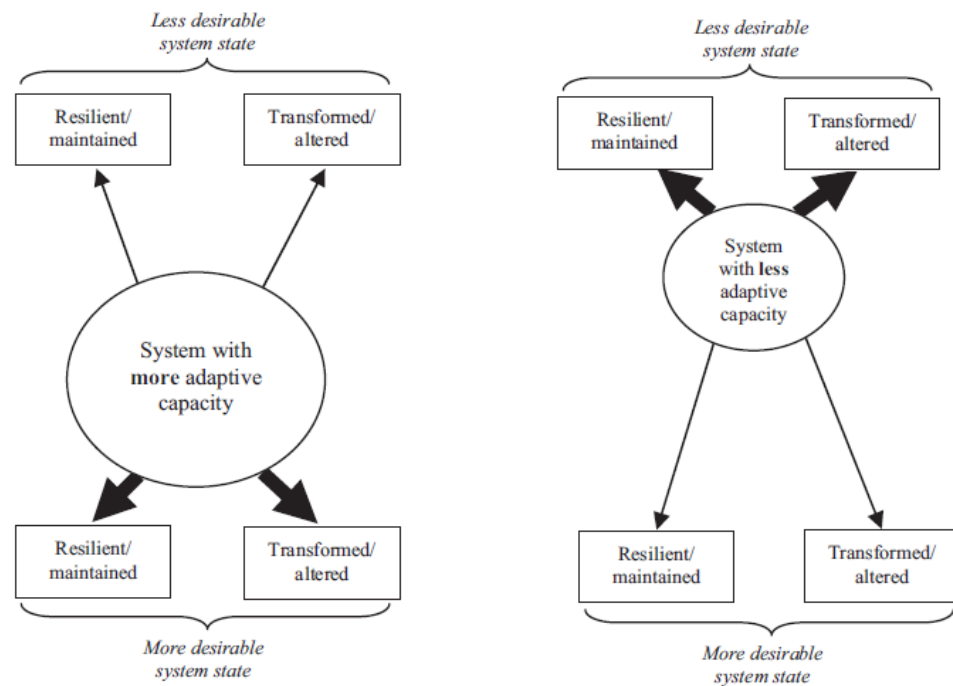
Figure 2-25: Systems with high adaptive capacity vs systems with low adaptive capacity as described by (Engle, 2011).

5- Some researchers have identified collaborative capacity as an essential requirement for building resilience within organizations. This capacity enables an organization to network successfully with other organizations or agencies when it lacks the capacity to recover from disruptive events on its own (Allen, 2011). There is increasing emphasis on building this capacity into organizations as network-centric organizations have been found to be more resilient compared to organizations that do not build strong networks with relevant stakeholders (Allenby & Fink, 2005).

Alameddine *et al.* (2019) identified three key capacities to build resilience. They are: 1) absorptive capacity: system behaviours enacted within existing available resources and their configuration, 2) adaptive capacity: involves the deployment of additional resources and reconfiguration of resources; and 3) transformative capacity: behaviours that radically change system structures and goals. Critical measures for each of these capacities identified by Frankenberger et al. (2014) are illustrated in Figure 2-26

Resilience Response Measures		
Absorptive Capacity • Coping behaviour • Risk management • Informal safety nets • Conflict mitigation • Disaster mitigation & Early Warning Systems (EWS) • Savings groups	Adaptive Capacity • Human capital • Debt and credit • Use of assets/info • Psychological • Dependency ratio • Likelihood diversification	Transformative Capacity • Governance mechanisms • Community networks • Protection and security • Use of basic services • Use of formal safety nets • Use of markets • Policies / regulations

Figure 2-26: Resilience measure of capacities (Frankenberger et al., 2014).

6- Abimbola & Khan (2019) built a dynamic oriented Bayesian network model that joined three system capacities given a certain disruption: absorptive, adaptive, and restorative. They used a joint probability distribution model to assess the resilience of a system as a time function and the variation of individual parameters representing the three capacities, as shown in Figure 2-27.
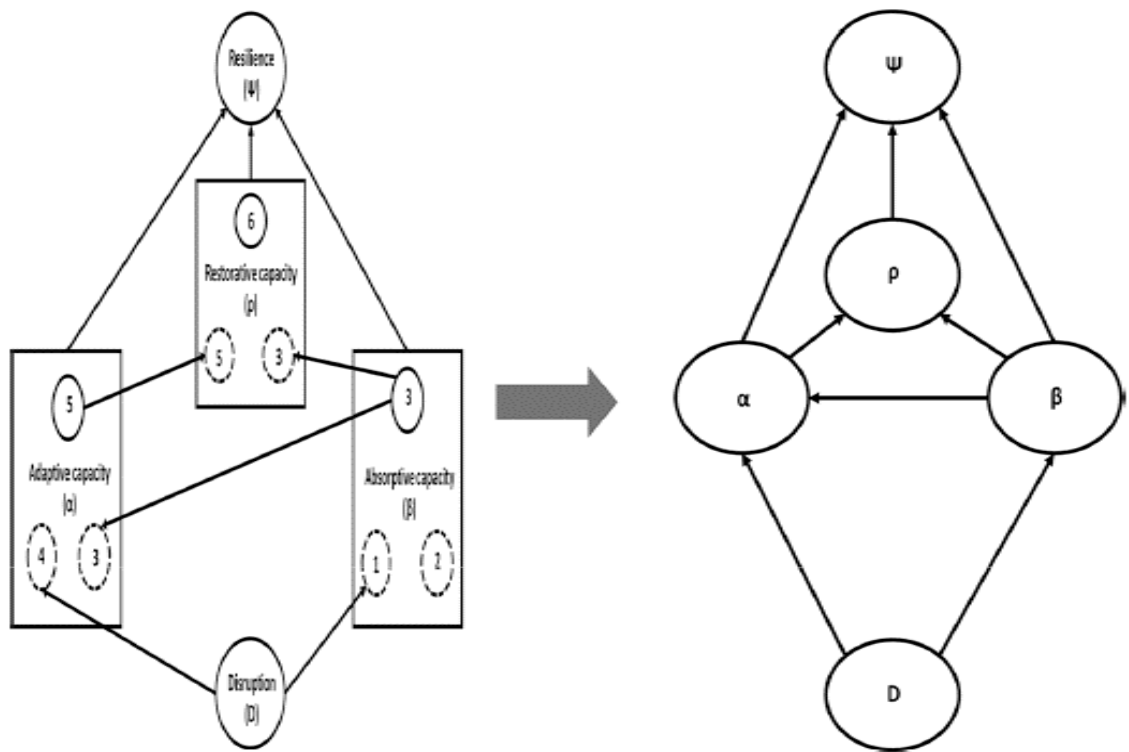
Figure 2-27: Illustration of resilience systems modelling based on Dynamic Oriented Bayesian Network and three system capacities (Abimbola & Khan, 2019).

7- Folke *et al.* (2010) described resilience as a function of adaptability and transformative capacities. They argued that transformative capacity enables an organization to make use of crisis as a window of opportunity. Transformation begins on a smaller scale and is then amplified to build resilience at a broader level by recombining knowledge and experience in innovative ways that push the organization beyond existing thresholds into newly developed trajectories (Folke, 2006; Folke et al., 2010).

8- Frankenberger et al. (2014) argued that resilience is a process-oriented capacity of organizations not a static characteristic. According to them, a characteristics approach to resilience attempts to identify reliable resilience determinants that can be assessed before shock without investigating if the characteristics of the determinants are relevant when the shock eventually occurs, while the process-oriented approach is premised on

the idea that these determinants of resilience are not static but continually changing. This resilience conceptual framework is illustrated in Figure 2.28.
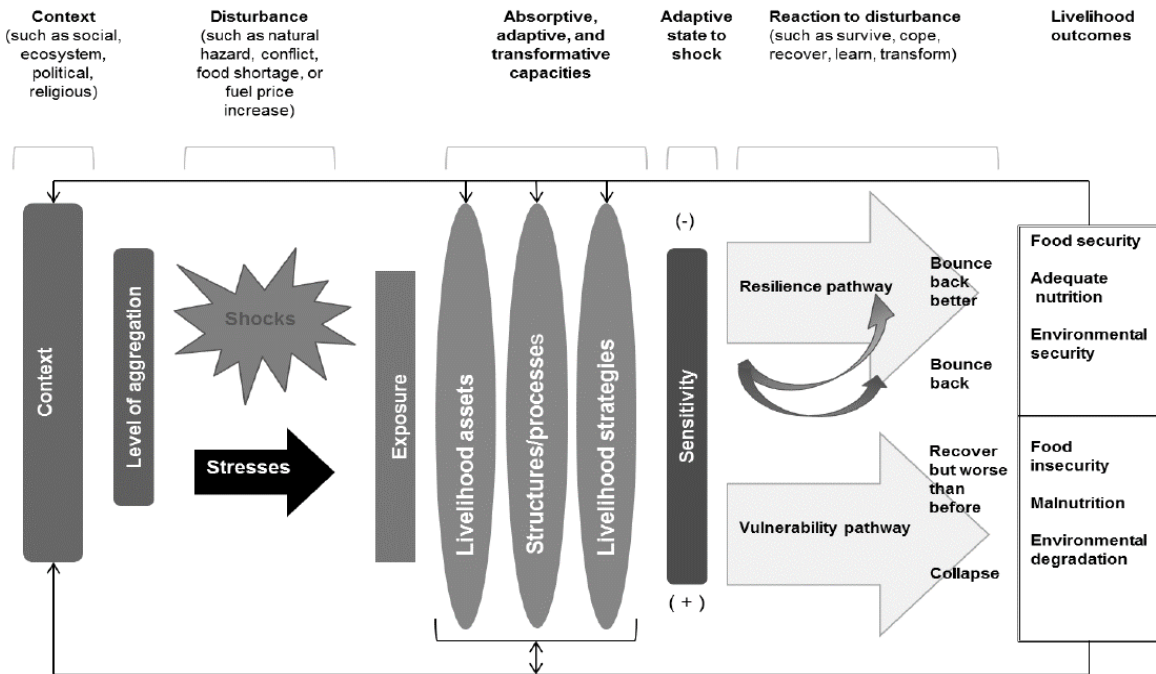
Figure 2-28: The capacities based conceptual framework adapted by Frankenberger *et al*. (2014).

9- Béné *et al.* (2012) recommended a three-dimensional model to build resilience based on absorptive, adaptive, and transformative capacities. They argue the sequential need of these capacities based on the intensity of the shock or change; if the severity of the shock is small, then we need the absorptive capacity to resist the change without further consequence on the structure reflecting the status of the system. When the absorptive capacity is not capable of managing the shock, we need the adaptive capacity to make adjustments in the system and maintain performance without significant change in the system's structure or status. Lastly, if neither of the two capacities (absorptive and adaptive) is sufficient to manage the shock, we need the transformative capacity to make alterations in the function, structure, or status of the system that will enable the

organization to cope with the disruption. Figure 2-29 illustrates the 3D framework for resilience-based on these three capacities.

Intensity of change / transaction costs

stability   flexibility   change

Absorptive coping   **Adaptive**   **Transformative**
capacity   **Capacity**   **Capacity**

(*persistence*)   (*incremental adjustment*)   (*transformational responses*)
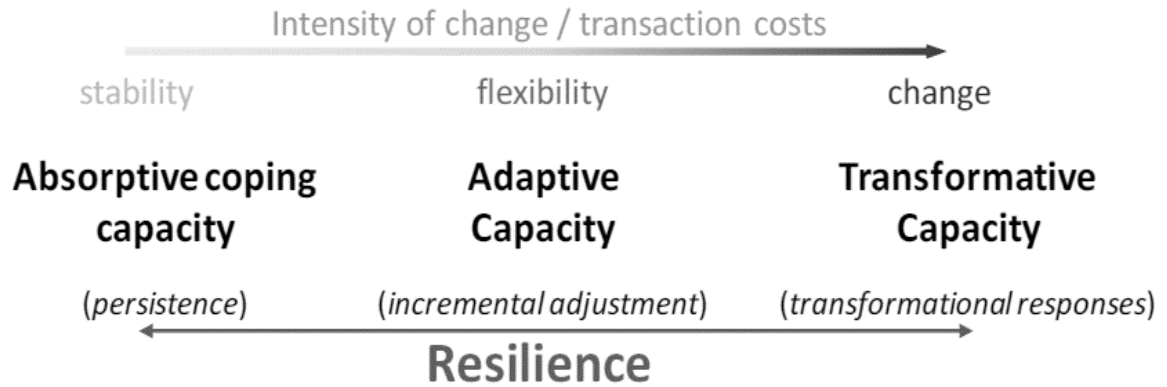
Resilience

Figure 2-29: Three-Dimensional model of resilience based on capacities (Béné et al., 2012).

10- One of the most comprehensive models in building resilience through capacities is based on the work of Francis & Bekera (2014). Their model recommended five components to build a resilience assessment framework: system identification, analysis of vulnerabilities, the objective setting of resilience system, stakeholder engagement, and three resilience capacities (absorptive, adaptive, and restorative). The vulnerability analysis is used to predict the likelihood of a disruptive event to which the system is vulnerable while incorporating dynamics into the analysis by adding the time dimension before, during and after the disruption. System identification is used to identify the system under study and its boundaries, while objective resilience settings are used to define a resilience system's objectives, which is usually to return to normal function. The stakeholders' engagement component is focused on coordinating with external parties to manage the disruption. The three capacities used in the framework are the absorptive, adaptive, and restorative capacities. This framework of resilience assessment is illustrated in Figure 2-30.
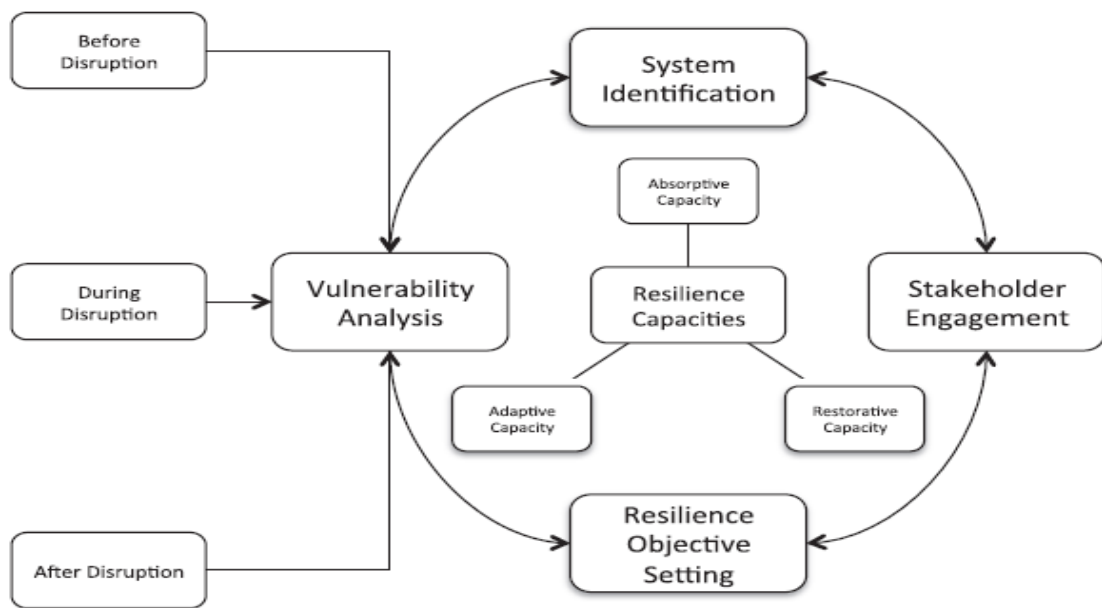
Figure 2-30: Resilience assessment framework, as recommended by (Francis & Bekera, 2014).

Although the previous examples of resilience capacities tried to identify the different types of these capacities and the definition and characteristics for each one of these capacities, further research is necessary to explore how organizations transform capacities and capabilities for resilience into organizational demonstrations of overall resilience. Moreover, because resilience emerges from interactions among variables at different levels that take place over time, changing circumstances may change the presence, importance, and contribution of each of these variables to resilience. A perspective that uncovers the antecedents and processes underlying organizational resilience, therefore, most likely requires a multilevel and dynamic perspective (Lazega & Snijders, 2015).

For the purpose of this research and as it is more addressing resilience of the public sector, if resilience is to be used properly as an analytic tool, its conceptualization should have a greater emphasis on framing it within social action. Even if resilience is related to individual action, it

is also a group and collective phenomena emergent in a specific social context, that is, effects due for specific circumstances (Revilla, Martín & de Castro, 2018).

2.11   Theories underpinning resilience (Complexity Science Theory)

As the world is complex, researchers should not limit themselves to traditional tools to find simple answers to build resilience within sectors or organizations. This has been realized by many researchers who discussed how to improve resilience using more advanced tools (Hillman, 2013; Kolay, 2017; Teoh, Yeoh & Zadeh, 2017; Tracey, 2015; Zhao, Liu & Zhuo, 2017). In addition, understanding what resilience means seems to be a complicated task due to the diversity of perspectives on the concept in different fields and different interpretations that are continuously changing (Folke, 2006). One way to understand resilience is going back to the basis, namely in the social-ecological systems or socio-environmental systems where resilience thinking applies the same set of analytical mechanisms and models that are highly linked to the complexity theory (Duit, 2016). There are many concepts of complexity theories within the socio-ecological systems, such as emergence and self-organization, thresholds and tipping points, transient dynamics, early warning signals, connectivity, and resilience thinking (University of Southampton, 2019).

Complexity theories share the idea that the whole, which is the system, is more than the sum of the parts and that the development of the whole stems from the interaction of the parts. Furthermore, he added that the main aim of the complexity theory is to understand the change dynamics of systems as part of the complex interaction of the parts of systems (Klijn, 2008).

Furthermore, it has been reported that many of the world's most significant problems are of socio-environmental types, and these complexities can be understood in terms of sustainability, resilience, or integrated assessment, and understanding complexity could be done through

knowledge elicitation of individual systems and their interrelationships (Little et al., 2019). However, it is not enough to elicit knowledge in complex systems, but rather being able to find a successful strategy, learn and adapt to change over time (Allen, 2011). In addition, Battiston et al. (2016) consider resilience, alongside other concepts like tipping points, networks, contagion, and feedback, to be relevant to understanding complexity. Though these models are used to monitor and manage complex systems, the most essential application of these models using them to anticipate and manage future crises. While systems help to understand the reality of current situations, they are limited by not predicting future structural adjustments that may occur. Allen (2011) developed a matrix to illustrate the perceptions of open and closed systems with respect to time. A strategic perception is prevalent in the short term, and an operational perception is prevalent on the long term.
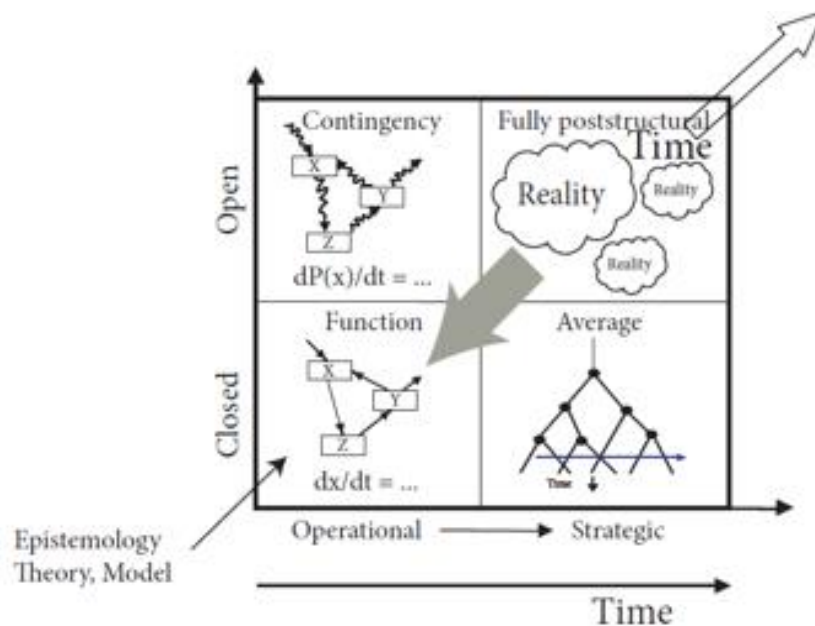
Figure 2-31: Different perceptions of systems (Closed, open) against time (Allen, 2011).

Our knowledge about uncertainties is limited, and we cannot predict future events with one hundred percent accuracy. Therefore, understanding complexity will require the use of mathematical models for evolutionary thinking, change, and transformation. Without having a

proper methodology to guide change, our judgements, decisions, and response to emerging events will most likely be driven by trial and error and subjective experiences that will only lead to confusion (Pugh, 2014). Accordingly, complex systems have learned to survive by adapting a strategy whereby they self-organize and continue to evolve as part of preparedness for disruptive events (Anderson, 1999).

Successfully applying resilience within complexity theory will imply the successful applications of systems mindset in the face of complex situations. Resilience can be considered as an emergent property of complexity and a common feature of complex systems that ensures that systems have the capacity and capability to endure disturbances (Cristancho, 2016; Fraccascia, Giannoccaro & Albino, 2018). To this end, scholars have identified a large number of characteristics of resilient systems, such as diversity, adaptability, flexibility, efficiency, redundancy, learning and anticipation (Meerow & Newell, 2015). Furthermore, McManus et al. in 2008 conducted a study of the resilience theory within complexity theory and dynamic context, concluded that resilience is a function of an organization's situational awareness, management of key vulnerabilities, and its capacity to adapt in a complex, dynamic, and interconnected environment. University of Southampton (2019) summarized some critical characteristics of resilience within a complex and dynamic environment as illustrated in Table 2-7 below.

Table 2-7: Some critical characteristics of resilience within a complex and dynamic environment (University of Southampton, 2019).

Resilience Characteristics	Description
Complex adaptive systems	"Systems with the inherent uncertainty in their dynamics tend to have multiple stable states and exhibit self-organization".
Adaptive Cycle	"A metaphor of systemic change that proposes that systems cycle through four phases: rapid growth, conservation, collapse, and re-organization".

Panachy	"A nested set of adaptive cycles at different scales that exhibits cross-scale interactions".
Adaptability	"The capacity of a social-ecological system to adjust its responses to changing external drivers and internal processes and thereby allow for development along the desired trajectory".
Transformability	"The capacity of a social-ecological system to create a fundamentally new system when ecological, economic, or social conditions make the existing systems not able to be maintained".

Addressing resilience within a complexity theory will lead us to resilience engineering that is mainly concerned with the design and evaluation of resilient systems (Righi, Saurin & Wachs, 2015). The resilience engineering movement is focused on socio-techno systems within which predictable technological processes interact with unpredictable human behaviour to form adaptive dynamic systems able to adjust to conditions that cannot be built into the system at the design stage (Dahlberg, 2015).

Tengblad (2018) argued that resilience engineering within socio-technical systems focuses on four resilience abilities: monitoring, anticipating, responding, and learning. Table 2-8 shows definitions of resilience engineering used by researchers identified by Righi, Saurin & Wachs. via a systematic review of the literature (Righi, Saurin & Wachs, 2015).

Table 2-8: Definitions of resilience engineering from different studies (Righi, Saurin & Wachs, 2015).

Study	Definition
(Woods & Hollnagel, 2006)	"resilience engineering is a paradigm that focuses on how to help people cope with complexity under pressure to achieve success."
(Hollnagel & Woods, 2006)	"resilience engineering aims to enhance the ability of a complex socio-technical system to adapt or absorb disturbance, disruption and change."
(Fairbanks *et al.*, 2014)	"resilience engineering is the deliberate design and construction of systems that have the capacity of resilience."
(Resilience Engineering Association, 2019)	"resilience engineering looks for ways to enhance the ability at all levels of organizations to create processes that are robust yet flexible, to monitor and revise risk models, and to use resources proactively in the face of disruptions or ongoing production and economic pressures."
(Anderson, Ross & Jaye, 2013)	"resilience engineering represents a philosophical shift in the science of safety. It is a proactive approach that focuses on the need for organizations to adapt

	to changes in the environment in which they operate, supporting workers in a safe adaption when necessary."

In the same study, Righi, Saurin & Wachs (2015) identified categories adapted for describing and classifying resilience engineering. These categories and their respective frequencies of occurrence are shown in Table 2-9:

Table 2-9: Categories adapted for describing and classifying resilience engineering and the number of repetitions in the scanned publications (Righi, Saurin & Wachs, 2015).

Categories / Studies	Frequency of occurrence
Ability of anticipating/being aware of hazards	8
Capacity of adapting to variability/being flexible	7
Ability of responding, restoring, or limiting effects	7
Ability of learning	6
Resilient behaviours, resilient repertoire, resilience markers, cognitive strategies that support resilience	5
Sources of brittleness, vulnerabilities, or threats to resilience	4
Ability of monitoring	4
Sources of resilience and opportunities	3
Capacity of absorbing variability / buffering capacity / error tolerance	3
Means of resilience engineering, resources and enabling conditions	3
Cross-scale interactions	2
Planning and preparedness	2
Goals of resilience	2
Sharp / blunt end; agents of resilience	2
Top level commitment	1
Just culture	1
The effectiveness of the sources of resilience	1
The opposite sources of resilience or sources of brittleness	1
The risk from sources of brittleness	1
Origin of the sources of resilience / sources of brittleness: internal / external; formal / informal	1
Mode of operation: the structure that a system adheres to	1
Forces and situational conditions	1
Preventive or reactive resilience	1

Furthermore, Linkov, Trump & Fox-Lent, (2016) identified four key resilience features namely: critical function, threshold, time, and memory and adaptive management in four application domains: Socio-ecological, psychological, organizational, and engineering & infrastructure.

The categorization of the feature is based on four phases of resilience: plan, absorb, recover, and adapt. These phases will be associated with the capacities of the systems that was thoroughly discussed in the previous section.

Table 2-10: Resilience features per phase and application domains (Linkov, Trump & Fox-Lent, 2016).

Phase of resilience	Resilience feature	Description by application domain			
Plan		Socio-ecological	Psychological	Organizational	Engineering and Infrastructure
		A system function identified by stakeholders as an important dimension by which to assess system performance			
		Ecosystem services provided to society	Human psychological well-being	Goods and services provided to society	Services provided by physical and technical engineered system
Absorb	Threshold	Intrinsic tolerance to stress or changes in conditions where exceeding a threshold perpetuates a regime shift			
		Used to identify natural breaks in scale	Based on sense of community and personal attributes	Linked to organizational adaptive capacity and to brittleness when close to threshold	Based on sensitivity of system functioning to changes in input variables
Recover	Time	Duration of degraded system performance			
		Emphasis on dynamics over time	Emphasis on time of disruption (i.e., development stage: childhood vs adulthood)	Emphasis on time until recovery	Emphasis on time until recovery
Adapt	Memory / Adaptive Management	Change in management approach or other responses in anticipating of or enabled by learning from previous disruptions, events, or experiences			
		Ecological memory guides how	Human and social memory, can	Corporate memory of challenges	Re-designing of engineering systems

		ecosystem recognizes after a disruption, which is maintained if the system has high modularity	enhance (through learning) or diminish (e.g., post-traumatic stress) psychological resilience	posed to the organizational and management that enable modification and building of responsiveness to events	designs based on past and potential future stressors

With resilience engineering, we are able to build systems that resist disturbances, remain integral continue to operate despite the presence of a threat (Patriarca et al., 2018). They highlighted cornerstones for systems to be able to achieve resilient performance that is responding, monitoring, learning, and anticipating.

Understanding the main concepts of organizational resilience in addition to resilience engineering while utilizing the concept of resilience capacities in the face of internal and external disruptions. This understanding will assist in having a more holistic view of developing organizational resilience in the public sector. This model should build the relationship between resilience performance and disruption event characteristics to be able to manage the disruption effectively and efficiently. The following section will present the gap in the literature based on the discussions and summary of the previous section of findings.

2.12. The gap in the literature

Currently, extensive research has been conducted by scholars on organizational resilience in the private sector compared to the public sector, where the use of traditional organizational reform recipes is more prevalent (Van de Walle, 2014). Moreover, studies of organizational resilience in the public sector focus more on the crisis and risk management perspective and do not explore resilience holistically (Duit, 2016; Koronis & Ponis, 2018). To validate this

argument, a search of organizational resilience implementation by the public sector in online journals using several databases, for example 'Willey online library' while defining three key search parameters in the advanced search (resilience in the title, public in the abstract, and organization in the abstract). The outcome of the search was 30 articles publicized in different journals (6 in disasters journals, 5 in public administration, 3 in risk analysis, 2 in architectural design, 2 contingencies and crisis management, and the others in specialized journals such as nursing, health and food). Most of these articles focus on resilience from the crisis management, risk management and disaster recovery specialization.

Literature is replete with evidence showing that the public sector is unable to develop resilience capacities on time to deal with the ever-evolving techno-socio-economic conditions as the world is becoming turbulent faster than organizations are becoming resilient (Hamel & Välikangas, 2003; Marston & Marston, 2018). Also, evidence is lacking on the application of absorptive, adaptive, and transformative capacities by public sector organizations to specific disruptive events facing. Furthermore, the example given in the literature review of trying to categorize characteristics of each dimension of the three capacities in the food sector did not find any similar research in public sector organizations (Schipper & Langston, 2015).

The identified need for having collaboration amongst organizations to build resilience, as was highlighted by Lai (2011), or by stakeholder engagement as discussed by Francis & Bekera (2014), was not clearly reflected in any conceptual resilience model in the public sector. Meanwhile, there is little evidence in the literature of how the public sector is building network-centric organizations to be more effective in the face of disruptive events (Allen, 2011; Allenby & Fink, 2005; Francis & Bekera, 2014).

Although it has been discussed in the literature review that the ability of public sector organizations to react rapidly and constructively to emerging events is closely knitted with their bureaucratic structures and that their procedures are driven by the implementation of management systems and excellence models (Van de Walle, 2014), only a few studies have been conducted targeted at how to overcome identified obstacles in public sector organizations preventing them from responding with resilience to disruptive emergent events.

While there has been extensive research on adaptive systems and system vulnerability assessment, current government systems still lack adaptive systems for managing epistemological and ontological emergent events resulted from internal and external uncertainties (Barasa, Mbau & Gilson, 2018; Engle, 2011).

2.13 Drawn themes based on the findings of the literature review

Based on the research background and the literature review, the following themes are used to build justification of this study emerged. The key insights and main conclusions driving this research are presented below:

- Change in economic structures, security challenges, and other social cohesion challenges are forcing nations and organizations to build their resilience capabilities and capacities to take proper decisions in the face of escalating emerging events associated with uncertainties due to these future trends (World Economic Forum, 2017).
- The emerging events are surrounding us and are forcing private as well as public sectors to review their absorptive, adaptive, and transformative capacities to be ready for the future (Béné et al., 2012).

68

- The external concerns, such as innovative new technologies and new regulatory regimes in addition to the internal matters, such as turbulence coming from the existing infrastructure (Collier et al., 2016; Kerr, 2015).

- The resilience concept has evolved into building capacities and capabilities to face both epistemological and ontological internal and external uncertainties (Ilmola & Rovenskaya, 2016).

- Currently, there is no consensus on the definition of resilience due to the diverse roots of the concept traceable to different scientific fields like psychology, ecology, natural philosophy, physics and recently, management (Annarelli & Nonino, 2016; Kantur & Say, 2015; Manfield & Newey, 2018; Rodríguez-Sánchez & Vera Perea, 2015; Teoh, Yeoh & Zadeh, 2017; Tracey, 2015; Xiao & Cao, 2017).

- Resilience plays a vital role in how effectively organizations are able to turn threats and challenges into opportunities (Megele, 2014; World Economic Forum, 2017).

- Building resilience in public sector organizations aims to enhance 1) their preparedness to respond to various threats and disruptions, 2) their ability to anticipate and continuously monitor emergent events, and 3) improve their ability to learn from experiences with disruptive events (Hollnagel, 2015; Kantur & Say, 2015; Patriarca et al., 2018).

- Resilience is gaining an advanced strategic positioning as an integrating concept to enable different sectors in general and the public sector not only respond to disturbances and recover, but also to learn from the experiences and become more competitive, innovative and agile.

- The public sector should consider resilience when looking to manage tensions that arise due to paradoxical issues like conflict between the routine traditional way of doing

business and the unpredictable and flexible approach of mindful actions that engender innovation transformation (Denyer, 2017; Van de Walle, 2014).

- Building a resilient public sector require that government agencies and organizations have these four major capabilities: the ability to respond to various disturbances and regular and irregular threats, the ability to flexibly monitor what is going on, the ability to anticipate disruptions, and the ability to learn from experience (Hollnagel, 2015; Kantur & Say, 2015; Patriarca et al., 2018).

- Building resilience within public sector organizations will have a positive impact at a national level, as it will enhance competitiveness, construct coherence, improve efficiency and effectiveness, enhance reputation, and leverage response to ever-evolving techno-socio-economic condition to enhance societal and community resilience (British Standard Institution, 2014).

- Resilience models are grouped into five main categories. The first one, derived from resilience engineering, is aimed at increasing the ability of organizations to monitor, anticipate, respond, and learn in the face of disruptions (Righi, Saurin & Wachs, 2015; Tengblad & Oudhuis, 2018). The second group of resilience models is designed with a multi-level approach to building resilience. These levels are: individual level, team level, organizational level, and community level. The third group of resilience models is the comprehensive balancing model of reactive and proactive approaches to resilience (Florin & Linkov, 2016). The fourth group either builds upon each of the concepts of business continuity, risk management, crisis management, and disaster recovery or integrates them to build organizational resilience. The fifth group of resilience models is the most traditional one, mainly concerned with the science of absorption, responding, and

recovery after disruptive events. With this group of models, the outcome is the return of the system to original optimum performance.

- Four main factors affecting setting up a proper system for resilience measurement are: 1) the dependency and interdependency of system capacities and time-varying, 2) the severity of consequences and potential losses caused by disruptions and their association with uncertainties, 3) the dependency of system performances on resources dispatch/input strategies and design attribute, and 4) the incompleteness of historical information on major disaster prevention efforts (Zhao, Liu & Zhuo, 2017).

- On the other hand, there are four levels of resilience maturity: 1) effective short term of business as usual capability where the organization is still lacking the resilience medium and long term horizons planning; 2) the medium-term ability to change and adapt where the organization still lacking the advanced ability of long term resilience planning; 3) the long term ability to shape the environment of the organization through long horizon resilience planning, and 4) where resilience become part of the organization DNA and this an advanced ability to shape the external environment of the organization positively (Kerr, 2015).

- Currently, available resilience models do not incorporate the source of uncertainty and the decision-making formulation when facing ontological uncertainties (uncertainties that are associated with events that we do not know anything about *"unknown unknowns"*) (Ilmola & Rovenskaya, 2016).

- Widening the applicability of resilience thinking requires leading organizations to expand their conceptualization to include ontological uncertainties (unknown-unknowns) while maintaining the traditional perspective of epistemological uncertainties (known-unknowns) (Ilmola & Rovenskaya, 2016).

71

- Accurately predicting the future is an impossible task. However, the impact of future uncertainties and complexities can be minimized or at least anticipated by identifying and analysing various parameters within our knowledge scope (Durst et al., 2015).

- Traditional risk management focuses on planning for and reducing vulnerabilities, while resilience focuses on speed of recovery and facilitating adaptation (Linkov & Trump, 2019).

- To build resilience capabilities, organizations need to know how to build and optimize robustness, redundancy, resourcefulness, and rapid recovery when facing emerging events (Kantur & Say, 2015).

- Resilience cannot be considered as an ultimate outcome. In fact, it is an intermediate stage that is characterized by a combination of capacities that lead to other positive wellbeing outcomes (Sturgess, 2016).

- The randomness of events and uncertainty shifts the thinking of organizations from an attempt to control the change and maintain stability into managing capacities of systems to cope with, adapt and shape the change (Béné et al., 2012).

- There are three key capacities in any system that are needed in the face of any dynamic disruption scenarios. These are: 1) absorptive capacity- the ability of a system structure to absorb the impacts and maintain its function during disruption scenarios, 2) adaptive capacity, the ability of a system to respond to adverse events by self-organization during the scenario to mitigate satisfaction loss, and 3) recovery capacity- the rapidity of a disrupted system to return to the desired service level (Zhao, Liu & Zhuo, 2017).

- Knowledge captured by each agent in a complex system is not everything as what matters in complex systems is not just knowing, but being able to find a successful strategy, to adapt, and to learn different changes over time (Allen, Strathern & Baldwin, 2007).

- Resilience engineering within socio-technical systems focuses on four resilience abilities: monitoring, anticipating, responding, and learning (Tengblad, 2018).

- The importance of incorporating collaboration dimension and stakeholder engagement dimensions in developing effective resilience model (Allen, 2011).

As it can be seen from Figure 2-32, the breakdown of sequential flow of resilience information based on the research background and the literature review suggests starting from uncertainty sources to try to have a better understanding of what triggers an emergent event. Then the emergent event itself has certain types and characteristics that need further investigation. Each organization has a pre-capability building before facing any emergent event that is represented by building robustness, resourcefulness, and redundant resources to enable quick recovery. When facing an emergent event, organizations need to build their capacities and response strategy based on the emergent event itself and based on the already built capabilities to drive an effective reaction. The cycle of responding to an emergent event needs to be monitored and measured to accumulate the maturity level of any organization as it is facing more and more emergent events. Finally, the main outcome of resilience is judged through the positive or negative effect on the core organizational performance and reputation.

Uncertainties Sources

Resilience models usually missing uncertainty sources	Techno-socio-economic changing conditions	External concerns such as innovative new technologies and new regulations	Internal concerns such as turbulence coming from existing infrastructure

Emerging Events

Surrounding us	Either epistemological (known unknown) or ontological (unknown unknown)	Still missing the decision making formulation when facing ontological uncertainties

Resilience Capabilities

Robustness	Resourcefulness	Redundancy	Rapid Recovery

Resilience Capacities

Absorptive	Adaptive	Transformative

Resilience Effective Response

Anticipate	Monitor	Learn	Collaborate

Resilience Response Strategy

Resilience Pathway (Mindful actions and innovational transformation). Focus more on speed of recovery and facilitating adaptation	Vulnerability Pathway (Traditional way of doing business). Focusing more on planning and reducing vulnerability	What matters in complex systems is not so much knowing put to have the capacity to be able to find a successful strategy and to adapt and learn different changes over time

Reaction to Disturbance

Bounce forward (better than before)	Bounce back (same as before)	Recover worse than before	Collapse

Resilience Measurement Factors

Dependency and interdependency of system capacities and time varying	The severity and consequence of potential losses caused by disruptions and their association with uncertainties)	Dependency of system performance on resources dispatch/input strategies and design attribute	Incompleteness of historical information of major disaster prevention

Resilience Maturity

Effective short term of business as usual capability	The severity and consequence of Medium term ability of change and adapt uncertainties)	Dependency of system Long-term ability to shape the environment	Incompleteness of Ability to shape the external environment positively

Resilience Outcome

Be more competitive, innovative and agile	Turning threats into opportunities)	Construct coherence	Improve efficiency and effectiveness	Enhance reputation	Leverage response to ever-evolving techno-socio-economic conditions

Figure 2-32: The breakdown of sequential flow of resilience information based on categories derived from research background and literature review.

Chapter Three: Research Theoretical Framework

3.1 Introduction

Chapter 1 discussed building the agenda for this research, and Chapter 2 presented the literature review to come up with the main themes for the study. In chapter three, a theoretical framework will be developed to form a starting point for exploring public sector resilience as a basis for decision making when emerging events occur. The aim of the theoretical framework is to define research key dimensions and relationships to guide the selection of the appropriate study design and methodology for the research.

3.2 Theoretical framework

A theoretical framework is a blueprint that provides the foundation and guideline for research (Adom et al., 2016). Researchers use theoretical frameworks to understand the scope and boundaries of a research inquiry and to keep the study focused on the research objectives. Theoretical frameworks consist of theoretical concepts, principles, constructs and definitions, and theories used in their development. They also define the relationships among variables considered important to answering the research questions (Torraco, 1997; Osanloo & Grant, 2016; Sekaran & Bougie, 2016).

Using theoretical frameworks in qualitative, quantitative, or mixed methods studies underscore the significance and importance of the research and add to its quality and scientific rigour. To construct a theoretical framework, the researcher needs to define the research problem or question(s) and justify the methodology chosen to solve the research problem (Lederman & Lederman, 2015).

This research will follow the three steps for developing a theoretical framework proposed by Sekaran & Bougie (2016). The three steps are: 1) introducing definitions of concepts in the model, 2) developing a model that represents a description of the developed theory, and 3) construct a theory that provides an explanation of concepts within the model.

Based on the key themes identified from the literature review and illustrated in Figure 2-32 in the previous chapter, a theoretical framework is developed. This theoretical framework comprises the three resilience capacities: absorptive, adaptive, and transformative, the key concepts of resilience engineering: anticipate, monitor, respond, and learn, and the collaborative dimension (Allen, 2011; Francis & Bekera, 2014; Frankenberger et al., 2014). This theoretical framework is shown in Figure 3-1.
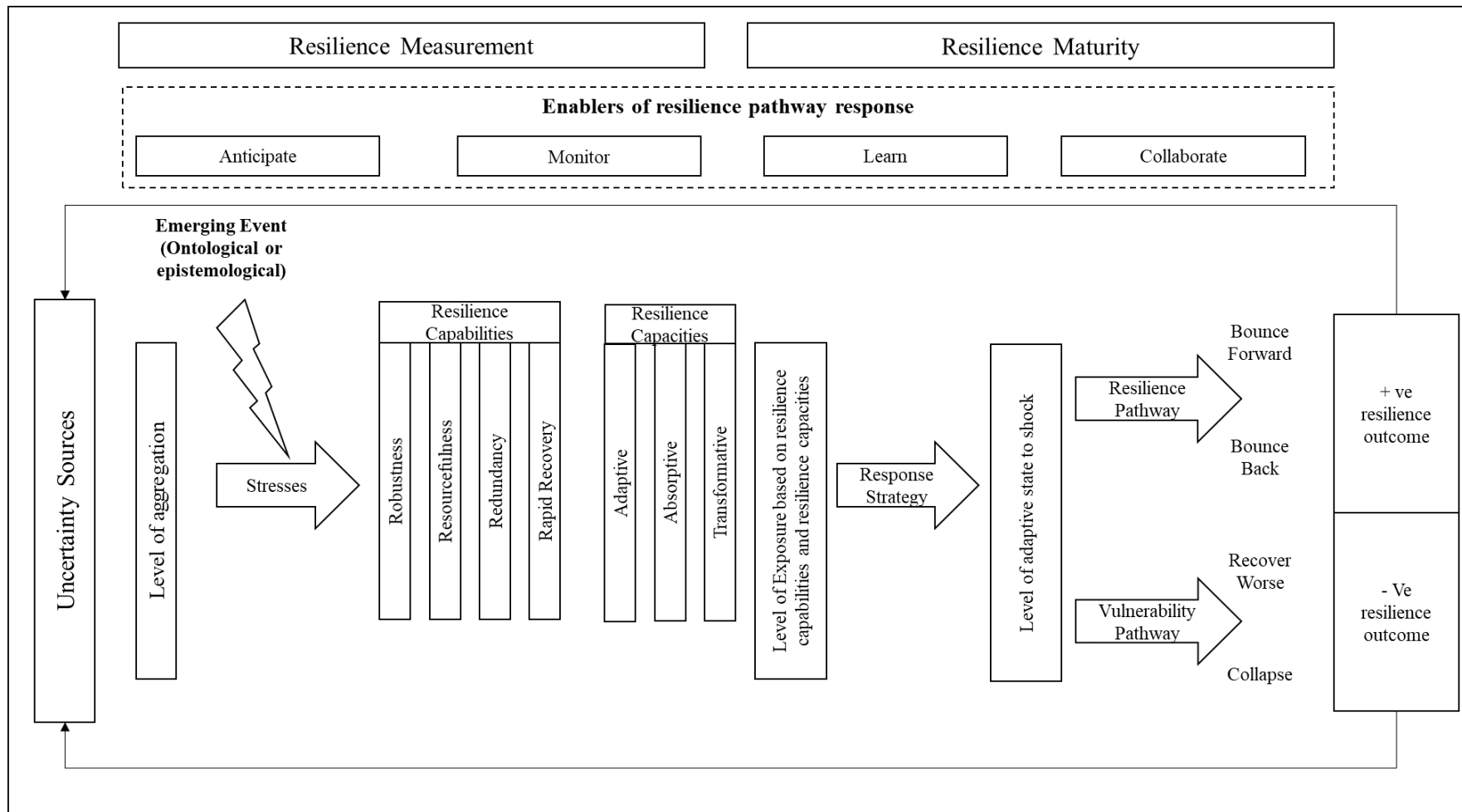
Figure 3-1: The proposed theoretical framework used in the study.

The proposed theoretical framework begins with sources of uncertainties. These sources are due to changing techno-socio-economic conditions that can be external such as innovative new technologies and new regulations, or internal for example, turbulence within the existing infrastructure (Collier et al., 2016; Hamel & Välikangas, 2003; Kerr, 2015; Marston & Marston, 2018). This is an improvement on commonly used resilience models that do not capture sources of uncertainty within their framework (Ilmola & Rovenskaya, 2016).

Resilience models should capture the capacity of a system to anticipate disruptive events within its framework. This capacity enables an organization to monitor and recognize when an emergent event becomes disruptive. Therefore, organizations are able to manage disruptions and identify new opportunities effectively. This will require building future foresight capabilities according to future foresight tools guidebook issued in UAE issued by the Prime Minister Office under the -Ministry of Cabinet Affairs and the Future, as well as scenario planning enhancement (Aguirre-Bastos & Weber, 2018; Dufva & Ahlqvist, 2015; Durst et al., 2015; Hills, 2015; Ilmola & Rovenskaya, 2016; Ministry of Cabinet Affairs and the Future, 2019; Sircar et al., 2013; Stewart & O'Donnell, 2007).

Development of resilience capabilities to manage disruptive events in organizations should consider the following 4Rs (Robustness, Resourcefulness, Recoverability and Rapid Recovery). Robustness represents "the ability to maintain critical operations and functions in the face of crisis". Resourcefulness represents "the ability to skillfully prepare for, respond to and manage a crisis or disruption as it unfolds". Recoverability represents "the ability of the system to recover quickly—and at low cost— from potentially disruptive events". Rapid Recovery represents "the ability to return to and/or reconstitute normal operations as quickly and efficiently as possible after a disruption" (Kantur & Say, 2015).

Based on the literature review, three key capacities were identified which represent the cushion of the system in response to disruption and are incorporated into the theoretical framework. These three capacities are absorptive, adaptive, and transformative capacities. The absorptive capacity is the ability of a system structure or organization to absorb the impacts and maintain its function during disruption (Zhao, Liu & Zhuo, 2017). The adaptive capacity enables actors in the system or organization to influence and manage resilience (Engle, 2011). The transformative capacity is the ability to make alterations in the function, structure or status of the system or organizations to cope with the enormous magnitude of change required (Béné et al., 2012). Furthermore, some scholars define transformative capacity as the ability to turn a crisis situation into a window of opportunity. Transformation begins on a smaller scale and is then amplified to build resilience at a broader level by recombining knowledge and experience in innovative ways that push the organization beyond existing thresholds into newly developed trajectories (Folke et al., 2010).

Responding to an emerging event is representing "The ability to know what to do or being able to respond to an internal and external disruption event". Having a resilient response will require activating the 4RS of resilience within the resilience strategy as well as the three components of resilience capacities (Hollnagel, 2015). Within complex systems, it is equally important to have the capacity to develop a successful response strategy and to adapt and learn from different emergent events over time (Allen, Strathern & Baldwin, 2007). There are also instances in which organizations cannot effectively respond to disruptive events by themselves unless they collaborate with other stakeholders. This underscores the need for a collaboration dimension as part of building a resilient organization (Allen, 2011). Without this dimension, managing networks with partners will not succeed in the face of the disruption event. This dimension was also emphasized by Allenby & Fink (2005), who argued that network-centric organizations are

more resilient compared with other organizations that they do not build strong networks with other stakeholders.

Based on the response type, organizations either follow the resilience pathway by taking mindful actions and implementing innovative transformation that is focused on speedy recovery and adaptation, or they follow the vulnerability pathway by sticking to traditional ways of doing business that are focused on planning and reducing vulnerability (Engle, 2011). With the resilience pathway, organizations may either bounce forward (better than before) or bounce back (same as before), while with the vulnerability pathway, there is a higher risk that organizations may recover but end up being worse than before or even collapse (Francis & Bekera, 2014).

Building resilience yields positive outcomes of enhanced competitiveness, construct coherence, improved efficiency and effectiveness, and enhanced reputation for the organization. The organization can then deploy these capabilities in response to the ever-evolving techno-socio-economic conditions to enhance societal and community resilience (British Standard Institution, 2014).

The learning dimension in the proposed framework represents the ability to learn from what has happened or being able to benefit from learning by experience (Hollnagel, 2015). It will feed into the response dimension for other emerging events that may occur in the future, as well as the resilience strategy represented by the 4Rs capabilities and the three resilience capacities. The learning dimension will also feed into the anticipation dimension to enable a better understanding of the sources of uncertainties that will transform into emerging events. This may also include the ability to activate the heuristic judgment learning capabilities to learn from

existing disruptive events or other disruptions that have impacted other organization (Manfield & Newey, 2018).

Monitoring represents the ability of organizations to effectively monitor the cycle of disruptive events and how it affects their performance. Monitoring should include both internal and external disruptive events and should include resilience measurements that are measuring resilience strategy represented by the 4R components and three resilience capacities. Furthermore, Zhao, Liu & Zhuo, (2017) identified the following four main factors affecting setting a proper system for resilience measurement: 1) the dependency and interdependency of system capacities and time-varying, 2) the severity of consequences and potential losses caused by disruptions and their association with uncertainties, 3) the dependency of system performances depend on resources dispatch/input strategies and design attribute, and 4) the incompleteness of historical information on major disaster prevention. Meanwhile, Ilmola & Rovenskaya (2016) identified two principal approaches to resilience measurement; either to collect organizational information about as many functions as possible or to use an indicator to measure organizational management of an unexpected event.

Kerr (2015) divided maturity of resilience systems into three levels: 1) effective short term business-as-usual capability where the organization is still lacking resilience mechanisms and long-term horizons planning, 2) the medium-term ability to change and adapt where the organization still lacks the advanced ability for long-term resilience planning, 3) the long term ability to shape the environment of the organization through long-term resilience planning, and 4) where resilience become part of the organization's DNA as an advanced ability to shape the external environment of the organization positivel.

Chapter Four: Research Design and Methodology

4.1 Introduction

This chapter will present the research methodology and study design for conducting this research. This research adapts the steps specified within the research onion -a multi-level description of the research process from conceptualization of the study to data collection and analysis- developed by Saunders, Lewis & Thornhill (2015).

The research process consists of the following: developing research philosophy, defining the approach to theory development, methodological choice, research strategy, time horizon, and data collection & analysis as illustrated in Figure 4-1.
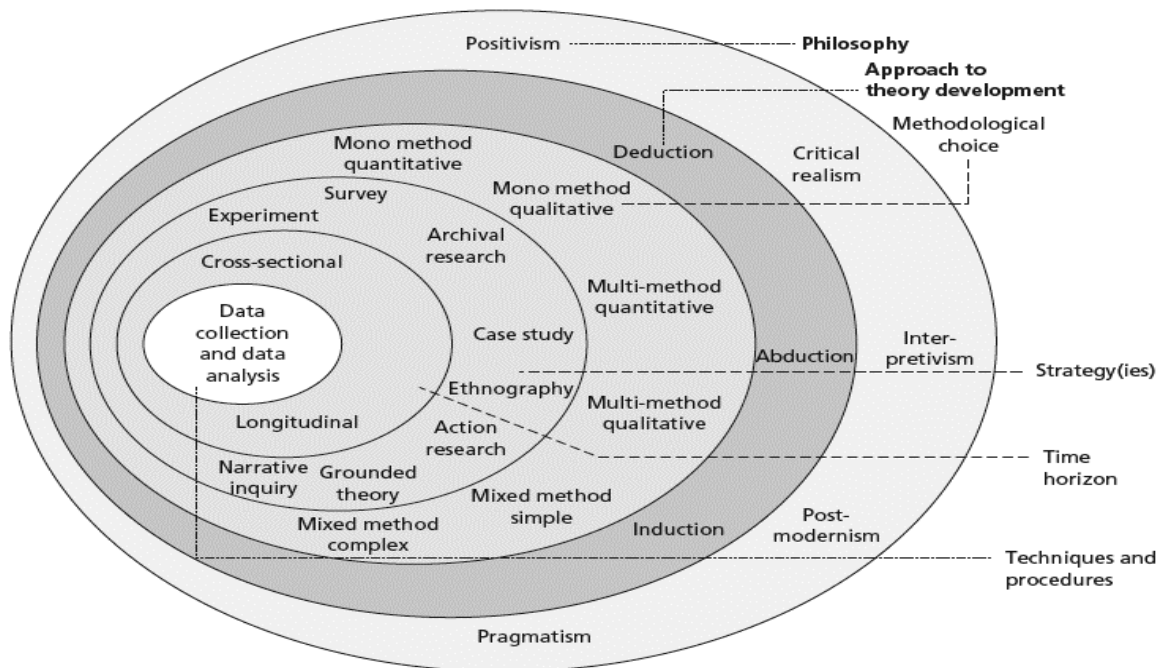
Figure 4-1: The research onion (Saunders, Lewis & Thornhill, 2015)

The other source that will be utilized in this chapter is the work of Maylor and Blackmon (2005), in which they defined the hierarchy of steps in the research process as follows: research

approach, research philosophy, research perspective, research methodology, research design, research method, research tools and techniques, data, and analysis. This hierarchical structure is shown in Figure 4-2.
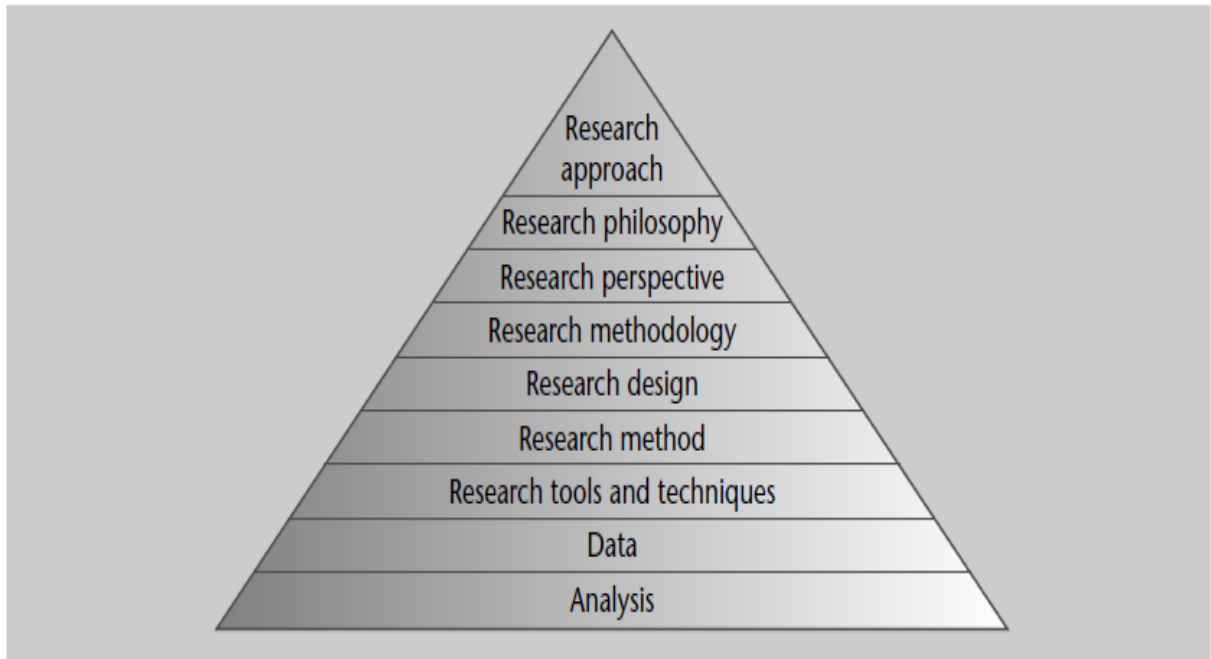
Figure 4-2: Research hierarchy (Maylor & Blackmon, 2005).

The following chapter presents the research hierarchy steps based on the sequence illustrated Following the hierarchies highlighted in the research onion by Saunders, Lewis & Thornhill (2015). This chapter discusses the research design and methodology, and their relevance to the research topic- building the resilience of the public sector in the face of emergent events- for this study.

4.2 Definition of Research Design and Methodologies

According to (Maylor and Blackmon, 2005), the research design describes the process of collecting, analyzing, and interpreting data to answer the research questions, and research

methodology refers to the perspective from which phenomenon in the world is studied. Similarly, Saunder, Lewis, and Thornhill (2015) described research design as including methodological choice, research strategy, and time frame while research methodology to the theory of how research should be undertaken. They also differentiated between research method and methodology, defining research method as techniques and procedures used to obtain and analyze data. Data collection methods include questionnaires, direct observation, and interviews, and data analysis methods can be quantitative (statistical) or qualitative (non-statistical). Table 4-1 illustrates the definition of research design and methodology from two sources (Maylor & Blackmon, 2005; Saunders, Lewis & Thornhill, 2015).

Table 4-1: The definitions of research design and methodology by two resources (Maylor & Blackmon, 2005; Saunders, Lewis & Thornhill, 2015).

Terminology	(Maylor & Blackmon, 2005)	(Saunders, Lewis & Thornhill, 2015)
Research design	Used to describe how you will collect, analyse and interpret information to find out more about your research problem	Including methodological choice, research strategy and time frame
Research methodology	It describes how to translate the research perspective into a way of studying the world	Refers to the theory of how research should be undertaken

The research design and methodology for this study are based on the qualitative research process described by Saunders, Lewis, and Thornhill (2015) and is illustrated in Figure 4-3.
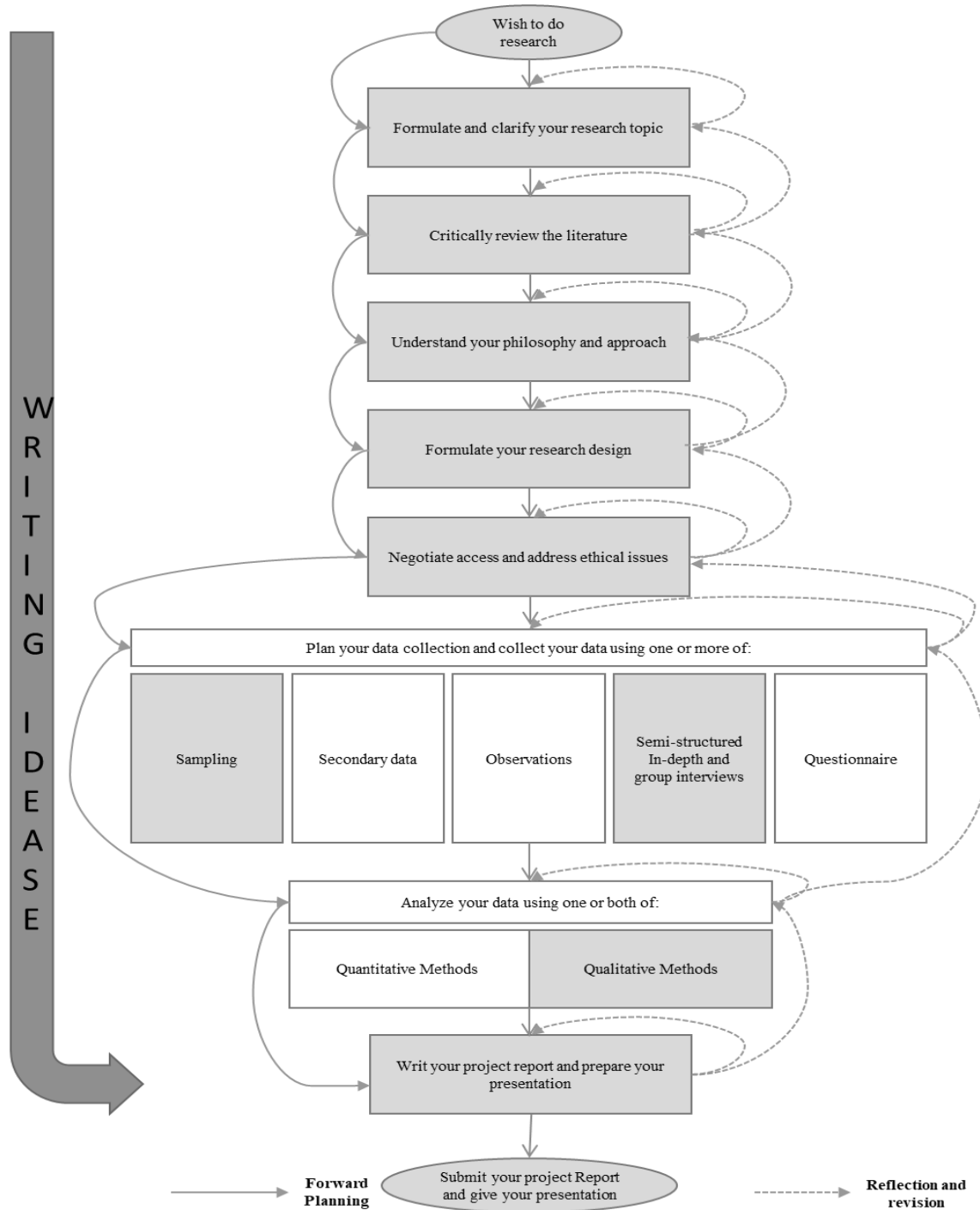
Figure 4-3: Research process, adopted from Saunders, Lewis, and Thornhill (2015).

4.3 Research Philosophy

Research philosophy as a term refers to a system of beliefs and assumptions about the development of knowledge (Saunders, Lewis & Thornhill, 2015). The research philosophy is linked with the beliefs and assumptions of the researcher and is embedded into the research design.
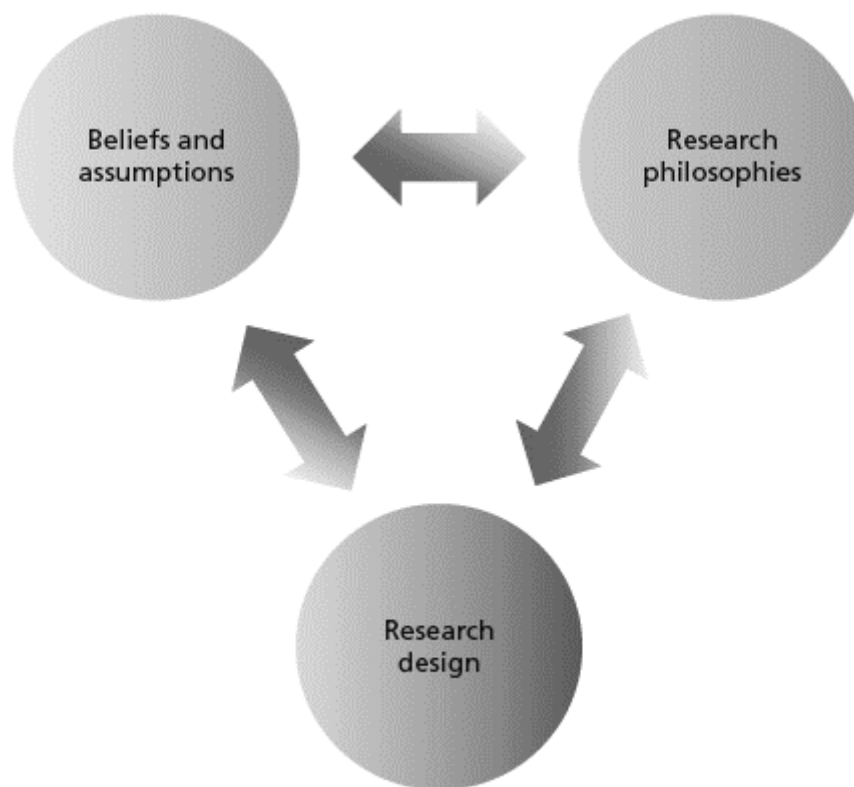
Figure 4-4: A reflective process for developing the research philosophy adopted from Saunders, Lewis, and Thornhill (2015).

The following are three research philosophies based on different perspectives about reality:

    1- **Ontology:**   This refers to assumptions about the nature of reality and has been a subject of debate among scholars and philosophers (Easterby-Smith, Thorpe & Jackson, 2012; Runeson & Skitmore, 2008; Saunders, Lewis & Thornhill, 2015). Ontology is

derived from two Greek words *onto* which means being, and *logos* which means knowledge (Gill & Johnson, 2002). Researchers based their studies on either assumption of objective reality or assumptions of subjective reality (Easterby-Smith, Thorpe & Jackson, 2012). Reality is said to be objective when it is perceived as existing independent of its environment, and subjective if it changes based on the perspectives of those viewing it, that is, subjective reality exists in our minds only as a construct (Runeson & Skitmore, 2008). To distinguish between the types of realities, Saunders, Lewis & Thornhill, (2015), defined objective reality as objectivism, and subjective reality as subjectivism. The concepts being investigated in this study are considered elements of subjective reality as their definition and characterisation changes depending on the perspectives and worldview of the stakeholders involved. For example, while some researchers view disruptive events as something negative that undermines performance, some others view disruptive events as windows of opportunity to change the status quo and bring about improvements. In the same vein, some view resilience as a reactionary quality that is developed in response to adverse events, others consider resilience as a feature of organizational performance and behaviour that can be proactively developed (Megele, 2014; World Economic Forum, 2017).

2- **Epistemology:** After assuming the nature of reality (ontology), we need methods of inquiry to acquire knowledge about the world. Epistemology is the philosophy that undergirds how we use and obtain knowledge of the world around us (Easterby-Smith, Thorpe & Jackson, 2012) . Epistemology is derived from two Greek words; *episteme* which means knowledge or science, and *logia* meaning logical discourse or theory or information or account (Gill & Johnson, 2002). Though there are many definitions of epistemology documented in literature, this study will adopt the definition of

epistemology as assumptions about knowledge and its communication by Saunders, Lewis & Thornhill, (2015). In their definition, they distinguished between objective knowledge, referred to as positivism, and subjective knowledge referred to as interpretivism. This study considers the role of both epistemological viewpoints in the development of a resilience framework.

3- **Axiology:** Refers to the role of values and ethics in research (Saunders, Lewis & Thornhill, 2015). The term axiology is coined from Greek words; *axios,* which means worthy, and *logos* which means *science.* Axiology has also been called the Theory of Value*,* or the philosophical study of goodness or value (The Editors of Encyclopaedia Britannica, 2015). Its significance lies in that it has given to the meaning of the term value and the unification that it has provided for the study of a variety of questions that had often been considered in relative isolation. Another section for the ethical considerations of this research will be discussed later in this chapter.

On the other hand, research philosophies can be differentiated in terms of objectivism and subjectivism assumptions. The former is related to assumptions of natural science, while the latter is related to assumptions of humanities and arts (Long et al., 2000).

Furthermore, Saunders, Lewis & Thornhill (2015, pp 151) identified also five main philosophies underpinning research philosophies, namely: critical realism, positivism, interpretivism, pragmatism, and postmodernism. All these philosophies are related to what to see, and experience, natural scientist, humans are different, adopting a wide range of research strategies, and language and power of relations.

This research is premised on the ontological assumption of subjective reality and the epistemological viewpoint of interpretivism. These perspectives are adopted because the

research purpose, which is to develop a resilience framework for the public sector, lends itself to interpreting the subjective reality of resilience as perceived by the study participants.

4.4 Research Approach

The section provides an overview of three main research approaches and ends with a discussion of which approach to be utilized in this study. These three approaches are as following (Saunders, Lewis & Thornhill, 2015):

1- Deduction: this approach involves developing a hypothesis within a theory and designs a research strategy to test the hypothesis. Based on the results obtained the hypothesis is either rejected or accepted. The deductive approach, as a highly structured approach, is driven by scientific principles, and typically uses quantitative data.

2- Induction: under this approach, a theory is developed after collecting and analysing data. The theory or conceptual model is built by collecting and analysing data to explore a phenomenon by identifying whether a relationship exists between variables that represent the phenomenon. This approach typically uses qualitative data which provides a rich understanding of the context and the phenomenon from the perspective of the study participants. It is important to note that the findings from studies that use this approach cannot be generalized.

3- Abduction: under this approach, data is collected and analysed to explore a phenomenon, define themes, and explain patterns. Often, this process is used to generate a new theory or update an existing one after testing through additional data collection.

A comparison of these research approaches is shown in Table 4-2:

Table 4-2: A comparison of research approaches (Saunders, Lewis & Thornhill, 2015).

	Deduction	**Induction**	**Abduction**
Logic	"In a deductive inference, when the premises are true, the conclusion must also be true."	"In an inductive inference, known premises are used to generate untested conclusions."	"In an abductive inference, known premises are used to generate testable conclusions."
Generalisability	"Generalising from the general to the specific"	"Generalizing from the specific to the general"	"Generalising from the interactions between the specific and the general"
Use of data	"Data collection is used to evaluate propositions or hypotheses related to an existing theory."	"Data collection is used to explore a phenomenon, identify themes and patterns and create conceptual framework."	"Data collection is used to explore phenomenon, identify themes and patterns, locate these in a conceptual framework and test this through subsequent data collection and so forth."
Theory	"Theory falsification or verification."	"Theory generation and building."	"Theory generation or modification; incorporating existing theory where appropriate, to build new theory or modify existing theory."

The outcome of this research - a theoretical framework of building resilience in the public sector- will be achieved using an abductive approach to qualitative data analysis. An abductive approach is selected for this part of the research because it aims to explore a phenomenon and develop a conceptual framework of the phenomenon applicable to the target population. The study will collect qualitative data guided by known aspects of resilience, followed by an explorative analysis of the data to unearth themes that represent the unknown aspects of resilience. These themes will then be generalized and organized into a conceptual framework of resilience in the public sector, defining the relationships between the specific and the general.

4.5 Methodological choice

Choosing between quantitative, qualitative, or a mixed-method study design depends on your research questions and research objectives. The different study design options available to a researcher are shown in Figure 4-5 (Saunders, Lewis & Thornhill, 2015, p.167).
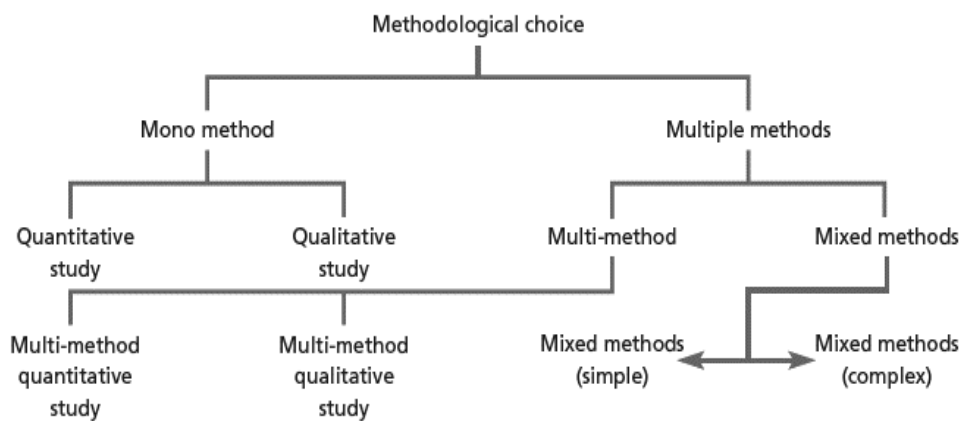
Figure 4-5: The methodological choice graph (Saunders, Lewis & Thornhill, 2015).

Table 4-3 summarises the difference between qualitative, quantitative, and mixed methods research designs based on research philosophy, approach to theory development, characteristics, and research strategies (Saunders, Lewis & Thornhill, 2015, pp 164-174).

Table 4-3: The difference between qualitative, quantitative, and mixed methods research designs.

| | Research Methodology | | |
	Quantitative	**Qualitative**	**Mixed-Method**
Research Philosophy	Generally associated with positivism philosophy	Generally associated with interpretive philosophy	Two philosophical positions that often lead to mixed methods research designs
Approach to theory development	Associated with a deductive approach where the focus is on using data to test theory	Associated with inductive approach to theory development, where a naturalistic and emergent	Use a deductive, inductive, or abductive approach to theory development

91

		research design is used to build theory or to develop a richer theoretical perspective than already exists in the literature	
Characteristics	Examines the relationship between variables that are measured numerically Analysis uses a range of statistical and graphical techniques. Uses data collection techniques like questionnaire	Using a variety of data collection techniques and analytical procedures, to develop a conceptual framework and theoretical contribution	Combined in a variety of ways that range from simple, concurrent forms to more complex and sequential forms
Research Strategies	Associated with experimental and survey research strategies	Associated with a variety of strategies. While these shares ontological and epistemological roots and common characteristics	Combined in a variety of ways that range from simple, concurrent forms to more complex and sequential forms

In addition to the research objectives, this study will use a qualitative study design based on the following reasons:

1- The research is based on ontological assumption of subjective reality (the subjective perspectives of study participants about the concept of resilience) and epistemological perspective of interpretivism (developing a conceptual framework by interpreting and drawing insight from the subjective perspective of study participants).

2- This study uses a mix of inductive and deductive approach to achieve the research aim of developing a theoretical framework of building resilience in the public sector. The deductive approach is used to identify resilience concepts in existing literature from different fields and organize them into a conceptual framework (or concept map) that

will be used to guide the researchers search for new, public-sector specific resilience concepts during the semi-structured interviews. The conceptual framework obtained from this deductive approach (Figure 3-1) is also used to develop opening questions and prompts for the interview guide. On the other hand, the researcher will use an inductive approach to explore the qualitative data obtained from the interviews for emergent themes. These themes will then be incorporated into the conceptual framework in figure 3 to develop a public-sector specific theoretical model of building resilience (Figure 6-4).

3- The research is associated with an abductive approach to theory development, where a naturalistic and emergent research design is used to develop a richer theoretical perspective about building resilience in the public sector. This approach also collects additional data to create a new theoretical framework about building resilience in the public sector (Figure 6-4) by updating the conceptual framework that was developed (Figure 3-1) based on data that already exists in the literature.

4- This research will investigate resilience characteristics that are needed by the public sector to effectively respond to emergent events with a qualitative study design in which a variety of data collection techniques and analytical procedures will be used to develop a conceptual framework and theoretical contribution.

4.6 Research Design

Saunders, Lewis & Thornhill, (2015). define research design as the general plan of how you will answer your research question(s). This plan will contain clear objectives derived from the research question(s), a description of sources from which data will be collected and the protocol for data collection and analysis, and a discussion of ethical issues and constraints (e.g., access

to data, time, research sites, and funds) the researcher will encounter (Saunders, Lewis & Thornhill, 2015).

Identifying the purpose of the research design

According to Saunders, Lewis & Thornhill, (2015), there are five kinds of study designs depending on the purpose of the research. These are:

1- Exploratory studies: These studies are designed to discover what is happening and to get more insight into a topic of interest. Usually, this study design is applied to research questions beginning with 'how' or 'what,' and used to improve understanding of a phenomenon, issue, or problem. Data can be collected in exploratory research via interviews or literature search. Exploratory studies have the advantage of being flexible and adaptable to change to accommodate a change in research direction if the need arises. The exploratory research starts being broad; then, it narrows as we progress in the research.

2- Descriptive studies: a type of studies used to gain an accurate profile of events, persons or situations. Usually, these studies are associated with research questions beginning with 'what' or 'who' or 'when' or 'where' and sometimes with 'how'. Descriptive studies may be done before or after exploratory studies.

3- Explanatory studies: These studies are focused on understanding causal relationships between variables. These studies seek to answer the question of why' or 'how' and may use qualitative or quantitative methodologies.

4- Evaluation studies: These studies are used to understand how well something works. They are used to answer questions like 'how' or 'what' or 'to what extent.' These studies are usually used in business to assess the effectiveness of an organization or business

strategy or policy or program or initiative. Evaluative studies may produce a theoretical contribution where the emphasis is placed on understanding effectiveness and then comparing it to existing theory.

5- Combined studies: These studies combine more than one study design, and usually use unstructured interviews to facilitate the data collection.

This study will use a qualitative explorative study design as it aims to improve our understanding of how public sector organizations can build resilience to respond to emergent disruptive events. The following sections describe the study objectives based on the research questions, data collection methods, and ethical issues as it relates to this qualitative study.

4.6.1   Study Objectives

The following three objectives are specified for conducting the explorative qualitative study to build the resilience of the public sector in the face of emergent event:

1. Systematic review of literature to extract resilience characteristics and strategies applicable to the public sector.

2. Identify emerging events that are stressors for public sector organizations and map these events into resilience strategies.

3. Develop and validate an adaptive framework to imbue resilience into the decision-making process of public sector organizations when faced with disruptive events.

4.6.2   Data Collection

Saunders, Lewis & Thornhill, (2015) define data collection methods as the tools and techniques used to collect research data in line with the study design, methodology, and research philosophy. The methodology selected for this research is qualitative, and data will be collected

via interviews. Using interviews to collect data is a powerful tool in qualitative studies (Kvale, 1983), and the advantages of using this data collection method in this study are highlighted below:

1. Understanding the participants' constructs and opinions of the resilience concept in general and their perceptions of resilience in the public sector.

2. Developing new ideas for the model / conceptual framework- an expected outcome of this research

3. Obtaining knowledge about resilience from participants, how to implement resilience thinking in the public sector context.

4. Examining the assumptions and ideologies of personnel about resilience in the public public policysector.

There are different typologies of Interviews used in qualitative research. These typologies can be based on the structure of the interview, that is, structured, semi-structured, and unstructured interviews, or based on the standardization of the interview, that is, standardization or non-standardized interviews (Saunders, Lewis & Thornhill, 2015). Another typology is based on the parties involved in the interviews, that is, respondent and informant (Powney & Watts, 2018). The typology based on the structure of interviews is the most common categorization in literature. Table 4-4 illustrates the primary differentiation between structure, semi-structured, and unstructured interviews, according to Saunders, Lewis & Thornhill, (2015).

Table 4-4: The primary differentiation between structure, semi-structured, and unstructured interviews (Saunders, Lewis & Thornhill, 2015).

Interview Type	Description
Structured	• Use questionnaires based on a predetermined and 'standardised' or identical set of questions and we refer to them as interviewer-completed questionnaires.

	• You would read out each question and then record the response on a standardised schedule, usually with pre-coded answers. • While there is social interaction between you and the respondent, such as the preliminary explanations that you will need to provide, the questions should be asked exactly as written and in the same tone of voice so that you do not indicate any bias.
Semi-Structure	• The researcher has a list of themes and possibly some key questions to be covered. • The questions may vary from interview to interview. • The order of questions may also be varied depending on the flow of the conversation. • Additional questions may be required to explore the research question and objectives. • The nature of the questions and the ensuing discussion mean that audio recording the conversation or perhaps note taking will capture data. • The interview schedule will also be likely to contain some comments to open the discussion, a possible list of prompts to promote and further discussion, and some comments to close it.
Unstructured	• There is no predetermined list of questions to ask. • You need to have a clear idea about the aspect or aspects that you want to explore. • The interviewee is given the opportunity to talk freely about events, behaviour, and beliefs in relation to the topic area.

Furthermore, the type of interview selected can be based on the purpose of the research, as shown in Table 4-5.

Table 4-5: Selection of interview type based on the research purpose (Saunders, Lewis & Thornhill, 2015).

	Exploratory	Descriptive	Explanatory	Evaluative
Structured		✓✓	✓	✓
Semi-structured	✓		✓✓	✓✓
Unstructured	✓✓			✓

✓✓ = more frequent, ✓ = less frequent

The semi-structured interview is selected for data collection in this study due to its exploratory nature. Semi-structured interviews are used in qualitative research to collect qualitative data by

initiating discussions to understand the 'what', 'how,' and 'why' of the research topic from participants' perspective. In the context of this research, this will enable a better understanding of the concept of resilience in the public sector from the perspective of subject- matter experts in the field. The semi-structured interview depends on specific themes or questions to be addressed during the data collection sessions that were previously identified in the literature (Chapter 2) and illustrated in chapter 3. Furthermore, as there is a possibility of identifying additional themes during data analysis, semi-structured interviews give the researcher flexibility to rephrase the questions or to ask additional questions based on findings from the interviews. This will enable the researcher to collect rich data and gain a robust understanding of the concept under study to fulfil the research objectives. Also, semi-structured interviews will address the language issue as some interviewees are not native English language speakers.

4.7 Designing interviews and data recording protocols

Designing and conducting semi-structured interviews in this research will follow the nine steps as defined by Creswell (2013) as shown in Figure 4-6:

1- Decide on research questions

2- Identify interviewees

3- Determine the type of interview

4- Using adequate recording procedure

5- Design interview protocol

6- Refine interview questions by pilot testing

7- Determine the place to conduct the interview

8- Obtain consent from the interviewees

9- Use good interview procedure during the interview
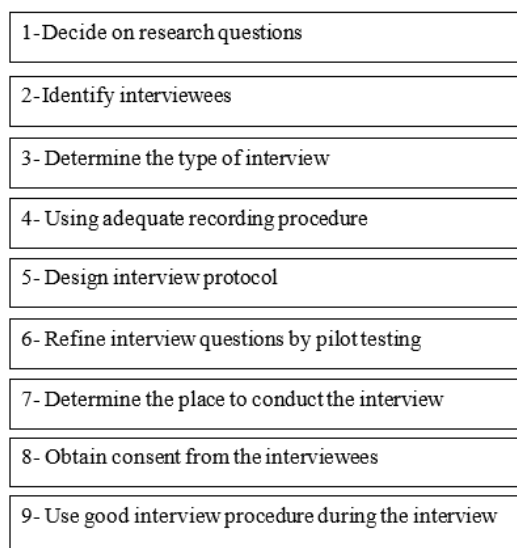
Figure 4-6: The nine steps to conduct semi-structured interviews (Creswell, 2013).

The application of these steps to this study are discussed in detail below.

4.7.1 Decide on research questions

The purpose of this study is to explore how public sector organizations can build resilience capacities and capabilities into their decision making and planning processes as part of their preparedness to confront disruptive events and future uncertainties. The study will be guided towards achieving this purpose using the following research questions:

1. How can public sector organizations anticipate and recognize emerging events?
2. What strategies do public sector organizations use to deal with emerging events?
3. How can public sector organizations build their resilience capabilities and capacities to anticipate, monitor, respond effectively to, and learn from emerging events?

The interview questions were drafted based on the themes identified in the literature review, as illustrated in Figure 2-32 and the theoretical framework for this study, as illustrated in Figure 3-1. Figure 4-7 illustrates the mind map graph for the identified themes, which shows the logic behind the sequence of themes guiding the interviews.
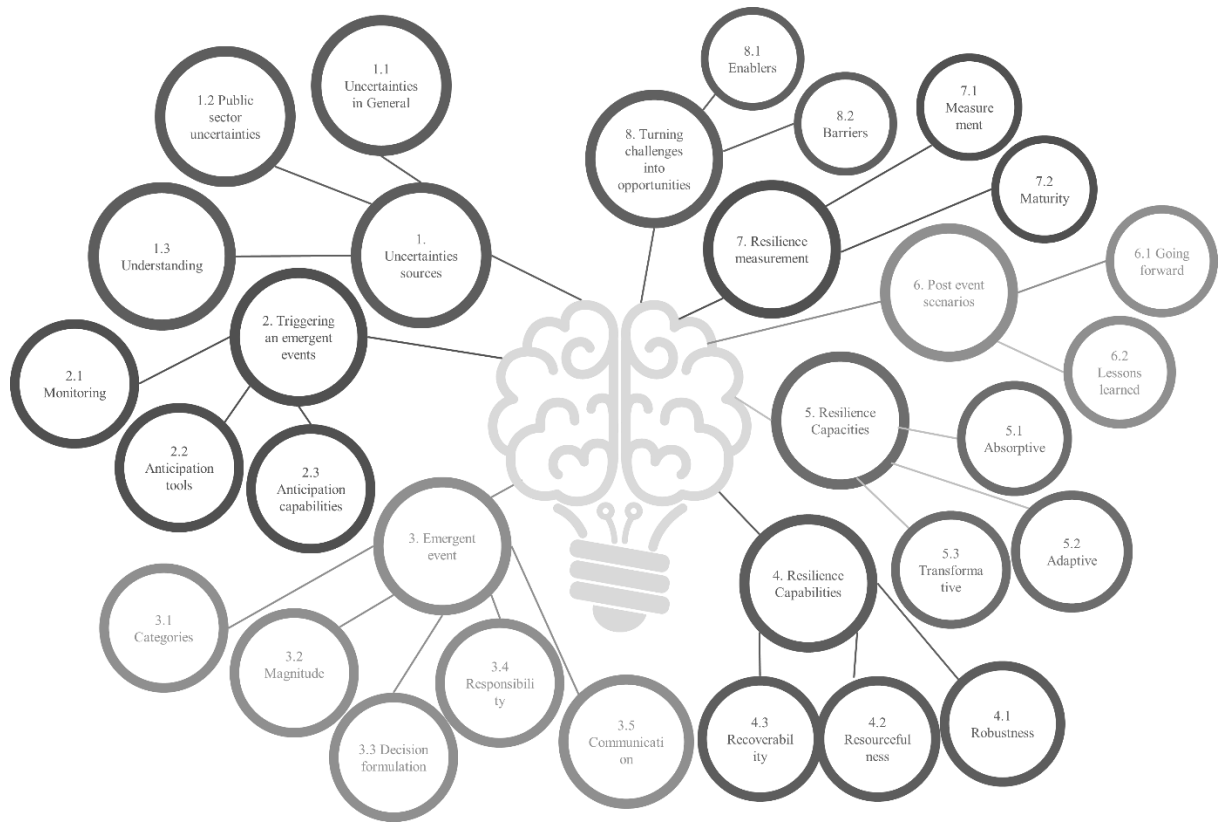
Figure 4-7: Mind map of the identified research themes

Using mind maps to assist researchers in qualitative research was extensively discussed in the literature (Burgess-Allen & Owen-Smith, 2010; Wheeldon, 2011; Wheeldon & Ahlberg, 2019). Mind maps are diagrams used to represent concepts, ideas and themes and arrange them around a central topic. Furthermore, mind maps are strong tools to assist researchers in framing and designing the data collection tools for qualitative research, as discussed by Wheeldon and Faubert, (2009). They argued that mind maps have the power to visualize concepts and themes in a better way that will enable researchers to centralize in systematic structures that will facilitate the design of the qualitative research method.

The following is a discussion of identified themes. The themes are drafted based on the systematic logic illustrated in the mind map above. A list of initial questions to be used during the semi-structured interview will be drafted based on this systematic logic.

100

1- Theme 1 (Uncertainty sources): This theme is about having an introductory understanding of uncertainties in general and uncertainties that affect the public sector.

2- Theme 2 (Triggering an emergent event): This theme is about monitoring uncertainties in the public sector to see if uncertainties transform into an emergent event, the tools that are used to anticipate these transformations, and the capabilities needed in the public sector to enhance the usage of these anticipation tools.

3- Theme 3 (Emergent events): The theme is about investigating the emergent events facing the public sector, the scale and magnitude of the emergent event, the decision formulation process in the affected organizations, defining responsibilities to take action, and diffusion of knowledge and communication of information about emergent events.

4- Theme 4 (Resilience capabilities): This theme will discuss capabilities such as robustness, resourcefulness, and recoverability embedded within the public sector, which enables organizations to face emerging event effectively, such as robustness, resourcefulness, and recoverability.

5- Theme 5 (Resilience capacities): Three capacities were identified within this theme to face an emergent event within the public sector. These capacities are absorptive, adaptive, and transformative.

6- Them 6 (Post-event scenarios): This theme explores the options available to the public sector after a disruptive event. In addition, this theme provides a mechanism to identify the proper method to capture the lessons learned from the disruptive experience and deploy them within the system.

7- Theme 7 (Resilience measurement): This theme will explore the mechanisms for measuring resilience within the public sector and investigates if this measurement system can be structured within a maturity model or not.

8- Theme 8 (Turning challenges into opportunities): This theme explores enablers in the public sector that are needed to turn a disruptive event into opportunities. It also investigates barriers to having this positive thinking within the government.

Successfully conducting qualitative research through semi-structured interview depends on having a reliable interview protocol that will enable the researcher to obtain good quality interview data (Yeong et al., 2018). Researchers can follow different techniques to prepare the interview protocol, but the heart of any qualitative research study is to elicit the subjective experiences and perspectives of study participants (Jacob & Furgerson, 2012). Having proper scripts before the interview begins helps to guide the process and set the stage for quality data collection. The interview protocol should have the participant information sheet that illustrates how the interviewer introduces himself or herself to the interviewee in addition to a brief about the study, the implications for participation, and contact details of the participants in case the need arises for further clarification (Rabionet, 2011). The first part of the participant information sheet is very important to give a brief about the topic and motivation for its importance. The following is the introduction to this study presented to the participant in the information sheet.

"We are living in a world of uncertainties as to future challenges such as the fourth industrial revolution, change in economic structures, security challenges, and other social cohesion challenges are forcing the public sector to build its resilience in the face of emerging events that may occur. The resilience concept is emphasized by the eight principles of Dubai to strengthen its growth and tolerance issued by His Highness Sheikh Mohammed Bin Rashed Al Maktoum in early 2019, and one of these principles is considering having a credible, resilient, and excellent government as one of the three factors that are driving the global growth of Dubai".

The other parts of the participant information sheet include a brief description of the research, the researcher's name and the university, research questions, and implications for participation. The following is a description of the implications for participation in this research presented to participants.

"There are no risks involved in participating in the study. All data points will be coded and anonymized so that no individuals or organizations can be identified in the analysis and publications of the findings. The information taken through the interview will be kept confidential, your participation is voluntary, and you have the right to withdraw at any time without giving a reason. The interview will be audio-recorded unless you give instructions to the researcher to take notes only".

Drafting of interview questions for a qualitative study depends on the researcher's knowledge of the research topic (Castillo-Montoya, 2016). Creating effective semi-structured interview questions should include the following elements: questions asked should be open-ended to give the interviewee the opportunity to respond using their own terms, questions should be neutral as much as possible to avoid influencing the interviewee to give answers that could have been intuited, each question asked should be related to certain aspects of the concept the researcher wants information about, questions should be asked clearly using unambiguous words, especially when asking about "why." In drafting semi-structured interview questions, it is very important to do that in a coherent ordering (Leech, 2002; Turner III, 2010). Questions are ordered such that the interview begins with general and simple questions, and the questions most pertinent to your research topic are asked in the middle of the interview. Also, it is important to be flexible enough in the ordering of questions in a semi-structured interview as you may need to skip certain questions or ask questions out of order you have planned based on the answers you get from the interviewee (Dearnley, 2005). Meanwhile, this type of research

that aims to explore public sector resilience to emerging events by assessing the knowledge and perspectives of interviewees about the concept of resilience lends itself to a semi-structured interview of the descriptive/interpretive type (McIntosh & Morse, 2015).

Based on the above eight themes identified in this study as an outcome from the mind map graph in Figure 4-7, Table 4-6 shows the questions to be used during the semi-structured interview with the purpose of each set of questions embedded within each theme.

Table 4-6: The relationship between the main themes of the research and interview questions.

Theme	Interview questions	Purpose of each set of the interview questions within each theme
Theme 1 (Uncertainty sources)	• As you know, we are living in a world that is surrounded by uncertainties due to accelerated and emergent technological, economic, social, and other factors. Can you tell me your insights within this regard? • How do you think these uncertainties are affecting the way the public sector is operating? • Do you think that some of these uncertainties will affect the public sector more than others? • In your opinion, what are the main causes of these uncertainties? (Why we are not certain about various things in the public sector).	To start an introductory overview of the uncertainties surrounding us in general and uncertainties affecting the public sector. In addition to having an initial insight about the understanding of these uncertainties.
Theme 2 (Triggering an emergent event):	You spoke about some of the uncertainties that surround us, and obviously, some of these uncertainties will scale up to transform into an emergent event that needs us to give more attention to it: • How will we know uncertainty may transform to an event? • What tools the public sector can use to predict this transformation? • How can we ensure that we are using the appropriate tools? • What the public sector should do, in terms of building capabilities, to properly use these tools?	To understand what tools the public sector can use for anticipating an emergent event and if monitoring systems and tools within the public can identify the transformation of uncertainties into an emergent event. The other part of the questions will investigate the potential tools the public sector can use to predict emerging events, validation of these tools and building capabilities to ensure proper usage of these tools.

Theme 3 (Emergent events):	Earlier, we spoke about emergent events that may face the public sector due to the uncertainties surrounding us. • Can you tell me more about the most common types/categories of emergent events facing the public sector? • How do we assess the magnitude of this event (Scale Up)? • What are the scenarios possible for you, do you wait for more data, do act in a similar way for all events, do you wait until the situation resolve itself? • If decided to take an action, how to define responsibilities to take action (Do you form teams, do you put an initiative, do you change your structure, policies, define certain unit, etc.) (Small scale vs big scale events) • How you ensure proper diffusion of the knowledge of the emergent event (spreading the knowledge in multi-dimensions).	The purpose of these set of questions is to get understanding of how we can categorize emerging events facing the public sector, how to assess the magnitude and the escalation of an emergent event, the first response strategy, defining responsibility to take action, and diffusion of knowledge about the emergent event to various stakeholders.
Theme 4 (Resilience capabilities):	How we develop our strategies to ensure the following: • During an event, what do we do to ensure that we are able to maintain our key operations or do the critical things we used to do? • How can we ensure within our strategies that our resources have the appropriate skills to manage the disruption event? • How can we build our strategies to ensure the quick and efficient recovery after an event?	To identify the strategy for building capabilities to face emergent events including robustness, resourcefulness, and recoverability. In addition to the relationship between strategies to face emergent events and the link between the action strategy and the overall strategy of the government or the government organization. This theme will also address how to balance between different factors of efficiency and effectiveness when facing an emergent event.
Theme 5 (Resilience capacities):	• How can we ensure that our system in the public sector is having the proper first line of defence to react to an emergent event? (Absorb) • How can we ensure that our systems in the public sector can do adjustments to ensure we are flexible enough to live with an emergent event? • How we learn from this event to change from the status quo to be different (positive and negative) to change our structures and the way we are doing work to change to something else?	To address which capacity is more appropriate to be used in the public sector in the face of emergent events. In addition to investigating if one of these capacities are more appropriate based on the type of government organization (service provisioning or policy making).

Theme 6 (Post event scenarios):	• Post a disruption event, what is the most likely scenario the public sector can do to go forward? (Retrench, expand, invest in new technologies, etc.). • How can we ensure that we have properly captured the lessons learned from our experience in managing the emergent event?	To investigate the scenarios the public sector can go after a disruption event, in addition to the learning mechanisms to improve the government system in the future.
Theme 7 (Resilience measurement):	• How do you think we can measure resilience at the public sector? • Can you tell me more if a scale for measuring resilience or its maturity will be appropriate to be implemented more at the government level or at the organizational entity level?	To identify the components of resilience measurement in the public sector and if a maturity model is a suitable tool to assess the resilience of the government in general and for the public organizations.
Them 8 (Turning challenges into opportunities):	If we can now explore more about how to turn disruptive events into opportunities in the public sector: • What are your insights about emerging events, do you think that they only have negative influences, or we may look at them as a window for a new opportunity? • What enablers should we have at the government level to turn the disruptive event into an opportunity? • What are the barriers at the government level that prevent this? • What enablers should we have at the organizational level to turn the disruptive event into an opportunity? • What are the barriers at the organizational level that prevent turning disruptive events into opportunities?	Getting insights about how the government sector can encourage the positive thinking of turning challenges into opportunities and what are the enablers to enable this transformation and the barriers that are preventing this transformation at the government level and at the government organizational level.

There are four steps to be followed before finalizing the interview protocol. The first step is to ensure that the interview questions are properly mapped to the research questions (Castillo-Montoya, 2016). A matrix was created to ensure that interview questions are mapped to main themes and properly distributed to address all the research questions. This matrix is shown in Table 4-7.

Table 4-7: Relationship between the identified themes and the research questions.

	Background Information	RQ1: How emerging events facing the public sector can be recognized?	RQ2: How resilience strategies in the public sector can deal with emerging events?	RQ3: How adaptive capabilities & capacities in the public sector can be elevated to effectively absorb and respond to emerging events?
Introduction	X			
Title	X			
Education	X			
Total work experience	X			
Total work experience in the public sector	X			
Do you currently hold a management position or an advisory/consultancy type position?	X			
1.0 Theme 1: Uncertainty sources				
1.1 General Uncertainties surrounding us (Global & Local)		X		
1.2 General uncertainties more influencing the public sector (Internal & external)		X		
1.3 Causes of uncertainties in the public sector		X		
2.0 Theme 2: Triggering an emergent event				
2.1 Tools (used) to predict the transformation		X	X	
2.2 Building capabilities to use these tools		X		X
2.3 What to do if uncertainty is identified to be as an event		X	X	
3.0 Theme 3: Emergent event				
3.1 Categorize of emergent events facing the public sector		X		
3.2 Magnitude of emergent event		X	X	
3.3 Formulating decision to take action		X	X	
3.4 Defining responsibility of taking action		X	X	

3.5 Diffusion of emergent event		X	X	
4.0 Theme 4: Resilience capabilities				
4.1 Robustness			X	
4.2 Resourcefulness			X	
4.3 Recoverability			X	
5.0 Theme 5: Resilience Capacities				
5.1 Absorptive capacity				X
5.2 Adaptive capacity				X
5.3 Transformative capacity				X
6.0 Theme 6: Post event scenarios				
6.1 Going forward (Retrench)			X	
6.2 Lessons Learned			X	
7.0 Theme 7: Resilience measurement				
7.1 Scale for measuring resilience			X	
7.2 Maturity levels or readiness techniques			X	
8.0 Theme 8: Turning disruptive events into opportunities				
8.1 Enablers in the public sector			X	X
8.2 Barriers in the public sector			X	X
Closing	X			
Thanks	X			
Sharing the outcome	X			

4.7.2 Identify interviewees and sampling strategy

Another consideration in selecting semi-structured interviews for this research is the flexibility it gives the researcher to select interviewees and determine who should and should not be included as research participants (Bryman, 2016). Although many researchers argue that the term *"sampling"* in qualitative research is not giving the appropriate meaning to such type of studies, but sampling is used to cover the *"generalizability"* of qualitative research. This means that the qualitative research sample is general to drive conclusions that are general to the

population of the study (Stenbacka, 2001). Despite all of that, the method used for sampling in this study is the non-probability sampling technique. This technique is used to select study sample for exploratory studies where the data to be collected is a subjective perception of study participants about a topic, as it gives the researcher flexibility to select a convenient sample of participants that can provide the data required to answer the research questions (Saunders, Lewis & Thornhill, 2015). As a researcher, there is a need to balance between credibility, available resources, and what will be useful in such type of these studies (Patton, 2002). Furthermore, Saunders, Lewis & Thornhill, (2015,pp296) illustrate the non-probability sampling techniques, as shown in Figure 4-8:
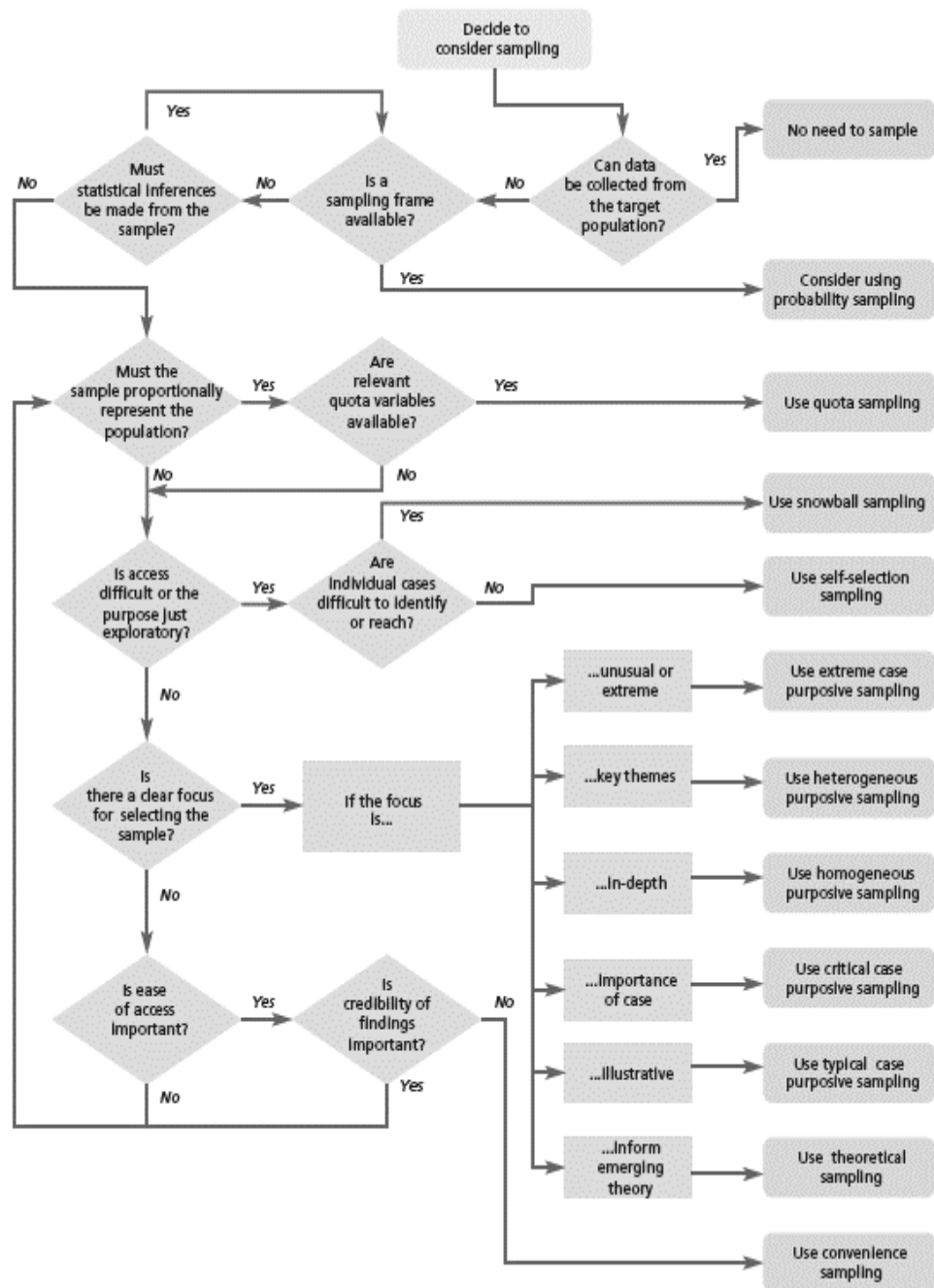
Figure 4-8: Non-probability sampling technique (Saunders, Lewis & Thornhill, 2015).

Furthermore, non-probability sampling techniques types consists of three main categories: quota, convenience, and snowball sampling (Bryman, 2016; Creswell, 2013; Easterby-Smith, Thorpe & Jackson, 2012; Saunders, Lewis & Thornhill, 2015). Quota sampling is used in a

specific population with interview-administered questionnaires (Bryman, 2016; Saunders, Lewis & Thornhill, 2015). Since this research will collect data from experts in the public sector exploring resilience to emerging events, it is not appropriate to use quota sampling as the study population is not defined; any subject matter expert working in the public sector either in UAE or any other country can be included in the study sample. The second type of non-probability sampling techniques is convenience sampling, where the researcher selects interviewees who are easy to obtain (Creswell, 2013; Easterby-Smith, Thorpe & Jackson, 2012). Convenience sampling was used in this research as the researcher has a very good relationship with public sector subject matter experts in the UAE or Jordan as part of more than 20 years of experience in this field. The last type of non-probability sampling is the snowball type where the researcher gets the benefit of the first interview to ask the interviewee to recommend other subject matter expert that can be interviewed (Miller & Salkind, 2002). This is a very constructive approach as it uses persons who have already being interviewed to recruit other subject matter experts who can provide more valuable data for the study. The script used at the of the first cycle of the interviews stated the following *"I will be very grateful if you can provide me with your feedback of how I can further enhance this interview and for recommendation for any subject matter expert you can refer me to in order conduct a similar interview"*.

This study used a mix of the two types of non-probability sampling: convenience and snowball. Defining the number of interviews to be conducted depends mainly on data adequacy, and this depends on the minimum number of interviews to be conducted and the sufficiency of data for analysis. According to McIntosh & Morse, a minimum number of thirty participants is considered adequate for conducting qualitative research using semi-structured interviews (McIntosh & Morse, 2015). Other researchers have suggested that for qualitative research to be published, between 20 to 30 study participants are needed. Furthermore, selecting the

appropriate sample size depends on the appropriateness of the data collected. Since sampling is a purposive one, the researcher must decide if the data collected adequately represents the phenomenon under investigation (Warren, 2002).

On the other hand, DeJonckheere & Vaughn (2019) discussed sampling in qualitative research using semi-structured interviews. They argued that it is difficult to define a sample size as the sample size is influenced by the number of interviews required to fully answer the study's research questions. They highlighted the number of participants required to reach thematic saturation as a common standard for determining sample size in qualitative research. Thematic saturation refers to that point in data collection where the researcher is convinced that there is no new thematic information generated for each additional interview conducted (DeJonckheere & Vaughn, 2019). In purposive sampling, it is important to ensure a variety of responses while considering the sample size of qualitative research, which means that the researcher should include participants with varied backgrounds in the selected sample.

Based on the previous discussion, and since the resilience concept is a very general topic, the researcher targeted conducting thirty-five interviews considering the variety of participants from different types of public sector organizations and the different specialities. Two extra interviews were added to ensure the theme saturation has been achieved. Therefore, a total of thirty-seven subject matter experts were interviewed for this study. There were two main groups of participants; the first group were participants drawn from the centre of government organizations and the other one coming from public sector service-providing organizations. Centre of government organizations is public sector entities that develop strategies, policies, frameworks or provide resources to service-providing organizations to enable them to provide their services. Service-providing public sector organizations are public sector entities that provide government services like energy, transportation, and licensing to the end customers.

Table 4-8 shows the speciality of the 37 interviewed experts based on the category of the public sector organization.

Table 4-8: Profile of participants based on public sector organization type.

Type of public sector organization	No. of interviewed subject matter experts
Centre of government	19
Public sector service-providing organizations	18
Total	**37**

Another categorization for the participants is based on their speciality or their current government organization speciality. Table 4-9 illustrates the profile of the participants based on the speciality.

Table 4-9: Profile of participants based on the speciality.

Speciality of participant	No. of interviewed subject matter experts
Strategy Management	2
Energy	4
Aviation	1
Economy	4
Government Systems	2
Education	3
Transportation	3
Information Technology	2
Security	2
Government Finance	1
Environment	1
Governance and Government Transformation	5
Government Project Management	1
Government Communication	1
Health	1
Policy and Strategy	2
Food Control	1
Infrastructure	1
Total	**37**

Participants were required to have at least ten years of management experience in general and a minimum of five years of experience in the public sector. The profiles of the participants are shown in Table 4-10 below:

Table 4-10: Profile of Semi-structured interviewees participants.

Abbreviation	Title	Education	Total Work Experience	Total Work Experience in the public sector	Specialization / Sector	Interview Date	Interview Time
INT01	Consultant	Master	20 years	11 years	Strategy Management	21.11.2019	00:59:28
INT02	Advisor	Master	22	20	Strategy Management	25.11.2019	00:55:08
INT03	Manager	Master/ PhD. Student	24	23	Energy Sector	25.11.2019	01:03:24
INT04	Chief Advisor	PhD.	42	11	Aviation Sector	27.11.2019	01:17:15
INT05	CEO	Master	29	15	Economy Sector	28.11.2019	00:45:54
INT06	Advisor	Master/ PhD. Student	30	12	Government Systems	28.11.2019	00:53.22
INT07	Advisor	Master	14	13	Education Sector	01.12.2019	00:52:36
INT08	Chief Specialist	Master	20	10	Transportation Sector	02.12.2019	00:58:14
INT09	Senior Advisor	PhD.	15	12	Economy Sector	02.12.2019	01:07:09
INT10	Advisor	Master	30	17	Information Technology	03:12:2019	01:08:06
INT11	Specialist	Master/ PhD. Student	19	17	Energy Sector	03.12.2019	00:52:25
INT12	Assistant Manager	Master/ PhD. Student	20	20	Energy Sector	10.12.2019	01:16:50
INT13	Managing Partner	Master	30	12	Security Sector	12.12.2019	02:22:48
INT14	Consultant	Master	22	14	Government Finance Sector	14.12.2019	01:05:21
INT15	Consultant	Master	21	8	Environment Sector	18.12.2020	00:43.61
INT16	Advisor	Master	20	14	Governance and government transformation	19.12.2019	00:52:56
INT17	Senior Advisor	PhD.	35	18	Government Systems	07.01.2020	01:03:46

INT18	Senior Director	PhD.	30	5	Education Sector	11.01.2020	00:44:44
INT19	Chief Consultant	Master	27	7	Security Sector	12.01.2020	00:52:05
INT20	CEO	Master	21	19	Information Technology	16.01.2020	00:41:49
INT21	Senior Consultant	Higher Diploma	16	13	Government Project Management	20.01.2020	01:12:57
INT22	Director	PhD.	18	12	Governance and government transformation	23.01.2020	00:41:21
INT23	Senior Advisor	PhD.	30	25	Economy Sector	23.01.2020	01:00:56
INT24	Analyst	BSc	14	14	Energy Sector	25.01.2020	00:40:44
INT25	CEO	Master	20	12	Transportation Sector	29.01.2020	01:06:13
INT26	Advisor	Master	18	16	Governance and government transformation	29.01.2020	00:36:43
INT27	Specialist	Master	20	10	Economy Sector	01.02.2020	00:42:23
INT28	Assistant Professor	PhD.	13	13	Education Sector	01.02.2020	00:43:28
INT29	Specialist	BSc	20	12	Transportation Sector	01.02.2020	00:52:49
INT30	Advisor	BSc	20	12	Government Communication	04.02.2020	01:00:32
INT31	Advisor	BSc	15	15	Health Sector	06.02.2020	01:04:05
INT32	Consultant	Master	20	9	Governance and government transformation	06.02,2020	00:51:17
INT33	Director	Master	27	27	Policy and Strategy	18.02.2020	00:44:27
INT34	Advisor	Master	15	15	Policy and Strategy	25.02.2020	00:44:39
INT35	Specialist	BSc	20	11	Food Control	29.02.2020	00:38:09
INT36	Advisor	Master	26	19	Infrastructure	05.03.2020	00:47:50
INT37	Senior Consultant	Master	16	10	Governance and government transformation	10.03.2020	00:49.28

4.7.3   Determine the types of interview

Since public sector resilience to emergent events is a poorly understood subject, the decision was made to collect data through interviewing participants. Using interviews to collect data is a powerful tool in qualitative studies, and the advantages for using this data collection method in this study are: 1) to understand the participants' constructs and opinions of the resilience concept in general, and their perceptions of resilience in the public sector, 2) to develop new

ideas for the model / conceptual framework- an expected outcome of this research, 3) to obtain knowledge about resilience from participants, how to implement resilience thinking in the public sector context, and 4) to examine the assumptions and ideologies of public sector personnel about resilience in the public sector (Kvale, 1983).

For this research, a semi-structured interview was selected to collect data. As described by Saunders, Lewis & Thornhill, (2015), semi-structured interviews are used in qualitative research to collect qualitative data through initiating discussions to understand the 'what', the 'how', and to explore the 'why' of a concept or phenomenon. The semi-structured interview is very important in this research as it will enable a better understanding of the organizational resilience concept from the points of view of subject- matter experts in the public sector. Although semi-structured interview depends on specific themes or questions to be addressed during the data collection sessions, it also gives the researcher flexibility to rephrase questions or to ask additional questions based on responses from the participants to gain a better understanding of the topic being studied.

4.7.4 Using adequate recording procedure

During the interviews, two types of recordings will be used. The first one is audio recording using two devices after obtaining permission from the interviewee and addressing any confidentiality concerns the interviewee may have. The other recording is by note taking to ensure focus on the main and emergent themes. These notes will be used to ask clarification questions to improve understanding of meaning. The statement used to seek permission for audio recording was "The interview will be audio-recorded unless you give instructions to the researcher to take notes only". Out of the 37 interviewed participants, only three interviewees did not grant permission for their interview to be audio recorded. For these three participants, a

draft transcript was prepared during the interview and reviewed, and a final transcript was prepared immediately after each one of the three interviews to ensure that the main points were covered.

4.7.5 Design interview protocol

The interview protocol contains four parts. The first part is the participant information sheet that contains an introduction about uncertainties and the resilience topic, name of the research project, name of university, name and contact details of researcher, name, and contact details of director of studies, introduction about the research aim, research objectives and expected outcome, and the confidentiality statement and usage of data, as shown in Appendix II. The second part of the interview protocol contains general information about the interview and the interviewee, as highlighted in Figure 4-9. The third part of the protocol is the interview questions that can be adjusted or modified based on the sequence of the interview. The last part contains a thank you statement to conclude the interview, how the study findings will be shared, any suggestions for improvement, and request to the interviewee to refer the researcher to any other subject matter expert that can be interviewed. The statement used in the script after the interview was as follows: *"I really appreciate your time and dedication to conduct this interview. I have had a new insight that will sure add a lot of value in my research. As earlier stated, all the information captured will be anonymized and there will be no mentioning of any name in the thesis or in the publications. If you are interested, I can share with you key findings of my study after gathering and analyzing data. Meanwhile, I will be very grateful if you can provide me with your feedback of how I can further enhance this interview and for recommendation for and subject matter expert you can refer me to in order conduct a similar interview"*.

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│  Location: _____                │
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│  Interviewee Name: _____                │
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│  Title: _____                │
│                                                               │
│  Organization: _____                │
│                                                               │
│  Education: _____                │
│                                                               │
│  Total work experience: _____                 │
│                                                               │
│  Total work experience in the public sector: ___              │
│                                                               │
│  Current position (Management / consultancy / advisory)       │
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Figure 4-9: General information captured in the interview protocol

4.7.6   Refine interview questions by pilot testing

The initial draft of interview questions was pilot-tested via conducting interviews with three

subject-matter experts with background and profile like those of the actual participants included

in the study. The objective for pilot-testing the interview guide is to obtain more information

and clarifications from potential respondents about the main themes (Table 4-6). The researcher

arranged the pilot interview sessions and agreed on the date, time, and place with the three

selected participants. These interviews were conducted in a comfortable environment with

minimal distraction and low noise. The pilot interview session opened with an informal

conversation between the researcher and the interviewee to build trust, establish rapport, and

enable interviewees to communicate freely and willingly. Then the researcher explained the

nature and purpose of the research to the interviewee and implications for participation to obtain informed consent and ensure confidentiality.

Then the researcher highlighted to the selected interviewee that this is a pilot interview, and they can provide their feedback about the clarity of the questions and if the interviewee was comfortable answering these questions. Next, the researcher conducted the interview as per the interview guide. Immediate notes taking by the researcher was made to capture feedback provided by the participants. In addition to notes taking, the pilot interviews were audio-recorded to ensure that all notes related to the questions or their sequence. The feedback received included information about the relevance and adequacy of questions following a sequence based on the protocol developed from the mind gap (Figure 4-7). These interviews were also used to check the efficiency of the recording device and note-taking process. To conclude the interview process, the researcher summarized the interview session and offered the interview opportunity to ask questions and provide further comments about the interview process. After addressing questions and taking down the interviewee's comments, the researcher concluded the interview session by appreciating the interviewee for their participation.

Post-pilot-interview reflection: the interview recordings were transcribed, coded, and themed according to the research objectives. Based on a reflective assessment of the data, the initial interview protocol was adjusted. Modifications included adding new questions to the prompts and changes to the language and sentence structure of the questions and instructions to improve interviewee's understanding of the interview procedure. The tone and volume of the interviewee's voice were also noted to improve the quality of recording during the actual interview. The time taken to complete an interview session was also noted. Each interview was

estimated to last 50 to 60 minutes. The outcome of this pilot-test was a second, revised interview guide which was subsequently tested for construct validity. The main notes received were to highlight the difference between the public sector and the government. In addition to that, some notes were received about the recognition of an emergent event and the need for examples to differentiate disruptive emergent events from normal recurring events that are usually covered under risk management. The last main comment received was about customizing some of the interview questions based on the speciality of the interviewee. These specialities include economy, education, and cybersecurity.

Validation: allocated time, an appropriate sequence of interview questions. After that, the revised interview guide obtained from the pilot test was given to three subject matter experts to check if the questions accurately capture the scope of the research topic of building resilience in the public sector in the face of the emergent event. The subject-matter experts deemed the interview guide to be valid for use as a data collection tool for this study.

It was estimated that each interview would take from 50 to 60 minutes. The three interviewees who participated in the pilot interview were also interviewed as part of the actual study interviews conducted after the pilot stage.

4.7.7 Determine the place to conduct the interview

Choosing the place to conduct the interview is depending on the interviewee convenience. Current technologies for noise cancellation will be utilized to ensure the quality of recordings. Informal places to conduct interviews will be targeted to ensure interviewees are not affected by routine operations. However, if these options are not available, especially with senior interviewees, the place will be selected based on the interviewee convenience.

4.7.8 Obtain consent from the interviewees

At least three days before conducting the interview, the researcher sent the participant information sheet to the targeted participants. Consent to participate in the study was obtained from the participants through email or WhatsApp message or a normal phone call.

4.7.9 Use good interview procedure during the interview

Each interview will begin by the researcher asking opening questions to elicit information and knowledge about the main concepts from the participants. In cases where the participant's response does not capture all aspects of the main concept, probing questions will be asked, or the initial question will be rephrased to obtain more information from the participant. The researcher will maintain eye contact and proper body language throughout the interview to show genuine interest and boost participants' confidence in the interview process. All interviews will start with an opening statement and end with a closing statement.

4.8 Analysing qualitative data

Saunders, Lewis & Thornhill, (2015,pp567) described different analytical techniques to analyze qualitative data. These include thematic analysis, template analysis, explanation building and testing, grounded theory method, narrative analysis, disclosure analysis, content analysis, and data display and analysis. The data analysis technique selected depends on the research approach, either deductive or inductive. This research uses a mix of inductive and deductive approaches to data analysis as it seeks to develop a theoretical framework based on the insights grounded in qualitative data collected through semi-structured interviews. This approach is related to the extended exploratory study and is based on thematic analysis of the data.

Before analyzing the interview data, the audio recorded data from the interview was transcribed through a proper alternative to ensure reducing the time. The interviews were in the English language. As the interviewees speak English as their second language, live transcription voice recognition software was not a good choice to be used. The audio files were transcribed using professional software based on Artificial Intelligence which is called Amberscript (www.amberscript.com). The audio files were uploaded on the system then after half an hour, the transcript was ready. A proofread by the researcher for all the audio files was conducted to ensure the transcripts' accuracy and ensure data quality.

4.8.1   Thematic Analysis

As discussed earlier in this section, thematic analysis is the main technique selected for data analysis. The purpose of thematic analysis is "to search for themes, or patterns, that occur across a data set (such as a series of interviews, observations, documents or websites) being analysed" (Terry et al., 2017). The coding of qualitative data enables the researcher to identify themes or patterns in the data for further analysis. Thematic analysis is used to help the researcher comprehend large amounts of qualitative data, integrate related data, identify key themes and patterns, produce a thematic description of data, develop and test explanations and theories, and draw and verify conclusions (Saunders, Lewis & Thornhill, 2015). The sources and types of coding designations are illustrated in Figure 4-10.
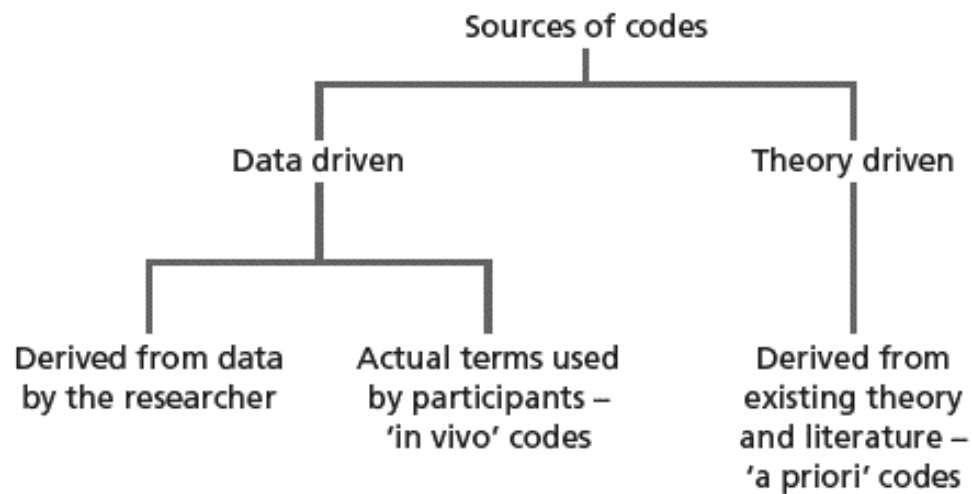
Figure 4-10: Sources and types of codes adopted from (Saunders, Lewis & Thornhill, 2015).

To ensure efficient and effective data analysis, the researcher used NVivo software to facilitate the data coding process to derive codes, themes, links. NVivo allows the researcher to interrogate the qualitative data at a particular level, and this improves the rigour of the analysis process by validating the researcher's impressions of the data (Welsh, 2002). The software is convenient for thematic analysis, and it can produce graphs that help the researcher to build relationship and conclusions, as shown in one of the examples in Figure 4-11.
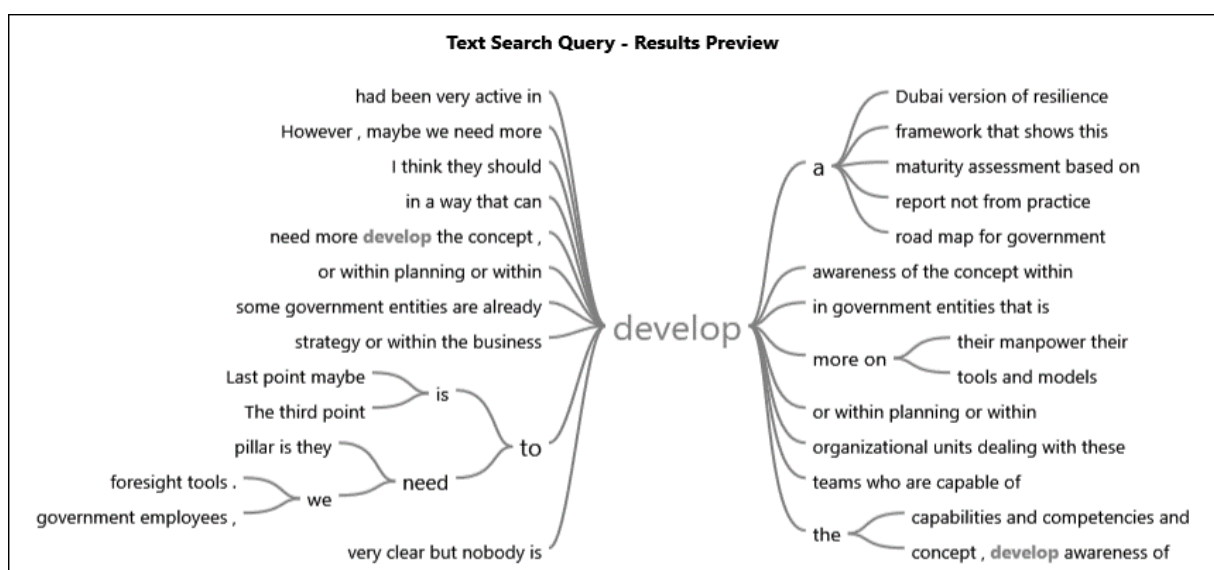
Figure 4-11: Example of a search query for a specific word using NVivo software.

4.9 Validity and Research Reliability

Bell, Bryman & Harley (2015) defined research validity as "the integrity of the conclusions that are generated from a piece of research". On the other hand, Yin (2017) defined research reliability as "demonstrating that the operations of a study, such as the data collection procedures, can be repeated". Furthermore, Saunders, Lewis & Thornhill, (2015) defined validation as "the process of verifying research data, analysis, and interpretation to establish their validity/credibility/authenticity". Two types of validation techniques used in this study:

1- Triangulation: using more than one source to confirm the credibility/validity/authenticity of research data, analysis, and interpretation. The primary source of data in this research will be through semi-structured interviews. Meanwhile, other data sources will be considered if the researcher determines that there is not enough data from the semi-structured interviews to construct the resilience framework. An alternative source of data will be to conduct focus group interviews. Data obtained from alternative sources will be triangulated with data obtained from semi-structured interviews to improve study validity.

2- Participant or member checking: Sample of data recordings and transcripts will be discussed with the interviewee to ensure that the researcher interpretation of the data accurately captures the perspectives of participants.

4.10 Research Ethics

Ethical issues refer to "the standards of behaviour that guide your conduct in relation to the rights of those who become the subject of your work or are affected by it" (Saunders, Lewis & Thornhill, 2015). Accordingly, this research is guided by the following ethical principles:

1- Integrity and objectivity by the researcher: During this research, the researcher will commit to acting openly, promote accuracy, and being truthful to avoid dishonesty and deception. Data would be represented as found, and no manipulation of data would be done to deviate this research from its original purpose. Any conflicts of interest would be reported directly to the research supervisor and the university.

2- Respect of others: This research is based on trust and respect. The rights of all persons participating in the study or affected by it will be respected.

3- Avoidance of harm: This research will avoid and prevent any type of harm from coming to participants. These include undue stress, embracement, pain, conflict, or discomfort.

4- Privacy and confidentiality of participants: This research will ensure the confidentiality of participants and the provided data. Permission will be sought and obtained from participants if the data is to be used differently than originally intended.

5- Voluntary nature of participation and right to withdraw: participants in this study will be given the full right to withdraw from participation and the right to decline to answer any of the interview questions or to end the interview at any time.

6- Informed consent of those taking part: participants will be given enough information about the purpose of the interview and the research intent, and they reserve the right to choose to participate or decline participation. The researcher would refrain from coercing participation if participants chose not to join the study based on the information provided. Consent would be obtained from participants before any amendments to the scope of the interview or the procedures are implemented.

7- Ensuring the confidentiality of data and maintenance of anonymity of those taking part: The information of persons participating in the interviews in addition to the information related to their organization, will be kept anonymous to ensure confidentiality.

8- Responsibility in the analysis of data and reporting findings: During data analysis and reporting of findings, the researcher ensures the confidentiality, privacy, and anonymity of data. The primary data is taken from the interviewee and should not be made up by the researcher. If secondary data is to be used in this research, permissions will be sought, and appropriate sourcing controls will be implemented.

9- Compliance in the management of data: The existing laws and regulations for data privacy in UAE in general and Dubai will be followed in this research. The researcher is committed to being aware of such laws and legislation prior to conducting the interviews and do data analysis to present results.

10- Ensuring the safety of the researcher: risks to the researcher and the participants will be analysed before taking any step further in this research.

Chapter Five: Results and Findings

5.1 Introduction

This chapter will present the results of the thirty-seven interviews that were conducted. Within this chapter, the coding strategy will be presented to come up with additional themes. In addition to this, the categorization of codes to come up with the additional themes will also be presented. The results of the interviews will be presented in sections base on the fifteen identified themes. Finally, the link between the identified themes and the research questions will also be illustrated.

5.2 Research strategy for analysing the qualitative data

There are five steps to start the analysis of the qualitative research data (Brinkmann & Kvale, 2015; Bryman, 2016). The first step is to get familiar with the transcripts by reading them and putting your initial comments. The second step is to start labelling the relevant related information and indexing them through codes. The codes identified in this research were based on the literature review discussion, the eight identified themes in the theoretical framework, the frequently used words of the interviewee identified through NVivo as shown in Figure 5-1 the interviewees' points of emphasis while responding to the interview prompts, and finally, the researcher's exploration of the data using his expertise to uncover themes and codes hidden in the data that are relevant to answering the research questions. The third step to starting the analysis of the qualitative research data is to decide on the most important codes and group the codes into categories representing themes. Step four is to identify links between codes and categories, or themes identified through the coding and categorization process. Step five is to show the relationship between the codes and categories under each theme using diagrams. The

final step is to present the results based on your coding and the relationship with the categories

and the themes. Discussion of the results will follow in the next chapter.

Figure 5-1: Word cloud representation of the words most frequently used by interviewees.

As discussed in the previous chapter, there were eight themes (Theme 1 to theme 8) relevant to

the research topic identified in the literature and included in the theoretical framework. In

addition to these themes, another six themes were identified through the qualitative data

analysis of the interviewees' transcripts (Theme 9 to theme 14). Also, another theme (Theme

15), which represents the general terminologies and points emphasized by the interviewees, was

added to ensure that no important data point was left out. Table 5-1 describes the fifteen themes

that the results and discussions will be based on.

Table 5-1: Illustration of the fifteen themes that are identified through the research:

Theme	Theme Description
Theme 1 (Uncertainty sources)	To start an introductory overview of the uncertainties surrounding us in general and uncertainties affecting the public sector. In addition to having an initial insight about the understanding of these uncertainties.

Theme 2 (Triggering an emergent event):	To understand what tools the public sector can use to anticipate emergent events, and if monitoring systems and tools within the public sector can recognize the transformation of uncertainties into an emergent event. The other part of questions will investigate potential tools the public sector can use to predict emerging events, as well as validation of these tools and the building of capabilities to ensure proper usage of these tools.
Theme 3 (Emergent events):	The purpose of these set of questions is to gain understanding of how to categorize emerging events facing the public sector, how to assess the magnitude and the escalation of an emergent event, the first response strategy, defining responsibility to take action, and diffusion of knowledge about the emergent event to various stakeholders.
Theme 4 (Resilience capabilities):	To identify strategies for building capabilities of robustness, resourcefulness, and recoverability to face emergent events. In addition to showing the relationship between capabilities to face emergent events and the response strategies of the government or government organizations, this theme will also address how to balance the different factors of efficiency and effectiveness when facing an emergent event.
Theme 5 (Resilience capacities):	To address which capacity is more appropriate to be used in the public sector in the face of emergent events, and to investigate if one of these capacities is more appropriate based on the type of government organization (service provisioning or policy making).
Theme 6 (Post Event scenarios):	To investigate the scenarios the public sector can experience after a disruptive event, and the mechanisms in place to learn from the disruption to improve the government system in the future.
Theme 7 (Resilience measurement):	To identify the components of resilience measurement in the public sector and if a maturity model is a suitable tool to assess the resilience of the government in general and for public sector organizations.
Them 8 (Turning challenges into opportunities):	Getting insights about how the government sector can encourage the positive thinking of turning challenges into opportunities, the enablers of this transformation and the barriers preventing this transformation at the government level and at the government organizational level.
Theme 9 (Resilience relationship with other managerial concepts)	This theme will investigate the relationship between resilience and other managerial concepts and systems, such as agility, antifragility, business continuity, flexibility, governance, innovation, policymaking and risk management. This theme will also explore how these concepts are integrated into management systems.
Theme 10 (Collaboration and partnerships)	The focus of this theme is the need for the public sector to collaborate with other parties, such as, academic institutions, other countries, international organizations, different government agencies, private sector, and research centres to effectively manage a disruptive event.
Theme 11 (People engagement)	To investigate the possible ways of engaging the society and the public sector employees to face an emergent event, how to assess their requirements and manage them if an emergent event occur.
Theme 12 (Public sector current and future mandate)	This theme focuses on the evolving role of the government and what is the expected role in the future. Also, it will address the perspectives of how the business model of the public sector and the value provision changes when facing an emergent event.

Theme 13 (Government Systems)	To define various components of government systems and how these systems can be tested to assess their readiness before an emergent event occur.
Theme 14 (Government Sectors)	The public sector consists of various specialized focus areas that are addressing different specialities such as economy, health, and education. The focus of this theme is to identify linkages between these sectors when building resilience at the public sector.
Theme 15 (Holistic view)	This theme is collecting all the general terms that were found as a frequently used words by the interviewees to try to build the big picture and not to miss anything important that may not have been highlighted by the other themes.

Coding of the data follows the steps recommended by Saldana (2015), as illustrated in figure 5-2. Three steps are described for theorization of the qualitative research. These are coding, sorting, and synthesizing. Two coding strategies were used for analyzing the data. The first step is a constructive approach used to validate the eight themes (Theme 1 to theme 8) already identified from the literature. The second step is an inductive approach which was used to derive extra themes from the data to ensure that nothing important is left out. Choosing the appropriate coding strategy depends on the type and the nature of the research questions. Since this research is exploratory and uses epistemological research questions to try to understand a phenomenon, two coding methods were selected for the first cycle coding; the first one is a constructive approach using theming data (Theme 1 to theme 8). The second selected method was descriptive coding to come up with the extra themes (Theme 9 to theme 15).
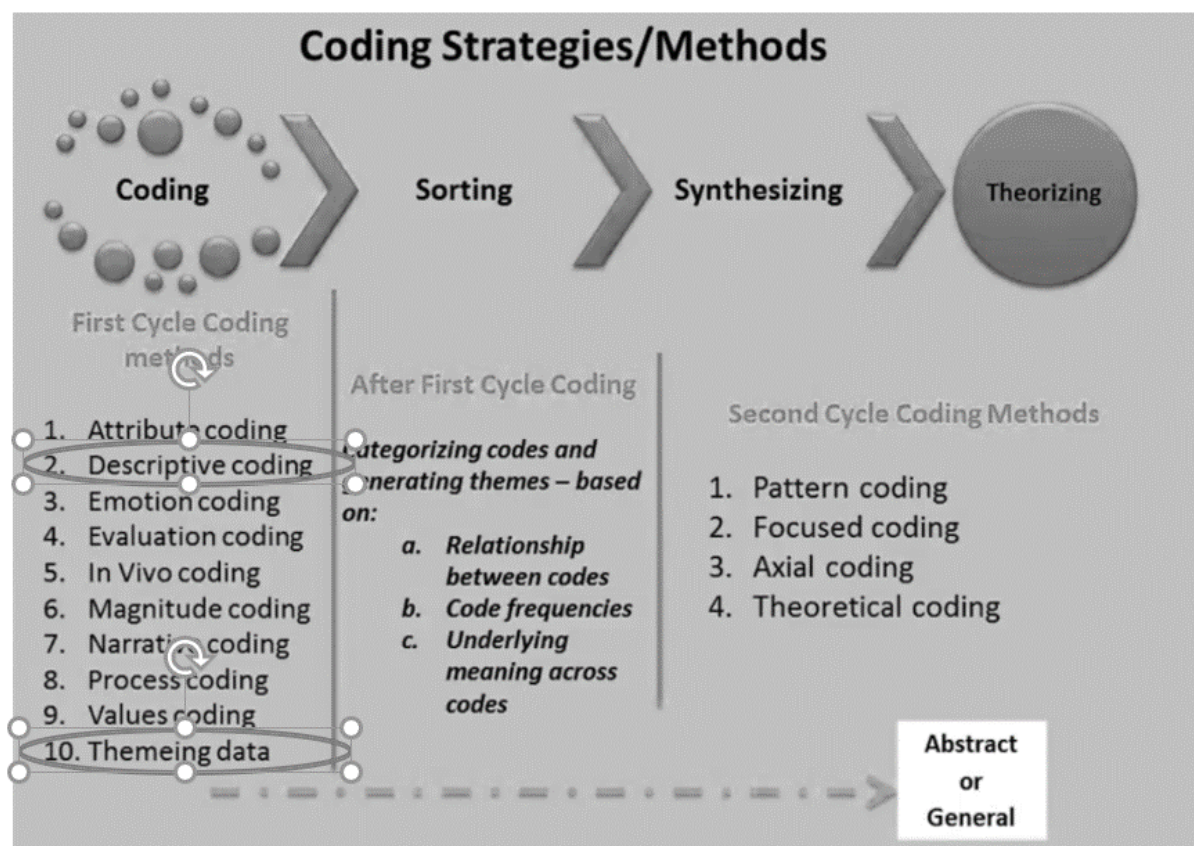
Figure 5-2: Coding Strategy used in analyzing the research data (Saldaña, 2015).

After defining the first cycle coding step, the second step which is after first cycle coding was implemented; the codes identified in the first cycle coding methods were filtered, assigned to categories and themes based on the identified relationship between codes, categories, and themes. The initial hierarchical codebook used in this study is illustrated in Appendix III.

5.3 Interview Findings

The findings will be presented based on the coding structure of each identified theme. There are fifteen identified themes, and within each theme, codes or sub-codes were identified. Before presenting the results, a figure describing the relationship between codes and themes is illustrated, then the important highlights of the interviewee data will be presented.

5.3.1 Theme Number One (Uncertainty Sources)

Figure 5-3 shows the hierarchical coding structure of theme number one, which is uncertainty sources. The findings of the data will describe the interviewee points of views on the uncertainties surrounding us in general and uncertainties affecting the public sector and provide initial insights about uncertainties.
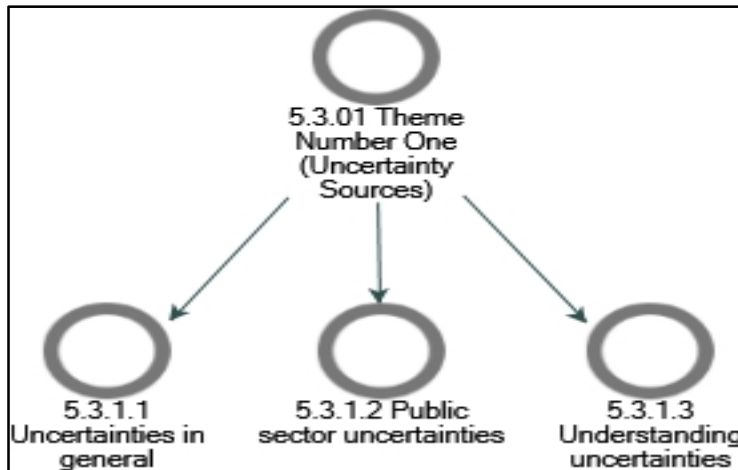
Figure 5-3: the hierarchical coding structure of Theme 1 (Uncertainty Sources).

Uncertainties in general

In the opinion of the interviewees, we live in a world full of uncertainties, and these uncertainties have accelerated in the last period due to many factors, and the most important ones are technology and connectedness. (Technology and connectedness were identified by interviewees as significant to building resilience in the public sector. However, the researcher recognizes that these terms can mean different things to different people depending on factors like their worldview, their professional background, etc. As such, there was no agreed-upon definition for these terms between the researcher and the interviewees).

INT01 thinks that *"The world is always under uncertainties. It has always been like that, and it will always be like that. But over the course of the maybe 100 years, the rate of acceleration*

for changes has been extremely increasing". Meanwhile, INT04 believes that uncertainties are realities as they are *"In all aspects of the surrounding world whether they are in the economics, political, social demographic, regional and global. These uncertainties have been accelerated with the fourth industrial revolution as the speed of emerging technologies, innovations, disruptive events are beyond exponential"*. Furthermore, INT25 believes that uncertainties are always there, and it is greater now due to connectedness *"I think the uncertainty has always existed. I think what's changed as humanity developed in general, is the fact that we're becoming a lot more connected because we have many more uncertainties now than we did before because the combination of things that can happen is much greater since we are all connected"*.

INT08 highlighted that current technology is the main source of uncertainties *"The most touchable uncertainty is due to the technological changes; the life of technology is around six months nowadays. But there are other important factors that are going on, such as political changes and the economic changes as some economies like China is now growing up while other economies are going down"*. Meanwhile, INT09 thinks that acceleration of uncertainties is not only limited only to a certain period as *"Historically speaking, the world has always been changing constantly. Now, the people feel that it is changing more rapidly or that there is a substantial shift in certain aspects like technology, which is true. But change historically has always been there"*. Similar to INT08, INT10, INT12, INT15, INT19, INT21 INT 22, INT25, INT29, INT30, INT35, INT36 and INT37 believe that technology and advancements in telecommunication systems, especially the fifth generation, are forming new uncertainties by trying to understand of how to deal with the big data and challenges coming from new data privacy such as using the cloud computing. INT24 added Artificial Intelligence as one of the main technologies that are having a role being not certain about the future.

INT13 believes that it is not only specific uncertainties as we are living in a *"VUCCA"* world where *"(V) stands for volatility. And (U) stands for uncertainty. (C) stands for complexity. The other (C) stands for constraints and (A) stands for ambiguity. So, we live in a world of VUCCA where lots of changes are happening, and these changes are affecting the way our life is being not only perceived but lived"*. On the other hand, INT16 also thinks that *"We live in a world of VUCCA where lots of changes are happening. And these changes are affecting the way our life is being not only perceived but lived"*.

INT17 believes that the political dimension is affecting all other dimensions such as the economy and even technology. Furthermore, INT18 mentioned two dimensions: the political dimension and the social dimension.

Another factor that is linked to uncertainty is vulnerability as indicated by INT23 *"We are vulnerable because we are really connected to the global economy, so I think that the first factor is vulnerability to global economic changes. Global changes overall. This is the main thing because in many cases we have our own strategies, but they are faced with certain events that we didn't expect, and it didn't belong to us it but belongs to other factors; for example, exchange rate, it belongs to developments in political issues, geopolitical issues. Therefore, we are very vulnerable. I think this is the main things that impact our economy"*.

Figure 5-4 and Figure 5-5 summarize the attributes highlighted by interviewees for this section which shows that technological advancement is the most frequently cited source of uncertainty in future. However, we are susceptible to many uncertainties due to vulnerability, connectedness, and accelerated changes, especially in the social and political dimensions.
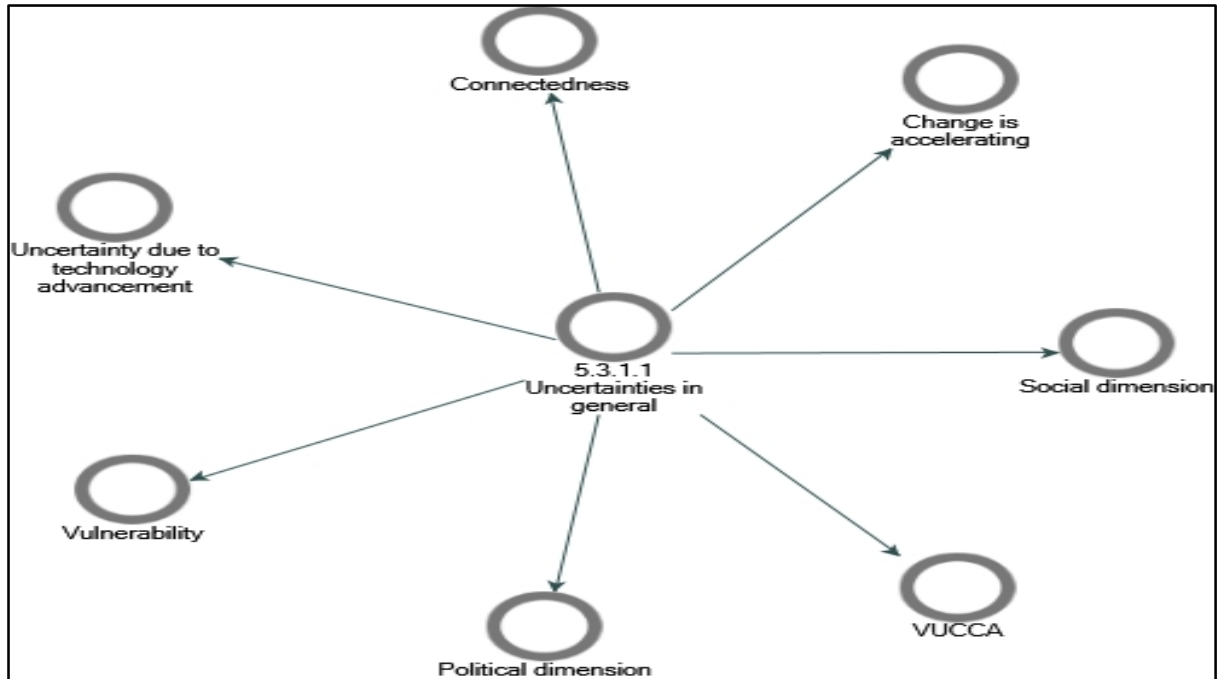
Figure 5-4: Identified sources of uncertainties in general.
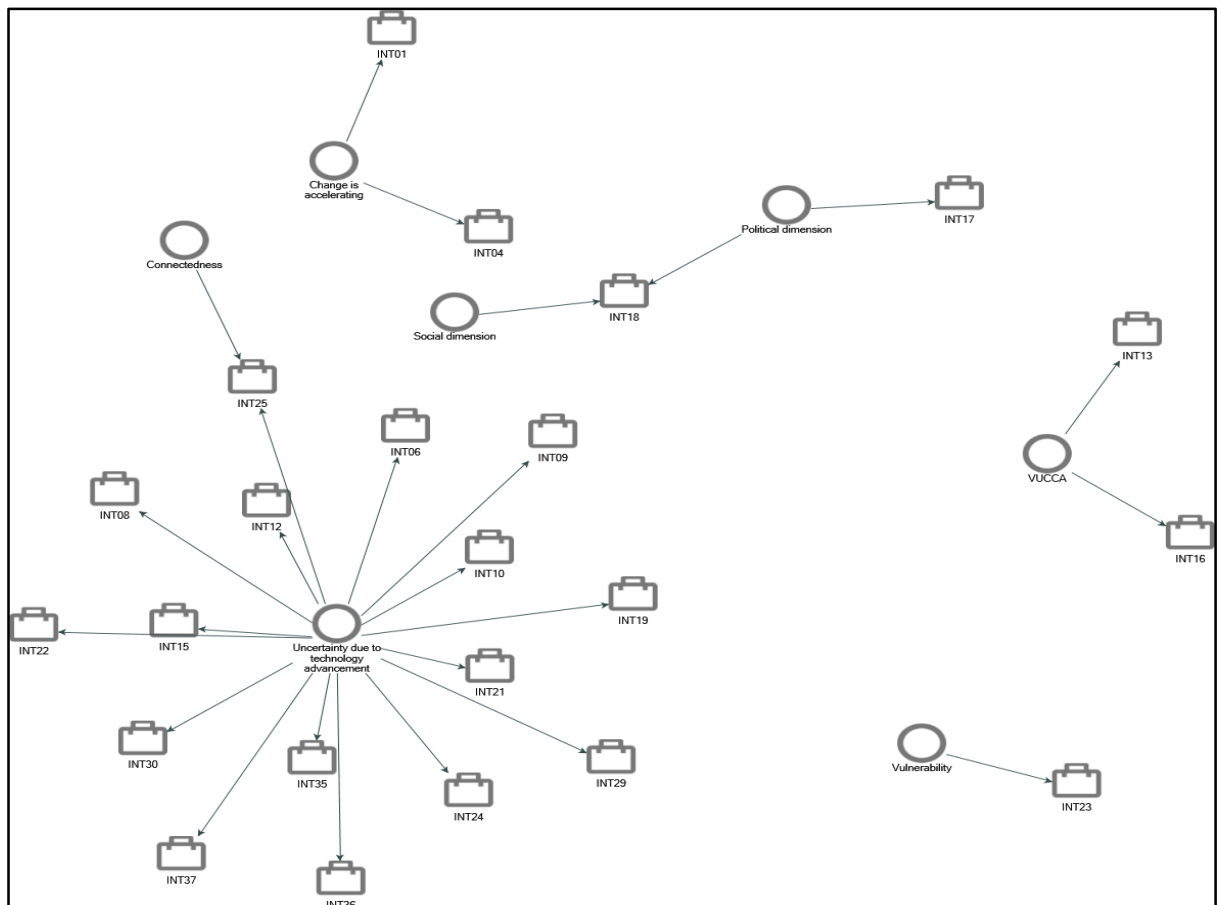
Figure 5-5: Sources of uncertainties in general identified by interviewees.

Public sector uncertainties

When we are talking about the public sector, we should take into consideration that the definition of the public sector varies as highlighted by INT30 *"When we define public sector, the public sector varies from a model to another and from one country to another. How those countries or those governments reacted to this technological revolution in the past 50 years, and it created variances. Therefore, we see certain setups of governments that have coped very well and understood that the technological revolution is an advantage. Some others have been left behind"*.

The public sector seems not to have a separate specialty as it is also surrounded by uncertainties; INT01 thinks that *"I don't think that the public sector has a specialty, I think public sector will be affected by similar uncertainties and will be affecting these uncertainties"*. This raises another point of how the public sector is affecting uncertainties, and the response comes from INT13 *"You see examples where the government is sometimes competing with the private sector. This makes a lot of uncertainty for the private sector.* INT25 argued that the public sector is exposed to uncertainties and events more than others *"I think the public sector is exposed to events more than others, only because the public sector is responsible for dealing with them on behalf of everyone else"*. INT 29 has a different point of view *"I think the private sector is affected more than public sectors. The public sector is so huge that it can absorb minor changes. Nevertheless, major changes can affect everybody. However, I think the private sector is affected more, but they have the flexibility to deal with this change better than the public sector. But of course, they will be affected, and maybe that's why they are able to deal with that faster because they will face it before the public sector"*.

On the other hand, INT07 highlighted that *"The rapid technological, economic and social changes, complexity and uncertainty are becoming a norm in the public sector also"*. Moreover, INT12 thinks that in the public sector uncertainties are all related to financial uncertainty *"Uncertainty can come from technology uncertainty, can come from environment change, can come from the financial crisis, financial change, worldwide trade, and the way we are doing the trade and the political things all of them can affect, but in somehow, they are all related to financial origin"*. On the other hand, INT33 thinks that some sectors in the public sector will be affected more than others by uncertainties *"I think the main three sectors to be affected are: economy, education, and health"*.

Furthermore, trying to isolate yourself as a country to be away from uncertainties by reducing connectedness and interaction is an impossible task as INT25 thinks that from a government perspective *"It's very difficult for any government to be isolated from what's happening in the world. So, if you think about even the most closed countries. Accordingly, if you think about North Korea, for example, North Korea is still affected by what is happening around the world. Therefore, when the U.S. exerts pressure on North Korea, North Korea feels it and you know they are affected maybe to a lesser degree than other open countries, but they are still affected. This brings us to a conclusion that: as long as you are connected to the world which is pretty much everyone you'll be at the mercy of these changes"*.

Again, technology plays a big role as a source of uncertainties in the public sector; INT20 believes that governments are surrounded by emerging technologies that are changing the business model for governments as they should align with big changes. These big changes such as new technological platforms are forcing governments to rethink how they are doing business as described by INT20 *"I can see, the big change or the main change that causes the disruptive is the technology and the speed of technology. Especially something that, of course, everyone*

137

knows about Uber and Airbnb and service technology. They are the one that changes, or they force the government to change from the normal traditional way into more agile government". Moreover, INT15 emphasizes the dominant role of technological changes that are affecting the public sector *"I think that technology is the most uncertainty that will affect the public sector as well as the other sectors".* Similarly, INT18 emphasised the major driving force of technology *"Technology is changing people's expectations. A public sector that was based upon paper providing their services. Now, they provide the services electronically. In the past, you had to interact directly with offices with workers with several civil servants. Today you do not even see them. You get your services remotely".* Similarly, INT26 believes technology is the dominant factor that will direct the way the public sector will change the way it is doing work in the future *"Having the AI, and the new blockchain and new technologies. Which are affecting our future and how we deal with governments, and how the governments will operate in the future".* Furthermore, INT36 emphasised the role of block-chain in the future economy and the necessity of the public sector to start investing in it *"The recent reports on Block Chain and the forecast for this technology to prevail and become persistent globally. It is expected that 10 percent of global GDP. Will be driven by block-chain in the year 2025. So, this number is really massive and big. That means that today if the decision-makers do not open up to facilitate and open the doors willingly to industries or technologies such as block-chain within the public sector, within government institutions, and within authorities. They will be missing out on the new wave of advancement and providing services to the public".* The technological factor is also emphasized by INT27 and INT 35.

INT 19 has a different point of view, as he thinks that people will at the end go back to the emotional factor to have a better service delivery experience *"This is what all organizations are focusing on: having more digital and smart channels, but I believe that we will reach a*

stage that we will say that many of the customers want the feel and they will request going back to the old types of providing the services that will connect with the emotions".

The uncertainties surrounding us will force the public sector to change the way it is doing work and to change the mentality from being reactive into being more proactive as argued by INT27 *"I do agree that currently, we are living in a world which is full of uncertainties. Now, I mean surprises are happening every week and even every day, and sometimes we reach to a stage where we cannot follow up things that are coming up. I think, in my opinion this will be reflected on our social life and in our work life and even to the public sector. We have to be proactive for such incidents, or I think they will be facing a lot of challenges which is going to affect their performance".* Being proactive is also associated with being effectively reactive as argued by INT11 *"Reactive by the response to change fast in a good proper way in order not to lose the financial and operational side. However, the proactive one needs a lot of attention. We should be ready based on trends and industries and future foresight studies in order to reach a pre-solution or a pilot and having it as a scenario rather than have it as a quick response. This needs to be done at the spot which will make a big difference in the way public sector serving".* INT28 related the uncertainties and changes to a cause-and-effect relationship *"Any change can cause an effect and since we've been going through different quick changes related to economy, related to culture, related to the working force. All sectors, especially the education is affected, it affects the people involved in teaching, and people involved and customers like students. In addition to the support, we get from the different stakeholders to keep the business running as expected".*

From the health dimension, INT31 highlighted that infectious diseases represent a big challenge to the public sector *"They can initiate in a very small event, but they have the ability to propagate, and by somehow spread and due to their virulence, they can cause morbidity and*

139

mortality. Such diseases can initiate in a very restricted conditions but if they are not isolated very well, they can definitely be public health concerns, they can cause or lead to public health disasters".

Moreover, the public sector nowadays is affected by too many changes as argued by INT34 *"There are a number of changes: One, economic uncertainties that are happening. Two, the speed of which change is happening due to globalization and openness. Three, political risks that are happening. Four, demographic shifts, especially with the age brackets and how this actually impact the public sector. Five, urbanization and what it means".* Uncertainties represented by shocks will also remain a challenge to the public sector as indicated by INT16 *"Definitely, you know economic shocks and financial shocks will always have an effect on the public sector because first of all they determine the fiscal envelope that the government has to work within, and it also determines the kind of issues and the kind of policy challenges that has to deal with".* Similarly, INT 28 thinks that the economic factor is the most dominant factor affecting the way the public sector is doing work.

Another factor that is governing the work of governments is the traditional mindset of governments which limits them from embracing the understanding that the role and the mission of the public sector is changing into a more competition role between countries as highlighted by INT01 *"If you are like me, you will believe that public the sectors in different countries are in direct competition between each other and the more successful the public sector is, the more successful the country is, and the more competitive the country is. Then of course, the uncertainties will shuffle or will rearrange the countries' capabilities and countries' success and this by itself will add reflection on the economic levels the social comfort of these countries, and it will be affecting the core business of the public sector which is mostly to guarantee welfare and wellbeing of the public".* INT04 suggested a new way of looking at uncertainties

in the public sector but not depending on the traditional role of governments and expecting in the future that things will not remain the same *"If you think that always the people, the citizens will come to you to have a passport, you are wrong. One day, the people will have the choice of selecting where and which country, they will have their passport and paperwork and so forth. That was 20 years ago. Nowadays, I think in a different way. I say that no more geography is limiting the public sector, you could have beyond geography you could have, for example, social security, and you could have another country offering social security in your country. Why not? It is a business anyway. It is an investment. Therefore, this is a big uncertainty. I do not think that it is not coming; it is coming. Therefore, this applies to all aspects. We have to be open-minded, and you have to really think about all possibilities and consider the emergence of many events"*. Similarly, INT21 believes that things have changed now, as the competition is between countries now *"To be very competitive compared to different countries"*. Furthermore, INT27 is on the same page of having more competition between public sector in different cities, states, emirates, or countries *"Currently we're talking about the public sector which we should expect as in was like 20 or 30 years before; currently, we're talking about the public sector which is competing between each other. If we are talking about, for example, investors who are coming to invest in A or B or C cities. Now, the investor is the decision-maker. If he does not like, let us say the licensing procedures in a city. I am sure that he can move to B or C, because he will have a lot of more attractive incentives there. So, in my opinion, now the public sector should be even better than of the private sector, they should be able to offer better services to attract more investor or more customers"*.

Furthermore, INT05 believes that the current mandate of the public sector ignores a very important segment which is the new generation *"For the public sector, I think the social aspect, especially with the new generation of Millennials, this is affecting the public sector is dissolved*

uncertainty because all the public sector is based on serving the old generation but it's not to the level to serve the Millennials and their expectations. So, this will result in uncertainty in this domain".

Meanwhile, the society's dissatisfaction with the quality of products and services provided by public sector entities is also flagged as a source of uncertainty as highlighted by INT06 *"The public is no longer satisfied with slow services or with outdated products of the government or poor planning. Because the information now is available for everybody and everybody can assess the government work".* INT09 highlighted the same point *"Let me summarize by saying the type of service and attitude that the public sector used to provide is not acceptable anymore by customers, this is why they are frustrated".* Furthermore, INT19 focused on the channels of providing services in the public sector and the response time *"I think channels of providing services will be very much different and will change. I think the type of services that citizens or public customers requiring will change. Additionally, the response time that was acceptable by customers will not be acceptable anymore. So, we have to have faster response and adapt to changes of the way we deliver services".* INT20 have a similar thinking as INT19 as he highlighted that the society is more demanding *"Users are more demanding now; you need to have everything in a very super speed and agile way? So previously, it was as the government used to provide the service that they feel it is good for them, based on policy and based on their strategy. Nowadays, they need to satisfy their customers. They need to be more competing with inside the market itself. So, competition is now rising, even though it is a government and no one competing with the government, but you can have disruptive technology that forces the government to change".*

The role, and how the public sector perceives uncertainties need to change as argued by INT16 *"The public sector traditionally has adopted the model which is based on reducing risk.*

Therefore, in the past, it was important that the government did not make any mistakes. It was OK if the government did not do anything amazing, but it was important that they did not make any mistakes, and so; as a result, governments have adopted these really bureaucratic and long processes to ensure that all decisions that they make have been approved and assessed before they are being made. What is happening with the pace of change that is taking in the world, is that governments have to really accelerate the pace at which they made decisions, and at which they innovate. This has put a lot of stress on and government systems that resist change and government systems that reduce risk. Therefore, you have this tension right now in the public sector between rapid change, transformation change, and the need to maintain as is". Changing how the public sector looks to things, was also emphasised by INT18 *"In the past the public sector acted or behaved like authority. Today it is service orientation. Public service is there to serve people not to exercise authority. People expect a fast response to their needs. So, this is basically is changing drastically".*

Another important uncertainty in the public sector is coming from the way governments are managing their national debts as highlighted by INT14 *"If you talk about the government administration or public financial management of managing debt, there is a challenge related to improving decision support by evaluating investments in the public sector. We call it public investment planning".* Similarly, the public sector in some countries is facing big challenges when dealing with uncertainties, due to not having economic diversification and depending on one source of income as highlighted by INT09, INT23, INT 27, and INT 32.

When addressing the impact of how these uncertainties will affect the way in which the public sector is operation; as highlighted by INT17 the impact is huge *"Of course, the impact is huge because the public sector should be the controller of any services or transactions in society. Of course, the regulatory role of the public sector to regulate needs and all transactions and*

services. So, as a regulator, changes in these dimensions would affect the policies, the regulations, and the laws because what is applicable now, or what can be a rule or policy now, might not be valid after five years or ten years, because everything changes. So, changes in these dimensions should affect the role of the public sector in provisioning and regulate of the service providers".

Figure 5-6 and Figure 5-7 summarize the attributes highlighted by interviewees for this section which shows technology as a major factor that will drive the public sector to change. However, the public sector needs to change its traditional mindset of how to deal with uncertainties. It also needs to focus on meeting society expectations while handling uncertainties and to be more proactive rather than being reactive while dealing with uncertainties. Furthermore, another important factor that was highlighted by interviewees is the competition among different countries, which makes the recipients more exposed to different experiences in other countries and that make another challenge of the public sector to fulfil the expectations.
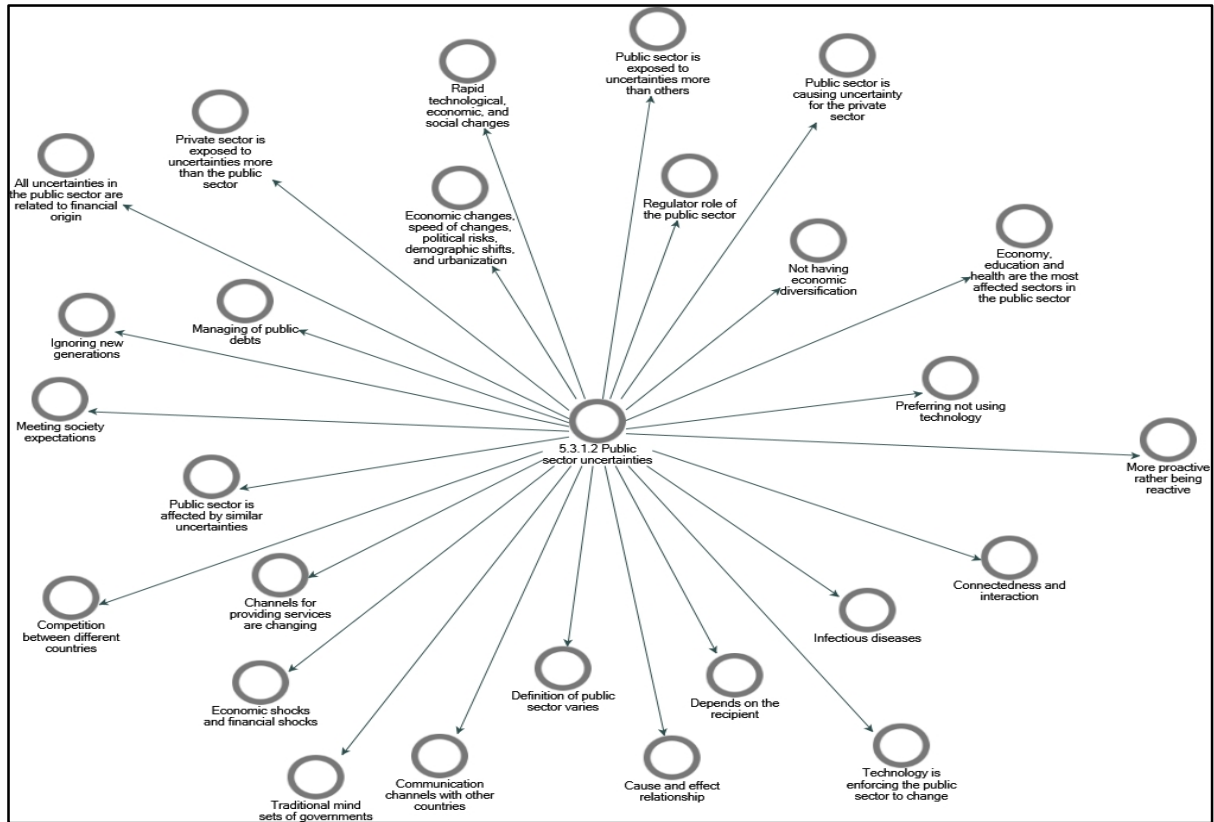
Figure 5-6: Identified sources of uncertainties in the public sector.
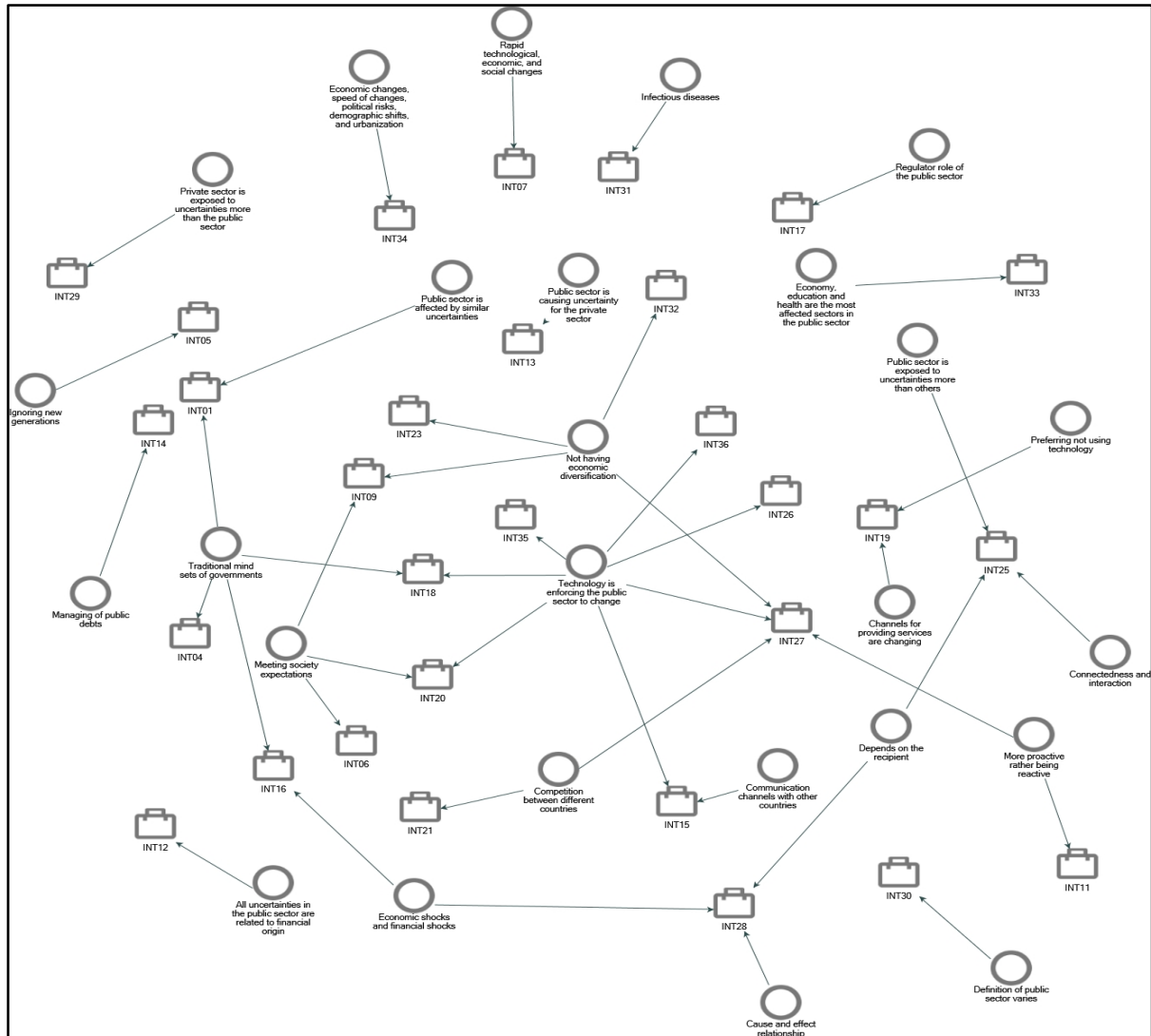
Figure 5-7: Sources of uncertainties in the public sector as identified by interviewees.

Understanding uncertainties

Trying to understand uncertainties seems to be a complex task due to different interconnectivity relationships between many variables as highlighted by INT01 *"Today, this interconnectivity between countries, between geographies, between people, enhanced the effects of the amplification of any change to have a viral effect on the world. In my mind, this is one of the most important reasons why we are not certain, and we get surprised with the changes"*. Uncertainties are also related to events that occur suddenly and most of the time we can't predict

these events as highlighted by INT03 *"There is a lot of emergencies and events that occurred suddenly without being expected or predicted. Based on that, it is more beneficial to organizations to build their own capabilities to face any event effectively, and not to focus on certain type of events"*. Meanwhile, inability to understand uncertainties is due to rapid and accelerated changes in certain sectors when compared to other sectors as pointed out by INT10 *"Because of the rapid changes. For example, technology is changing rapidly. So, the accelerated time in the technology sector is very fast, while in the economy it's not that fast. In order for the economic sector to change, this will take time"*. Besides the acceleration in technology, there is another factor, which is people sticking to their old habits as highlighted by INT18 *"I think because people. It is difficult for people to change their habits. Secondly, the technological trends developed so fast that the public sector cannot really predict what's going to happen"*.

Others think that trying to understand uncertainty may be limited by the investment constrain that is required by the public sector which is always focused on efficiency as discussed by INT11 *"Because it will take efforts, money and time to invest in such challenges that may not happen. In addition to the result-oriented thinking that sometimes it goes narrow as we need specific targets to be achieved, rather than looking at the big picture"*.

Other interviewees have another point of view; they think that it is better to be uncertain about things rather being certain as highlighted by INT04 *"I will say that it's better always to be uncertain or unsure, rather than being sure. Being sure about uncertainty is really a recipe for death. So, the way I look at things, you've better doubt. You've better doubt so that you reach a good status or a good position to deal with the future and the unexpected events. If you are a good thinker, you have to doubt. I think the more knowledgeable you become about the surrounding environment, the more you will have doubts"*.

Furthermore, INT07 argues that it is not always your ability to understand the uncertainty as the question is: What will you do with this understanding if you do not have the proper readiness to grasp the opportunity or to prevent the risk? *"Public Sector entities do recognize some of opportunities and threats that may be emerged by future trends, yet they seem uncertain about their readiness to deal with those changes and to assure that they are adequately equipped to deal with emergent events"*. Similarly, INT15 thinks that you have to build readiness by increasing awareness and providing the necessary training *"The public sector may not be ready to face these uncertainties due to lack of awareness and training"*. There is another point of view related to readiness, which is the need to own the technology to be able to understand and deal with uncertainties when compared to other countries according to INT08 *"As we are not developing the technologies, we are imitating only these technologies. Therefore, we are just waiting for others to have new technologies, and some of these technologies are disruptive. We are not building or predicting the future of these technologies"*.

INT09 thinks that there are three factors affecting the understanding of uncertainties in the public sector *"Again, I go back to the comment of different people who had a different understanding of uncertainties. The different understanding is one factor; the second factor is your maturity in recognizing that this is a threat or not, because your background and your thoughts will affect your attitude at the end of the day"*. Similarly, INT19 thinks that there are other groups of factors affecting our abilities to understand uncertainties *"I think it's a group of factors; One of them is lack of capabilities, which is the analytical capabilities of how to analyse data and how to benefit from data and benefit from the studies that are being conducted. One more factor is the speed of changes, and the changes are becoming much faster. So even if they respond, they are not responding in a fast manner relevant to the speed of the change"*.

INT20 thinks the inability to understand uncertainties in the public sector in a better way is due to the following constraints *"I think it's a group of factors; One of them is lack of capabilities, which is analytical capabilities of how to analyse data, how to benefit from data, how to benefit from the studies that are being conducted. One more factor is the speed of changes as the changes are becoming much faster. So even if they responded, they are not responding in a fast manner compared to the speed of the change"*. Meanwhile, INT22 thinks that the ability to understand uncertainty is a holistic complex understanding process that is not dependent on one factor alone, *"I would say that to be able to predict you need to consider all many things together. It's not only the systems, it's not only the people; it's not only the policy, it's all of them together. We need to take all of them in a very comprehensive way and ensure that they are all work together in parallel"*. Moreover, trying to understand uncertainty is associated with the denial phase that the public sector may go through at a certain stage as highlighted by INT23 *"I don't see that something is uncertain to the extent that we are faced with it all of a sudden, but in some cases, we deny because we thought that we are strong enough and this is not always the case"*. Meanwhile, INT25 thinks that understanding uncertainties is limited by the comfort zone of the human nature that avoids digging into things that are doubtful *"I think dealing with uncertainties is not a natural human trait. I think as human beings, we like to know things, and we like to know answers. That's why in many instances we tried to make up answers when we don't really have answers, and I think because of that it's not really a comfortable topic for most persons to deal with"*. INT30 emphasized that understanding and dealing with uncertainties depends on the type of government; *"There are two kinds of governments as I said one government didn't know that they need to actually make that move and they are just living in circles. The second one, they understand the importance of that, but they are not able to use because of certain bureaucratic systems in those sectors"*.

INT34 thinks that it is a mindset issue as governments tend to be more reactive rather than being proactive *"I think generally governments tend to be more reactive rather than being proactive; most governments are stretched in terms of the resources, and in terms of financial and human resources. Therefore, embedding this thinking within the governments is actually a kind of having more resources constraint"*. Meanwhile, INT37 thinks that uncertainties happen because we don't have the proper systems to identify them *"Uncertainties arise because we don't have proper signals to identify them"*.

INT13 thinks that to better understand uncertainties we have to focus on cause-and-effect relationships rather than focusing on trends *"What I think is: we should have more into looking at cause and effect rather than looking only at trends. One of the things I noticed is: we are more of trend followers, and a lot of people do follow what they see as trends, and they expect that the trend will continue as it is or will not continue as it is. When the trend changes, they feel surprised by what happened. We need to think more of the causes effects relationships"*.

On the other hand, INT14 linked the ability to understand uncertainty to the culture *"The gap usually is in the mentalities of the people and in the culture of different public sector organizations and the culture of the cities and countries"*.

Depending merely on history when trying to understand what will happen in the future is a big obstacle to trying to understand uncertainties when developing public policies as argued by INT16 *"I think the biggest reason is that: governments have traditionally used historical evidence when they develop policies. They have used inputs that are historical in nature; they simply look back. Therefore, for example, when you think about developing economic policy, education policy, or all of these policies we have been talking about. You might look at data over the last 10 or 20 years, and you might look at research papers that came out you know ten years ago, you might talk to experts who've been thinking about this stuff for 20-30 years. These*

have been the same tools we used for hundreds of years; these have been the tools of

policymakers and the data points in which policymakers use to develop a certain policy".

Figure 5-8 and Figure 5-9 summarize the attributes highlighted by interviewees for this section,

which shows that the complexity factor is always surrounding uncertainties, which makes this

topic ambiguous. Accordingly, some participants preferred to focus on building readiness rather

than trying to find answers that may not exist.
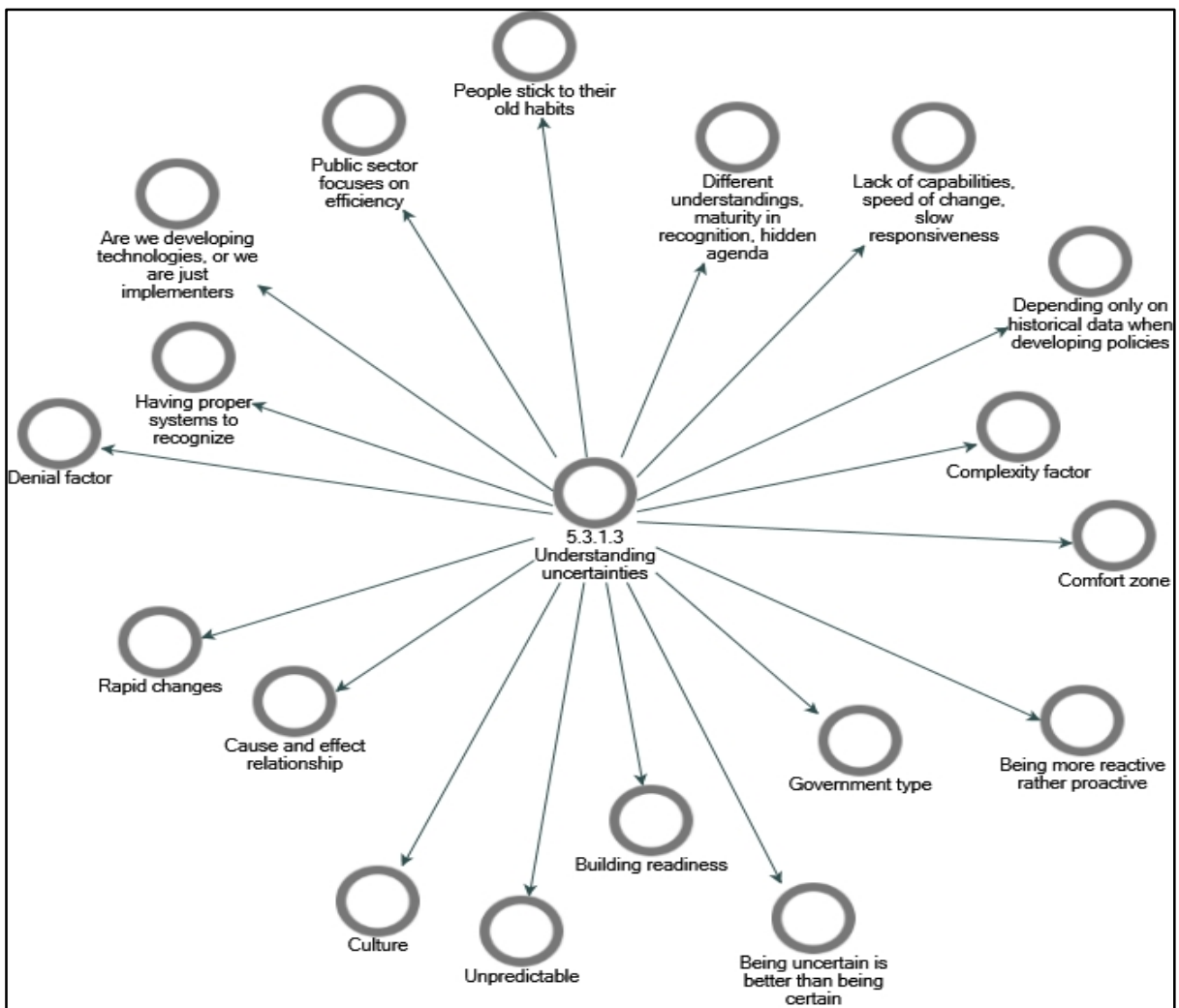
Figure 5-8: Identified attributes for understanding uncertainties.
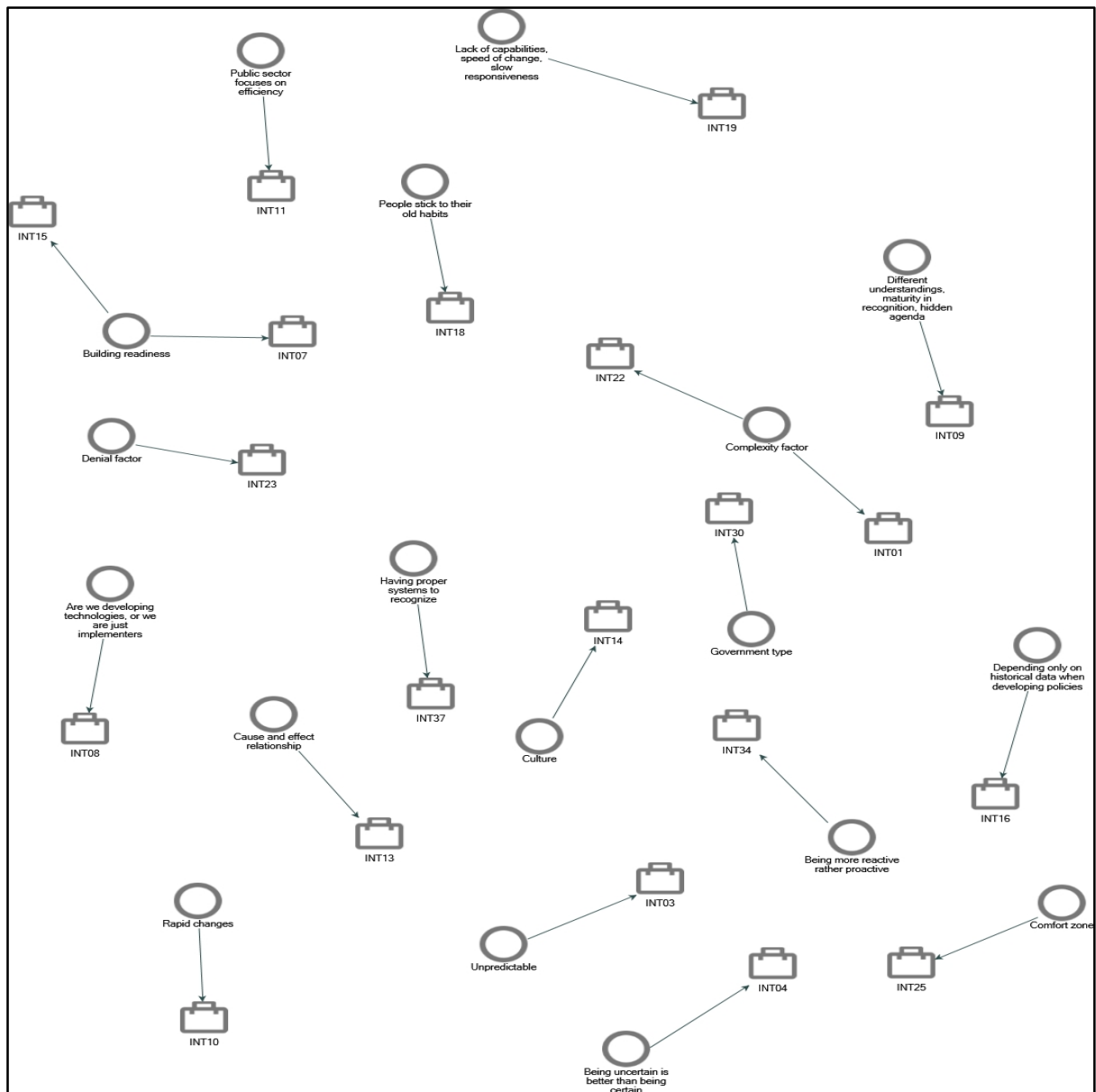
Figure 5-9: Identified attributes and interviewees inputs for understanding uncertainties.

5.3.2   Theme Number Two (Triggering an Emergent Event)

Figure 5-10 shows the hierarchical coding structure of Theme number two, which is triggering an emergent event. The findings of the data describe interviewees' points of views on the tools the public sector can use for anticipating an emergent event, and if monitoring systems within the public sector can identify the transformation of uncertainties into an emergent event. The

other part will investigate the potential tools the public sector can use to predict emerging events, validation of these tools, and building capabilities to ensure proper usage of these tools.
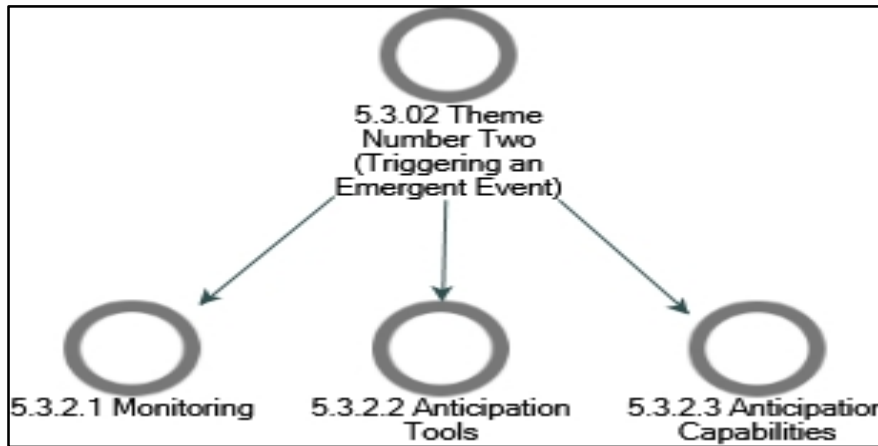
Figure 5-10: the hierarchical coding structure of Theme 2 (Triggering an Emergent Event)

Monitoring

Monitoring will address the question of how we will know that uncertainty may transform into an emergent event. The interviewees have different perspectives about monitoring. One of them is related to the earlier discussed topic of the public sector being proactive or reactive as expressed by INT01 *"As a public sector or as a decision-maker in the public sector, do you recognize yourself as an early adopting strategy? What do you want to get in front of things? Try things and contribute to the manufacturing of these new trends, new events. Otherwise, you are more like a late participant"*. INT02 highlighted that, even if we are trying to predict and monitor but there is a limitation in our abilities, as there will always be events that are unpredictable: *"It's not only you need to have the ability to predict that is one thing, but I think our ability to predict will always be limited, you will also need to be able to react fast once you are faced with a challenge or with an event, even if you have not predicted it before"*. Similarly, INT03 identified two types of events; the first one is the predictable ones that can be identified

through the risk management system, and the second one is unpredictable events. Furthermore, INT07 thinks that monitoring of uncertainties and events can be done through the risk management tools and systems *"By applying proper risk management tools and studies, the organization can further understand the uncertainties and evaluate its probability to occur"*. The same point of view of utilizing risk management tools was also emphasized by INT15. On the other hand, INT10 emphasizes the role of business impact analysis for monitoring and assessing the impact of the trends *"You need to always have a framework in place as a government sector to assess these uncertainties, prioritize them, and then make a business impact and see how it will impact you as a government sector"*.

Meanwhile, INT05 emphasizes the need to have an early warning system *"I think if we have an early warning system, this would be the only way to predict this kind of uncertainty. There is a concept, which we call it the centre is at the edge, so, all these kinds of uncertainties or trends are happening in the wider zone. Therefore, there is a kind of science, for example if we are talking about block chain or geopolitical threats or any event that is happening somewhere in the world. Maybe it is a small event, but it will move to be the major one in the centre. If you have this system which can predict what's happening in the edge, this is the only way we can have this kind of more solid evidence with the uncertainty"*. INT25 has a similar perspective as INT05 on the need to have early warning system *"I don't think there is a way that you can predict everything, but what you need to do is to establish systems that can start identifying warning signal"*.

INT04 and INT06 think that uncertainty is only a possibility of things to happen, but the most important thing is when things happen, the public sector should be prepared to deal with such events. Furthermore, according to INT11, monitoring should not focus on trying to understand the future as this will be a waste of time, but the important thing is to build preparedness and

readiness to face what the future hides for the public sector *"There is a trend analysis as well as macro risk management and crisis management scenarios. In addition to that, we do not need to waste time in knowing the future rather than to be ready and enabled for the future"*. INT12 emphasized on having your own models in the public sector to try to understand how uncertainty will transform into an emergent event and how to handle it *"Uncertainty will be built on a model and some theories, and at the end, it's your own model which shall describe what's going on, and what are the expected reactions"*.

Furthermore, INT13 highlights that the public sector needs to understand the new business models that are emerging *"We need to try to look at the causes of what's happening and try to understand how the new business models are happening around us. At the same time, we have to be alert of predicting the Black Swan Events"*. Meanwhile, INT18 emphasizes the need to utilize data knowledge and learning to enable the public sector to better understand what is going on *"I think using data that is essentially a powerful tool for the public sector to predict and learning from past events and learning from other countries experiences"*. On the same page, but with a broader perspective, INT23 thinks that the data is everywhere and it is not only the formal research and published data that we need to take care of, but we also need to read between the lines in the media reports *"We are living in a very open world and it's very easy for you to get any data, any information about anything that you are not very much aware of. Therefore, it is very easy to know even if your studies are published, analysis of data are also published, media is not covering everything and sometimes they change facts. Accordingly, you have to be clever enough to read between the lines"*. Similarly, INT28 thinks that we should focus on whatever information that is available in the media *"The first would be referring to what is available in the media by doing media scanning about anything taking over or anything that might be happening and if individuals or groups are getting affected directly or indirectly"*.

INT29 prefers to have a specialized function with highly skilled people to monitor what is going on based on sectors *"I think we should have a function with highly experience people such as the subject matter experts in each domain. So, someone in economy, someone in politics, and someone in technology. Their job is to make like risk analysis, threats analysis, and any other types of analysing and studying data to determine what kind of changes are anticipated or also what kind of threats that might arise. Of course, they can use benchmarking with other governments all over the world, and they can utilize good communication or good relations"*. Furthermore, INT32 looks at monitoring and prediction as mechanisms to try to understand the integration between different circumstances *"So, the prediction is not a tool; it's not a system. It is not software. It is an integration between international and local circumstances"*. Meanwhile, INT33 emphasizes that the public sector should have its own measures to try to predict what is going on *"I think if our entities at least have their own measures. Therefore, from those measures, they maybe can find when the crisis will be closer. If they do not have those measures, they will never know. They will only now after the event happened, and then we have a high probability of losing control"*. Similarly, INT18 emphasizes that the public sector should have its own KPIs *"They can also have their own KPIs. They have their own dashboards; they can see, for example, from the increase or decrease of population or households in the country or even road traffic's data. They can use a lot of information to analyse rising or falling trends"*. Furthermore, INT37 defines three factors to understand if uncertainty will transform into an event *"Past or historical knowledge based on the prior knowledge (Intelligence and look at past experience), present by cooperative approaches with other countries, and future by being innovative for correlation testing (stress testing for possible scenarios)"*.

Figure 5-11 and Figure 5-12 summarize the attributes highlighted by interviewees for this section, which shows that the public sector should have its own measures for monitoring. However, monitoring alone is not sufficient, and the public sector should work on building preparedness parallel to monitoring. The public sector should also have its early warning systems to identify any potential emergent event, and it should utilize current systems to provide the necessary information required to monitor internal and external events.
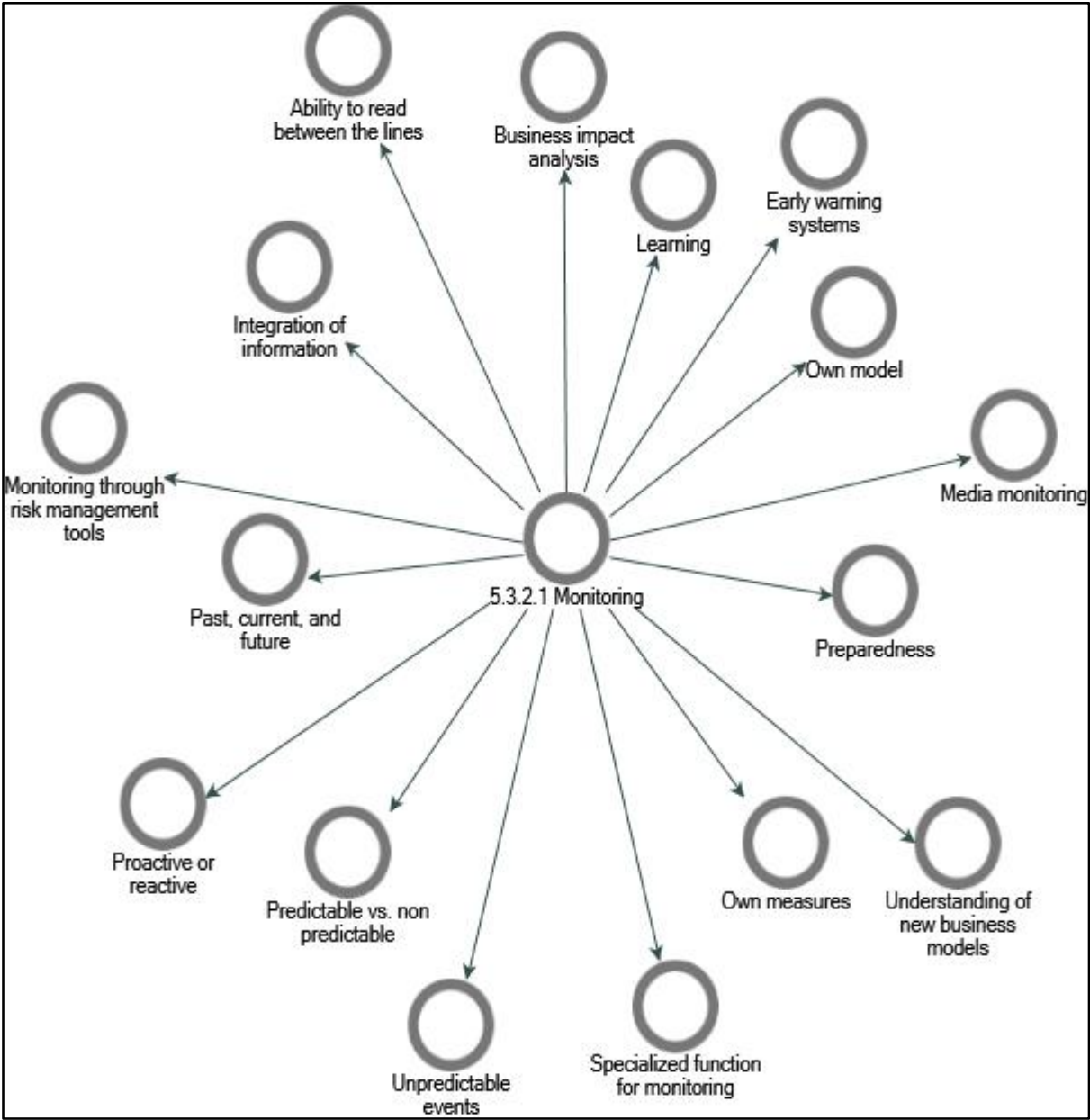
Figure 5-11: Identified attributes for monitoring.
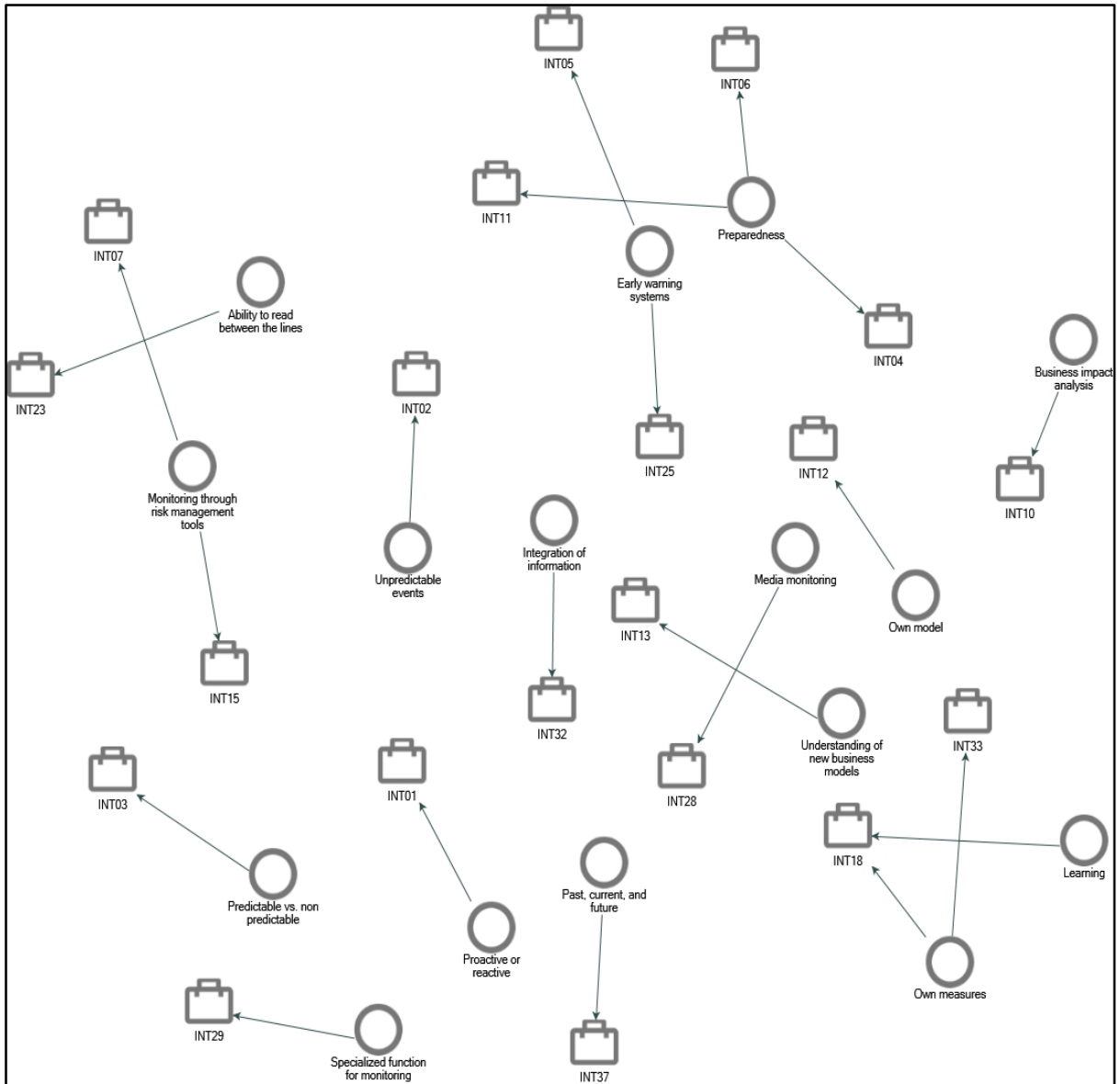
Figure 5-12: Identified attributes and interviewees inputs for monitoring.

Anticipation Tools

The following section will highlight the interviewees' perception of the anticipation tools the public sector can use to predict an emergent event, how to ensure that we are using the appropriate tools, and what we need in terms of building capabilities to use these tools.

INT01 questioned the maturity of any existing tool used for anticipation *"I can imagine that there can be some practices of scanning, monitoring, research and sort of that things, but I'm*

not sure currently that any of these tools are mature enough to give us reliable outcomes". On the other hand, INT02 thinks that anticipation is more related to systems such as the strategic management and performance management systems that instil within them some prediction components *"I think there are some sort of systems, first of all, like the whole science of strategy management and performance management that are trying to understand what happens either inside a country or a city or outside them. Therefore, at least the tools that we are using, or I have been using in my work, are mainly measurement tools that would help to feel the early symptoms of a change, if you choose the right indicators or the right tools for that. If you manage to manage them properly, you would be able to a certain extent to predict what could happen and to be ready for such scenario"*. INT02 also added other tools such as scenario planning or adopt other resilience frameworks *"You can adopt some sort of resilience frameworks in a city or country-level like the Sendai Framework that is advocated by the United Nations Office for Disaster Risk Reduction. Therefore, this framework is meant to equip countries and cities with proper tools to be ready to respond to emergency events, as well as the ISO 37 123 that has been released very recently"*. Moreover, INT03 emphasizes using strategic planning tools such as SWOT and PESTEL analysis to try to anticipate and predict an emergent event as the public sector should not have new tools for the purpose of only having those tools *"You need not to rediscover the world. We are using the best practice tools that are used all over the world. That's to be in line with the best practices. The other thing for ensuring the effectiveness of our tools is to ensure that the tools are fulfilling the requirements of all stakeholders and fulfilling the objective or the need that was built for it. If the prediction was closer to reality, then we can say it is effective"*. He added that, if we need to use new tools, then those tools should be fit-for-purpose and based on applicability to the core function *"You need to choose the right tool for the right environment"*. Furthermore, INT04 thinks that besides

having a proper performance management system, the public sector should engage in periodic knowledge and research activities *"You have to have periodic activities, studies, researches, seminars, workshops. You have to invite experts; you have to read, you have to be part of all what's going on in your area and keep your eyes on what others say and what they are predicting and so forth"*. The research part was also emphasised by INT12. Meanwhile, INT05 emphasizes having soft tools such as the behaviour analysis tools to predict, *"Maybe some of the behaviour analysis tools, which is very important also to predict the internal events"*. Moreover, INT06 identifies several tools for prediction *"The use of data, the use of big data, business intelligence tools, future-shaping, and future foreseeing scenarios"*. However, to be able to validate the quality of those tools we have to follow a credible method according to INT06 *"Well, if you want to measure the quality of your future research, you have to see that the data you are relying on is from credible resources, and the data is filtered and tested. Everything has to be in a structured way, the methodology should be an approved methodology. The people who are doing this are experts and seeing the outcomes of those studies to have proper decisions based on them"*. Furthermore, INT07 thinks that the public sector should first have a clear foresight strategy and a detailed PESTEL and risk assessment analysis tools *"The public sector entities should first have a clear future foresight strategy that is well designed. Also, it should have detailed risk and PESTEL analysis, which should analyse all future factors that may affect the entity operations and mandates, followed by deep analysis of main factors of ambiguity and conducting planning by scenarios approach"*. To validate those tools, they should be linked to indicators as illustrated by INT07 *"All foresight strategies and tools should be linked with indicators that measure the success in dealing with uncertainties, those indicators varies depending on the business type, but in general, we can always rely on*

operations main indicators (efficiency, effectiveness, and customer satisfaction) to track the success of those tools".

Similarly, INT08 listed several tools that can be used for prediction and anticipation by the public sector *"Mainly there are tools that are already used by the government, like future foresight tools, horizon scanning, and trend analysis".* He thinks also that there should not be any restriction to the use of these prediction tools by the public sector and a more reliable outcome will be achieved if we are using different tools *"I think that there are no restrictions in using any tool. But what I think, that if you are using different tools, you will be more flexible in accepting, and more flexible to predict what is coming. So, although each tool has its outputs, the most you are open for any new tool that is used for predicting the future, the easier for you to predict what the future will be".*

INT09 emphasizes having clear KPI and responsibilities to be able to properly predict *"Two things: clear KPI and responsibility. Also, commitment to the change which comes with responsibilities or linked to responsibilities. Sometimes we don't have the right KPIs for the journey we want to take and if you're measuring the wrong things you are implementing the wrong things on the ground. Many times, you have measurements, and you have KPIs, but you don't have responsibility for implementation, so implementation is disconnected from strategy or vice versa. Therefore, you wouldn't address the event that may impact you and then make the change".* INT09 also thinks that the public sector should develop its own tools for prediction *"First of all, developing your own tools means that you should benchmark and look at different things. Then take these tool kits. The second step would be customizing it to your own local needs, which may not necessarily be exactly the needs that exist for someone else. Third, you look at several events that occurred in different sectors, and how did you respond to these in the past. How effective were you in alleviating the impact in case it was negative or taking*

advantage of the impact in case it is positive? and you need to be very honest with yourself in this assessment, the post-event impact assessment, if you see yourself responding effectively and you had the change that you were looking at implemented the way you want, then you're using the right tools. If you don't then definitely, you're using the wrong tools". Similarly, INT22 thinks also that the public sector should have its own tools in case there are no other international option available *"I think if you have international guidelines, standards, frameworks, or manuals that will help you to know, this will be good and well. And if not, maybe creating your own, at least will help you to predict. It's very challenging to know what's coming in the future, but it's important that you try to know"*.

Furthermore, INT10 thinks that our prediction is made through having a proper risk assessment tool beside having a resilience framework *"You have to have a risk methodology. Another tool to have a resilient framework where you can identify internal and external uncertainties. How these uncertainties will impact the government sector especially? and prioritize these uncertainties when they are transformed to emerging situations"*. Meanwhile, INT10 thinks also that the public sector can perform testing or mock drill to validate the prediction tools *"You can use it on a trial period or a pilot and test the tool itself. Therefore, once you test the tool and test the results, you can see if this tool is suitable for you or not. Also, you can run another drill in the future and test the same situation or a different situation and see how the public sector reacted accordingly"*. Piloting of tools was also emphasised by INT26. Using risk assessment analysis as a prediction tool was highlighted by INT34, and doing drills was emphasised by INT35.

Furthermore, INT13 thinks that before you choose the prediction tools you have to first define your assumptions *"Well, first of all, let me start by saying that: We are making our predictions based on assumptions. Therefore, an assumption is something how we think about reality. And*

162

based on that, we get something, sometimes our assumptions are fraud, and sometimes our assumptions are very close to reality". Meanwhile, INT14 emphasizes the need to have a framework first before choosing the tool *"It's not about tools it's about first choosing the framework itself that's being used or will be used"*. He added that this framework or model should be based on three scenarios *"The macro economic forecasting based on three scenarios: the optimistic, pessimistic, and the moderate scenario. Developing the model depends on the capacities of the people working in this model, the availability of the information, the consistency of this information, and if technology can play a big part in this"*. Having a model before prediction was also emphasized by INT29 and INT30. Furthermore, besides making the assumptions, and before using a framework to make the prediction, INT25 emphasized the need to have the buy-in of leadership as they are the ultimate users of those tools and the ones who will be taking decisions based on them *"So, I think it starts with getting buy-in from leadership, leaders need to understand that this is something that is important and it's a skill set that you'll have to invest in, and you may not see results immediately"*.

INT15 has a different point of view as he thinks that rather than building tools and strategies for prediction, we can depend on integrating the current management systems in different fields *"With reference to my experience, implementing international management systems can help to predict this transformation. Many ISO standards can be used to predict uncertainties. For example, ISO 31001 helps organizations to build an enterprise risk assessment framework that can be applied in any management system. ISO 22301 helps organizations to identify alternative scenarios in case of any uncertainty transform to an event and ensure business continuity. ISO 27001 helps an organization to protect their information and ensure information security, and ISO 14001 helps an organization to protect the environment from any coming environmental emerging event"*. He added that we need to conduct a vulnerability

assessment to define the gaps and choose the proper tool for prediction *"Conducting vulnerability assessment will help the public sector to predict its weaknesses and focus on using the right tool and establishing the management system(s) that will close these gaps and strengthening it"*.

Moreover, INT16 emphasized having tools to understand the public beside the other tools that can be used for prediction *"So, one of the areas in which governments are starting to experiment in are tools that amplify signals that are in the public domain. For example, some of these tools are around understanding the kind of trends in social media. What are people talking about? These are some early warning signals in terms of what are some of the things that are emerging now in public. There are foresight tools that also trying to predict within certain domains what's going to be the future, for example, Artificial Intelligence"*. Similarly, INT32 focused on social media analysis to predict internal emergent event, or the preparedness of the public if something happens. Moreover, INT17 emphasizes having Artificial Intelligence tools, using big data, open data, and expert systems.

Before implementing these tools, we have to validate them as indicated by INT17 *"There is something called validation of the data. Validation means you reached a similar result using different ways in a simple way"*. However, with the prediction of emerging events it is very hard to do that as we do not know the outcome according to INT17 *"But again, you will never be sure that you have used the right tool because you don't know the outcome"*. Similar to INT17, INT18 also emphasized having the Artificial Intelligence tools including machine learning, and INT31 emphasized having algorithms part of Artificial Intelligence analysis capabilities to make predictions. Meanwhile, INT35 emphasized using Artificial Intelligence to enhance data management before using it as a tool for prediction.

Furthermore, INT19 thinks that all the anticipation tools are linked to Decision Support Systems tools *"I think some organizations are depending on getting tools that can help them in the Decision Support Systems (DSS) tools. Others are getting AI tools that can give them insights or speed up the decision-making process and the analytical processing of data, and others are building their capacity in foresight and in benefiting from the experience of experts in the same field to anticipate the different scenarios and to be ready for any scenario that can happen or occur. So, partly is digital or smart solutions that can support the decision support process, and another one is dependent on expertise or experts who can make forecast or foresight the future"*. To investigate if we have the appropriate tools, we have to have KPIs to measure their success in addition to having experts' judgemental opinion according to INT19 *"Actually many organizations now are having key performance indicators that measure the success of these tools. Another way is depending on the experts and asking experts about their experience in utilizing such tools"*. Using expert judgement was also emphasised by INT24.

INT20 emphasizes having scenario planning beside trends analysis and benchmarking to predict the emergent event, *"I believe to predict, we need to do kind of scenario planning. If we start doing scenario planning, at least we'll be ready in case something happened, or we can define the reaction or how to mitigate the impact"*. As per INT20, there is no way to guarantee that you are using the appropriate tool *"No, there's no guarantee, of course, to choose one tool or the other, but at least you should be prepared or do your best practice exercise"*. Using scenario planning was also emphasised by INT26 and INT33 and using benchmarks to select the appropriate prediction tools was highlighted by INT32.

Moreover, INT21 highlighted some important factors for choosing the anticipation tool, which is data and information visualization *"I do agree that if there is something that is more visual, you can see something but that will involve a lot of effort, a lot of work"*.

INT27 thinks that to make a prediction we cannot rely on only one tool, and we need to use a mix of tools *"Well, I think first, you cannot rely on one tool only. In my opinion, you need to use a mixed combination of tools"*. Furthermore, INT37 thinks that to enable anticipation and prediction of emergent events the public sector should have different tools *"Individual tools (advisor think tank), centralized institutional public sector institutes to do the future foresight for the public sector, and usage of technology through Artificial Intelligence and Big Data to try to understand what's going on"*. To make sure that the public sector is using the appropriate tools, INT37 highlighted two factors *"First, inward by doing self-reflection checks and balances of the design (We test theories against cases). Second, outward by external eye validation through external reports to investigate what others are talking about us, such as reports from the World Health Organization"*.

Figure 5-13 and Figure 5-14 summarize the attributes highlighted by interviewees for this section, which shows that the public sector should think first of how to validate the anticipation tools before choosing the appropriate tools. The participants highlighted the importance of having a framework to first define what we should look at, after which a decision is made on whether to use new tools or currently existing tools for anticipation after carefully considering both options.

Furthermore, participants preferred to focus on the usage of tools derived from artificial intelligence and data science to be able to meet exponential growth within this regard, while some participants are still focused on using expert judgement and current KPIs to enable anticipation. Other important points that were raised by participants are regarding the importance of owning the prediction tools by the public sector and using a mix of tools for anticipation. However, the public sector should not ignore using the proper tools to continuously monitor public opinion.
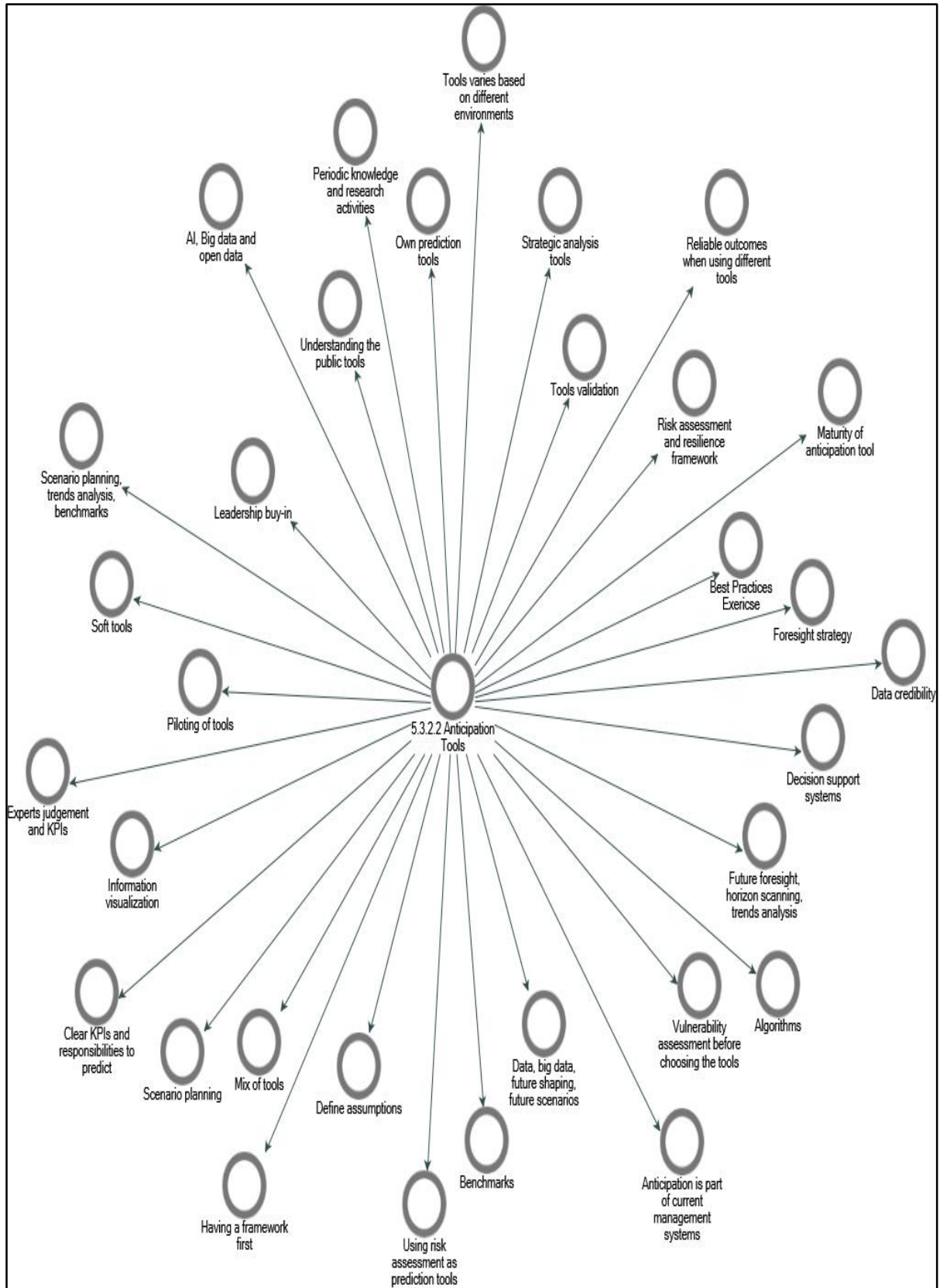
Figure 5-13: Identified attributes for anticipation tools.
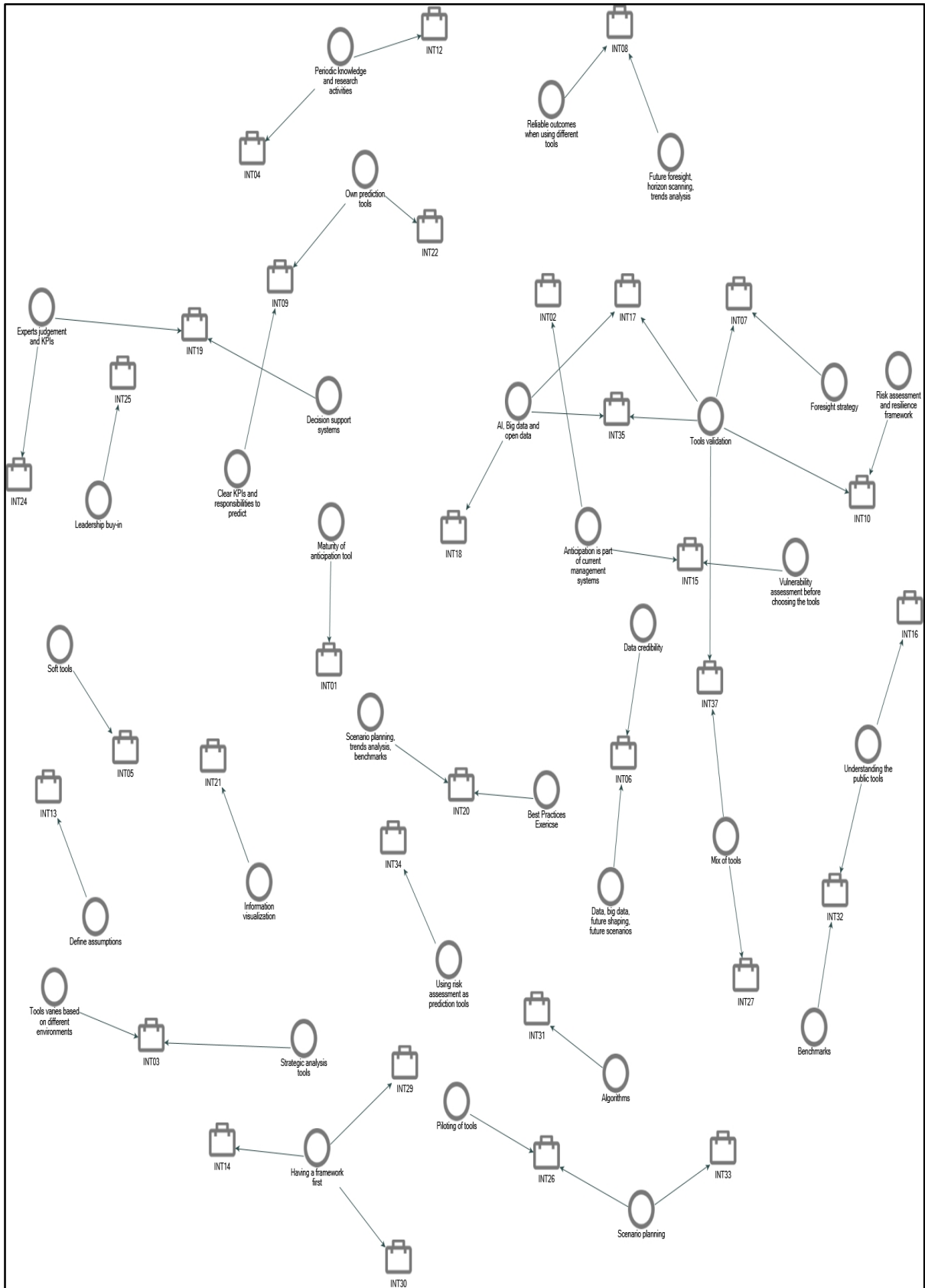
Figure 5-14: Identified attributes and interviewees inputs for anticipation tools.

Anticipation Capabilities

The following section highlights the interviewees' perception of what the public sector should do, in terms of building capabilities to properly use the anticipation tools.

INT02 thinks that whatever tool the public sector is using, the most important thing is to build capabilities of the people and remove any obstacle to ensure a proper flow of information between different parties to facilitate effective decision making. *"But no matter what you do, your tools will always become obsolete in some time. All what you can do is to make sure that at least they are lubricated; and with lubrications, I mean ensuring that there is a proper flow of information and data for decision making"*. He added that to build the capability of people, you have first to have a system and a culture that enables proper capability building process *"Building the capability of people is easy and once you have a system in place, then you can have people trained and make sure to emulate this one. However, you need to have two things I think inside an institution one is the system and the other one is the culture. And then the question of capability or capacity within people that's a matter of a process that you undertake to make sure that you learn as an institution and as people according to the situation"*. Taking another perspective, INT04 talked about the importance of knowledge *"I strongly believe that knowledge is a key in this regard, whether it is knowledge management on an organizational level or it is the knowledge sharing or knowledge transfer, knowledge distribution, dissemination, and creation. In addition to that, we need to ensure governance; do you have proper governance that encourages distributing decision making and participation in decision making? If this is the case, then most likely you will have all the important voices in the organization heard, but if it is an autocracy and single-handed decisions are the case, then definitely you will have big risks and big troubles"*. Furthermore, INT05 believes that although building capabilities to use anticipation tools is important, but the most important thing is the

acceptance of the outcome of these tools by leadership as they use these outcomes to take decisions *"If leadership is not adopting this kind of tools, even if you bring the most talented people to use them, it's a stopping factor because the leaders have to believe in the outcome of this"*. INT08 expressed the same perception about the role of leadership *"I think that the first thing that they need to have is a clear vision that does depend on the leadership. The leadership needs to be assured that they are open for the future"*. He added another factor, which is having a system as part of the capabilities *"The system is one of the enablers or one of the capabilities that you have; If you need to have a system on how to handle these changes, how to assess these changes, and how to relocate your resources like budget, technology, adopting new technology, recruiting the right people, these systems need to be used to support you"*.

Meanwhile, INT07 thinks that besides building capabilities in traditional tools such as risk management, the public sector should invest in building people capabilities in foresight sciences *"The public sector has to invest more in building the staff future foresight capabilities, as it is newly introduced to the public sector, the entity should provide its staff with proper tools for risk management and analysis and provide sufficient training to its staff to deal with those tools"*. Taking another view, INT10 believes that it is all about training programs and capacity building programs for the people *"So, you have to have training programs and capacity building programs across the whole government, and this is for the tools that you already adopted"*. The capacity building programs were also emphasised by INT33. Similarly, INT26 focuses on providing training to the people to use these tools *"Through training, and you need to measure the training's impact not only provide training. This is an important thing. Unfortunately, a lot of government employees go for training just to escape from work, and we need to measure their skills before and after"*. INT14 also believes in building the capabilities of employees similar to INT10 but adds that the public sector should have a specialized strategy

first *"Governments must have strategies to build capabilities because if you left it without having a clear strategy, it would never be developed"*. Similarly, INT29 emphasises on having a model first *"I believe the model itself should define the requirements. First, you need to choose the right people to do the job based on the type of experience and the type of qualifications. In addition, you need to train them and build their skills in this domain. It is not easy to define what kind of training you will need, but it depends highly on the model itself, and in general, the training needed will be in the domain of uncertainties and anticipating. I think this should be defined in the model"*. Meanwhile, INT21 emphasizes on building capabilities of the people *"You need people who are capable of building real scenarios, and you need people to tackle real risks available currently and showing them what these tools can do with the risks in front of them"*. Furthermore, before training the people you have to select the right people to train according to IN23 *"Before building the capabilities you have to select the proper people, because it is not everyone who can develop a scenario, it's not everyone who can predict, it's not everyone who can have virtual thinking to develop a scenario against uncertainty"*. Meanwhile, INT19 has a similar opinion as he considers building capabilities of people and leadership is the most important thing *"Invest in their people, train their people in how to use these tools, train their leadership on how to benefit and read the reports generated from these tools"*. The training aspect was also emphasised by INT35 *"They need practical training or you can send them to other countries for training as shadowing with other experts who are competent within this field"*.

Furthermore, INT09 highlighted that to build capabilities, you need two pillars: people and technology *"Building capabilities is always about two main dimensions, people and technology. Therefore, you need to have the right balance between both"*. Similarly, INT16 focused also on building the capability of people and investing in technology *"I think two main*

areas where you require building a big investment. One is in technology infrastructure, and the other side obviously is the human side of the equation". The other big challenge based on INT16 opinion is the culture *"The bigger challenge is cultural because the government culture also requires a transformation, and this has proven to be much harder than the skills because you want a culture where people are empowered to solve problems sometimes without seeking approvals. You want a culture where there is flexibility, where structures can change quickly to adapt to what's developing outside. The problem in the past is that governments have been extremely rigid and extremely slow to change and so to enable people to feel free to deal with the problems that they face, this requires a major cultural shift"*. Furthermore, INT17 thinks that to build capabilities to use the anticipation tools, organizations should create a culture of learning: *"I think, the best way is to start creating what I like to call a learning organization. Again, because all the tools that we have mentioned depend on data, the use of data from history or current and future. We need to use data, and using data requires creating a culture of learning organization"*. Meanwhile, INT20 highlighted the importance of having a research centre in the public sector *"I believe you should have taken an approach of creating something like research centres or research labs is very important"*. These research labs should be established at a central level then each public sector organization should have its own according to INT20 *"Must be done in the government level and cascaded down into government entity level. So, the government level must adapt or has to kind of accept this and enforce implementation at the government entity level"*. The centralization approach to do anticipation was also emphasised by INT27 *"As I said in order to be prepared for these incidents, I need to ensure that I have proper anticipation of these incidents. Therefore, if we agree that we can make it centralized, then this group of centralized team that is going to make this anticipation or forecasting or let's say the expectation of these incidents, they will just develop this list, and*

172

they will put the weightage, and then they can leave it for the government sector or the public sector to start to be prepared for these and put what I can call response plans for them". Furthermore, INT34 suggested that we should have the capable teams at the sector level then we can have other teams on the lower levels *"We also need to have the capabilities at the sector level to be able to identify what potentially the kind of these risks are. So, at the macro level, there should be an institutional team, but at the micro-level, there could be experts on the sectors; people who are also looking for sector-specific risks"*. Meanwhile, research and development were also emphasized by INT30 *"Research and development is key to any organization. We are seeing many organizations, multinational companies that are spending 10-15% of their income or their profits, putting them back into their system. Realizing the importance of research and development in keeping the company in competition. The same thing applies to governments, if they don't cope with training and development, if they don't send their human capitals to make them aware with the latest tools and equipment, they will be left behind"*.

INT22 has a similar point of view with INT02 regarding ensuring the open communication to ensure proper usage of the anticipation tools *"You need to have an open communication channel or path to pass their messages to the top without barriers. The escalation should have a clear process where even if you don't believe that this topic is important, then they can bypass you and go to the next level. So, this communication channel should be clearly defined first from the beginning"*.

Figure 5-15 and Figure 5-16 summarize the attributes highlighted by interviewees for this section. Interviewees think that to build anticipation capabilities, the public sector should first focus on training and capability building programs for the employees. These programs should focus on new technologies and how to use these technologies to better understand uncertainties.

173

The other important factor that was raised by interviewees is getting leadership buy-in to understand these tools and to utilize the outcome of these tools to make proper decisions. The public sector should also focus on building research centers and having the proper culture to enable foresight. Another factor that was highlighted by interviewees is to have a centralization approach for anticipation by having one hub where all the data are gathered and analyzed to enable better information analysis.
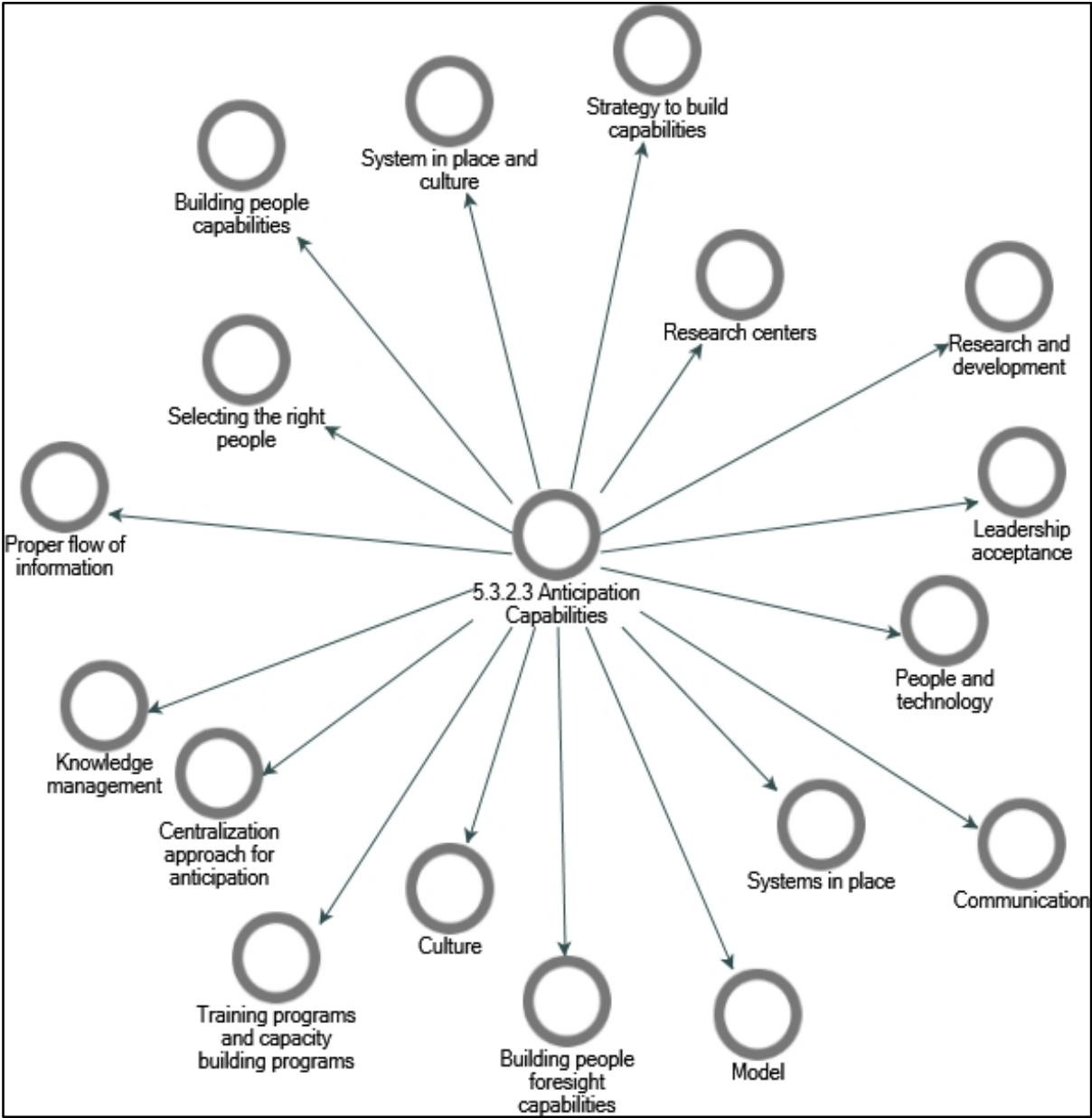
Figure 5-15: Identified attributes for anticipation capabilities.
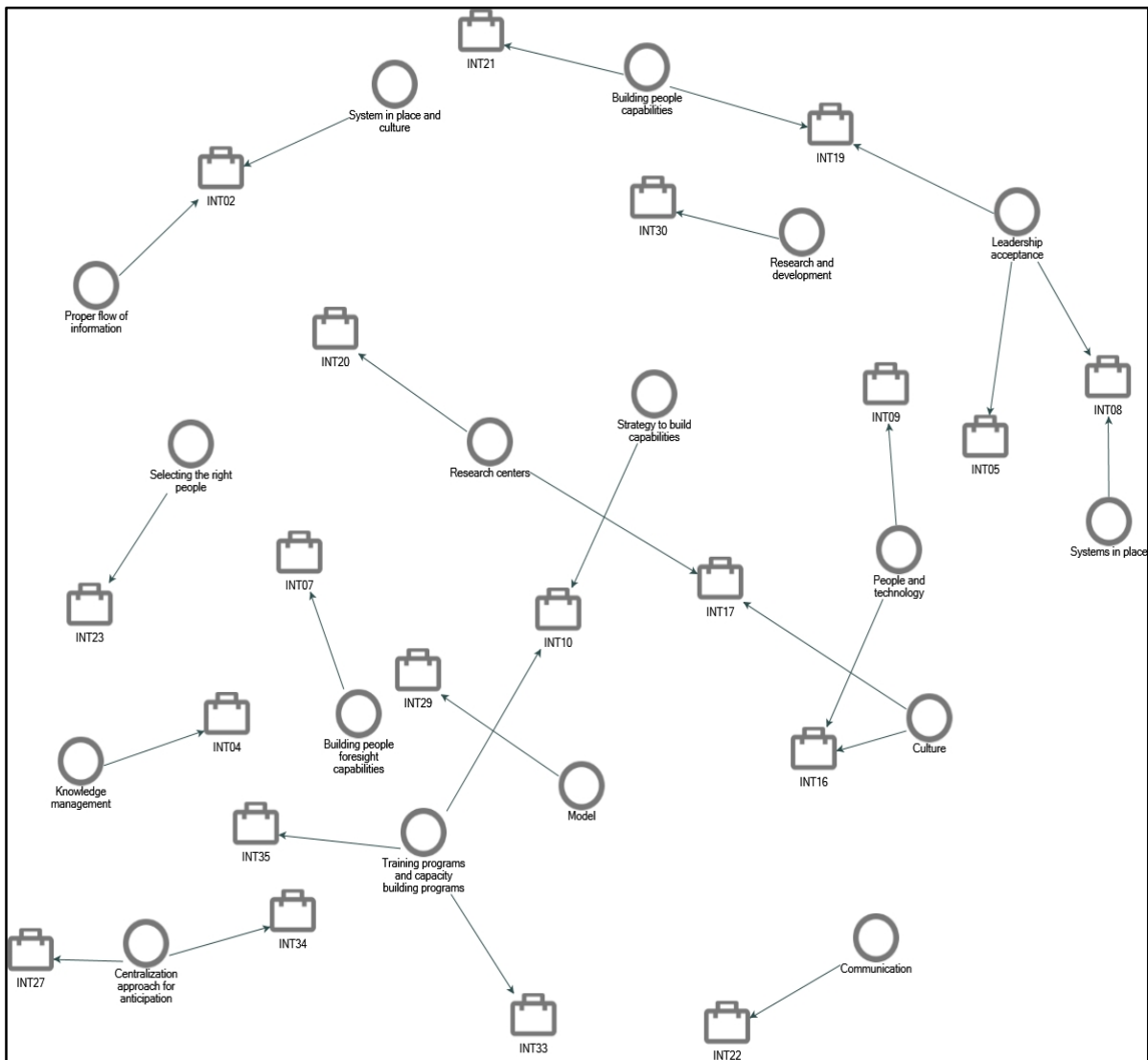
Figure 5-16: Identified attributes and interviewees inputs for anticipation capabilities.

5.3.3 Theme Number Three (Emergent Events)

Figure 5-17 shows the hierarchical coding structure of Theme number three, which is emergent events. Study findings will describe the interviewees' viewpoints on how we can categorize emerging events facing the public sector, how to assess the magnitude and the escalation of an emergent event, how to define the first response strategy, how to define responsibilities for taking action, and how to diffuse knowledge about the emergent event to various stakeholders.

175
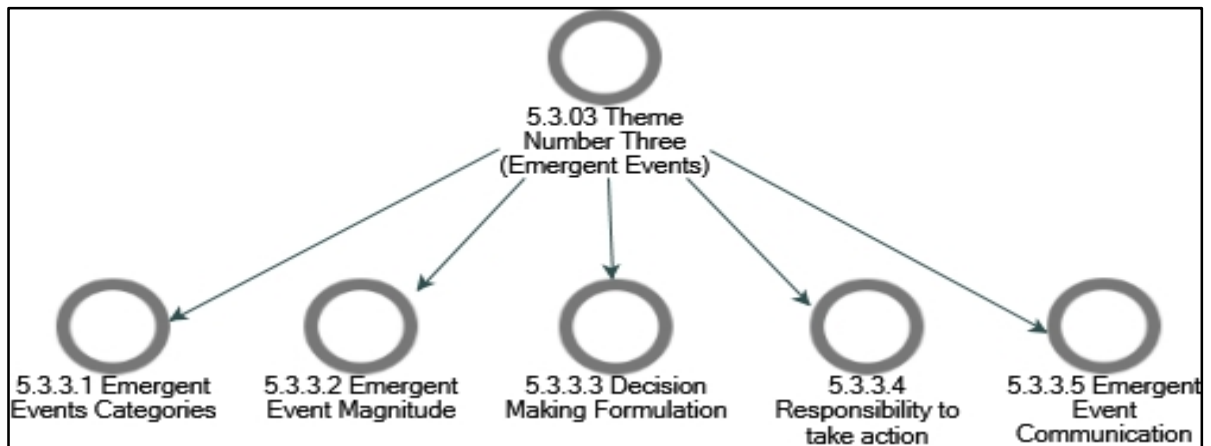
Figure 5-17: The hierarchical coding structure of Theme 3 (Emergent Event).

Emergent Events Categories

Participants' opinions about the different categories of emergent events are presented in the following section.

INT01 highlighted that emergent events in the public sector could be categorized based on technological relationship, fast-changing community culture, or on community prioritization *"In my mind, the most obvious for the time being at least category of the event is technology services related event which is mainly advancements in technology or enhancement in technology. In addition, more serious potential events are caused by changes in the community culture or the community prioritizations"*. Furthermore, INT02 has three categories of emergent events that may face the public sector, which is spatial, sectoral, and megatrends *"So, I think we have three dimensions to deal with. One is spatial, which targets either the global, regional or local. The second one is the sectoral level, which I am here talking about political, economic, health, or social event, and both are influenced by some megatrends, one of which is that technological advancement. The other one is the economic scene as a result of the continuous change of the social norms in societies. So, I'm talking on three different levels: spatial,*

sectoral, and one has to do with megatrends". Similarly, INT03 categorizes emergent events in the public sector based on different sectors *"You can categorize them based on the sector that the emergent event came from, for example, political, logistical, technological, whatever economic, social"*. Furthermore, INT05 is more inclined to categorizing events based on the PESTEL grouping *"There is no specific categorization in my mind, but I would follow, for example, the PESTEL model. Because PESTEL is the easier one and very obvious"*. The PESTEL categorization was also emphasised by INT25 *"So, economic, political, environmental, and technological obviously with cybersecurity as a major threat right now. It just sounds like we're going to go through the entire PESTEL list"*. Similarly, INT32 and INT33 emphasized the PESTEL categorization while INT36 highlighted only the economic, social, and environmental as part of PESTEL.

INT06 has a different point of view as he thinks that the emergent events facing the public sector can be categorized based on the effect and the magnitude of the emerging event *"Well, you can categorize it by the effect and the magnitude of this emergence issue on the public sector"*. Similarly, INT18 has a similar categorization based on the magnitude and the impact. Meanwhile, INT07 thinks that the emerging events facing the public sector in the future will be mainly related to technology and social changes, which is somehow aligned with INT01's point of view *"Mostly the emerging events which are related to technological factors as big data issues, information security, smart learning, and the social changes (which are related to social media channels) causes many emerging events that governmental entities should deal with"*. Furthermore, INT08 identifies a specific disruptive technological change, which is block chain technology *"I think that block chain is one of the disruptive changes"*. INT08 added that, besides technology, we have political and economic changes *"I think that the main change will be in technology. Maybe there will be different political and economic changes"*.

INT09 categorises the emerging events into two categories; events that you know about and you have time to deal with them, and events you do not know about and they have a sudden shock *"I would classify them into two categories. The first category is emerging events that you already know about, but they take time to affect you; for example, global warming. The second category is the category that hits you suddenly like earthquakes, the global financial crisis, something that you're not prepared to, it happened suddenly, and this basically tests your agility, your resilience, and the speed of reaction to these events"*. On the other hand, INT10 highlighted security-related and cybersecurity-related emerging events *"The cybersecurity. Another one is security threats from security in general"*. Furthermore, INT10 added the economic crisis and the natural disasters to the earlier list. Meanwhile, INT15 emphasized cybersecurity attacks as the main events that may face the public sector in the future, while INT19 focused on economic, social and security. INT22 focused on technology and economy. INT11 has two categories which are internal and external *"Now, the public sector has two categories which are external and internal categories; For the internal, it is not just the systems or incidents of operations rather than the customer side which is maybe missing like the youth needs for example. They have aspirations, and if the public sector cannot meet these demands from such a young group, it will be a clash. Now, for the external ones, of course, wars, trade wars, economic situation crisis, financial crisis, and devastating regional incidents such as hurricanes and others may be considered"*. Meanwhile, INT13 has a different classification in four categories that can be highlighted through a quadrant relationship *"Well, there is a very important classification I will share with you. I learned it from somebody called Dr. Alan Barnard. What he says is there are two types of major classifications categories. Therefore, any event could be avoidable or unavoidable. It could also be consequential or inconsequential"*.

In trying to define the categories of emerging events, INT16 listed some of them *"Well, right now we're facing a period of geopolitical risk, both in the region and around the world. You are seeing a politics of divisiveness around the world. That is one area. Obviously, technology is a huge area; the fourth industrial revolution is a big emerging risk that is going to affect countries around the world and the more the technology develops the greater the gap between the high skill and the low skill countries, and that is going to continue to grow. On the other hand, you're starting to see much more mobile global population, and so people find it very easy to change countries and to live in different places, and so how can countries adapt to having a bigger and bigger expat population and what does it also mean to be a global citizen"*. Furthermore, INT17 has two ways of categorization *"I think to categorize them based on the dimensions that we have mentioned earlier; this has political influence or impact or economic impact or cultural impact. Another way is to categorize them based on risk assessment tools. So, the likelihood of happening, the impact that can have so we can have different categories and scores then we can categorize them into catastrophic, disaster or risk or whatever. So, based on the different scores for different dimensions, we can have different categories"*. Similarly, INT29 has a similar categorization based on the risk assessment methodology. Meanwhile, INT20 has another list *"The first one is I can say technology. The second one is security. The third one is infrastructure. And number four, which is the most important one, is the service and maybe comes later health care and transportation"*. Meanwhile, INT27 highlighted three main categories; political, health and economic emerging events *"If you want to classify them, you can say political, health, and financial crisis, which might happen, like for example, the trade conflict between China and the US as it is it going to affect the country here"*.

Finally, INT36 categorizes the events that may face the public sector based on the level at which it affects people's needs based on Maslow pyramid *"But to simplify it, I think if we draw the analogy of the very famous and old model of Maslow. I would say if you touch the pyramid from the bottom then you are largely affecting the public sector most, and as you are going up on the ladder, you will have a less impact"*.

Figure 5-18 and Figure 5-19 summarize the attributes highlighted by interviewees for this section. Interviewees think that the public sector is surrounded by emergent events related to political, economic, social, technological, environmental, and legal areas. Another important factor for categorizing emergent events is based on its effect on the society or community. Others think that emergent events in the public sector can be generally categorized based on the effect and magnitude of the event and based on the likelihood and impact. There was also emphasis on cybersecurity which is considered part of the technology category, and there was some emphasis on the health category.
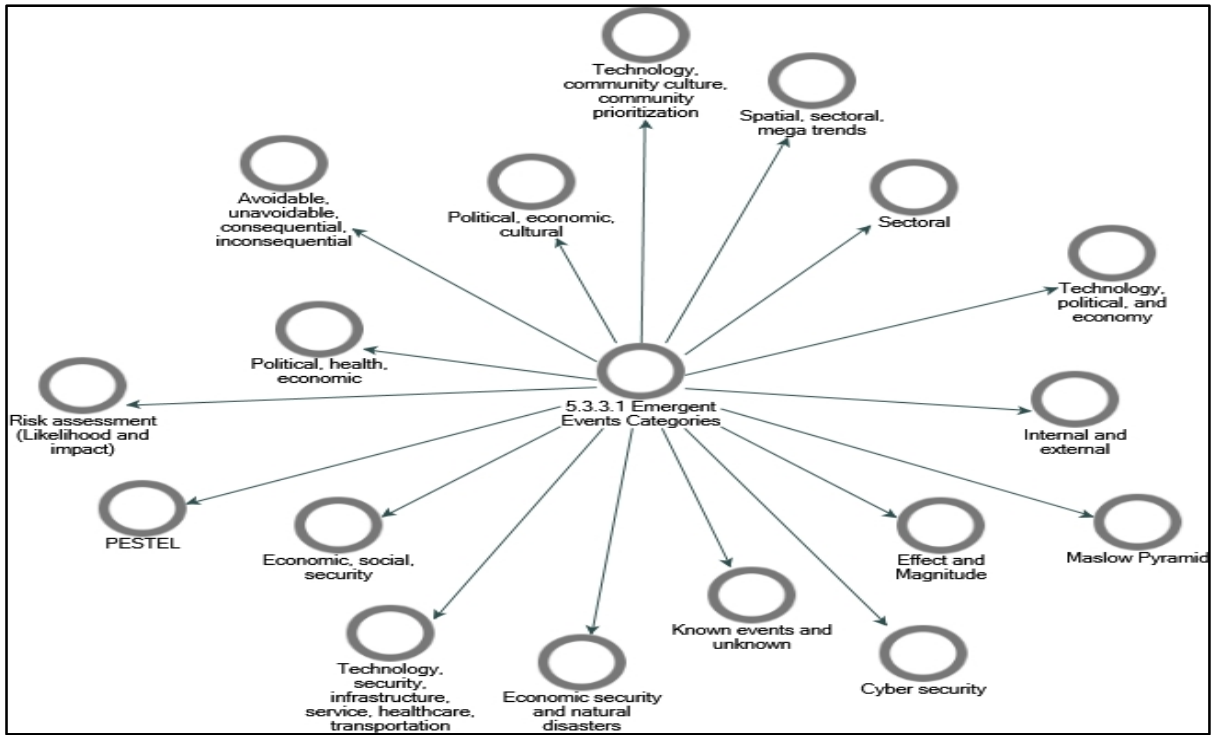
Figure 5-18: Identified attributes for emergent events categories.
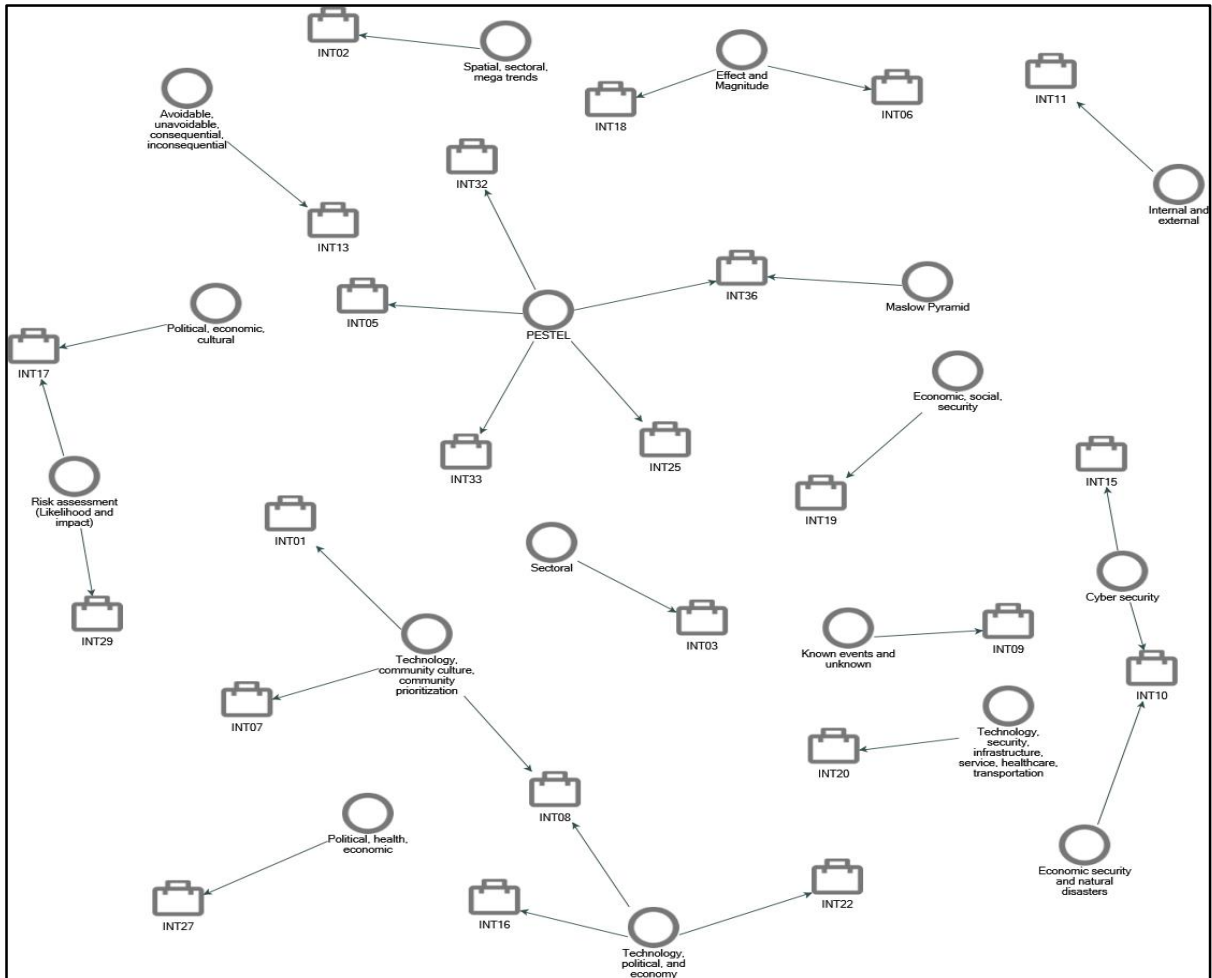
Figure 5-19: Identified attributes and interviewees inputs for emergent events categories.

Emergent Event Magnitude

The following section will tackle assessing the magnitude of an emergent event facing the public sector and the way in which it will upscale:

INT01 linked the magnitude of an emergent event with measuring the impact, certainty, and the acceleration of the event *"Impact, certainty and acceleration, and maybe these are the three factors that should be in my radar"*. Meanwhile, INT02 suggested two factors: the scope of the effect, and how deep the effect is *"I think you can always have a diagram, a two-dimension type one with a scope of effect and one with how deep the effect is. Something like four quadrants. So, either the effect is limited in terms of scope and limited in terms of impact or big*

in scope limited of impact or big of impact limited in scope or big in scope and big in impact". Furthermore, INT05 suggested using an impact assessment tool to assess the impact *"It's through impact assessment tool"*. Similarly, INT06 mentioned the impact assessment tool and specify areas where it is affecting the public sector *"The impact of how it is affecting the public sector; if it affects its structure, if it affects its performance, if it affects its way of delivering its services, this is all affecting the public sector or maybe affect its existence"*. Meanwhile, INT10 highlighted also assessing the impact *"Measuring the impact and how you can measure the impact itself is by the probability of occurring and the impact when it occurs. For example, if a crisis happened, how it will impact my business in the government sector or how it will impact the capability of the government sector to offer or continue doing its business as usual"*. Similarly, INT20 also emphasised on the impact but added the likelihood and frequency to it. Meanwhile, INT32 mentioned likelihood, frequency, and added the cost to these factors. Similarly, INT27 highlighted that the magnitude could also be assessed through the impact. Furthermore, INT07 is aligned with assessing the impact, but with assessing the impact on strategies systems and stakeholders *"We assess the magnitude of the event by evaluating its impact on society, organization strategy, operations, services, employees, and customer satisfaction in addition to other factors, all factors should have a weight and be evaluated by an experienced staff"*. Having experienced entities or experts to assess the magnitude was also emphasised by INT08 *"You need to have access to these people having good connections with universities, research centres, who know how the changes are going to be"*. Furthermore, INT07 suggested to use the judgement of expert people, but he also defined the tools to be used when assessing the magnitude *"It's subjective, DELPHI method can be used from experts or from even people working in the public sector. Now, it can be mostly subjective, but it is also can be quantitative through simulating results, scenarios, and trends that can also give a clue*

about this. If the accuracy is not very high, it is okay. But at least we have some estimation in the house that it has the right way of dealing with big or small challenges because small challenges may have the butterfly effect, it happens small, but it turns into going big, it's like a snowball. Sometimes they do not link between them, and this is a challenge by itself. The link is between the small events that will lead to high events through a complicated cause and effect analysis and using advanced techniques like big data and artificial intelligence that will also assist in testing and expecting more accurate results".

INT09 defines two dimensions to assess the magnitude, which are connectivity and the impact *"First of all, the two dimensions: connectivity and size. If you are connected to these events with a high degree of connection, then you will definitely have a very strong hit. For example, when the international financial crisis hit, we were hit because we were highly connected to the financial markets, with Europe, with the US, everywhere. China was not impacted that much, actually, they did not even feel it, because they were not connected to the global financial market. They have a different system and setup, so they knew that they would not be affected. Secondly, you look at its impact and how much damage it caused or how much profit we make. So, if I look at the GCC and say that in the past ten years, before 2008 and before the international financial crisis, let's say around 100 billion Dirhams came into the region and always, 70 percent of them on annual bases was going to the UAE. Therefore, you do not need sophisticated tools if you are planning in Saudi Arabia to say: I am bigger than the UAE in terms of size and population and I am getting less money out of it. Therefore, you can measure the impact very easily, understand, and know that there is something going wrong. So always, remember the impact and connectivity".* Furthermore, INT09 added another dimension, which is sensitivity *"A complementary one is probably your sensitivity to this event which will translate into speediness of the impact. Therefore, if you are too sensitive because there are*

certain sectors for example, the impact transforms and passes quickly to the other partners. Like when we look at financial markets. However, if you take other markets like tourism, probably or real estate, sometimes it takes time to pass over this impact, or it may not pass over at all".

Besides the impact, INT13 identifies the link of the magnitude of the event with the quick response *"Well, it depends. Nevertheless, we do not live in a linear world. Therefore, in a nonlinear world, usually, it goes logarithmic. So, the more you delay acting, the more negative the impact will be".* The impact was also emphasised by INT15 along with the criticality *"This is a critical event with a very high impact. Because of cyber-attacks, organizations can lose their identities, database, infrastructure, information and even their image".* Furthermore, INT16 suggests that the public sector should not work hard to assess the magnitude as this is a meaningless measure. What the public sector should focus on more is to be flexible enough regardless of the emergent event magnitude *"If you want to try to assess ahead of time it's very difficult. You can only really assess after the fact; what the magnitude was and what the impact was. By the way, this question is phrased from a traditional government perspective, which focuses on how we can assess the magnitude so that we can prepare for it. What governments need to be asking now is how we can become flexible enough that we can adapt regardless of the magnitude. This is an adapting question; governments need to start asking transformation questions, which are: how we can automatically evolve so that when these events happen the system itself adapts and changes. Therefore, for example, one of the things we will look at in terms of a metaphor, rather than governments being one giant beast, it should be like a flock of birds. So, it's still a big entity, but the individual points can move around to adapt to whatever is coming, and that makes governments much more resilient".* Similarly, INT25 suggested also that we should be comfortable with the fact that we do not know *"I think we have to be*

comfortable with the fact that we will not know. It is just because everything is so interconnected you do not know what is going to cause an explosion. So, I think that the more we are comfortable with the fact that you never know what's going to happen, the better things will be". On the other hand, INT17 focused on the preparedness rather than focusing on how to assess the magnitude *"First, I would like to give my insights because you have inspired me to think about something that I always like to think this way. There is something called Alpha risk or beta risk; Alpha risk: if you do not expect an event, you do not take action, and it happened. Beta risk: you expect something and does not happen. Do you prefer to go for beta risk or alpha risk? Therefore, it is better to prepare yourself for an emergent event and make it with the biggest preparedness, and nothing happens, better than not to be prepared and then something happened"*.

Another opinion came from INT19, he thinks that the magnitude of an emergent event in the public sector can be assessed based on the population to be affected by the event, its severity, and if we can do something about it or not *"I think mostly how many the number of the population that will be affected. Another category or another criterion is the severity, even if it affects a few maybe numbers of people, but how severe they will be affected, and the third one whether it can be rectified or not; if it happens, can we rectify it, or it cannot be rectified?"*. Similarly, INT22 thinks that the magnitude is highly related to the level of the impact on the society *"I guess the impact of each to the society. This will be the major criteria to assess the magnitude"*. Furthermore, there is another categorization of the magnitude of the emergent event based on sectorial priorities as highlighted by INT21 *"Based on how you prioritize your sectors in the beginning. Dubai, for example, the main industry that Dubai today as a city relies on is tourism, real estate, and business. Now as much as they want these three sectors not to be impacted because these are the sectors that are helping the economy stabilize and stand on and*

they need to diversify, that's for sure, but these are the three sectors today they don't want to be impacted". Meanwhile, INT26 listed too many methods to assess the magnitude of an emergent event *"It can be measured through many ways; the financial impact due to this event, the effect on the people, on their emotions or on their situations. The effect on technology, for example, if any cyber-attack comes, it will affect the infrastructure and the people's money, in the banks"*. On the same page of INT26 but with a slight difference, INT28 listed some factors to assess the magnitude *"Number of people affected, economic effect, loss of profits or loss of marketplace, and losing the interest of people"*.

INT31 referenced how infectious diseases affect the public as a way of assessing the magnitude of emergent events *"Maybe in the earlier stages there would be some hesitancy but of course it depends on the disease or if it has been developed from one place or another. However, in general, as a disease, it begins somewhere, or the event will begin somewhere, maybe we will not be able to anticipate to which level it will spread. But with the time going on, with the close monitoring of such cases, and with knowledge of risk factors like transport and the other risk factors of fast infectivity of the disease, we will get to know that this is a disease that can really affect us badly so that we need to start quickly in order to be prepared against it"*. Furthermore, INT35 thinks that having proper risk management will enable to assess the magnitude *"If you have risk management approach and you implementing this well, based on this you can classify the magnitude level"*. Similarly, but with a more structured approach, INT37 thinks that the magnitude is assessed through risk management *"We have to go back to a matrix structure and define criteria. I think one way to look at it is to look at the economic impact, social impact, and environmental impact (triple bottom line) same thing that you do with risk. When you are trying to forecast, you are looking at their probability versus their impact. Theoretically, you evaluate the impact with the potential impact that will happen. We have an event, and now we*

186

are evaluating the impact, but in my opinion, it does not need to be only financially, if you look at the three bottom impacts (social, economic, and environmental). If we don't want to monetize the impact, then we should do a qualitative assessment. However, it is better if we can have certain cases, then we can measure the impact based on certain cases. I think also layering is important, when something happens it is not good only to do your self-assessment of impact but also to look at what others are talking about you".

Figure 5-20 and Figure 5-21 summarize the attributes highlighted by interviewees for this section. The results showed the importance of using an impact assessment tool to identify the emergent event magnitude. The magnitude can also be assessed based on the people affected and based on the financial and technological implications.
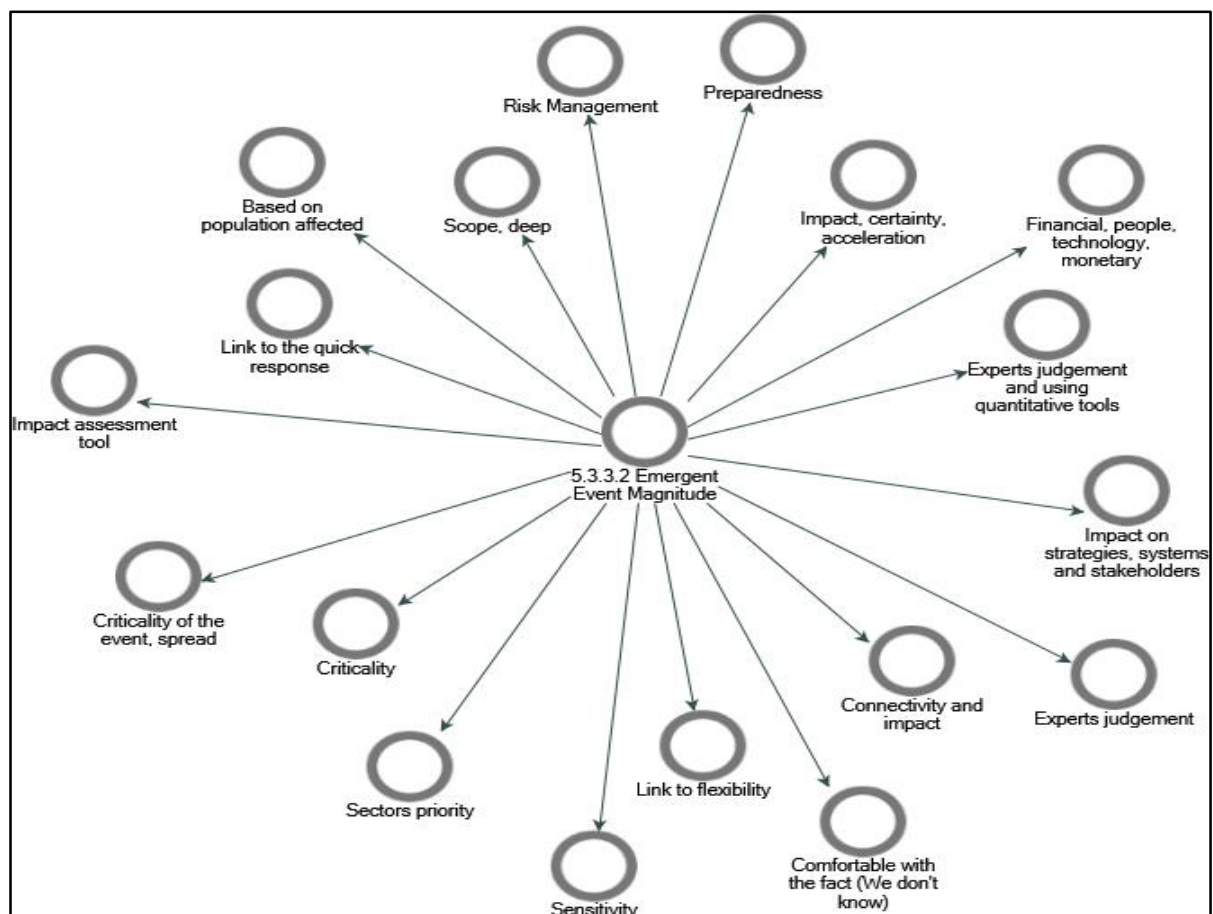

Figure 5-20: Identified attributes for emergent event magnitude.
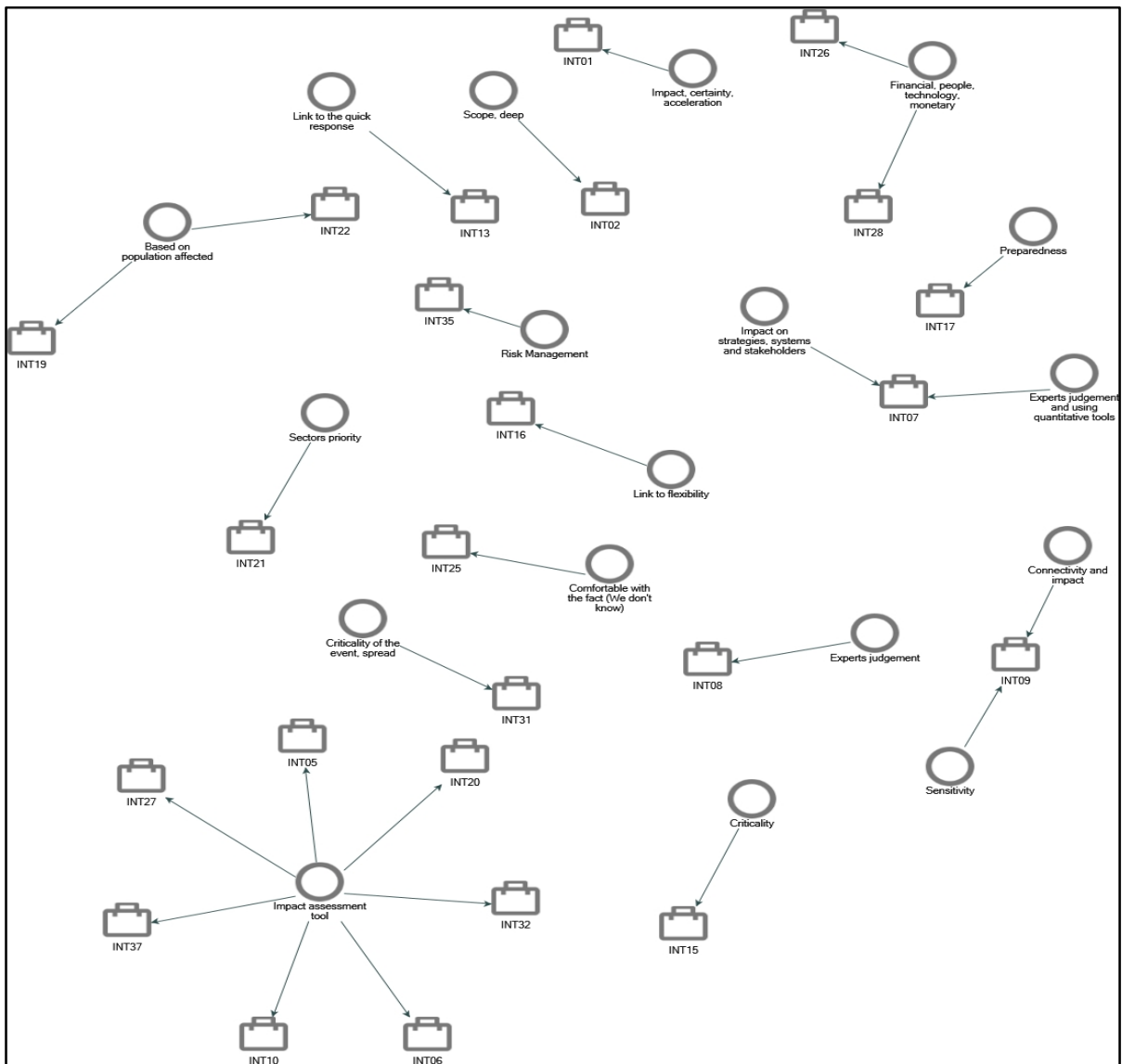
Figure 5-21: Identified attributes and interviewees inputs for emergent event magnitude.

Decision Making Formulation

The following section details interviewees' viewpoints for decision-making scenarios that could arise upon identifying an emergent event. These are should we wait for more data? Should we act in a similar way for all events? Should we wait until the situation resolves itself?

INT01 emphasises that the decision making the public sector will formulate when triggering an emergent event is depending on the type of the event itself *"If this event is happening in the bad deep level, then maybe this will be an opportunity for the organization to pause a little bit saying, okay, we are going to be different in the future because the future is going to be different for us"*. If this is the case and if the public sector is facing an emergent event, then it is time to rethink about our strategies according to INT01 *"If this is a significant event then maybe the response of the organization should be: let's rethink our strategy. Our strategic thinking is not only a strategic plan but also strategic thinking altogether. If this is let me say, a tooling practice event, then let's push it to our services and our processes and see how we can do the best out of it"*. On the other hand, INT02 thinks that when an event is identified, the public sector does not have the luxury to be passive, but needs to be active and immediately react, and all is depending on the magnitude of the event *"To what extent we always need to wait for some data, definitely, but that does not mean we are waiting idle. It depends on the event. Sometimes you have to act even if you don't have data. I think it depends on the magnitude of the event or on the magnitude measured by either the scope and the impact"*. Furthermore, INT03 is aligned with INT02 on the need to start to collect data *"I need directly to take actions, first of all I need to collect data and collect information about the event",* and according to INT03 the public sector should not always take actions *"Sometimes, for some events, maybe, it's not feasible to deal with them, because if I deal with them, I will pay more than what it will affect me"*.

INT04 thinks that whatever the decision will be, it should first address the public assurance part *"You want to say things which makes the public feel ease, but also you have to demonstrate that you are capable of dealing with this"* and if the public sector faces an event then it should revise the existing strategy as per INT04 *"In a deeper way, you have to have a strategy review every now and then, when such things happened; definitely this is the time to make a strategy*

189

review". Similarly, INT13 thinks that your decision is based on how much the effect is affecting people *"So, one of the things that could be part of the think tank is to try to look at the short-term and long-term events that would deprive people of their bread and butter and try to do what is necessary to avoid these things happen"*. Meanwhile, INT05 focuses on having a specialized team to analyse the situation first before making a decision, either to do nothing or to escalate the issue *"I think in all cases we have to analyse. There should be a specific team to analyse, and then the decision should be made. Maybe, these are the two scenarios that we have; either we do nothing and just keep it in the watch list, or we have to escalate it"*. Furthermore, INT07 prefers to have a scenario planning for the different possible responses, then select the most appropriate response plan *"I prefer planning by scenarios, as I have to predict many scenarios for the uncertainty and come up with a response plan for each scenario so that the organization will be ready once it occurs"*. Similarly, putting scenarios based on emergency and importance of the emergent event was emphasised by INT08 *"I don't think that for each one it has the same scenario and we can have a quadrant matrix between the emergency and the importance of the emergent event"*.INT09 prefers first to specify KPIs for the impact of the emergent event, defining responsibility to collect data, and having a pre-planned response plan *"Well first of all, if you have clear KPIs, and clear responsibilities already assigned and identified, then getting the data would be very quick. You can then estimate the impact and prepare the response, or you should have a pre-prepared response, a default response placed earlier and then you'll see if it'll suit you or apply changes to it"*. Meanwhile, INT10 thinks that the tool you will use for prediction will give you a clue on the decision to be made *"The tools you have, it will give you some kind of prediction on the crisis itself. If you have the first evidence of the crisis, you do not wait until the full crisis happened and then you can react. So, early react or reaction to the crisis, this gives you the advantage of*

quickly rectifying the crisis, so you need to be ready". Furthermore, INT11 thinks that it all depends on the readiness of the public sector and having a proper pre-plan, *"We are talking about readiness as we discussed. The readiness means that there are a proper plan and deployment of actions"*. Being prepared and ready by developing scenarios before the emergent event occurs, was also emphasised by INT 15 *"Building different scenarios for different emerging events and prepare mitigation plan to reduce their effects and prepare treatment plan in case they hit us. It can also increase sector preparedness and response by establishing different emergency plans for each type of scenario"*.

INT16 has a different point of view, as he thinks it all starts by empowering frontlines to take action *"In a government that empowers its frontline staff to take action, those governments would be able to deal with the immediate needs of whatever event is emerging. If you allow some flexibility on the frontlines, then you start in a way tackling the issue from day one"*. Meanwhile, IN17 prefers immediate but gradual action while keeping the public informed about what is going on *"They should not wait, they should act immediately. However, maybe to act in a gradual way. Therefore, first, they must act then they have to address the issue to the public because they are public sector"*. Furthermore, INT18 thinks that the speed of reaction should depend on the nature of the emergent event *"I think this depends upon the event itself. For example, if it is a health-related disease that can quickly spread and kill many people. You cannot wait, and you have to respond quickly. Nevertheless, if it is an economic crisis, that is growing slowly, you don't have to react immediately to this kind of event"*. Similarly, INT20 thinks that it depends on the event itself *"I think it is based on the event; because if the event requiring an immediate response, we should not wait for the leader to come and analyse data related to it. However, if the event requires a quality response, not an immediate response, then you have to analyse better, and then act"*.

Keeping the public informed by promptly communicating with them was also emphasised by INT19 *"I believe the best thing is to communicate in a fast manner. Tell the public that yes; we know about the problem and we are working on solving the problem. In addition, we are working on these areas. But don't mention the solution or what you are intending to do before having the proper time to analyse the situation in a comprehensive way to make the right decision"*. Furthermore, INT23 also think that everything should be explained to the people and we need to engage them in the decision-making process *"I believe that we should explain everything to the people and let them decide. I think that it is very important for the government to explain everything to the people because they are partners"*.

INT23 thinks that the decision is depending on the personality of the decision-maker *"I think it depends on the person and the personality of the decision-maker; some of the decision-makers will take time to reflect, and some of them will just take the risk and the calculated risk and will decide"*. She elaborated more on the benefits of engaging the people in decision making *"The other thing is that they feel that they bear the responsibility to support the government, so it helps in making an alliance between them and the government. The other thing is they might even come up with solutions that the government might be unaware of, and these are the conditions to tell the people what is happening. However, if you decide to cover up everything and tell them that everything is fine, you lost the opportunity to gain the help and support of the people to the government"*. Furthermore, INT25 thinks that everything is depending on the situation itself *"Some situations require you to respond immediately with full information, while others require you to respond immediately with little information. The idea is that, as soon as a crisis happens or as soon as an event happens, positive or negative, you need to have a team that's capable of understanding what is happening, synthesizing that information, and then coming up with a very quick response mechanism to either do something on the ground or say*

something".

INT26 believes that it depends on the type of emergent event *"It depends on the case or the emergent event. If it is very critical, then I need to respond directly, and I will not be conservative. However, if I have time then of course I need to have more data and write down options in order to choose the right one".* Meanwhile, INT27 thinks that the action should not be immediate, and we should wait for proper information *"I think it's not going to be immediate because first I need to take the right action at the proper time".* INT28's idea is to form a committee to handle response *"More like a committee which can take over in case of an emergency".* Another opinion came from INT30, as he thinks that the key word is trust, if the society trusts you, the decision will be at the end for the favour and the wellbeing of the society, then the decision maker have a confidence in the decision that will be taken *"A key word is trust; trust plays a major role in this. If the society do believe and have trust in the government about what they need and what they do, and they have experienced that the government are always thriving the best for them. Then when you have unforeseen events happen, people are willing to listen. So, governments may require time, and the society will accept to give the governments some time until they understand how to act".*

INT34 thinks that it is not only the society, but we should also assess the interests of government stakeholders before formulating a decision *"Government stakeholders at the beginning, but also talking back to the citizens, what's my ultimate and then moving to the next step. I would assess the different options and how they relate to society. Assuming I choose an option, which is ultimately very cost-effective for the government, but it is not the best actually option for citizens, here I need also to look at my risk management plan".* Furthermore, INT36 believes that severity and criticality of an event will play a major role in the decision but taking into consideration the well-being of people *"It is depending on the severity and criticality of arising*

situations. I think the well-being of individuals has always been the core of decision-makers and leadership in this country".

Finally, INT37 highlighted that the decision is based on the cost and impact *"There are decisions that have a low cost and low impact and these should be the actions that we do now just to send a message for assurance to the public. To say to them: yes, we can do something, although in fact, it does not have a real impact and you will slow down with the things that would cost you and have a higher impact".*

Figure 5-22 and Figure 5-23 summarize the attributes highlighted by interviewees for this section. Interviewees believe that decision-making formulation is mainly dependent on the event itself. Meanwhile, decision-makers should assure public interests while taking a decision, and they should develop different scenarios to support their decision-making process. The first thing the public sector should do after triggering an emergent event is to start collecting data and review the current strategies to evaluate if they are still applicable or not. They should form a specialized team who should evaluate the readiness level immediately. Moreover, decision-makers should study mechanisms to engage people in the decision-making process.
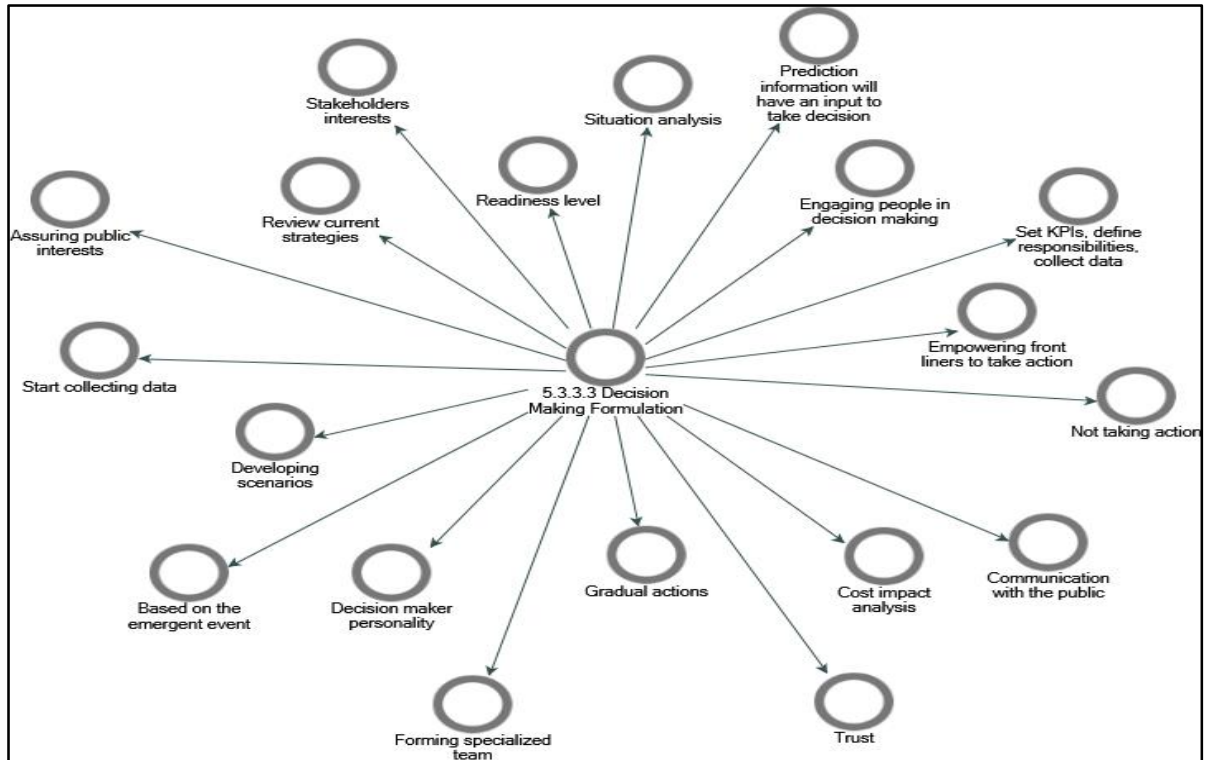
Figure 5-22: Identified attributes for decision-making formulation.
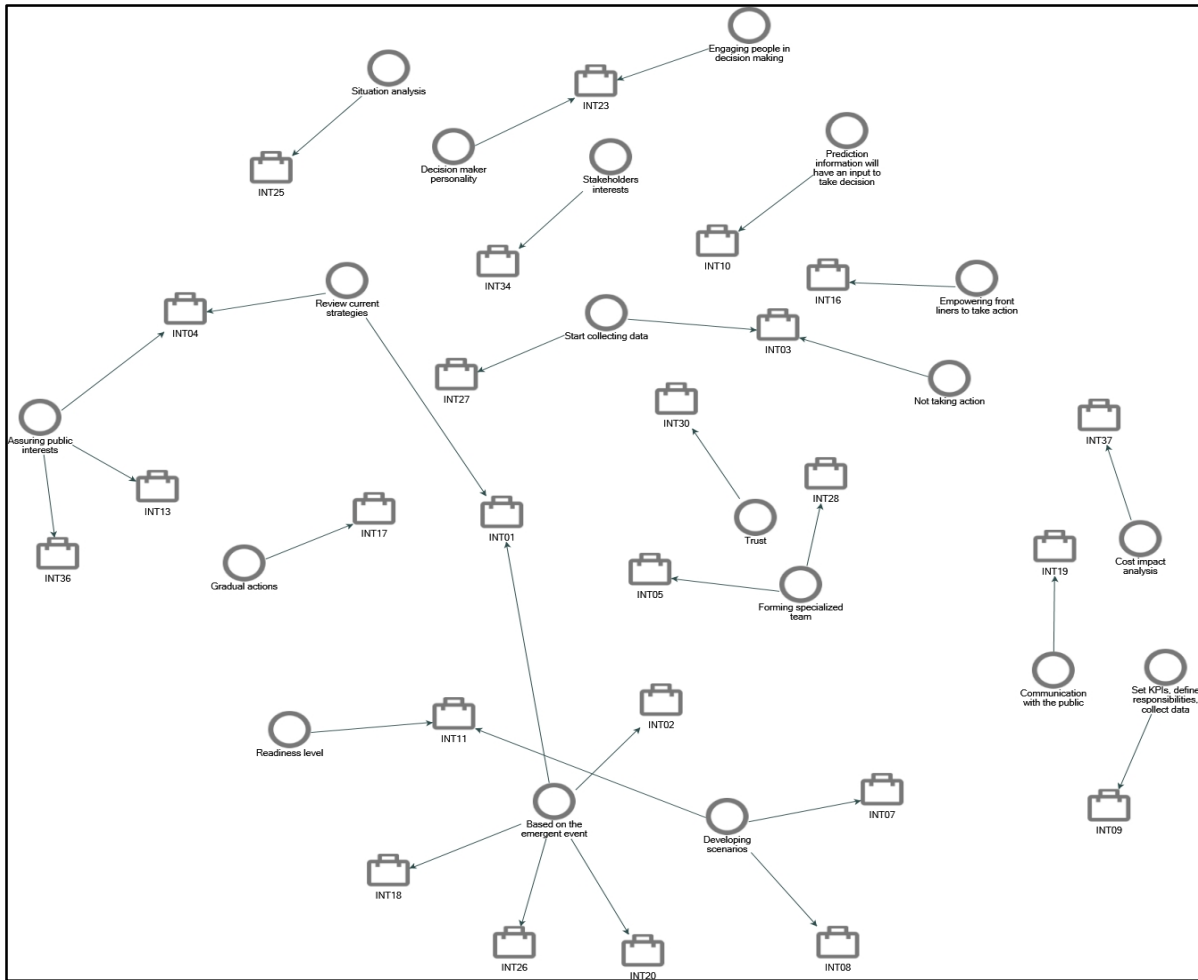
Figure 5-23: Identified attributes and interviewees inputs for decision-making formulation.

Responsibility to take action

The following section describes interviewees' viewpoints on defining responsibilities to take action in response to an emergent event. These ideas include forming teams, implementing new initiatives, changing structure and policies, and creating specific units to act, etc.

Defining responsibility to take action comes first from the conscious mind of the organization to realize the impact of the event and how it is changing the realization of the strategy, then responsibilities can be defined through the new initiatives to address the new situation according to INT01 *"There will be a conscious mind of the organization to say that this is the*

event. This is how we see it. In addition, to realizing the need to respond to it". However, INT02 advocates forming cross structural teams, *"You don't start by changing structures. I think we should start by activating internal teams, cross-functional teams to try to better understand the situation or the event and suggest quick actions that would not affect your long-term vision because sometimes what you do on a short term or on a reactive basis would jeopardize your long-term position as a city or as a country"*. Meanwhile, INT03 believes that defining responsibility when an emergent event happens at the government sector level should be with the specialized organizational government entity responsible for taking action *"Responsibility will only be within the scope of work of one entity that the responsibility to take action lays with"*. Furthermore, INT04 thinks that the immediate action needed to absorb the shock should be with the core strategy team *"Your core strategy team have to come together and start working on reacting in a reasonable way after absorbing the first shock. If you don't do that, you are doing something wrong"*. Similarly, INT29 highlighted that defining one unit is more effective in the public sector than having cross-functional team *"I have experience with the cross-functional teams, and it's very effective, but in the private sector. In the public sector, I never saw cross-functional teams working well. That's why I prefer to have a function or unit within the organization to be responsible for this and to be supported by the other unites, but the responsible unit have to lead and have to be accountable and responsible to implement the actions"*. On the same page, INT37 believes that a specialised unit is an answer when it comes to defining responsibilities in the public sector *"If we are talking about emerging events, I would still tend towards a central unit, clear command chain, it does not mind if we have cross-functional teams to support but not a cross-functional team to take a decision"*.

INT06 thinks that defining responsibility either by forming a cross-functional team or by defining a specialized entity depends mainly on the culture *"Of course, hundred percent it will*

depend on the culture of the organization; some people or some organizations will perform well in teams while in other cultures this will not work". INT11 has a similar opinion, as he thinks that this depends on the culture *"It depends on the culture, what works for the public sector can answer exactly what is the suitable option. For example, committees, a specific department, central unit or whatever other option"*.

Meanwhile, INT07 believes that forming a cross-functional team is the solution, and this will be the first step. The most important thing is to give authority to this team to make the proper recommendations to the leadership *"Forming teams representing all concerned parties would be my first step; the team should come up with analysis and recommendation that may include changes in strategy, changes in initiatives, changes in processes, change the policies or even the organization structure"*. Similarly, INT08 is with forming cross-functional teams, *"I think that cross-functional teams, from different departments, from different agencies within the same organization will be more effective than assigning it to one unit."* The same opinion came from INT10 *"I think the best approach is to form a cross-functional team from all concerned entities. This team is working independently from their core entities, and they have clear roles and responsibilities once you have a crisis declared, and they know how to react and how to work to mitigate that crisis"*. On the same page, INT14 is with having a cross-functional team that may be a virtual one *"Having the cross-functional team from all government organization is something crucial. This cross-functional team maybe a virtual team, but it has clear rules and responsibilities of building those strategies, communicating those strategies and making the government ready to face those issues and risks"*. INT17 is also with having cross-functional teams based on the nature of the event, but with expanding these teams to include other parties from the society *"I think we should have some plan where cross-functional teams are formed based on the nature of the event. Therefore, we can have something like crisis management*

team or emergency preparedness team. Based on the situation, if it is technological, then experts from the required fields are there. If it is more economical, then experts from the required field are also there. We can also have someone from academia". Furthermore, INT22 is also with having cross-functional teams *"I think we should have a cross-functional team because I believe that this is one of the things that everyone should work on"*. Similarly, INT27 is with having cross-functional teams *"For responding to the incident, you need to have a cross-functional team because we cannot say that this incident is going to happen every day. So, I cannot create a structure which is going to only be responding to such an incident"*. Similar opinion came from INT30 as he thinks that the effective way is to define responsibility within cross-functional team *"What I believe is, cross-functional teams rather than a stand-alone set up is the answer. So, for instance, if you have a disaster that's happening then you have a committee for that, that committee would actually be from different sectors with people who have the knowledge in how to deal with these things and people that know how to communicate with the society"*.

Furthermore, INT09 thinks that whatever the decision to be made to define responsibilities, the most important thing is to define a one responsible person *"First of all, regardless if you have a cross-departmental team or a vertical team within the same department, the responsibility should lay at the end of the day with one specified identified person otherwise you lose control. The second point is: because you need this type of coordination from this person across different entities, because even if you have separate teams or cross-departmental teams working in parallel, each team may do what they believe is correct, but this may not be the required action for all of the teams working in parallel. So, I would say that there should always be one responsibility lying with one person"*.

Meanwhile, INT13 thinks that defining responsibility *is depending on the type of the emerging event "It depends on the type of the event"*. Similarly, INT16 believes that it also depends on the type of emerging event *"I think it depends, because you can imagine that some governments already have some teams to deal with the high probability events or disasters. If you think about cybersecurity attacks and things like that, there are teams to deal with that. Otherwise, when you start talking about economic shocks. A lot of these challenges and these emergent events are catching governments by surprise, so it depends on the event type"*. On the same page, INT18 also believes that it depends on the nature of the event *"It depends upon the nature of the event you're dealing with"*.

Furthermore, INT15 is with having a hybrid model between cross-functional teams and having a new structure based on tiers and levels, *"You can categorize the events into tiers or levels, from one to three, where tier one is the least effect, and tier three is the highest. Then establish a response team for each tier, with different roles and responsibilities. Different tiers will involve different people, and even you can involve other organizations for high tiers. This new structure will be only applied in case of emerging events. It shall not affect the daily work of organizations"*.

Another opinion came from INT19, as he thinks that we need a combination of specialized unit and cross-functional teams *"I think, a combination of both; you need a unit that is responsible. At the same time, you need a cross-functional team that can support this unit. Nevertheless, from my experience, if you depend only on the cross-functional team, you will have a slow response, and the responsibility and the accountability will not be very clear"*. Similarly, INT20 believes also that we should have a combination of the two options, but first, we should specify the responsibility within a certain unit, then we can form the cross-functional teams *"I believe the government entity which is responsible for this kind of event, or is this kind of response*

should be the one which is requiring formation of the cross-function committee". Similar point of view came from INT35 *"Actually, both of these proposals will work and is important. Cross-functional is important and to identify the role under a specified entity is also important"*.

Figure 5-24 and Figure 5-25 summarize the attributes highlighted by interviewees for this section. Nine of the interviewees preferred to define responsibility through cross-functional team, and four preferred to have a hybrid responsibility definition structure between the cross-functional team and specialized entity. Three of the interviewees preferred to lay the responsibility within a specialized unit. Meanwhile, two of the interviewees think that responsibility definition is based on the event itself and another two think it depends on the culture.
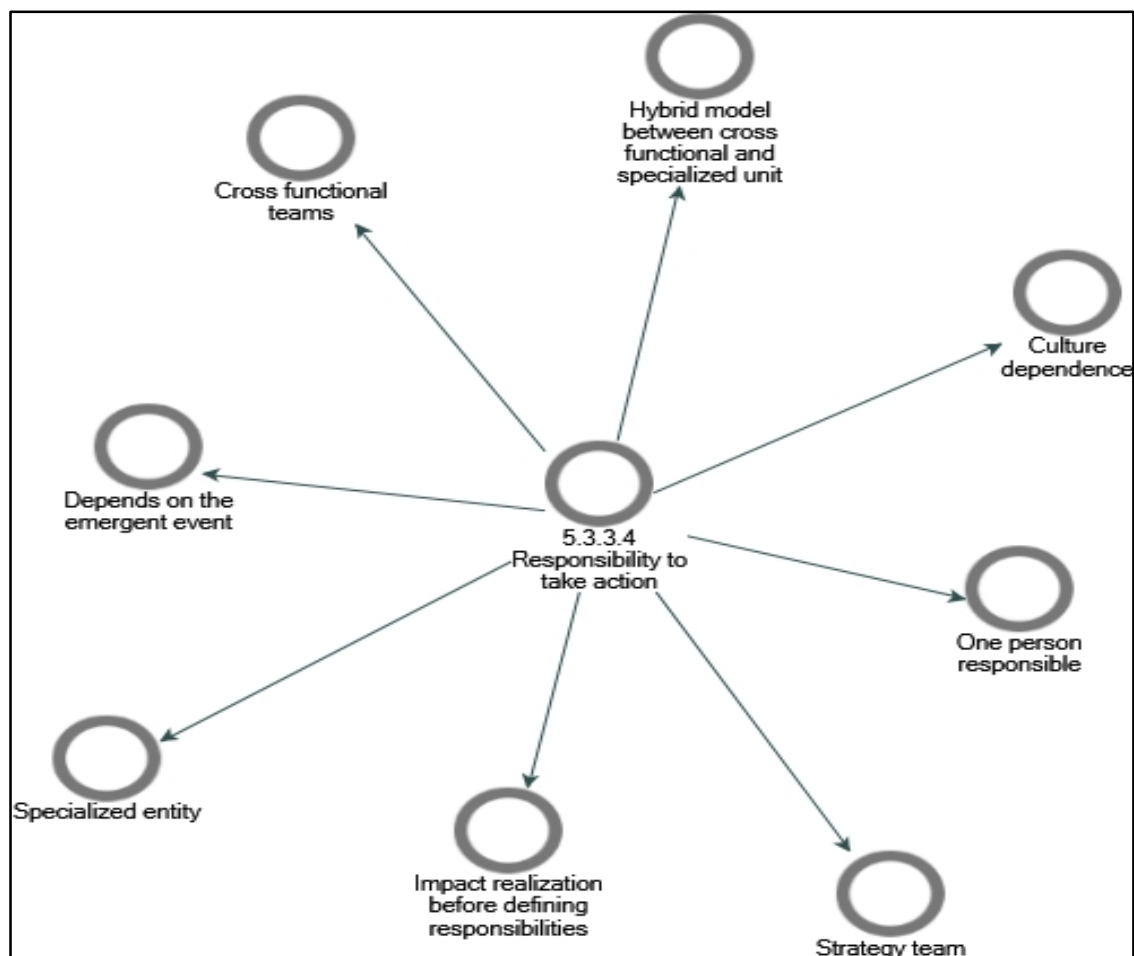
Figure 5-24: Identified attributes for responsibility to take action.
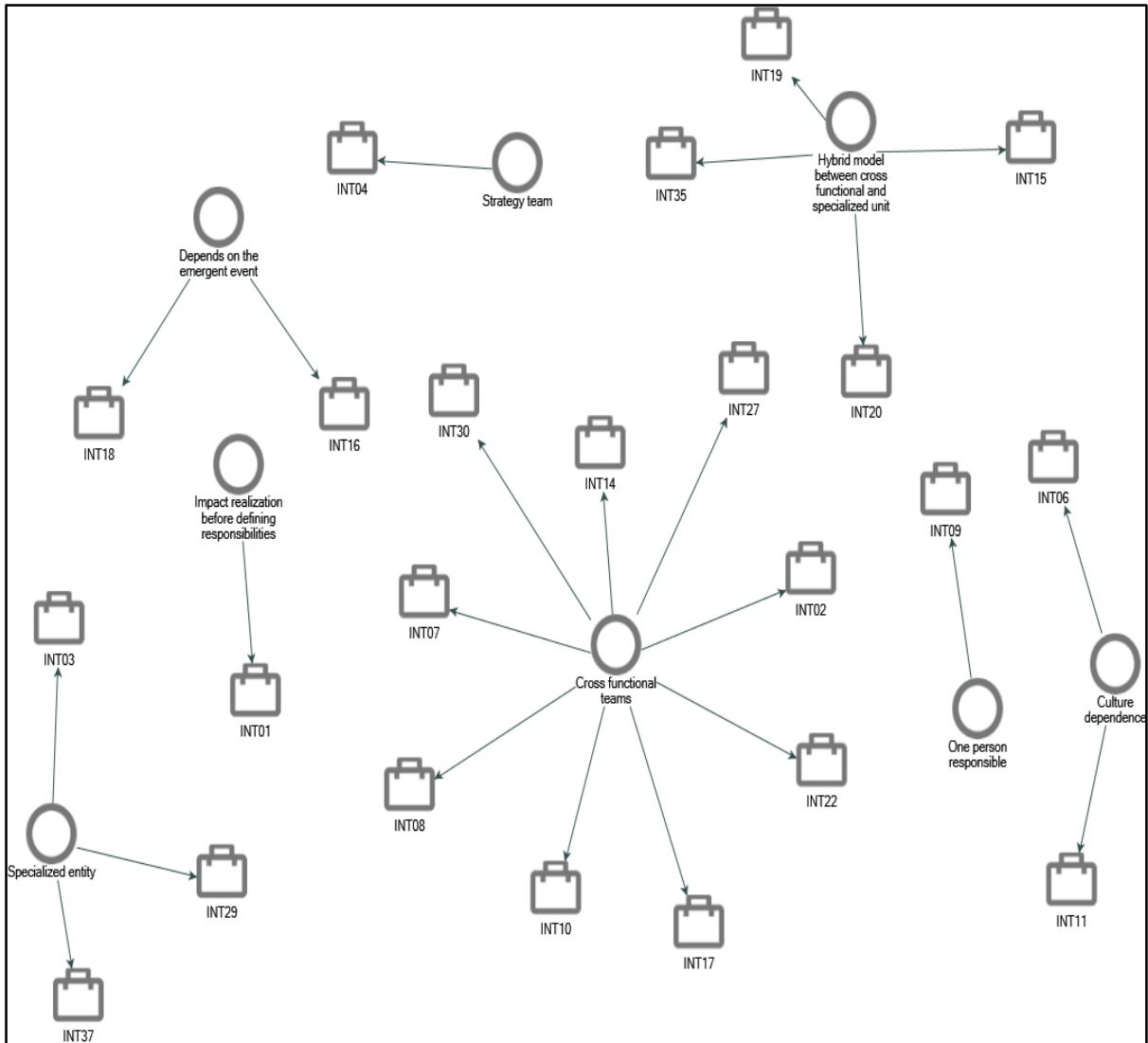
Figure 5-25: Identified attributes and interviewees inputs for responsibility to take action.

Emergent Event Communication

The following section presents the perspectives of interviewees on how to ensure the proper

diffusion of the information related to the emergent event (spreading the information in multi-

dimensions).

INT01 look at disseminating the information and communicating with different parties as part

of the knowledge management cycle of government entities as it is forming an opportunity to

open real dialogue platforms with them *"It's not about sharing and disseminating as much*

information as you can, it's about involving and dialoguing about it. So, I think smart entities will be having a structured platform for dialogue and enhance the ability to build a memory for the organization".

INT02 thinks that the public sector should keep the public aware of what's going on, but not to the extent that may cause chaos *"Although I am a big advocate of transparency, at certain events you need to make sure that whatever information diffused or disseminated is a bit controlled. You should be transparent but making sure that transparency would not lead to chaos".* Similarly, INT05 believes that we should be transparent, but for some sensitive events, the information should be restricted *"I think this should be in two levels; some of the events should be only stated for certain people, but the majority should be transparent. We need to build the culture of transparency and sharing knowledge for this kind of events, but maybe some events that have some sensitivity should be to certain closed loop. So, this depends on the type of event itself".* Meanwhile, INT03 thinks that communicating the knowledge about the emergent event should be only with the people who needs the information *"The knowledge that needs to be communicated to the people who need it".* Furthermore, INT09 has a similar point of view that we should be transparent fully with what the people need to know *"Full transparency on what the people really need to know or to react adequately; it's nonsense to have full transparency of all information that is damaging and will affect their morale and attitude".* Meanwhile, INT10 has the same point of view of INT05 for being transparent in general, but we should restrict this transparency in case of some sensitive events *"It depends on the emergency itself; if it is related to security, of course, you cannot fully be transparent because some information has a national security impact. But to a great extent, you need to be transparent".* Similarly, INT16 has a similar opinion as the trend is now going towards greater transparency *"I can tell you for sure that the trend is towards greater transparency. Of course,*

there are specific areas like defence and security which are so different, but generally, there's really very little value in keeping things as a secret because people know and if they don't get the data from you, they can get it from elsewhere". He added that the benefit of being transparent is to get people involved *"And in fact, there's a lot of value in being transparent because then you can get the private sector involved and you can get the public involved"*.

Furthermore, INT04 is with communicating the updates to the stakeholders, but the timing is very important, and this depends on the type of the emergent event *"It's always better that your stakeholders know from you, not from others. That is part of the assurance that you are a trustworthy organization taking care of their interests and serving them in the right way. The other thing as we said, if there is a disease, communicable disease, and we started to notice there is some emerging epidemic and so for, definitely before I start talking to the public, I have to work very hard on the health measures that need to be in place. So, when it is the time to talk to the public, then we'll tell them about the actions we have taken. So, the timing really has to be very carefully studied"*.

INT06 is with the gradual dissemination of knowledge about the emerging event *"If it is a major event or something that is affecting people's lives, you want to transmit the information about it in parts"*. Similarly, INT17 is also with the gradual dissemination of knowledge about the emergent event but based on the available information *"I believe in full transparency, but gradually, if we don't have enough data to share, just address this, and don't wait without anything till you get the data, then you start to share information"*. Meanwhile, INT07 is with having a clear methodology to communicate the information about the emergent event *"I would follow rigid internal and external communication tools, by initiating a clear matrix to identify concerned parties (internally and externally) and define their roles in the emerging event (responsible, accountable, consulted, or informed)"*. Similarly, having a structured plan of

communication was also highlighted by INT20 *"From my perspective, I believe we should be ready as part of the contingency plan to prepare something called the communication plan. That communication plan has to specify clearly, which action needs to be announced, who is going to announce that news or the event, and to whom"*. Furthermore, INT08 is with transparency while focusing first on the employees *"I think that you need to be transparent; you should convince your employees first and communicate your change vision that we together are going to achieve"*. Meanwhile, INT11 is with transparency to avoid spreading rumours among the society *"Being not transparent will affect the rumours spreading everywhere as you know, so it is better to be transparent and fast in communication in a very defined structure of communication in a very good way"*. On the same page, INT13 is with communicating fast but in a proper way *"In terms of communication, we should act as fast as possible, because we live in an era where the information travels faster than the speed of light, it doesn't of course! But again, people have access to a lot of information [...], and one thing I've learned about communication is you have to make sure that you communicate in the right way"*.

INT14 suggested that the culture is dominating the way the emergent event should be communicated *"This goes back to the culture; if society is a controlled society, the leaders may see that there is a risk of communicating this to the public. Therefore, they keep it close. In a more open society like Western societies, they always try to be very open of those types of risks. My personal perspective is being open is much better than being closed"*. Furthermore, besides the culture, INT25 identified other factors related to the typography of the recipient *"I think full transparency is idealistic because not everyone is equipped to process information the same way and not everyone comes from the same background, from the same experience, and from the same culture. Furthermore, people of different ages will react differently to news and will interpret things differently"*. Similarly, INT28 thinks similar to INT25 *"Different people have*

different abilities. In order to benefit from each individual ability, you need to tell them what you need them to do. You might get good information from somebody you did not expect by saying what you need them to do. They might have a better approach, and you will find out that they are more capable than others to adapt, to deal with the risk and take the risk". Meanwhile, INT15 highlighted that in case of an international type of events, the public sector should maintain the communication channels with other countries *"Communication channel with other public sectors from other countries shall be kept open in order to be updated with any events worldwide"*.

Furthermore, INT18 highlighted that communication depends on the nature of the event itself *"It depends upon the nature of the event, if it is health-related issue; you need to be very transparent in case people must take precautions. If it is an economic crisis, where providing full information can even complicate the matter more, then full transparency is not advisable"*. Similarly, INT19 has a similar point of view *"In certain situations, like situations that are related to security or related to national security or related to issues that can harm other parties, I think we should not be fully transparent, and we can communicate what can be communicated. But full transparency is needed in many other issues where confidentiality or sensitivity is not there"*. On the same page, INT26 also thinks that it depends on the situation *"I'm with transparency, but it also depends on the case, because people could panic. So, we need to manage the messages that we provide to people"*. Similar to INT18, INT19 and INT26, INT29 thinks that it depends on the cases and there is no one rule to be implemented on all cases *"It depends on the type of event; some events you cannot be fully transparent, political for example as this may affect your relationship with other countries. Sometimes, also for financial events, you do not want to be fully transparent. Therefore, it is better to be decided case by case. Meanwhile, health, for example, it is better to be transparent, so people take their*

precautions. You can't put a rule for all kinds of events or cases". Similarly, INT32 thinks also that it depends on the type of the event *"It depends, as we can't generalize any role here; For example, security and terrorism, we have to be a little bit conservative, but for economic, I think you have to be more transparent"*. Furthermore, INT34 agrees that disseminating knowledge is based on the event itself, but it has two dimensions *"I think it depends on the case and we need to assess a couple of dimensions: One on stakeholder engagement and the second thing you need to have a communication and change management plan"*. Meanwhile, INT36 believes that there should be a balance between full transparency and not being transparent at all and this depends on the situation *"Both statements are justified as normally from a leadership position here, you need to strike a balance between how much needs to be communicated and how much of it should not be"*.

There is another point of view on the value of being transparent, which came from INT21 as he is not a big advocate of transparency *"I don't think full transparency is the key here at any emerging event; yes, the information does move faster today with the help of technological advancement, but I think full transparency is not the key here"*. Similarly, put with flipping the other side of the coin for being conservative in disseminating the knowledge about the emergent event, INT22 looks at communication as only keeping the people informed and not on everything *"I believe that we should keep them informed. This is important, and we should actually share with them the required information on the right time. But always, not all the information, some of the information because of the privacy, because of the security, because of the psychological aspects, we should not share"*. She added that we should also depend on the soft communication when disseminating the knowledge about the emergent event *"We should also consider the soft communication which is using the influencers, using the social media, the social media influencers, even making use of rumours, it doesn't matter. We should*

communicate to people in all attractive way and the non-attractive way that is applicable". Similarly, INT24 looks at communicating what is going on as only informing, *"Keep sending them messages in daily basis, and that depends on the size of the crisis, if it's a bigger crisis, just keep send them a message about it"*. Furthermore, INT35 believes that the most important thing in communication is to keep the people aware of what's going on *"The most important thing is the awareness programs and how to build the messages for this society. So, based on this, any society in the world will react based on the messages and how the reaction of the government or the concerned parties with the related issue"*.

Unlike INT21 and INT22, another opinion came from INT27 for full transparency *"I think recently with the role of social media, we cannot deny anything, we cannot hide anything. Therefore, I think the best way to be always transparent. Because currently, everyone can act as a press reporter through the mobile. So, the best way, as I said, you need to be transparent with people"*. Similarly, INT37 is with full disclosure of information about the emergent event *"I think full disclosure of information will be better, if you actually give data as it has been requested, eventually people will consume and will request for more, and they will ask, and you will be perceived as someone who is not transparent. Eventually, they will get all the data but think of being proactive ahead, fully disclosing all the data is the way to go. I don't believe in sensitive data for such cases you need to fully disclose the information"*.

INT30 believes that the level of disseminating information depends on the trust between the public sector and the society and this should not be the norm *"I'm going to talk again about the word trust; I mean trust and communication. Governments that are well equipped and have a two-way trust between the government to people and people to the government tends to communicate more transparently and openly. Now, that should be the rule on this. Having said that, sometimes even with the governments that have that kind of trust and depending on the*

unforeseen event that happened, governments tend to be not transparent but rather keeping certain information that if it was released, this could be harmful to the community more than actually disclosing it. So, the government is actually doing this for the sake of the people". Meanwhile, INT31 specified some protocols to communicate the information in a specialized sector, which is the health sector *"In the health field, we call this as risk communication; whenever emergency happened, there are trained spokespersons, their mission is to communicate with the public as early as possible".*

Figure 5-26 and Figure 5-27 summarize the attributes highlighted by interviewees for this section. Interviewees think that defining the transparency level to communicate an emergent event is based on the event itself, as there are some sensitive events that need a special way of handling and communication. The most important thing with communicating with the public is communicating the information without causing chaos and this by itself requires using proper communication methodology. Another important factor that was highlighted by the interviewee is fast communication, as people should not wait to tell they hear something from the public sector officials. The information can be gradually transmitted while making a balance between full transparency and restricting only sensitive information.
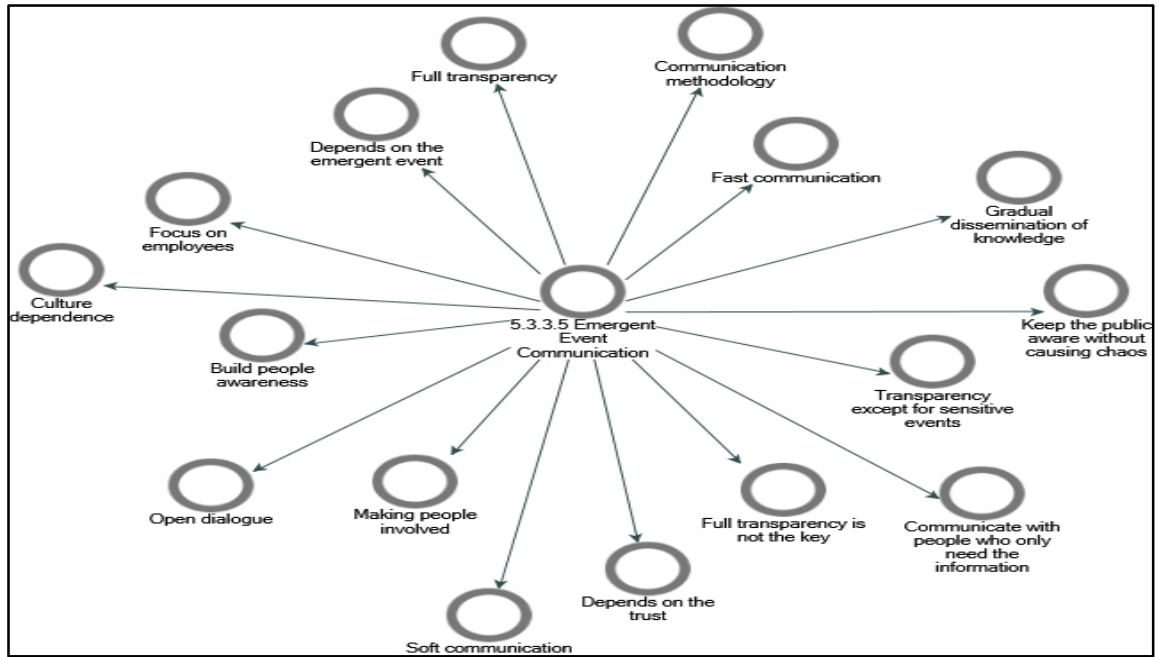
Figure 5-26: Identified attributes for emergent event communication.
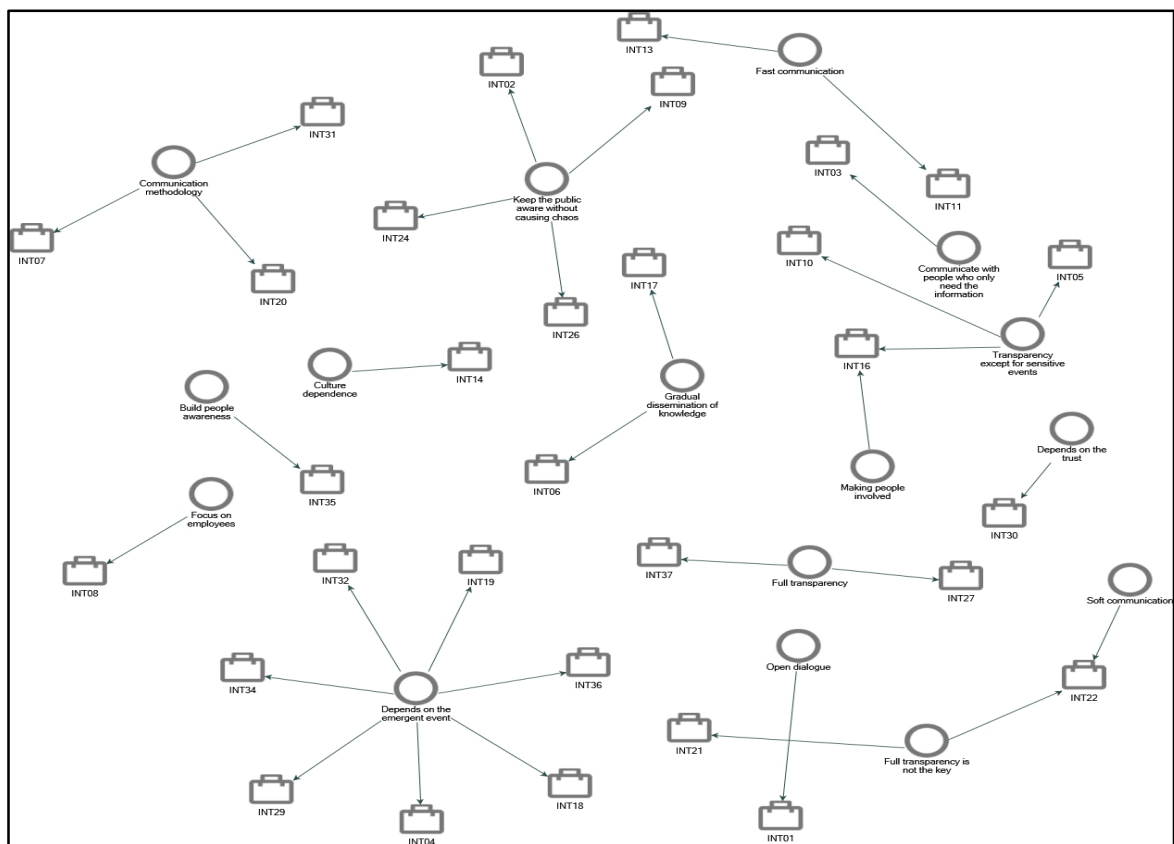
Figure 5-27: Identified attributes and interviewees inputs for emergent event communication.

5.3.4 Theme Number Four (Resilience Capabilities)

Figure 5-28 shows the hierarchical coding structure of theme number four, which is resilience capabilities. The findings of the data will describe the interviewee points of views on how to identify the strategy for building capabilities to face an emergent event, including robustness, resourcefulness, and recoverability, in addition to the relationship between the strategy to face an emergent event and the overall strategy of the government or the governmental organization. This theme will also address how to balance between different factors of efficiency and effectiveness when facing an emergent event.
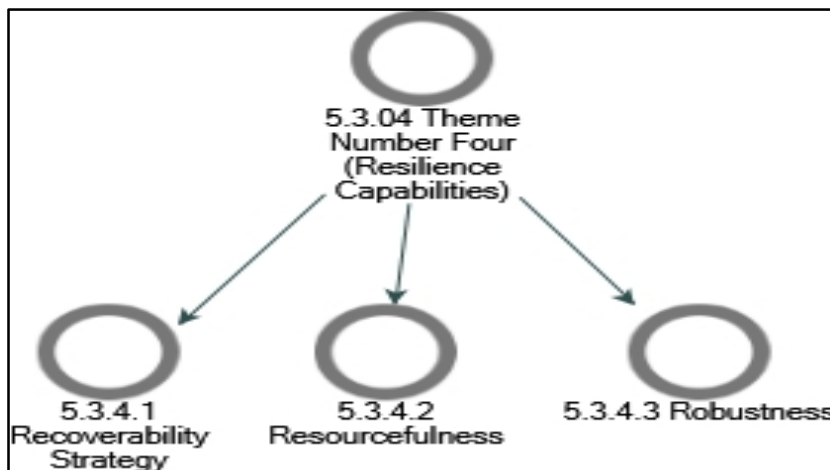
Figure 5-28: The hierarchical coding structure of Theme 4 (Resilience Capabilities)

Recoverability Strategy

The following section presents the interviewees' point of view on how to build a recoverability strategy to ensure the quick and efficient recovery after an emergent event:

INT03 recommends having pre-plans to identify the strategies based on the events that the public sector may face. These plans define the capable people and the financial resources and can be evaluated through mock drills *"It's been allocated from the beginning by the organizations, put something ahead to be used in any emergency that expected or not expected.*

211

Based on that, organizations have their people, have the financial resources, and have the willingness to recover and go back to the right track after an event". Meanwhile, INT05 thinks that the recovery strategy depends mainly on the vision of the leadership *"I think it's all related to the vision of leadership. If the vision was that we are going to recover whatever the cost is, this is their call. Alternatively, we need to mitigate the risks and recover, but in stepwise or stage wise, and we will do this in steps. So, this is the call of the leadership"*. Furthermore, INT09 believes that the recoverability strategy should address the people interests and this will positively affect the image *"Your image is how you help your people, how you will respond quickly, how you alleviate the hurt and the pain that was caused by this event, and how you recovered and came out of it. So, it's a combination of speed and efficiency"*.

INT10 suggested having a balance between the intended recovery period and the efficiency *"See a recovery period and efficiency is like a relationship and especially in the public sector or government sector. You need to quickly recover. At the same time, you need to utilize the right resources and to have your efficiency to be high. It is very difficult to have the balance between both" You can do this by measuring the impact; if you did not recover quickly, how much you will lose, and what will be the impact of the inefficient way of the recovery"*. Meanwhile, INT11 suggested having prioritization for certain critical functions or jobs to be recovered immediately *"A prioritization criterion can be deployed in order to make redundancy for certain critical jobs or critical functions to be recovered immediately"*. Similarly, INT12 also thinks that the recoverability strategy should be based on the impact of the core jobs that you need to recover in a quicker base *"I start with the emergent event itself and if it has a low impact or high impact related to the core job. I have to identify from the beginning without being biased toward any of the tasks"*. Furthermore, INT13 suggests having a balance between the impact of the event on the image and sustainability when developing the

recoverability strategy *"But probably the overall goal of a quick recovery is you need to have an image plus economy. Therefore, you need to have a sustainable economy plus image because the image affects the economy and vice versa"*.

On the other hand, INT14 argues that the recoverability strategy depends on assessing the impact, and it is a very difficult task to assess this in the early stages of the event *"The issue is we don't know now the impact that will happen on the society because of this event. We may know that there is an event happening. We may be reasonably calculating the cost of this. We may create reserves and take precautions for this before it has happened. But the big issue is we don't know the real impact when it happened"*. Meanwhile, INT15 thinks that inviting different parties can formulate recoverability strategies and it should focus on readiness to face an emergent event prior, during, and after an event *"Strategies are usually established by conducting workshops. During strategy building workshops, we shall invite subject matter experts from different business areas and members from the emergency teams. With their expertise, they can develop strategies taking into consideration the scenarios they built in the emergency plans and ensure readiness to face and recover the business before, during and after events"*. Furthermore, INT16 suggests that putting recoverability strategy should not always focus on quick recovery, as we may not be able to achieve this all the time *"I think governments should act quickly to protect their countries, their systems, their populations from whatever shocks that may happen, but then they should take their time in the recovery because real recovery requires real understanding of what the issues were"*.

INT23 emphasized having quick-wins as part of the recoverability strategy *"Well it depends on how deep and how wide that event is. Therefore, if it is a very public, very wide impact on the economy or the community, so in this case, it is very wise to give them quick wins. Because quick-wins contribute so much to the morals of the people that are inside it, it calms them down*

and absorbs their feeling of anxiety. So, this facilitates your role as a planner to implement your long-term strategies". INT33 has a similar perspective about quick-wins: *"I believe that in our process we define the solution within three categorize: the first category will be from zero to six months, and we call these quick wins"*. Furthermore, INT14 emphasized the need to meet people's expectations as part of the recoverability strategy *"So, you want to meet the people expectations while planning and dealing with the event"*. Meanwhile, INT28 focuses on having the information first before drafting a recoverability strategy *"You start by collecting information, wherever you feel that you don't have enough information and that you need to collect more, you can work harder on that part"*.

INT29 suggested implementing the 80-20 rule in putting the recoverability strategy *"Maybe they can implement the 80 20 rule, that's you can recover by 80% based on 20% of the total investments"*. Furthermore, INT31 suggests having a readiness strategy with different scenarios for any event, and when the event occurred, you just need to activate the response strategy *"Definitely, if something happened you would implement your response strategy"*. Meanwhile, INT34 suggests having evaluation criteria before defining the recoverability strategy *"I think assessment criteria should be embedded in your options at least. Therefore, when you assess in support your options, if you are assessing them along with the speed of implementation, the costs, and the feasibility, all of them should be studied. Therefore, you need to be very specific in your assessment criteria of options. Then, once you've selected your option, it needs to be flashed into an implementation plan, into a risk plan, and into a communication plan"*. Furthermore, INT35 suggested that the recoverability strategy should include some actions to prevent the event from happening again or eliminate the effect in other areas *"You should work in parallel, put a quick action and put other plans to prevent this from happening again or happening in other places"*. Finally, INT36 suggests having an evaluation of the current

controls as they may affect the implementation of the recoverability strategy *"Again this is one of the situations that we will have a conflict between what needs to be done and how it should be done. Many situations will be poorly controlled; because of procedural matters, because of authorities and line of authorities, as we have to go through the checks and balances and regulations".*

Figure 5-29 and Figure 5-30 summarize the attributes highlighted by interviewees for this section. Interviewees think that the recoverability strategy is based on the level of preplanning prior to an emergent event. Meanwhile, the public sector should do a prioritization of critical functions to be retrieved, and there should be quick wins part of the recovery strategy to demonstrate the ability to manage the emergent event.
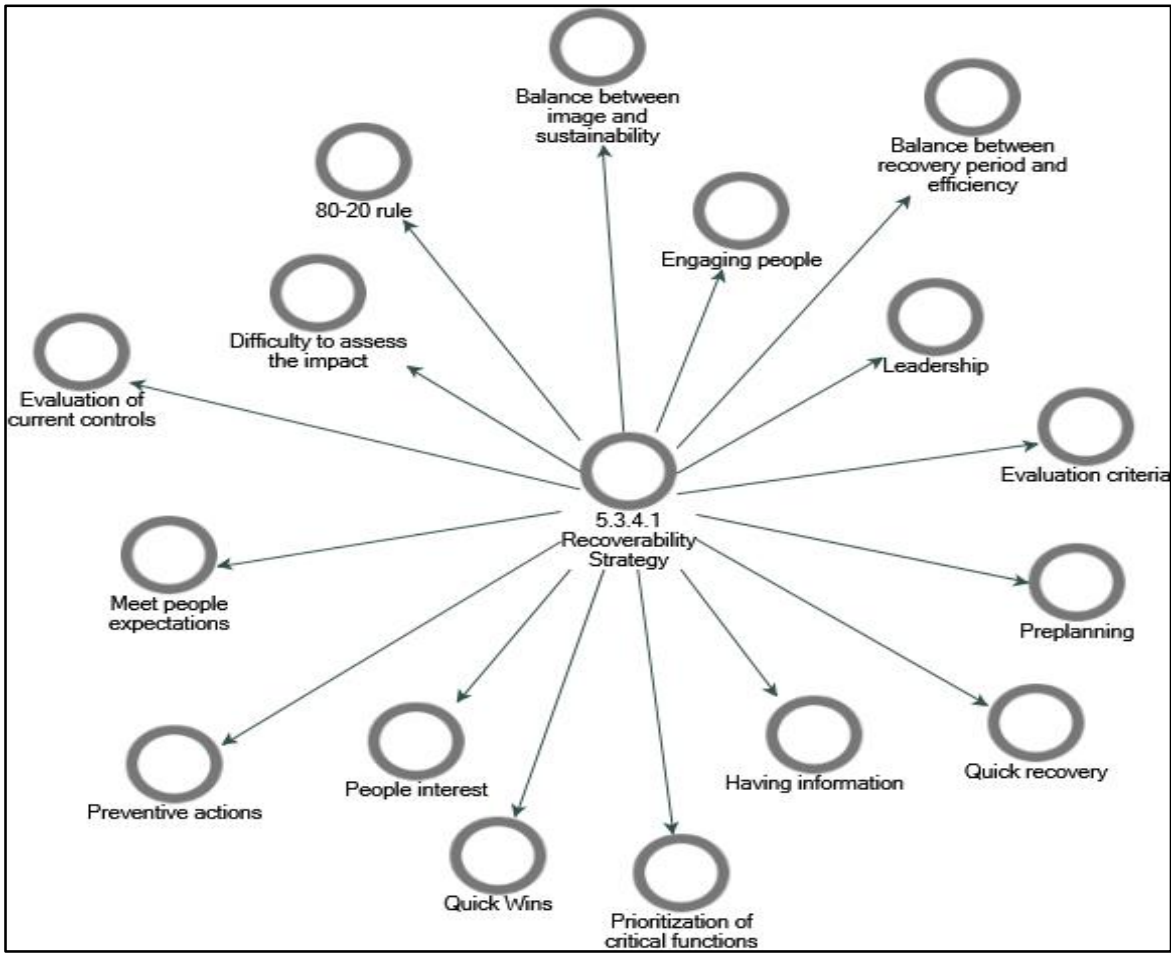
Figure 5-29: Identified attributes for recoverability strategy.
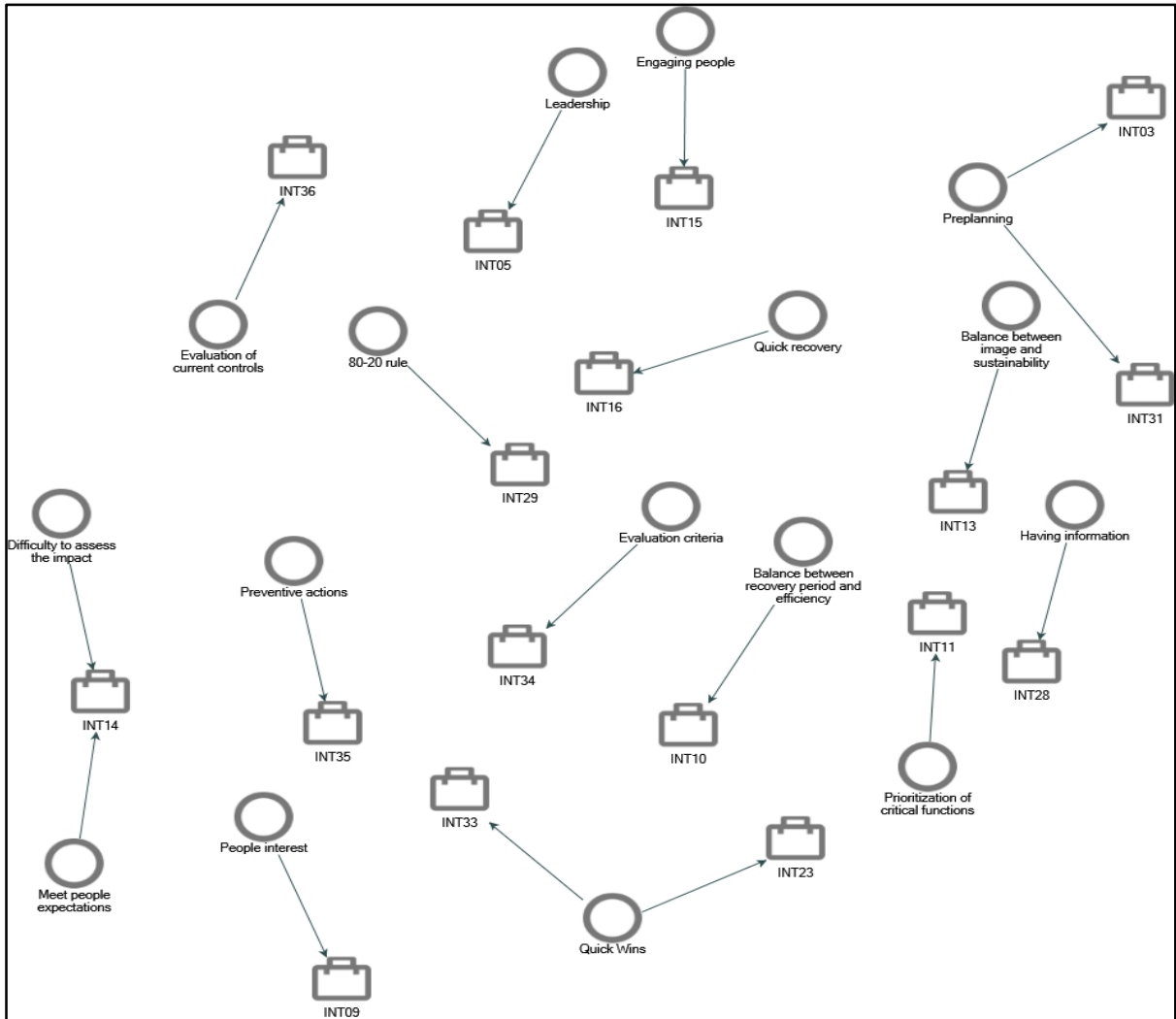
Figure 5-30: Identified attributes and interviewees inputs for recoverability strategy.

Resourcefulness

The following section present the interviewees' point of view on how we can ensure that within our strategies, we have enough resources and reserves. Also, how to equip human resources have the appropriate skills to manage the disruption event in the public sector:

INT04 highlighted the need to have extra human resources as reserves to be used when an emergent event occurs *"Definitely people are key because we need the technical knowhow; we can have redundancies in critical areas"*. He also highlighted that the public sector could utilize

technology in order not to have the redundant human resources always available on sites *"Let me say the following: the technology nowadays is available so that you don't have to have people physically on sites; you can have an expert opinion, or you can have the knowledge and the advice and so forth, without being available in the location"*. Meanwhile, INT05 suggested utilizing the human resources in the full cycle of the event management starting from prediction *"They are predicting the event, analysing the event, responding to the event, this kind of thing. Therefore, they have a full-time job. It's not only just waiting for the event to respond to it"*. Furthermore, INT06 emphasised to have a public-private partnership to utilize resources from the private sector whenever needed *"Another alternative is a private-public partnership"*. He also thinks that having proper planning before an event occurs will enable better allocation of resources if an emergent event happened *"When you're building scenarios when you have this overall risk management plan, you would have to see if the resources are not enough and from where you can get them"*. Similarly, INT07 agrees that a good strategic plan will be able to identify resources required to deal with an emergent event *"The strategy should include objectives related to deal with future forecasting and dealing with risks and uncertainties. The strategy also has to identify clear roles for planning, monitoring and training on those topics to ensure the ability of the organization to deal with emerging events"*. On the same page, INT11 also suggests having a proper pre-plan of resources prior to an emergent event phase *"The resources need to be pre-planned taking into consideration emergency resources types that they can use. This should be in the black box of the public sector in order to retrieve and deploy"*. INT15 also agreed that resources requirement should be planned in the prior phase *"By implementing risk-based strategic planning, we will be able to identify hazards and assess risks expected to affect strategies and established the required precautions. Part of the precautions shall be identifying the required resources, building capacities, gaining skills and*

217

provide training". Similarly, INT24 emphasizes good planning of resources as part of preparedness to respond to emergent events: *"If you plan well to face something like this, you will expect it, and you will keep it in your strategy"*.

INT09 thinks that you have to make trade-offs in the resources in case an emergent event happened, as we do not always have the luxury of extra resources to be utilized *"Sometimes you don't have the luxury of the availability of extra resources to utilize. So, the issue is that you would rarely see a government having a hundred percent of resources available to invest and to face any of this and that's why you have to decide on the trade-offs you want to have"*. Meanwhile, INT13 challenged the concept of efficiency in some of the public sector entities that have a specialized work nature focused on prevention; we need to look at things from the big picture *"What about civil defence? You want to have them idle more than you want to have them working. You do not want to prove that they are efficient by having more fires so they can put off the fires. Therefore, we do not want to have an efficiency in civil defence as an example. Therefore, there are times where we need to pay extra for resources in order to have them ready if something happened. You do not look at the small picture. If you are looking at the small picture at local government efficiency or local government unit efficiency, there is a problem. You have to get the overall government efficiency"*. Similarly, INT16 also challenged the efficiency concept in the public sector, as the normal definition of efficiency is not reflecting what it is intended for *"We used to define efficiency in terms of outputs. Therefore, how much money are we spending to build the road, to issue a passport, or provide a service? We need to start thinking of efficiency in terms of outcomes, and it means that you are not thinking about the service, but you are thinking about the impact of that service. So, events affect that impact and force you to rethink your approach and sometimes that means you have to pay more or to spend more on certain things"*. The other challenge INT16 highlighted is the change of

efficiency measures if an emergent event happened and we need to respond to it *"An event has happened, so we have a new reality. Therefore, you cannot say we are inefficient compared to the usual state because that state does not exist anymore"*. INT16 also suggested the public sector should have a pool of human resources in addition to financial reserves. These should be readily available when the public sector needs them *"Some governments allocate the resilience fund that they can then spend whenever events take place. I have not seen a resilient human resource pool, generally, that has not happened yet. I've also seen governments experimenting with flexible budgeting so moving budgets around. I think Singapore has something around reallocating a certain percentage of the budget every year to the emerging trends. Canada is experimenting with what they call it a skilled cloud, so they have some government employees that are almost like freelancers, and they move around wherever there is a need. Some governments are starting to create those mechanisms to make it easy to move people and money around to deal with emerging events. Therefore, I think it's in the experimental phase, it's not clear, but certainly, there are lots of ideas coming out in terms of how we are embedding the flexibility in the resources"*. Furthermore, INT34 defined some areas where we can utilize the extra resources in the public sector to be ready for emergent event: *"So, it's not like an extra team on top of what you have. I think having, for example, economists or foresight people is actually a support for even the people who exist; all of our policies need predictive analytics, and all of our policies need foresight. Therefore, you could actually benefit from them on so many dimensions"*. Furthermore, INT27 suggested having a workload analysis in case of an emergent event to identify the human resources that the public sector can utilize: *"We can do what we call it workload analysis, or proper workload analysis, to extract these extra resources that can be utilized in this exercise"*.

INT20 suggested prioritizing speedy recovery no matter the cost as it is very important to maintain the reputation of the public sector: *"You just need to solve the problem. This might be the priority more than investing more money. So, being efficient in spending versus this, may affect your reputation and your ability to recover from the current state. You should always put fast recovery even if you spend more as a priority"*. INT26's perception of resourcefulness aligns with the public sector's traditional practice of maintain financial reserves to be used a buffer when needed: *"So, putting this kind of reserves in the budget is a good thing and you will not take it to other projects and keep it just in case something happened"*. Similarly, INT30 emphasised to have a financial budget reserve *"I think it goes back to the budgeting team which is part of the government. So, the finance department in any government put reserves when they do the budgeting exercise"*. Similarly, INT33 suggested having a reserve in the budget that should be around 1%. Meanwhile, INT35 defines the justification to invest in building preparedness rather than spending more if an emergent event happened without readiness *"Maybe you are paying an x amount to be ready if you did not, and in case of an emergent event, you may pay ten times more"*.

Figure 5-31 and Figure 5-32 summarize the attributes highlighted by interviewees for this section. Interviewees think that there should be proper resource planning prior to an emergent event to identify the best utilization of resources when faced with an emergent event. Maintaining a financial reserve is an important factor that the public sector should always consider. In addition to efficiency factors, other resilience factors should be taken into consideration when a disruptive event occurs. There should also be tradeoffs of current resource allocation to ensure appropriate management of an emergent event.
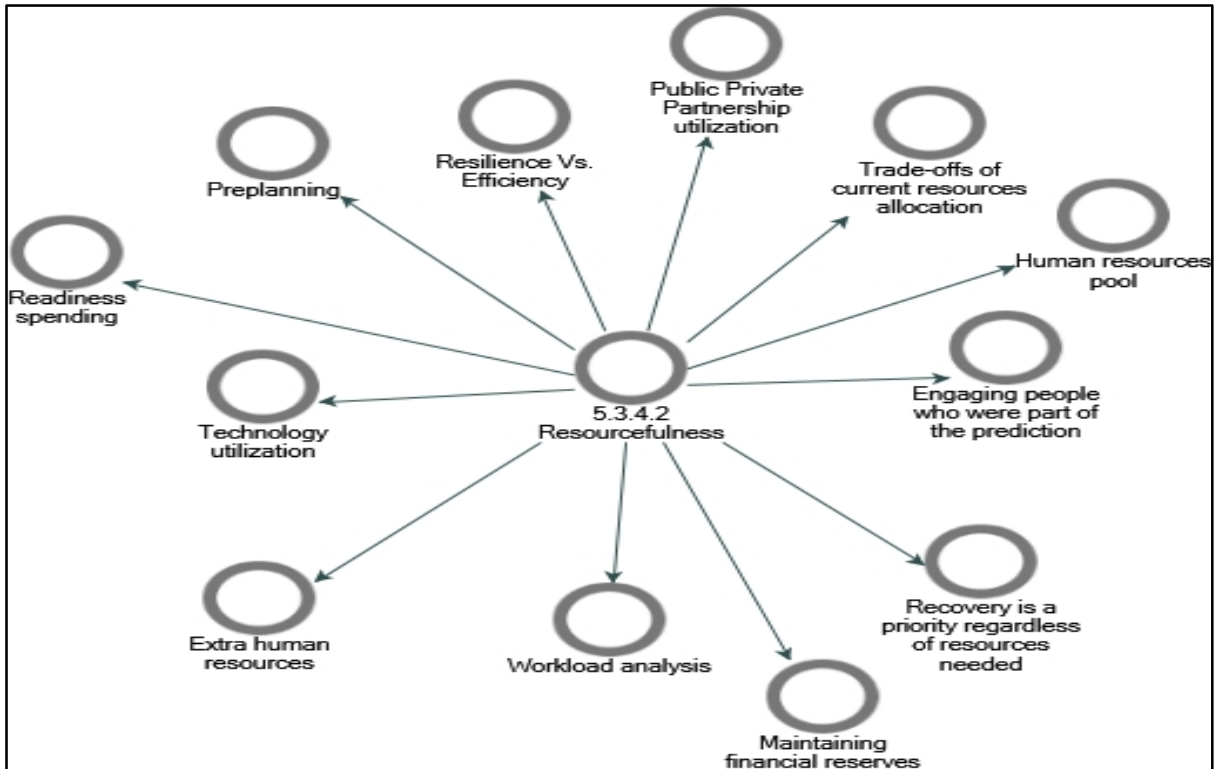
Figure 5-31: Identified attributes for resourcefulness.
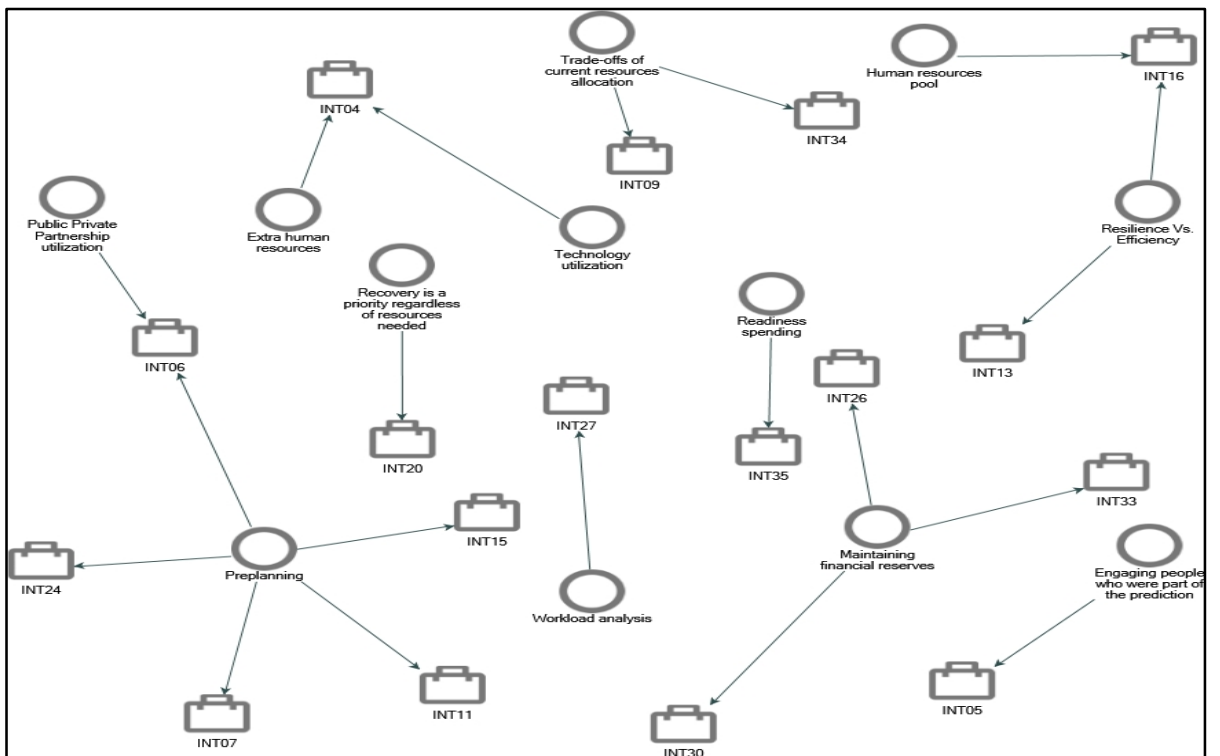
Figure 5-32: Identified attributes and interviewees inputs for resourcefulness.

Robustness

The following section present the interviewees' point of view on what the public sector should do in order to ensure that it is able to maintain its key operations in case of an emergent event: INT03 looks at robustness as building various capabilities to be ready and prepared whenever the public sector faces an emergent event: *"They need to build their capabilities; the capabilities of the people, the capabilities of their processes, the capabilities of the systems, and the capabilities of the infrastructure. We need to build every single capability to face any unexpected events in the environment"*. Furthermore, he suggested having mock drills to ensure proper capabilities building: *"I need to build my internal capabilities. I need to put every day a scenario and implement the scenario with mock drills"*. Meanwhile, INT04 believes that, when it comes to robustness, the public sector should not be treated as the private sector as the situation is not the same: *"The majority of the emerging events in the public sector will not lead to stopping offering your services, it will affect the quality of services or the response time and so forth. It could affect, for example that you are lagging behind some new level of performance. In general, if you look at the private sector, an emerging event could be disastrous in terms of you may be losing your market share. In the government, I wouldn't say that you will lose your business unless we are talking about disastrous or major certain actions that will lead to stopping offering the services to the public"*. Similarly, INT24 thinks that it is very difficult to affect your core business in the public sector: *"If you talk about a mature public sector entity, the key operations will not be affected by any crisis"*. Furthermore, INT07 suggested having a proper scenario planning to minimize the effect on the core services offered by the public sector: *"A specialized team should analyse the emerging event, in order to understand the event and come up with preconditions to minimize its effect on the key operations and mandates. Also, a popper planning by scenarios could support the organization to deal with the event directly"*.

Similarly, INT15 thinks that you need to have a good plan in the early stages and prior an occurrence of an emergent event: *"If we plan well before the event happens, we can implement the plans and activate the emergency teams depending on the tier of the event"*.

INT09 recommends a more feasible way for the public sector when it comes to building robustness, which is by investing in the infrastructure and resources, based on the presenting situation and frequency of occurrence of an emergent event: *"I would say that you're not supposed to build a hundred percent for most events scenarios, but you're supposed to have extreme agility to invest hundred percent in the response"*. Furthermore, INT10 suggested having business impact assessment to identify gaps in the system, and to ensure the system is capable of providing the key operations in case the public sector faces an emergent event: *"You have to do business impact analysis to identify the capability of your systems to operate and provide your key services. By doing this, you will know the enhancements needed in the system in order to be prepared for an emergency"*.

INT19 looks at building robustness by first identifying the key operations, processes and services *"I think key operations and key processes and key services out of the backbone of any public organization. So, priority should be given to these core processes or core services"*. Furthermore, INT21 emphasizes that the public sector should define thresholds of disruption that should not affect the day-to-day business *"I think they might have a threshold where if an emerging event happens, they can go to a certain capacity, without affecting the day-to-day activities of the city or of the country"*.

Figure 5-33 and Figure 5-34 summarize the attributes highlighted by interviewees for this section. Interviewees think that robustness is associated with having pre-plans and building readiness. Meanwhile, building robustness in the public sector is different from the private sector. For instance, if you have a mature public sector, key operations providing services to

223

customers are less likely to affected by disruptive events as the public sector will find alternatives to keep providing services.
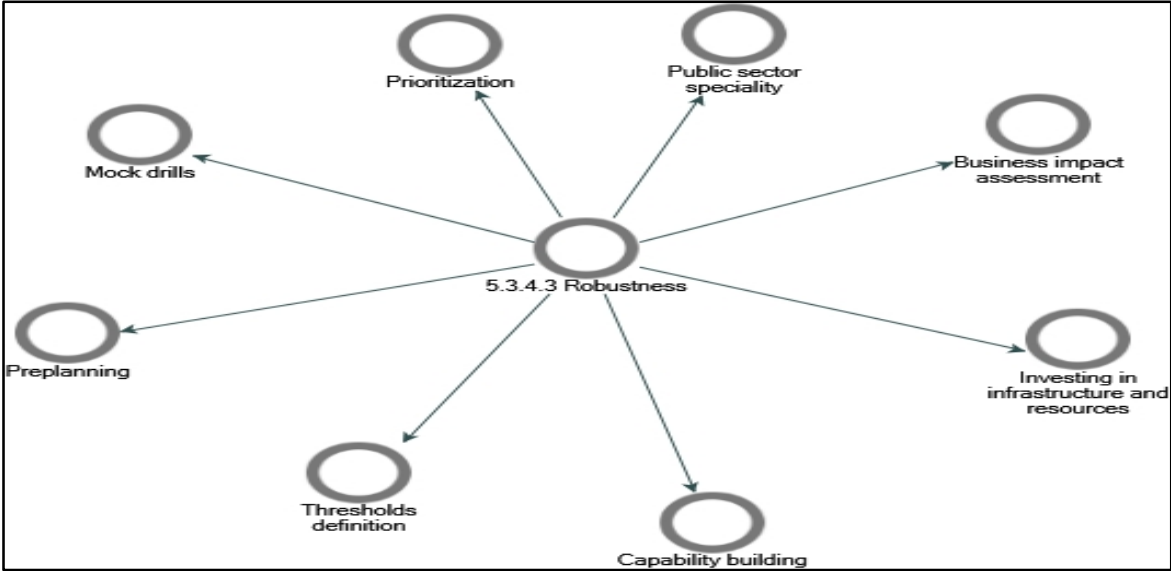
Figure 5-33: Identified attributes for robustness.
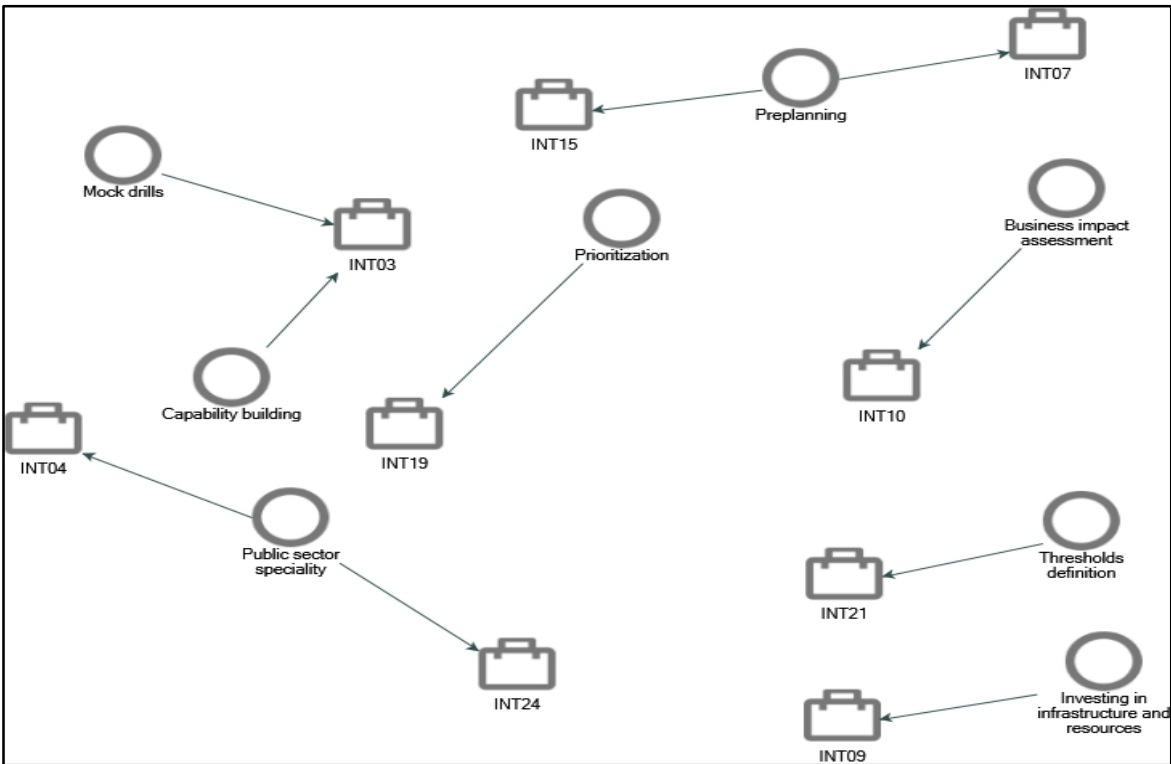
Figure 5-34: Identified attributes and interviewees inputs for robustness.

5.3.5 Theme Number Five (Resilience Capacities)

Figure 5-35 shows the hierarchical coding structure of theme number five, resilience capacities. Findings from the data describe the interviewees' points of views on how to determine which capacities are most important to have for the public sector to respond effectively to emergent events. In addition, the relationship between these capacities and the type of government organization is discussed (service provisioning or policymaking).
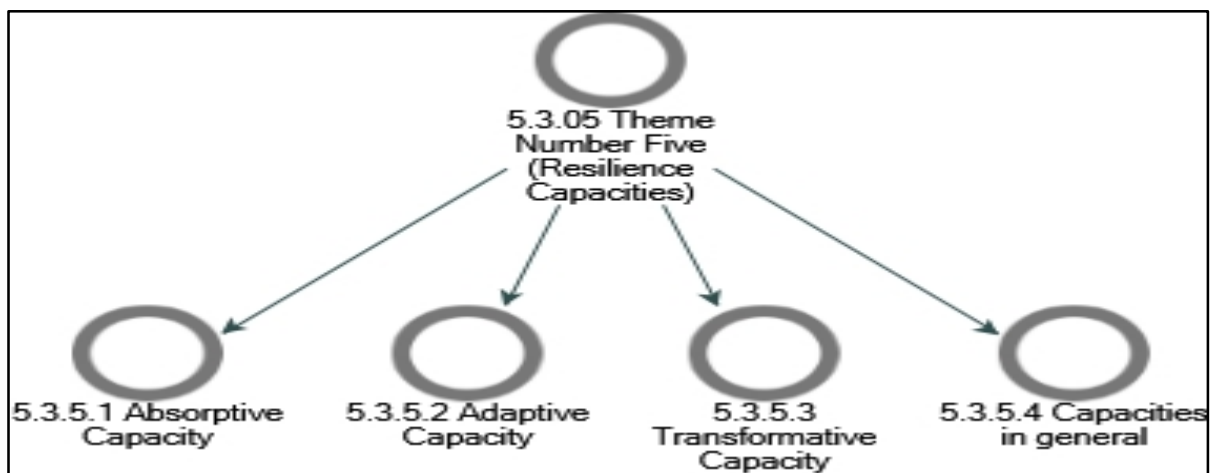
Figure 5-35: The hierarchical coding structure of Theme 5 (Resilience Capacities)

Absorptive Capacity

The following section present the interviewees' insights about absorptive capacity (The ability of the system to endure a disruption without significant deviation from normal operating performance). INT03 thinks that absorptive capacity is the most important capacity for the public sector as it also incorporates the preventive actions before an event occurs: *"I think the most important one is the first line of defence also representing the preventive actions that take place before any event"*. Meanwhile, INT07 thinks that management control is a key feature to absorb the emerging event in its earlier stages and this can be achieved through operational systems and risk management systems: *"Management control is the key defence tool for the*

organization to absorb any uncertainties; This may include implementing robust operational management and risk management approaches and apply audit and compliance tools in a continuous manner". Similarly, INT14 thinks that the absorptive capacity is the most important capacity the public sector should focus on: *"After the disruptive event, the government or the public sector will merely apply the first thing, the absorptive capacity, which represents how to absorb the impact of the event and get out of it in a very fast way with the least casualties and least impact".* Another similar opinion emphasizing the importance of absorptive capacity in the public sector came from INT18: *"I think, naturally they should focus on the absorptive capacity because this is the one that will minimize the impact of any emergent event. If we do not have enough absorptive capacity, we will collapse, and we will not be able to transform to bounce back. So, what helps you to survive is that you have enough absorptive capacity to enable you to survive in the future".* INT18 believes that absorptive capacity has certain requirements to be successfully implemented: *"I think you need different mindsets that are ready to deal with new trends, ready to deal with emerging events, people's skilled with new technology, people who are resilient themselves, and people who are ready to accept change and deal with different situations".*

Furthermore, INT24's perspective is that everything that will come later depends on this capacity: *"The first one which is the absorptive capacity is more important than the other two; because every action that will result will depend on your first reaction".* Not being emotional is the most important feature you need in your people to be good in absorptive capacity according to INT24 *"I will say not to be emotional in dealing with the crisis. You have to have realistic persons who try to take the right action for the situation and who try not to blame the others for the crisis if it happened".* Furthermore, INT26 thinks that the most important one is the absorptive capacity as it is the shock absorber for any event: *"The absorptive capacity is*

226

important. In a car, for example, if you have a good shock-absorbing system, you will stay on the road, but if you do not, then you will be out the track". He added that in order to be absorptive, you need to have a good emotional skill: *"I think the emotional intelligence skills and soft skills in the absorptive should be high, not panicking, being able to deal with change, and change management skills. These should be strongly evidenced from the beginning"*. Similarly, INT27 believes that in the public sector, absorptive capacity is the most important: *"In my opinion, I think we should focus more on the absorptive capacity in the public sector; because if you manage to absorb the incident and reduce its impact to almost zero, you don't have to move to the second capacity and so on"*. To be absorptive, INT27 defines certain requirements: *"You need to have proper prediction tools; because if you have the proper prediction tools, you will be able to come up with almost all the incidents which you could face. If you managed to do that you will be successful in putting the proper responsive plans for it"*. Similar to INT27, INT35 thinks that the absorptive capacity is the most important because if you are not good in absorption, you will not be able to adapt and be transformative: *"Because if you cannot do this, you cannot change to the other two options"*. He added that to be absorptive, the public sector needs to have a strong leader who can make right decisions: *"In the absorptive capacity, you need decision-makers. So, you need leadership with skills that they can decide what to do because it is critical"*.

Figure 5-36 and Figure 5-37 summarize the attributes highlighted by interviewees for this section. Interviewees think that the absorptive capacity requires high emotional and leadership skills. It is also linked to the mindset of people and technology as it is the first capacity to be utilized in response to an emergent event. It is also associated with prediction tools.
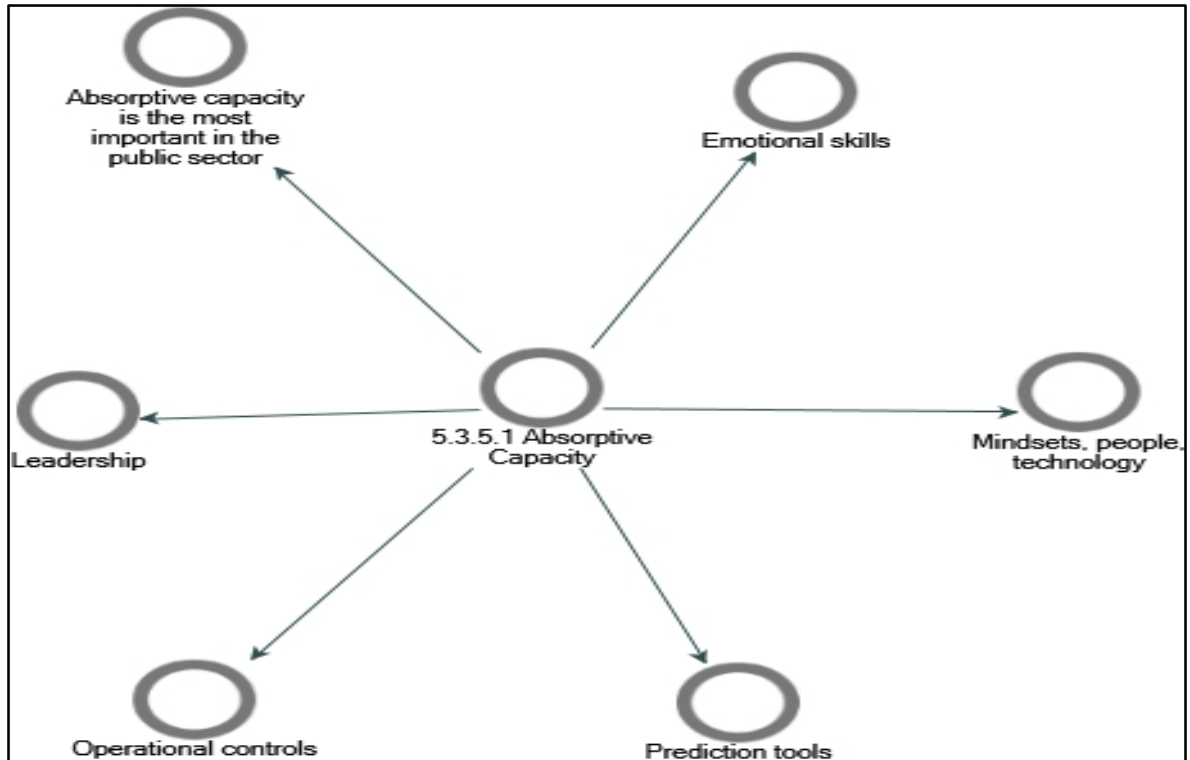
Figure 5-36: Identified attributes for absorptive capacity.
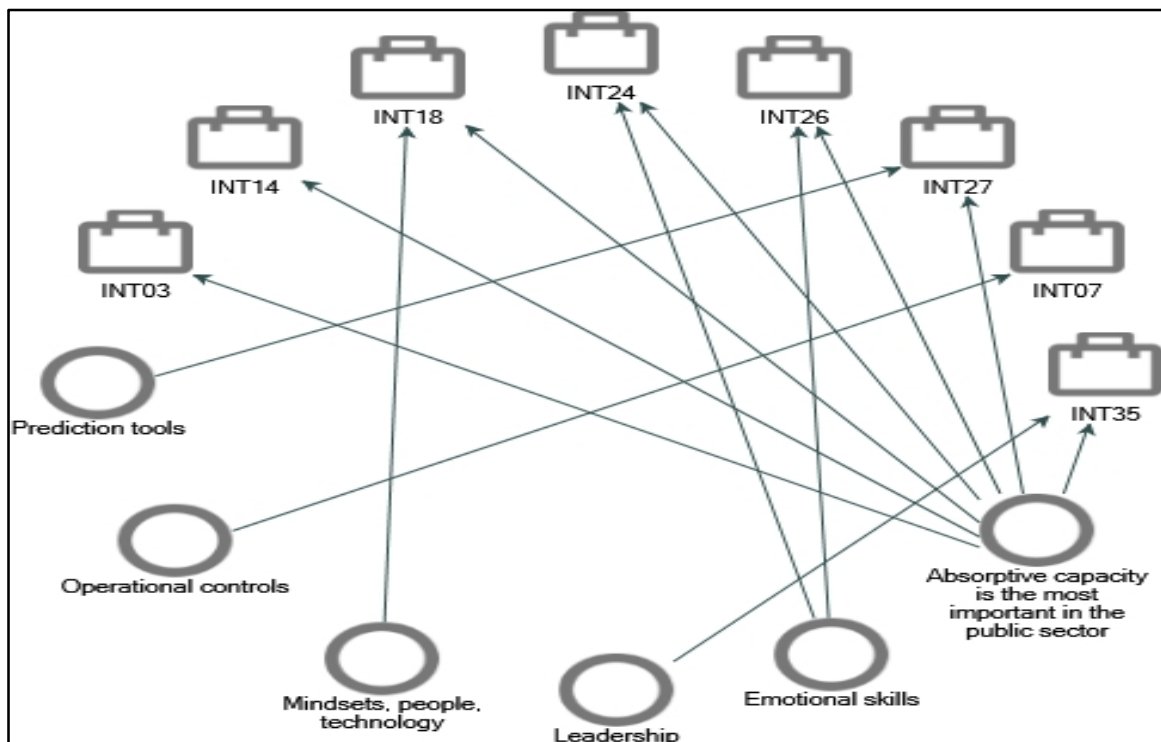
Figure 5-37: Identified attributes and interviewees inputs for absorptive capacity.

228

Adaptive Capacity

The following section present the interviewees' point of view and their perspectives on adaptive capacity in the public sector (How can we ensure that our systems in the public sector make adjustments to ensure we are flexible enough to live with an emergent event).INT03 emphasized that the people and systems need to be adaptive: *"All the systems are tools; tools to fulfil the need for facing the event. First, you need to have capable people who can use those systems to face the events. Therefore, you need to work on the people first and after this build the right systems. The right people define the adaptive systems required to facing the specific event or the expected events in the future"*. Meanwhile, INT07 emphasized the need to have flexible structures and strategies to be more adaptive *"The public sector strategies and organizational structures should be more flexible, and adaptable to deal with changes. Public sector should rely on team working and delegation of authorities rather than relying on bureaucratic structures"*. Furthermore, to be adaptive depends more on people skills than systems as highlighted by INT28: *"More adaptive depends more on the peoples' skills rather than the system; because the system will act as you change it, but you need somebody to change it. So, it's more realistic to have the individual's needs to be effective and take the adaptive part"*. Being adaptive needs certain requirements according to INT28 and one of them is agility: *"If you say adaptive, it might be related to previous experience, it might depend on the way you act with the event. If you have the experience, you can predict. If you are talking about agility, which means that it is your way of doing it. Do you do it to make it right, or do you do it to make sure that it is right? Agility is very effective but if you have the time. If you don't have the time, you can distinguish between iterative and incremental"*. Along the same line, to be adaptive you need to have a skilful people from the second layer of management and operations according to INT35: *"For the adaptive, you need to build the second layer of the management*

and other people because this needs some actions from the operations". Meanwhile, INT36 thinks that adaptive capacity is more important than absorptive and transformative in the public sector because it is the one that is mostly needed to fulfil people requirements: *"You cannot go to adapt before you absorb. Therefore, it is in the middle stage between the two. Therefore, if you want your score to be high, you need to be good in adaptive"*.

To be adaptive, INT20 identifies certain requirements: *"I believe the first one is infrastructure. The second one is a flexible strategy and policies that allow you to adapt fast. Third, you need the experienced resources that have proper capabilities. In addition to that, you need also back up plans"*. Furthermore, INT22 identified an important factor to be taken into consideration in developing adaptive capacity, which is how people adapt to change: *"How people will accept and will adapt is an important area. In addition, we need to plan this from the beginning; it's not only about our response decisions or the time it took us, but it is also about making sure that the people are adapting to the change"*. She also emphasized the need to be agile and responsive to be adaptive: *"Responsiveness, speed, agility, my ability to be really agile to respond is very critical"*.

Figure 5-38 and Figure 5-39 summarize the attributes highlighted by interviewees for this section. Interviewees think that adaptive capacity is associated with agility and people skills. Meanwhile, the public sector needs flexible people, systems, structures, strategies, policies, and infrastructure to be adaptive.
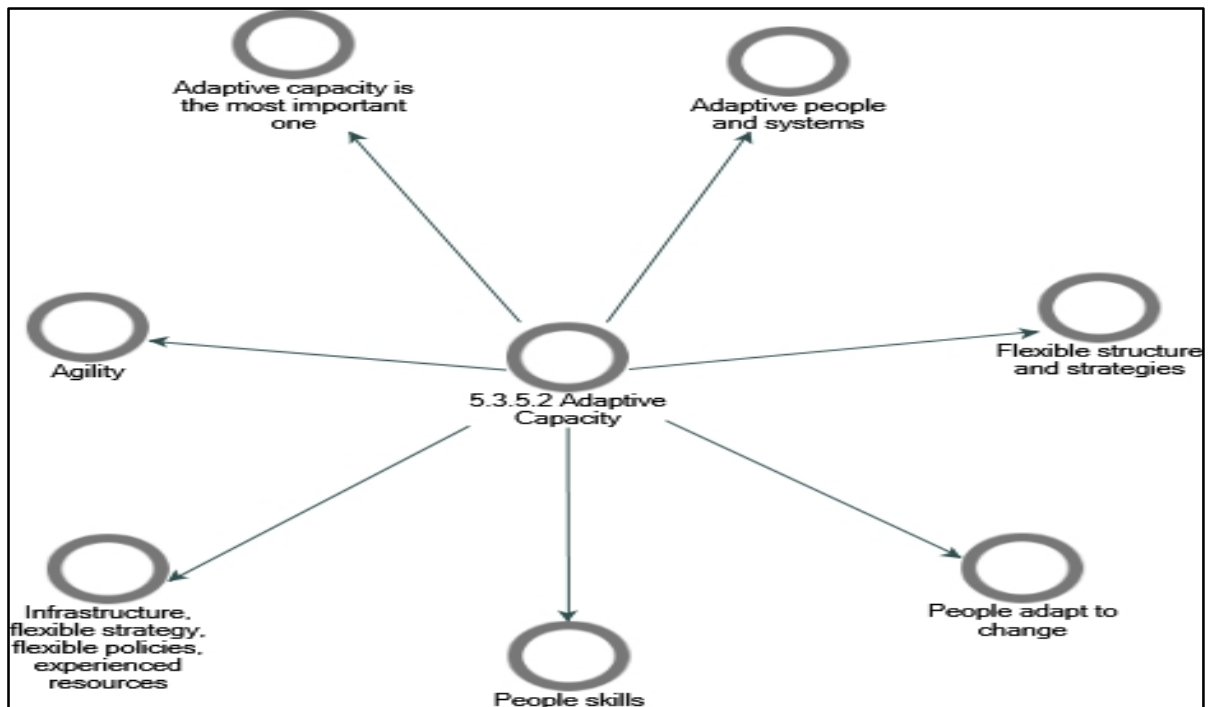
Figure 5-38: Identified attributes for adaptive capacity.
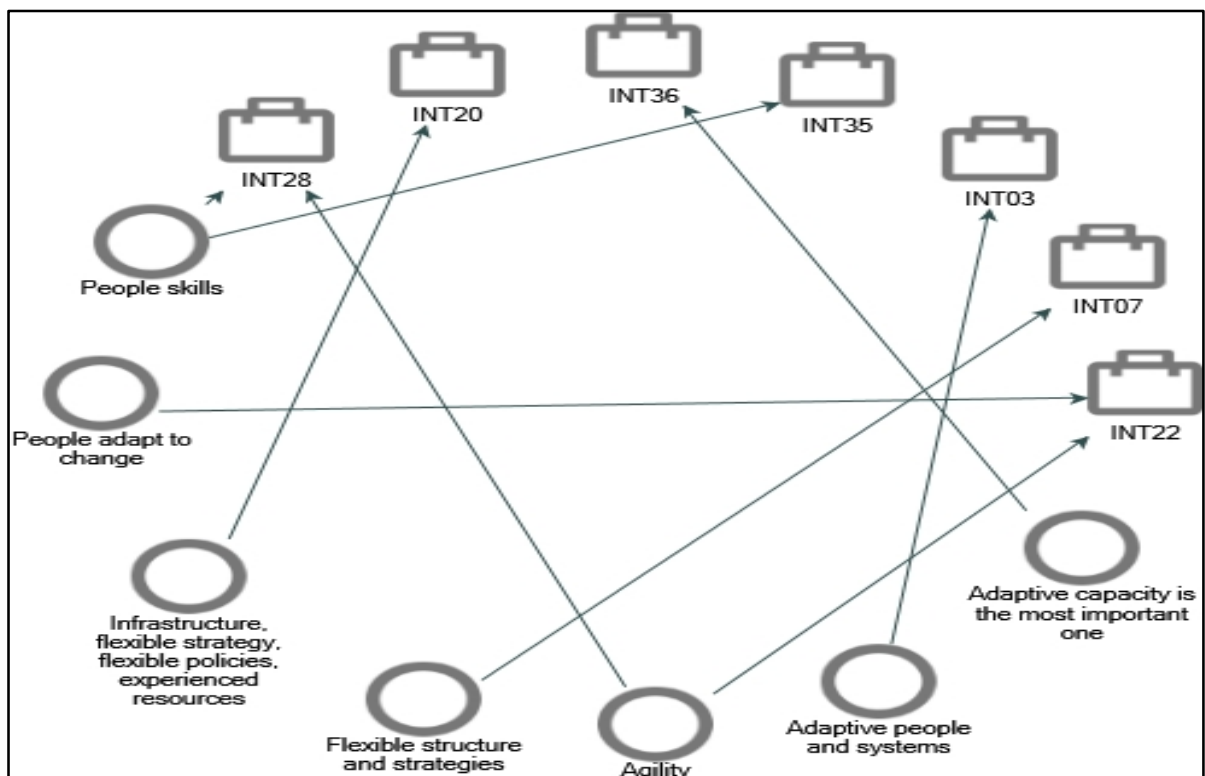
Figure 5-39: Identified attributes and interviewees inputs for adaptive capacity.

Transformative Capacity

The following section present the interviewees' point of view about their perceptions of transformative capacity in the public sector which represents how learning from emergent events can be used to prepare the organization for future events.

INT01 argues that the public sector should take into consideration that things will not be the same after an emergent event, and the public sector should do more in the transformative capacity side to align with the new developments: *"But events when they happen. They are really a big force that distorting all norms. Therefore, if you want just to come back and settle as soon as possible, maybe you are settling in a very dynamic environment that is different from your initial position. Therefore, you are really settling in the wrong way. Accordingly, you should have been thinking of transforming from the beginning in order not to reach to this position"*. Meanwhile, INT07 emphasized organizational learning as a mechanism for transformation: *"Organizational Learning is a key concept to produce thoughtful changes in several areas and it could support the organization to enhance its capabilities in addressing the event and identifying various solutions, which can suit the organization nature and culture"*. Similarly, INT13 emphasized the role of organizational learning in transforming to a better position even if the public sector faces a negative emergent event: *"We will be able to utilize even negative events to transform the way we do business, which is part of organizational learning. Moreover, transformation means finding new ways to do things in a better way. Therefore, this should always be the focus. And this should be the major outline of how the government would deal with resilience"*. To have transformative capacity, the public sector should be good with learning and unlearning according to INT13: *"One of the elements I am thinking of is having a systematic way of learning. And the other one is not the opposite of it, but a systematic way of unlearning and you know, unlearning is more difficult than learning."*

232

Furthermore, INT10 identifies the need for the public sector to change its strategies, policies, and systems in response to emergent events: *"To change dramatically the way you are doing business, or change the whole strategy, or change the whole policy, based on the assessment and based on the outcomes of the crisis itself"*. Meanwhile, INT20 thinks that the transformative capacity is more important than the absorptive and adaptive capacities as it is the one that makes the public sector to recover from an emergent event to a stronger position than before the event: *"Especially in the public sector, I believe the last one which is the transformation capacity is the most important one. Because that one is ensuring your recovery from the incident stronger than what you were before. Because even if you have been hit badly, but you have the capacity to recover to even in a better stage. This is the optimal solution, rather than observing and trying to absorb the shock and trying to be stable. This will not be helping you"*. Similarly, INT35 thinks that the transformative capacity is important, and to be effectively transformative, the public sector should have a holistic view to be transformative at the central level and not at the entity level: *"Transformative, it should be; this is a little bit complicated because this will not work with you as an entity, it will work with the government sectors or government entities together because it's impacting all the sectors and they all need to do something with the Transformative"*.

Finally, INT37 thinks that the transformative capacity is the most important one in the public sector because it represents the advancement to deal with the emergent event when compared to others: *"I think the transformative capacity represents the ability to bounce back which is the most important one; because it only sits within advanced nations if they have the ability to bounce back and recover and excel and thrive. So, I think it actually should have the most important focus, should take the most resources, and should have the most processes dedicated to it"*. He added that to be transformative, you should have imaginative capacity: *"I think for*

233

the transformative capacity you need to have imaginative capacity; going beyond realism, if

you are realistic and pragmatic you will always be stuck with coping around what happened.

If you have an imaginative capacity and this is something that should help the people bouncing

back and thinking of things they have not logged off".

Figure 5-40 and Figure 5-41 summarize the attributes highlighted by interviewees for this section. Interviewees think that transformative capacity is associated with learning. However, to be transformative in the public sector also implies the need to change strategies, policies, and systems. Transformation requires innovation, imagination, and a recognition that the new normal will not be the same as the normal.
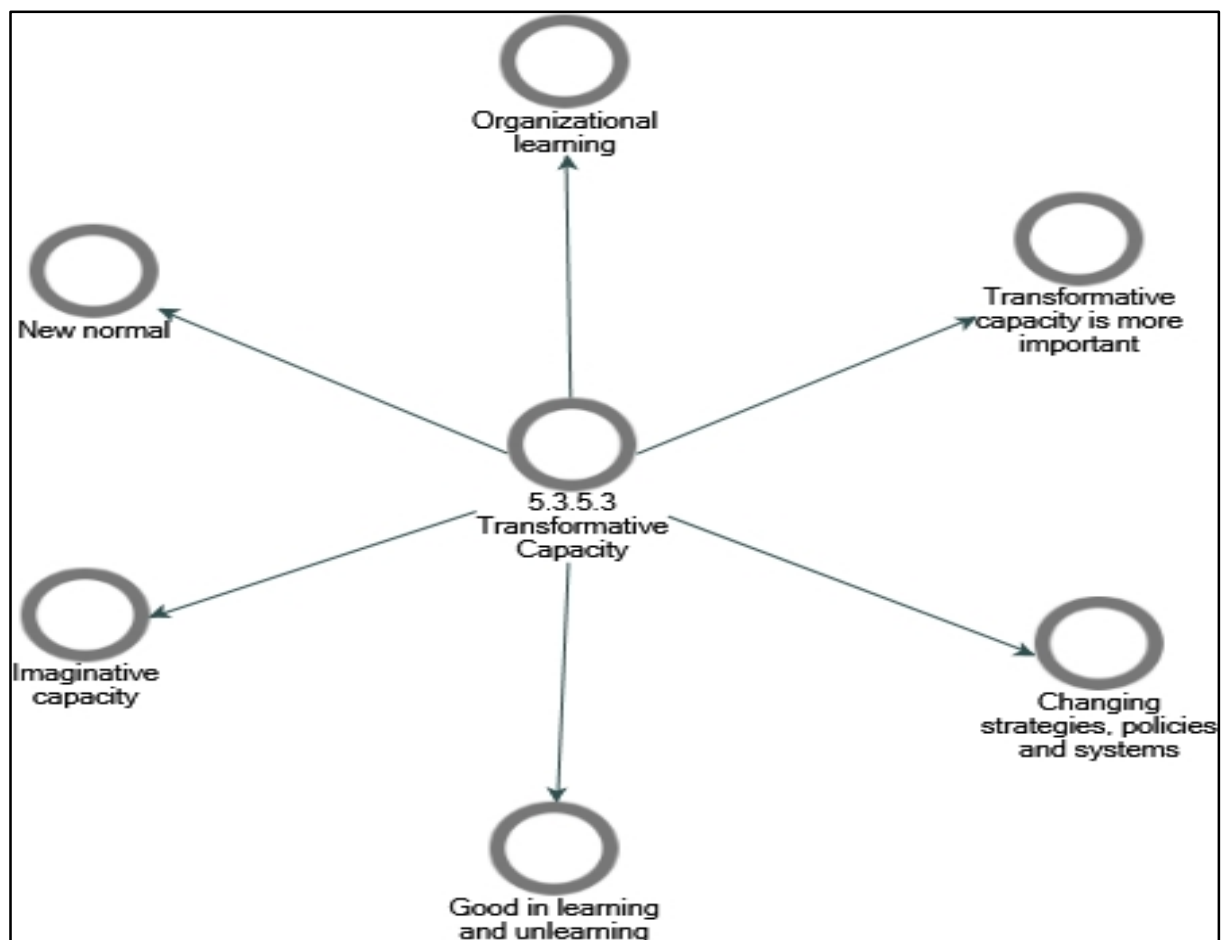

Figure 5-40: Identified attributes for transformative capacity.
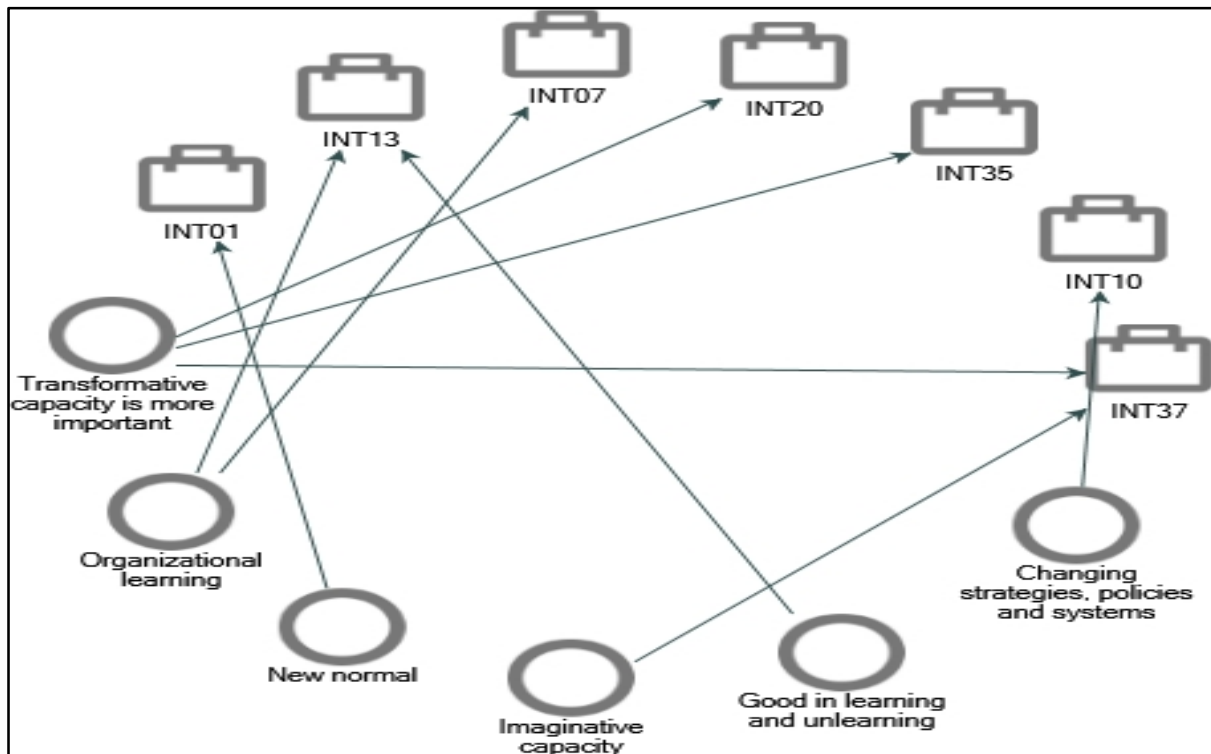
Figure 5-41: Identified attributes and interviewees inputs for transformative capacity.

Capacities in general

The following section presents the interviewees' point of view and their perspectives on capacities in general. This will address the understanding of the three capacities (Absorptive, adaptive, and transformative) the public sector should have to face an emergent event. In addition, it involves investigating if we need to have a balance between the three capacities or if the contribution of each capacity is weighted differently, and what characteristics we should have for each capacity.

INT02 thinks that the absorptive, adaptive, and transformative capacities are not the same, and should be interlinked in a way or another to face an emergent event: *"I don't think they are the same, like in the market crash absorption means that you need to have enough reserves to absorb the crash on the short term. Meanwhile, transformation is about change in the shape of*

235

your organization fully. Therefore, definitely, I think they are interlinked. They need to talk to each other, but I think we need different measures for each one of them, different capabilities, and different capacities". Meanwhile, INT03 highlighted the need to have a different strategy if the public sector decided to focus on one of the three capacities more than the other when facing an emergent event: *"We need different strategies based on the decision; if you need to adapt, you need a certain strategy. If you need to transform, you need another strategy. So, you need to identify your strategy based on your decision of dealing with events".* Furthermore, INT04 thinks that the three capacities differ based on the type of the public sector organization and nature of their work: *"My expectation is that government organizations are different on the three capacities; an organization which is heavy on operations, will not have the ability to be transformative. It will be maybe able to deal with absorbing but will have hard times adapting and transforming. Where an organization which the nature of its work is creative and not operational and more strategic, it should be capable of being transformative without any problem".* Meanwhile, INT17 has a different opinion as he thinks that the higher the strategic level you are, the more you need to be absorptive: *"Well, I think again with the slight differences, centre of government or agencies that are responsible for planning and setting strategies, setting directions to be more absorptive. While the second layer, with policy and regulations making, should be adaptive. Then the operational level where services are provided and interaction with the public is evidenced, they should be transformative".* INT17 also defined the needed skills for each capacity: *"The more it is absorptive, the more they need analytical skills, investigation skills, and simulation of models skills, so that they can comprehend the data and they can understand. In the adaptive stage, maybe they need problem-solving skills, and they need operational tactics. In the transformative, they need skills that are*

236

more interpersonal because they are dealing with customers. So, they need more interpersonal skills like communication skills and negotiations skills".

On the other hand, INT05 thinks that it is difficult to differentiate if we need one capacity more than the other two as the three capacities are embedded in each department and each team: *"I do not believe it's different based on functions, because any of the three capacities can be within the same team or the same department. It is all about the mix between the three capacities and the way they respond, and they maintain the work, and how they bounce. I think all the three should be within the same entity but with different priority and different weights based on the function of the public sector entity. For example, if I am government entity which is serving the business community maybe I will put more weight in the adaptive and the transformative capacity, but if it is something related to security or health, I should go for the biggest absorptive capacity because this can affect all the operations"*. Similarly, INT19 thinks that all the three capacities are of the same importance: *"I think they all go hand in hand, because you have to start with the absorptive capacity to make sure that you analyse you observe, and you understand the whole situation, then you have to use your adaptive capacity, then you go to the transformative"*. INT19 elaborated more on the requirements needed for each capacity: *"When you talk about transformative capacity, you need a team and tools that are utilizing state of the art technologies that are focusing on innovation, focusing on bringing new services, and new ideas. When you talk about adaptive, you are talking about a team that can effectively manage any type of situation. Finally, when you talk about absorptive capacity, we are talking about a team that can manage emotions, move, and communicate in an effective way with the public. So here, one of the key capabilities is the ability to properly communicate and listen to public opinion"*. Furthermore, INT19 elaborated on the leadership skills needed for each capacity: *"You need three types of leadership for that; I think if you're a transformative leadership, you*

can apply all other leadership styles required for all the three capacities. If you are an adaptive leadership, you can apply the ones related to absorptive and adaptive. If you are only an absorptive leadership, you will only be able to start with the first type of capabilities required to be absorptive. So, it's like three levels of maturity. If you are at level three, you can work on all of them, but if you are at level one, you cannot be transformative like that".

Furthermore, INT08 thinks that the three capacities depend more on the type of emergent event, than on the type of the organization: *"I don't think that adopting one style like being transformative is the right solution all the time. It's not. So, we need to have a mix of these capacities to be used based on the situation that we have".* Meanwhile, in addition to the type of emergent event, INT21 thinks that the capacities also depend on the repetition of an emergent event: *"It's also because how repetitive the event is; if it is very repetitive for example, we are sitting on a piece of land and earthquakes hit us every time, you can't be absorptive; you have to be transformative. So, it depends on the situation and the repetition of the situation".*

INT06 believes that the public sector should have all the three capacities *"You have to have them all, it's not like you have to choose one of them".* He added that if government entities do not have one of these capacities, they should look at alternatives to provide the necessary capacity level: *"If you don't have these capacities, you have to have a way to access to those capacities from somewhere else".* Meanwhile, INT09 thinks that choosing the combination of capacities depends more on the strategy the government sector is taking, whether proactive or reactive: *"All three of them are important. However, I would say it depends on the event management strategy you choose. You would see the majority of some governments being more reactive and only few of them are proactive; if you are proactive, you will focus on the three capacities with the same weight. If you are more reactive, I would say the absorptive capacity would have the highest weight, less on the adaptive, and probably zero investment on the*

transformative". Meanwhile, INT12 thinks that, for the public sector we should focus more on absorptive and adaptive: *"Mostly it is absorptive and adaptive"*. Furthermore, INT14 thinks that all of the three capacities are important and not acquiring all of them is risky for the organization: *"There is a risk of having one capacity and not having the others If you have the absorptive capacity and you don't have the adaptive and transformation capacity that means that you will face efficiency issues"*. Similarly, INT22 thinks that all three capacities are important, but the public sector needs to focus more on the transformative capacity: *"I think all of them are important, and it depends on how critical the situation is. Nevertheless, I am very much into the third one, which is the transformative capacity"*. On the same page, INT23 thinks all of them are important: *"I think that they're of the same concern, because unless they are all together, and they are implemented at the same time, you lose one of the pillars that you depend on for the change management"*. Similarly, INT29 thinks also that all of the three capacities are important: *"They are all important. If stage one is successful, for example, and stage two and three are not successful, we did nothing. Without all of them, you cannot bounce"*. In addition, INT16 highlighted that the public sector needs all the three capacities on all levels: *"I don't think it's just between the centre and the entities, I think that in every sector you need the mix of the three"*. Similarly, INT33 and INT34 think also that all of them are important. Meanwhile, INT25 thinks that the absorptive capacity is more important than the adaptive, and the adaptive is more important than the transformative: *"You definitely must have absorptive, you cannot live without absorptive, because if an event happens and you are unable to absorb it, you're in deep trouble and nothing else matters. For the adaptive, I would say it is important for you to be adaptive, but it might be a little bit less important. Then obviously, if you can go beyond that and become transformative, that's another added benefit"*. Furthermore, INT28 gives more weight to adaptive capacity; if there are changes, then you need to make sure that

you adapt to these changes: *"I think it's more important to focus on the adaptive; because if there are changes, you need to make sure that you can adapt to them if you have to. So, if we put adaptive as a percentage with the third and the first capacity, I would say 20-50-30, so 50% for the adaptive"*.

Furthermore, INT16 identified several factors to be considered in determining the right capacity; the government type, the event type, transparency, culture, and level of control: *"I think it's a factor of the government itself, but also the event that's taking place. I think some events will force you to focus on the transformative capacity more than others, and other events will force you to be more absorptive. I think it is also a factor of transparency because the more transparent the culture and the government are, the more adaptive and transformative they are. Meanwhile, the more governments can control the message, the more they feel that there's less need to react to the change"*. Meanwhile, INT30 believes that the three capacities depend on the type of government: *"The transformative way of dealing with things is closer to modern governments. I totally believe that transformative governments are a great model for a government that is trustworthy and a government that understands the needs of the future"*. Similarly, INT31 highlighted that though we need all the three capacities, being transformative is an advanced status desirable for the public sector to have: *"If you really have good power, the good preparedness, you can be successful in transforming this event into a protective position or in another way that you can get a better reputation and strong image that reflects a strong public sector mentality"*. Along the same line, INT32 believes that the capacity the public sector uses more reflects its vision and perspectives about the future: *"I think all of them are of equal importance. Now, if you are futuristic, you must predict those threats, and you will be more in the transformative. Unfortunately, if you have a lot of issues either with the*

circumstances surrounding you or with the stability of your systems, you need to be more absorptive".

Figure 5-42 and Figure 5-43 summarize the attributes highlighted by interviewees for this section. Nine of the interviewees think that absorptive capacity is the most important one, three think it is adaptive capacity is more important, while four think that it is the transformative capacity. Meanwhile, seven of the interviewees think that the three capacities are of the same importance. The three capacities differ based on the type of work that the public sector organization does. There should be a different skill set for each capacity and an identification of the links highlighting the relationship between these capacities.
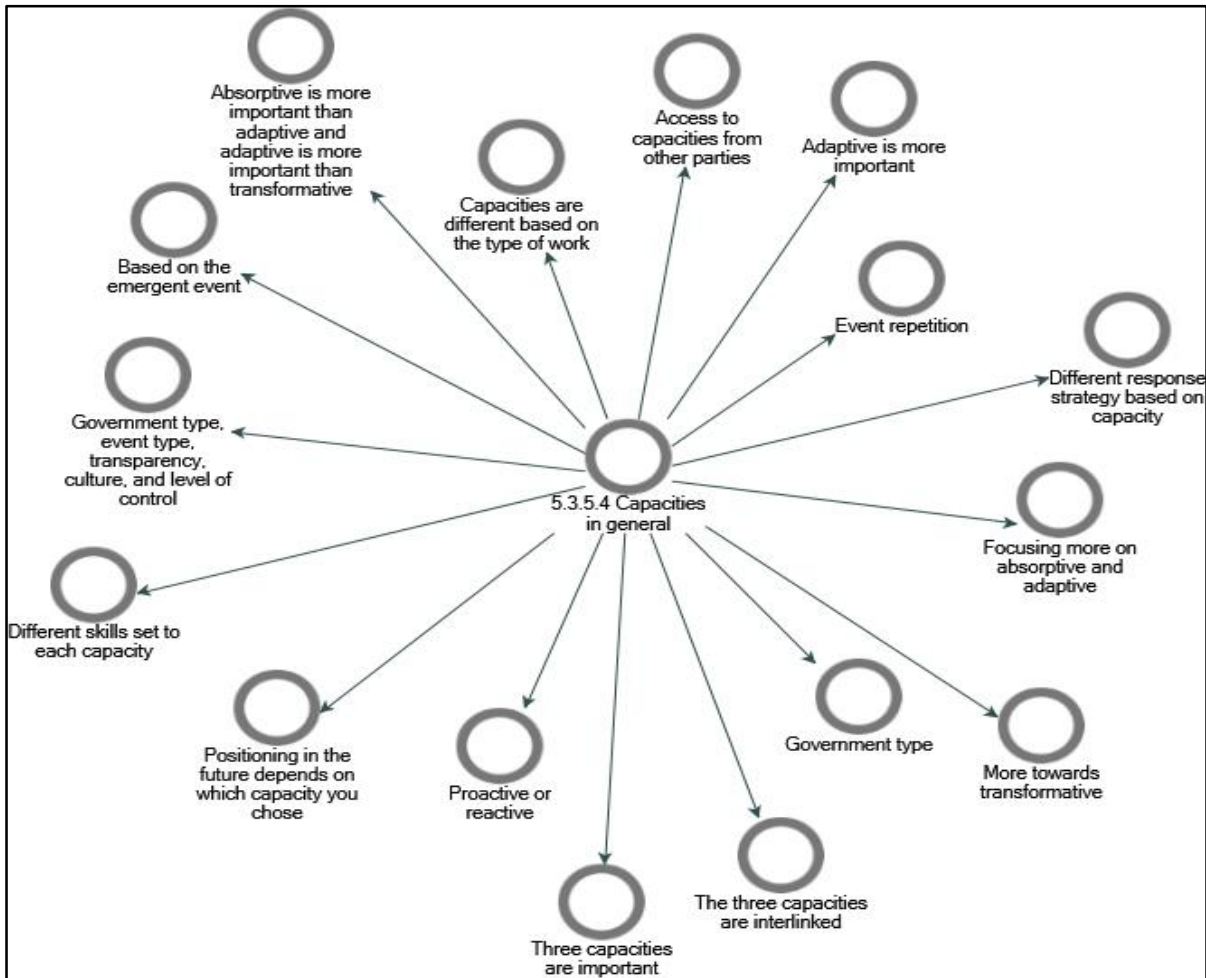
Figure 5-42: Identified attributes for capacities in general.
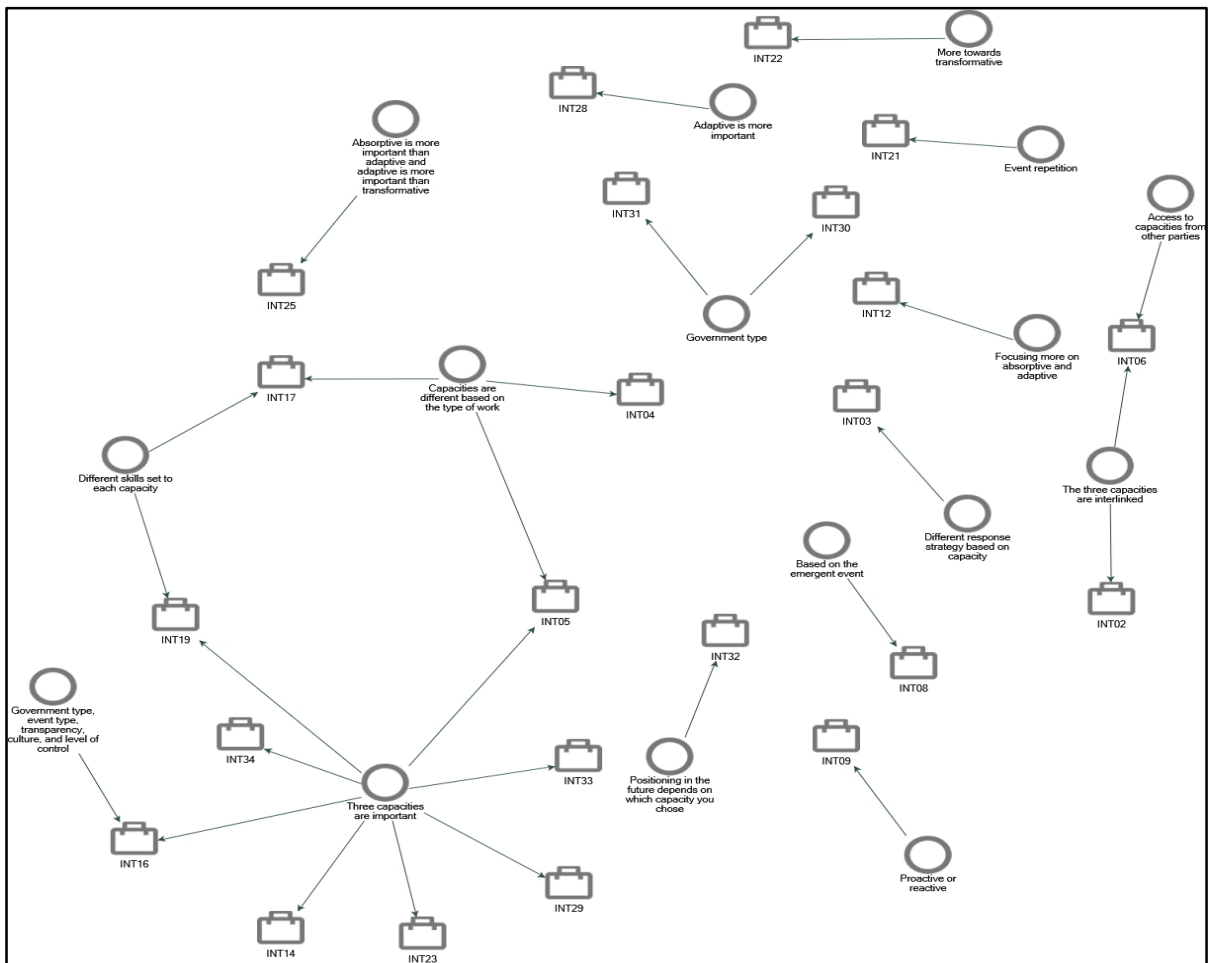
Figure 5-43: Identified attributes and interviewees inputs for capacities in general.

5.3.6 Theme Number Six (Post Event Scenarios)

Figure 5-44 shows the hierarchical coding structure of theme number six, which is post-event scenarios. The findings of the data will describe the interviewees' viewpoints on possible scenarios for the public sector after a disruption event, in addition to the learning mechanisms to improve the government system in the future.
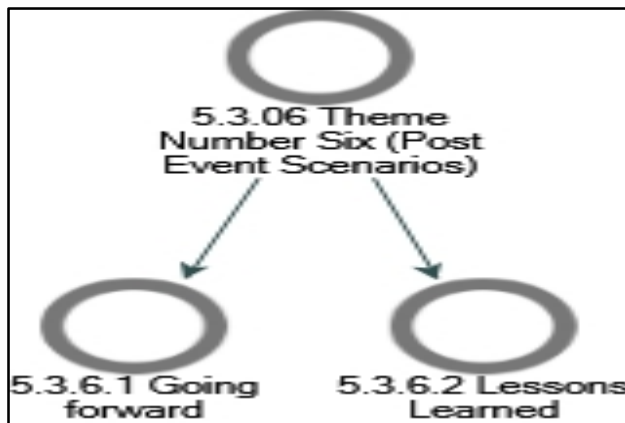
Figure 5-44**:** The hierarchical coding structure of Theme 6 (Post Event Scenarios).

Going forward

The following section present the interviewees' point of view on the aftermath of a disruptive event and the most likely scenario the public sector can follow to go forward (Retrench, expand, invest in new technologies, etc.)

INT01 listed three main things the public sector should go through after an emergent event; collectively rethinking value delivery after the event, re-examining the services being provided to the public, and realigning competencies: *"The first thing is to really think collectively and in alignment, so that you can really reengineer value streaming and value development. The second thing, I think will be rethinking service families and service justification and accordingly reproduce services to align with the new reality to the best interest of the constituents and of the direction and realities of the government. Thirdly is to realign the competencies and integrational matrix"*. Meanwhile, INT03 thinks that in the aftermath of an emergent event, the public sector usually invests in new people and new technologies: *"So, they put new technologies and new people to ensure that the event will never occur again"*. Furthermore, INT04 emphasized the need to review the strategy post an emergent event: *"If we are talking about major emerging events that affect us on a strategic level, then definitely our strategy has*

to be reviewed. The strategy review itself has two purposes; number one is incorporating lessons learned, and number two to develop the new strategy or the changes in the strategy". Similarity, INT06 highlighted that after an emergent event, new priorities come into the surface depending on the characteristics of the emergent event and the new situation: *"So, it depends on the situation, and you have to put new priorities"*.

INT07 suggested studying the performance of the organization using a specialized team which was not involved in planning and responding to the event, to identify improvement opportunities: *"Public sector organizations mainly studies the disruption event by specialized teams and improve depending on the response to the event"*. Similarly, but without specifying the responsibility, INT08 suggested evaluating the strategies that guided organization's response to the event: *"We are evaluating our strategy, and we are evaluating the actions that we had; was it good as we expected, or not? If it was not, then we need to identify the changes that we need to have and our actions in the future to maximize our benefits"*. Meanwhile, INT15 suggested having a committee to evaluate the performance: *"The emergency committee shall meet to evaluate the damage happened and discuss the weak areas in the emergency plans that make them not working. The business continuity plans shall then be activated along with the function recovery plans. The committees shall discuss lessons learned from this event and update the plans to prevent any damage from happening again"*. Similarly, INT27 highlighted the need to evaluate how successful the response of the public sector was, identify gaps, and develop improvement plans: *"I think the first thing they have to do is to measure the success of the response plan and identify any gaps which are already happened and identify improvements to eliminating these gaps"*. Furthermore, INT35 highlighted the need to do capacity building for the human resources and evaluate the current systems to be more ready in the future: *"They should think about the capacity building of human resources and other resources. They should*

think about lessons learned from the event. Therefore, they can, for example, change their database or their systems if they are not working or not improving. They can use new techniques, and the most important thing is the human resources, they should invest in human resources. So, they will be more ready in the future".

INT09 emphasized evaluating the outcome and not the tools that have been used: *"I think that all you have mentioned are tools. I would not say you should focus on the tools; you should focus on the outcome. Firstly, is how can you avoid this event completely in the future. Secondly, if it happens and it is not avoidable, how can I be able to absorb the outcome? Then the tools that you have mentioned will come at the second stage, what are the combination of tools that I need to put in place to achieve this. So, I would say you need to focus on the target and the outcome rather than the tools".* Similarly, INT10 thinks that following a disruptive event, the public sector should analyse outcomes: *"I think it's by analysing the outcomes. You can decide the approach you want to use post an event. For example, if I analysed the outcome after an event and figured out that the outcome was not up to level because of the enlarged size of the government, so I have to resize the government itself. Was this because I am using old technology and not moving quickly with the fast development adoption of new technologies. Was it because I am not ready because I do not have a framework in place, or I am not ready to react and absorb the crises? Was it because of capacity building, and I did not have the resources who are trained to deal with the crisis and emergencies? So, I think it depends on the outcome of the crisis and based on that to analyse the outcome".* Furthermore, INT11 thinks that post an event' the public sector should capitalize on the opportunities that the emerging event presents: *"Capitalize on the opportunities that the disruption gives; the disruption is not only a disruption. There are extra series of opportunities that can be capitalized on and having a new business out of them"* Similarly, INT22 emphasized capturing the opportunity post a

disruptive event: *"The first thing the public sector should think of is the opportunity; they should really think about it wisely and take a decision according to the opportunity that is embedded. This opportunity has pros and cons that they need to study it well and respond accordingly"*.

INT12 believes that post an event the public sector should go through a root-cause analysis process to eliminate the causes of an event: *"They will analyse the root cause and the main trigger for such events to mitigate the origin of the root instead of doing some protective actions"*. Similarly, INT23 thinks that the public sector should do a root-cause analysis: *"If for example, we have a disruptive incident that caused problems to the community, so in this case, the proper action should be looking into what happened and find the root causes of things"*. Meanwhile, INT13 thinks that post an event the public sector usually is driven by fear, and we need to eliminate decisions based on fear: *"Now, what I know is that fear is a more powerful driver than the improvement needed. So, fear will drive people to reduce, resize and not to spend more. So, if you want to be resilient, you need to find a way to drive not only the fear but to drive out from government the wrong decision making that is driven by fear that will cause you to underspend and overreact as a result of an emergent event"*. Furthermore, INT14 thinks that post an event, public sector organizations should re-examine the way they operate and create avenues for collaboration with the private sector so that the private sector can do some of the operations that were earlier restricted to the public sector: *"Maybe engaging with the private sector or engaging the private sector in government operations. Of course, it can be one of the solutions. That means reducing the size of the government or transferring the risk of the operation of a specific service to the private sector or having the private sector providing the services to create a competitive environment. In the end, this means delivering the service at a better price to the citizens"*. Meanwhile, INT20 highlighted the need to have a workshop

246

following an event to identify lessons learned and opportunities for improvement: *"The first thing, to conduct kind of workshop once the event happens and we recovered. Conduct a workshop that you can openly and transparently study what happened and what went wrong and what are the lessons learned from that one and then try to improve"*.

INT16 thinks that post an emergent event, the first thing the public sector should look at is to figure out why it was not able to trigger and predict the event: *"Well, the first thing we need to ask is why the current systems didn't address that event automatically. The second question we need to ask is, how can we predict the event next time when it happens ahead of time?"*. Meanwhile, INT18 highlighted the need to work on preventive actions and to improve response if the same event happens again: *"I think they should work on preventive measures first to prevent the occurrence of a similar event in the future. Second, to build how to respond more effectively, if it happens again"*. Similarly, INT29 highlighted the importance of trying to prevent the event from happening again or minimize its effect in the future: *"They should think about prevention. Of course, we are talking about negative changes or negative event, and then they need to think about preventing the reoccurrence of this event if it is possible"*. Furthermore, INT19 is argues for expanding or keeping the status quo, but does not support layoffs and resizing: *"I believe that either of the following two scenarios should be done: The first one is to expand to show I'm still interested in making better services and better processes and make disruptive change to maybe do things even better. The second scenario is to keep the status quo. Nevertheless, the biggest mistake will happen when you succeed with your team and then penalize them by saying, then I will resize because this will make you lose the trust of your team and your employees"*.

INT21 advocates for having a good communication with society and the other government sectors post an emergent event to discuss openly what went right and what went wrong: *"I think*

that the communication part is very important; the communication with the public, the communication between the government sectors is very important to say what has happened and how they have dealt with the issue and what is their plan to do if it happens again, which are the lessons learned". In similar vein, INT24 thinks communication with the employees is important: *"The top management should send a message to the employees to encourage them for what they have done".* Furthermore, INT30 thinks that post a disruptive event, the leadership of the public sector should inject positivity to regain the trust of people *"Positivity, injecting positivity, because they need to pave the disruption that has happened to go back to normal. So, you'll get your operations back and communicate that you're going to move forward and not look at the disaster that has happened or the unforeseen events, because if you keep on talking about what has happened, you're not going to be able to move one step ahead. That's why modern governments that have trust with their people tend to move faster than governments that have a legacy with their own people and their own communities".* Similarly, INT36 thinks that, in case of big events, they should be properly communicated to the society and recorded for future reference: *"It should be positively and strongly recorded. Information should be shared and communicated to generations through the educational system, through special channels of passing information or through reaching out by the social media to make sure that they also understand how it was dealt with".*

Meanwhile, INT25 believes that the post-event scenario depends on the situation and the event itself: *"It really depends on the situation or the event itself. For example, if you're going through an economic downturn, having a countercyclical fiscal policy, it is quite important to kind of reinvigorate the economy so the public sector typically tends to expand the budget and they tend to borrow more because they know that if they're able to get the economic cycle working again, then things will kind of come back, and then they can go back to previous budget levels.*

Therefore, in those instances, the governments are taking a kind of a bet on economic growth and will invest during those times. In other times, you may have to retrench, if you know that the source of trouble is that you have just gotten too fat as a government and you have subsidized too many things. You may have to actually bring this down, bring your investments down, bring your expenses down and then be able to deal with it that way".

Figure 5-45 and Figure 5-46 summarize the attributes highlighted by interviewees for this section. Interviewees think that the first thing the public sector should do post an emergent event is performance evaluation. There should also be a strategy review exercise to capitalize on the opportunities that may emerge after the event. A root-cause analysis should also be done, and an identification of the proper preventive actions should take place.
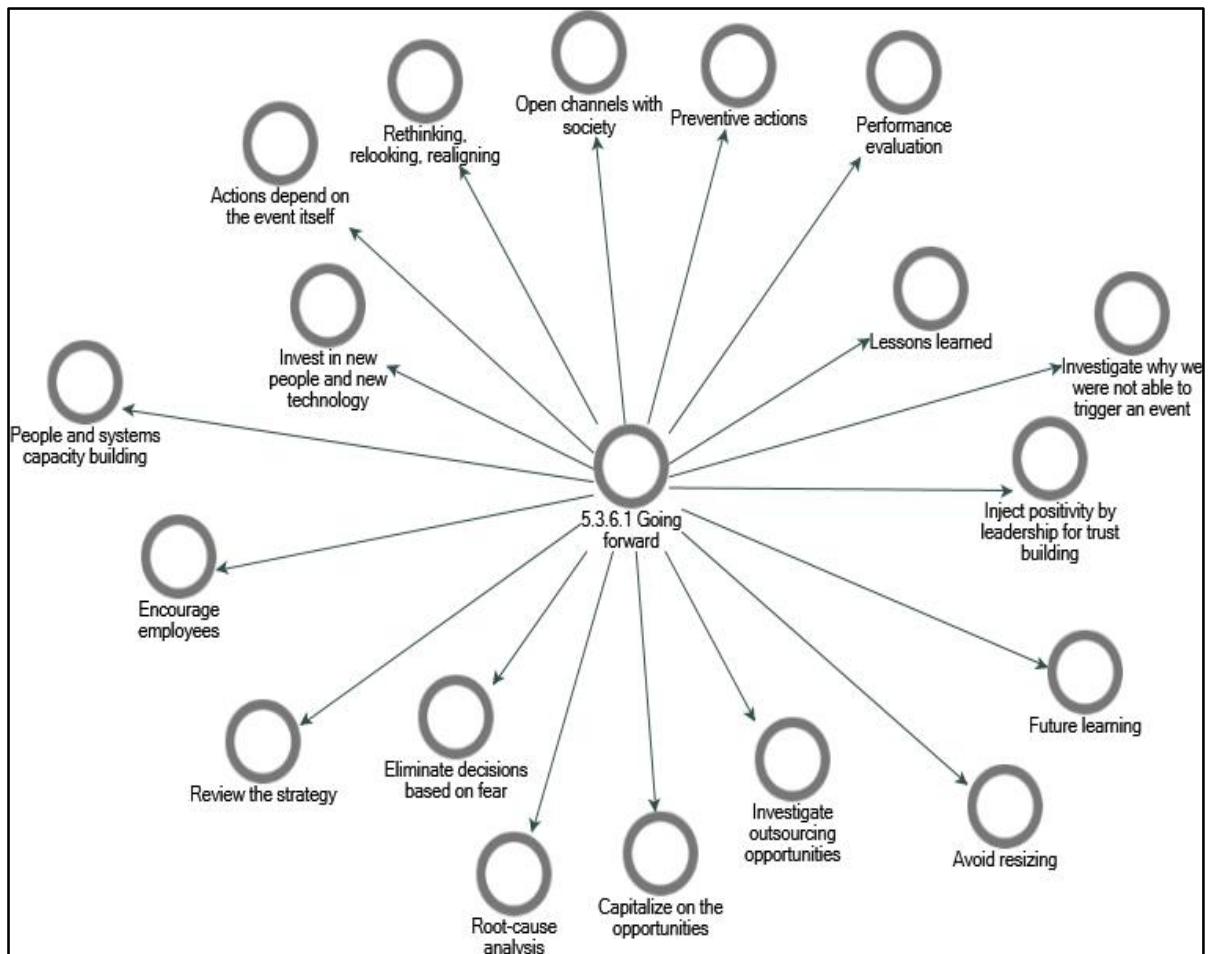
Figure 5-45: Identified attributes for going forward.
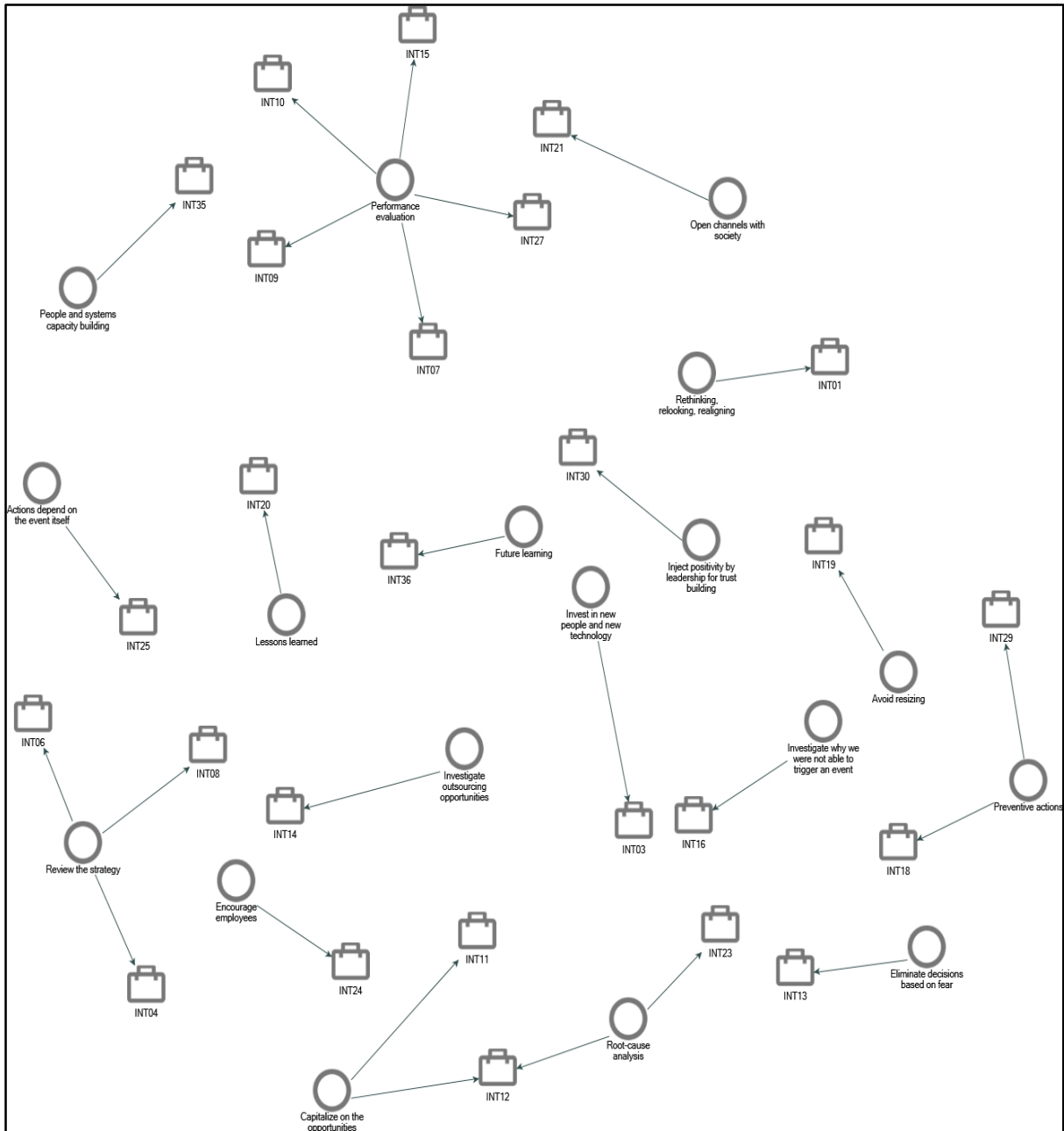
Figure 5-46: Identified attributes and interviewees inputs for going forward.

Lessons Learned

The following section present the interviewees' point of view on how the public sector can ensure that lessons learned were properly captured from the experience of managing an emergent event:

Post an event, INT02 suggested reassessing the current tools, systems, policies, and capabilities to become more agile in the future as part of lessons learned: *"I think the most important lesson learned is that: we always need to go back and assess the tools, assess the systems, and assess the capabilities and hold people and entities accountable. You might eventually resize, but that does not necessarily the case. You might need to become more agile, definitely"*. The reassessment process in the public sector should include the entire value chain, and the output will be revised policies and services according to INT02: *"You will have to have your outputs, which are in the public sector either policies or services. I think the whole chain should be assessed. Nevertheless, the assessment does not mean that you need to check the whole system. Assessment means basically relook at processes at each part of the value chain, assess according to the event, and take the right actions"*. Meanwhile, INT03 emphasizes the importance of documentation to capture the lessons learned, and then there will be discussions among the management team to identify root-causes and to improve performance in the future: *"Every single one dealt with the event will make a report. Reports are taken with very high importance, then meetings are scheduled to assess the root causes, identify new priorities, and actions will take place"*. Similarly, INT13 highlighted the need to identify the root causes then you can decide which policy you need to revise: *"So, you need to identify the cause-effect relationships and the root causes of why this happened. Then you need to relook at the policies that drive the behaviour of people. Therefore, you need to identify what within these policies need to be changed, and then disseminate this as fast as possible, and get the buy-in of why they should be changed"*. Furthermore, INT34 recommends having a consortium or high-level meeting at the government level to discuss the lessons learned and share knowledge: *"It could be that there is a government kind of consortium or meeting on a quarterly basis where government entities that have got a certain disruption will share what was faced and what are*

252

the lessons learned. In addition, they could have like a register of these lessons at a government level".

Meanwhile, INT07 emphasized the need to do proper documentation to be able to capture the lessons learned: *"Lessons learned should be documented and stored in an electronic database or shared folders, and it is preferable to allow users to identify lessons learned by keyword".* Similarly, INT19 highlighted the need for documentation, and this should be done for the whole cycle of the emergent event management: *"Documentation should be done at each stage, not wait until the event ends. I think the documentation should start from day one, from when you forecast it, till the event occurs, and till after the event or post the event. So, documentation and using tools to document and capture the lessons learned is very critical".* Meanwhile, INT32 emphasized the need to make documentation a mandatory exercise in the public sector *"Make it mandatory, let me give you an example in our organization, before we can close any project it in the system we have to upload what are the lessons learned. Some lessons are positive, and some lessons are extremely negative. Therefore, we have to document both".*

Furthermore, INT09 added the need to have ongoing education and knowledge sharing practices to do documentation: *"First of all, the documentation. Unfortunately, you would see a lot of documentation missing, which means that the team that will come later on to deal with a certain event may not have enough experience. Two is ongoing education and sharing information for different departments about the event, especially for cross-functional teams".* Along the same line, but with a more holistic view, INT12 highlighted the need to have a data bank for the government to have collective learning: *"I think we need to have a data bank that deals with the lessons learned of the whole government".* He added that we also need a proper system to capture the lessons learned and we need to enhance the trust: *"We need a proper system to evaluate the lessons learned and tackle the most important ones that can be adopted*

by all governmental entities. Also, we need to enforce the trust; if people fear to be questioned if they share the knowledge, then there will be no proper deployment of the lessons learned".

Similarly, INT30 highlighted the need to have knowledge and data centres to manage the lessons learned: *"In my point of view, there should be a knowledge and data centre where certain data that is collected to be stored at a specialization research unit on the departmental level"*. Meanwhile, INT17 also highlighted the need to have proper tools and models to properly capture the lessons learned but in a simple way: *"Through developing models or tools that can capture the information, and document them it in a way that facilitates retrieving later on. However, everything should be done in a simple way. I believe in simplicity, such as a very simple checklist or a very simple tally mark that will help to gather the information and utilize it. Not using very complicated systems that require a lot of efforts and nobody will do it"*. Furthermore, INT18 suggested having a visualized documentation of lessons learned through documentary films so that everyone can learn from the previous experiences: *"Of course, documenting is one of the indispensable mechanisms for retaining knowledge. Documenting is not only in paper or electronically; we can even produce documentary films so that people can see what happened in the past to educate people and raise their awareness"*.

Meanwhile, INT05 highlighted that the outcome of the lessons learned exercise should be enhanced effectiveness when a similar event happens in the future by taking proper preventive actions: *"To activate your preventive system to make sure that if this event occurred in the future, there is enough capacity to absorb it with the least damage and minimum impact"*. Similarly, INT06 also emphasized the role of lessons learned in developing preventive actions: *"The lessons learned, this how I look at this, I did simply an assessment of what we did well and what we didn't do well during that event. Also, what can we prevent in the future and what we can fix now"*. Furthermore, INT22 highlighted the need to explore the lessons learned not

within the public sector itself, but also to form a team to draw from lessons learned by other countries when they experienced emergent events: *"It's not only about your internal lessons learned, but it's about the team also going around the world and working on lessons learned from different perspectives"*. Similarly, INT35 highlighted the need to link the lessons learned with the experience of other countries: *"If you make it related events that happened in other countries. So, to make it more attractive, you should not focus on the event itself, you should formulate it as something that is not only related to you but also with what happened with other countries that have gone through the same experience"*.

Furthermore, INT08 listed three tools to properly capture the lessons learned: documentation, workshops and publications: *"There are many tools that you can have to capture your lessons learned; you can document these lessons learned on a database and put it in a place where anyone can access this database all the time. You can have knowledge sharing sessions. You can publish them in the internal intranet. You can have even external publications as the public sector organization should care about teaching knowledge to others"*. Similarly, INT10 emphasized conducting workshops, simulation exercises, and publications to properly share the knowledge about the event: *"You can convert the lessons learned into training material. You can publish the lessons within the whole government sector, so they can learn from the government experience. Therefore, training material, conferences, and workshops are some of the tools and also publications. Also, simulations, so in the future, you can simulate the same event and the drivers you have in place and do simulations for people to learn"*. Similarly, INT24 elaborated more on simulation: *"The simulation, for example, make teams and let them go through the same experience that we already had and ask them about their opinion. Maybe they will generate new ideas that will be helpful to implement"*. In a similar vein, INT26 also highlighted simulations as part of capturing lessons learned: *"By simulations and videos. This*

should be quick and direct to the point". Simulation and drills were also emphasised by INT31: *"Documentation will always be needed everywhere so that you can transfer the knowledge to everybody whenever the time passes. However, I believe that we should do simulations of disasters or drills. There are different training techniques in which you assume a disaster is coming and then you test your capacities in this, either they call it table exercises or they call it sometimes drills".* Furthermore, INT11 highlighted the importance of lessons learned in developing different future scenarios: *"You can take the old experiences as lessons learned and make them as scenarios to investigate about what we have done wrong and what we have done right in order to include them in our future plans".* To ensure lessons learned are properly captured, INT15 suggested having mock drills: *"The organization shall conduct drills more frequently to test the updated plans and ensure that lessons learned are implemented and taken into consideration".*

Meanwhile, IN23 listed some of the channels the public sector can use to share the lessons learned and sharing knowledge with people and not only transferring the knowledge: *"Well, by having too many channels; Number one media; if you have proper media then you can circulate the message you want through media, it should be through certain programs that people trust and certain media influencers whom people trust, and it shouldn't be like a lesson or a person who is just delivering a speech. Number two social media; like Facebook, Instagram, and Twitter. These channels could be very useful as well because people think that the thing is important if they do trust the person. Furthermore, we can also use academia through publications. The main thing here is you are sharing knowledge with people and not transferring to them the knowledge. There is a big difference between sharing knowledge and transferring knowledge. People like the knowledge that you share with them, but they don't like the knowledge that is dictated to them".* Similarly, INT33 elaborated more publications as a

256

means of disseminating lessons learned by emphasizing on the importance of publishing case studies *"Put the lessons learned as a case study and try to publish them through universities"*. Meanwhile, INT25 challenges the traditional ways of trying to share the lessons learned through seminars and workshops arguing that they are not effective: *"I actually don't think that these sessions are effective for many reasons. One, most people are just not interested, once you've averted a disaster and once you're beyond the disaster and you've dealt with it already, you know people are not really interested to see what happened. Two, human beings, in general, tend to fall back into bad habits very quickly. So, if you communicate this to someone today, it doesn't mean that they're going to not going to repeat the same mistake later on, in fact, you can almost bet that they're going to repeat the same mistakes"*. Furthermore, INT25 suggested institutionalizing systemic change to be able to properly capture the lessons learned: *"I think the best way to capture the lessons learned is by institutionalizing systemic change. So, your systems have to change as a result of this to be able to identify these reoccurrences, to be able to prevent them as much as possible, and to be able to deal with them when they happen again"*. Furthermore, INT27 highlighted the information gap between the high-level management and the people in the field as a possible barrier; in order to properly capture the lessons learned, you have to open dialogue to get the lessons learned from the people in operation: *"I think the best tool is you need as a decision-maker to go to the field and ask people about the lessons learned as they are the implementers of the response plans. They will be the best persons to tell you what the lessons learned are"*. Meanwhile, INT28 focused more on asking the right questions to the people that were affected by the emergent event to capture the lessons learned: *"You need to ask the correct questions. You need to know what you are looking at, and what you are looking for. So, you need to make sure that you ask the right questions to get the correct answers from the people who were affected"*.

Finally, INT37 listed participation, gamification, and visualization as three main pillars to properly capture lessons learned: *"Three things, participation, gamification and visualization. I am going to expand on each. Something happened it is good to involve everyone in capturing the lessons learned; social media networks, big data, algorithms based on Artificial Intelligence to collect data from everywhere and look at trends to see what happened. These are the components for collecting inputs of what happened. Therefore, this is a participatory approach. Second thing, how to make people participation interesting it is just through gamification things. The third thing is: you have to present the data in a visual way; it does not have to be reported, it does not have to be numbered; to keep things stick with people, you have to visualize the lessons learned"*.

Figure 5-47 and Figure 5-48 summarize the attributes highlighted by interviewees for this section. Interviewees think that proper documentation is required to adequately capture lessons learned. These documentations can be used as input to develop simulation exercises that will help the public sector employees to learn from the experience facing emergent events. Lessons learned can also be a learning tool across government organizations and even across countries. Root cause analysis should be done part of the lessons learned to identify the preventive actions to be taken.
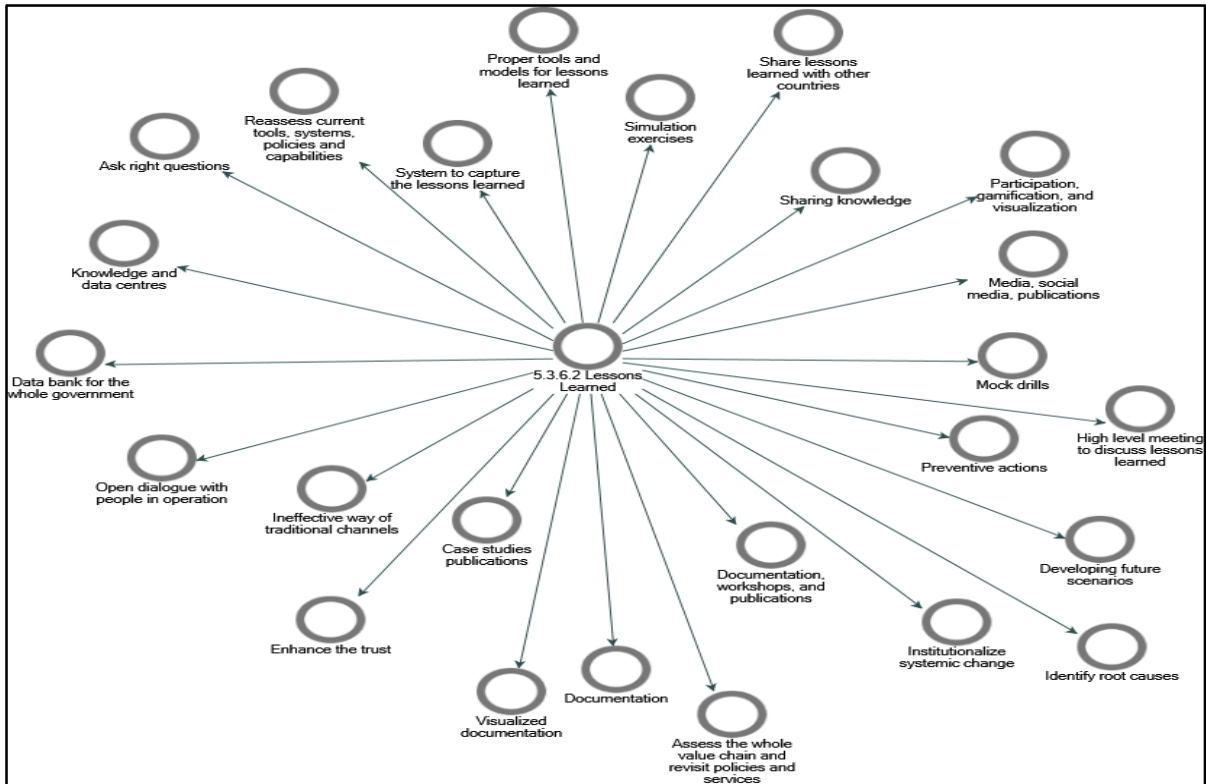
Figure 5-47: Identified attributes for lessons learned.
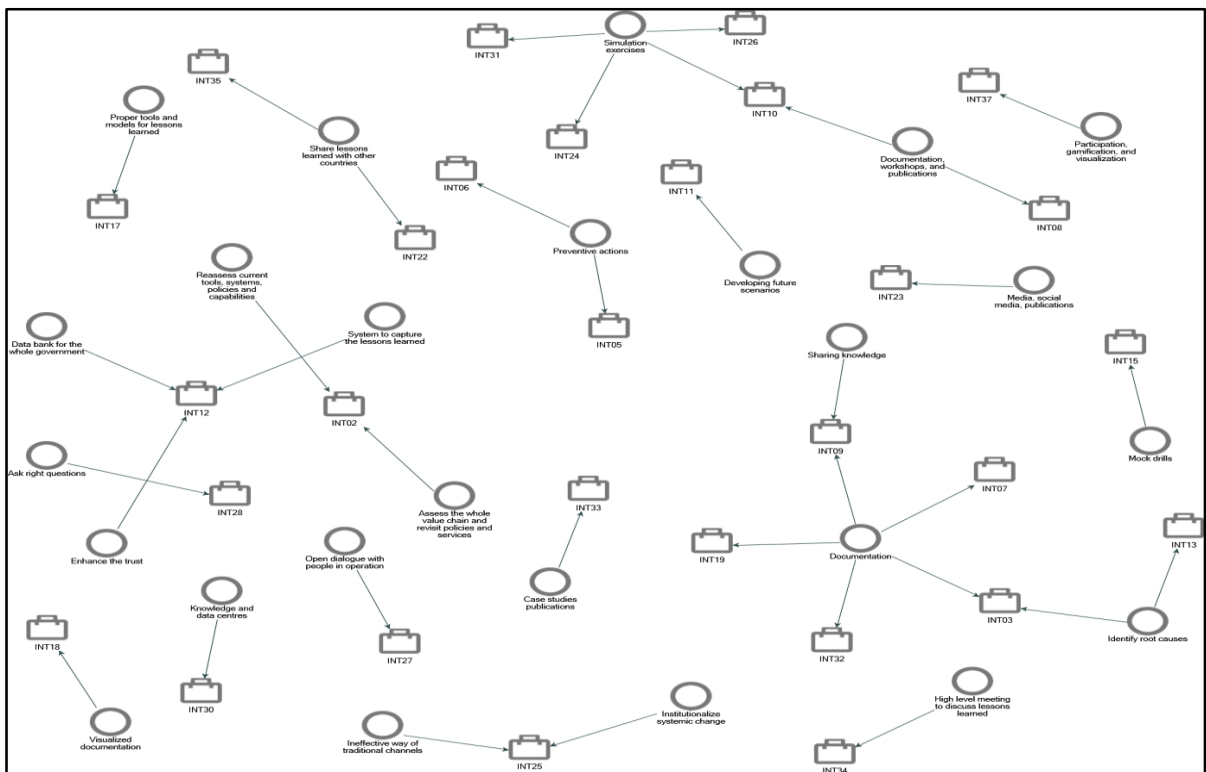
Figure 5-48: Identified attributes and interviewees inputs for lessons learned.

5.3.7   Theme Number seven (Resilience Measurement)

Figure 5-49 shows the hierarchical coding structure of theme number seven, which is resilience measurement. The findings of the data will describe the interviewees' points of view on the components of resilience measurement in the public sector and if a maturity model is a suitable tool for assessing resilience in the public sector.
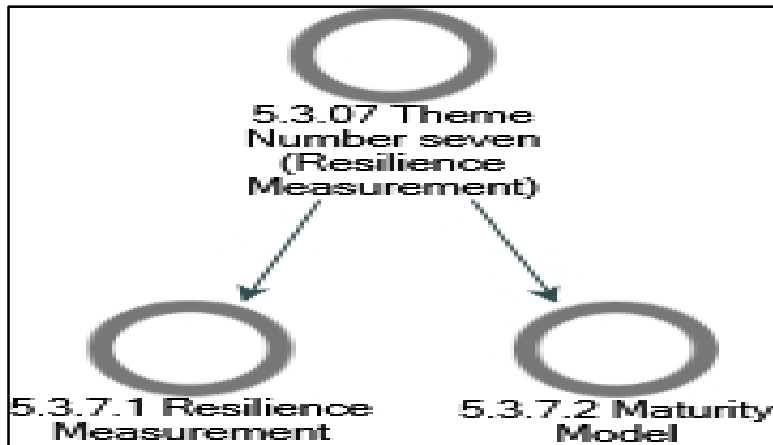
Figure 5-49: The hierarchical coding structure of Theme 7 (Resilience Measurement)

Resilience Measurement

The following section present the interviewees' point of view on how to measure resilience in the public sector.

INT01 highlighted that resilience could be assessed through measuring the institutional capacity, evaluating practices, and measuring results: *"Maybe if we want to measure resilience, we need to measure it as institutional capacity. You want to see if there are practices that were put in a continuous way to monitor and follow up trends. In addition to questioning the implication of these trends on processes, systems, and strategy of the organization. Second, you can measure resilience from the results achieved"*. Meanwhile, INT02 suggested having a dynamic resilience framework to be able to measure resilience in the public sector: *"So, you have your resilience framework that contains all the required tools. Then, there is an event that*

would emerge, which was not taken into consideration after that event, what you need to do is, you need to upgrade your resilience framework to make sure that next time you would capture similar events. Therefore, with this upgrade, you need to go back to assess your systems and your policies according to new or updated resilience framework". Similarly, INT27 highlighted that in order to measure resilience in the public sector, you need to measure the ability of the anticipation tools to predict an emergent event in addition to your response success during an emergent event: *"First, I need to measure the success of the tools which I have developed to predict the uncertainty or the unexpected event. The second one: I need to measure when these events happen, I need to measure the success of the response plan"*. Meanwhile, INT08 highlighted that the public sector needs a resilience framework to be able to measure resilience: *"First, you need to define the resilience framework. You may need to incorporate some measurement factors in the framework like the speed of response, agility in reallocating resources, and agility in changing systems, processes and policies"*. Similarly, INT28 highlighted also that we need to define what do we mean by resilience in the public sector before measuring it, *"What do I mean by resilience? How I define it? and how I am going to measure it?"*. He elaborated on the way of doing the measurement: *"What I'm measuring, and what are the components that I'm measuring. How are these components related to each other? the different relationships between these components, their occurrence rate (how often they occur), how serious they are whenever they occur, and the sensitivity of each of these components, then robustness, and then stability"*. Along the same line, INT34 emphasized defining what is meant by resilience in the public sector in order to be able to measure it: *"The first thing I need to define what I mean by resilience. So, when I say a country is resilient, what does it mean? Maybe we need to benchmark what resilience means in different places. Second, we need to identify what are the KPIs that make the public sector resilient; so, there could be*

a resilience index with the different KPIs and different weights". Furthermore, INT03 defines many variables to measure resilience such as measuring capability of people, measuring success of mock drills, response time, cost, the quality of decisions, and the performance in case facing events that were not put in the radar: *"Measuring if you have the right capabilities of people to deal with any event, measuring the success of mock drills, response time for any event, the cost of the responses and recovery, the quality of the decision making, and your performance when you faced something that was not expected"*. Similarly, INT04 listed three main components to measure resilience- current KPIs, time, and cost: *"I really believe there are three measures that you have to apply; One is your normal key performance indicators. Two is related to time to respond. The third one is the cost"*. Furthermore, INT24 thinks that resilience can be measured through identifying variations in the execution of strategy: *"As I said, just measure the percentage of variation of achieving your strategic plan that was influenced by an emergent event"*.

INT05 identified two main factors to measure resilience- events that were not part of the radar, and ability to absorb and adapt with the least cost and impact: *"I think number one is the percentage of events which we cannot observe. Number two is absorption and adaption of all of this with the least cost and the least impact"*. Furthermore, INT06 listed some of the KPIs that can be used to measure resilience: *"There are some KPIs measuring this: number of drills, number of sensors in the public sector, number of scenarios, and quality of scenarios"*. Similarly, INT07 thinks that there are many measures that can be used to measure resilience in the public sector *"Many measurements could be used to measure organizational resilience that may include: staff engagement, event awareness, decision-making, innovation, and sharing knowledge"*.

INT09 suggested measuring resilience through the three capacities: absorption, adaption, and transformative. He also recommended measuring resilience based on the hierarchy of the public sector- government as a whole, sectorial, and the government entity level: *"I would go back to what we have discussed about absorption, adaptation and transformation. If you take these three capacities and you measure yourself against them in case of an emergent event, then this is the first approach. The second approach would be measuring resilience in three dimensions: government as a whole, then you can go sectorial and then you can go at the entity level"*. Similarly, INT14 suggested measuring resilience using these three capacities: *"We can measure resilience by measuring those three capacities"*. Furthermore, INT34 highlighted that in the public sector you have to measure resilience in a hierarchical level: *"I think there should be a generic framework to start with, with a set of KPIs. The measurement starts from a macro level at a city level then at sectors cascaded down to entity-level"*. On the other hand, INT25 listed some examples of general high-level measures that can be used to measure resilience based on the three capacities: *"For the absorptive, you can use macro indicators, and if you're able to kind of maintain those macro indicators at a consistent level throughout, regardless of what is happening around you, then this could be a measure of absorptive capacity. For the adaptive, you have to look at how quickly you can recover from a shock without affecting your metrics for a long time. For the transformative; you need to basically measure how transformative your public policies are in shifting the curve up"*. INT14 added that there are objective measures when it comes to measuring resilience, but we could also have subjective measures through measuring people perception about the public sector: *"But the reality is that there are going to be things that are not on your radar. If there are things that are not on your radar that are happening, maybe you can measure resilience subjectively through getting people's opinions; their confidence levels in general and you can have indices on happiness and confidence"*.

263

Similar to INT14, INT37 thinks that to measure resilience you need to have both qualitative and quantitative measures: *"Through three factors two are quantitative and one is qualitative; the first one is to measure the monetized cost and of course the less, the better, two it's the time between the event and bouncing back. Therefore, a kind of composite measure between financial impact and the time of response is the measure of resilience and of course, the widespread effect, this could be another financial measure. On the qualitative side, I think it should go with the perception of people, and by this measure you validate your initial thinking of what resilience is".*

INT10 suggested having a matrix to measure resilience based on measuring the impact and the cost: *"You can measure it by measuring the impact and the cost, and you could have a matrix for that for an emergent event that happened. Or, you can measure them against a simulated event that may happen; how much it costs the government, either tangible or intangible, it means a direct cost or indirect. Indirect something similar to impact the goodwill, your reputation, etc.".* Similarly, INT11 suggested some measures for resilience pre and post an emergent event: *"To measure resilience, time is a basic measurement which is the time to recover. Nevertheless, this is post. Pre-measures, you can use readiness testing results, simulations or drills results".* Furthermore, INT13 suggested having a general measure for resilience in the public sector which is the wellness of society: *"The measure would be on the overall impact on the wellness of the society. What I meant by the wellness of society is the ability of the government to provide an environment where society continues to flourish".* Meanwhile, INT29 suggested focusing on sectors when we need to measure resilience at the public sector: *"So, it's more sectoral, more related to the sectors such as economy, health, and technology".* Furthermore, INT35 suggested customizing international KPIs for resilience to

suit your specific situation: *"The KPIs for resilience in the public sector can be extracted from international indicators that define the resilience ranking for each country"*.

INT15 suggested measuring resilience through assessing the quality of the business continuity plans: *"Resilience can be measured by the ability of the public sector to face and standstill in front of an event without being affected or with the least damage. The more comprehensive business continuity plans you develop, the more flexible and resilient your systems will be, and the more you can survive from emerging events"*. Similarly, INT30 highlighted also that most of the resilience measures could be extracted from the business continuity models: *"A business continuity model has a lot of checklist points to ensure that resilience model is in place"*. On the same page, INT31 also thinks that to measure resilience, you have to measure preparedness and there are usually measures within the business continuity system or other ISO systems for that: *"So for example, the training related to preparedness or trained people available in the government authorities, the technological systems available, the communication pathway available. I believe that there are relevant measures you can extract from business continuity standards or some other ISO standards that are related to this topic"*. INT16 highlighted the difficulty of measuring resilience without having an emergent event, as your measures will not be accurate: *"So, unless that event has happened, this is when you can really test how well you reacted, and so that gives you the opportunity to learn and to see how far you've come"*. He added that simulation measurement could help, but to a certain extent and this will not give the full picture: *"Simulations would help at least to identify the obvious shortfalls, but you won't really know, because the thing about emergent events is that you don't know where they will come from. So, it's very difficult to prepare for them, and to measure your preparedness against an event that you don't know what it will look like"*. Similarly, INT20 highlighted the difficulty of measuring resilience without an emergent event *"If a major event happened to the public*

sector, and they recovered, then they can measure resilience according to their performance against the event. But organizations that never had an issue before or any disruptive event before, they didn't have anything to measure, and they can't measure their actual resilience". In a similar vein, INT22 thinks it is challenging to measure resilience without an event. Alternatively, she suggested having some measures related to readiness, but she thinks this will not give the full measurement overview of resilience: *"You will never know even if you will measure your readiness without an event. You will not get the full readings unless you live the event".* Furthermore, INT23 thinks that it depends on the emergent event itself, but there are general KPIs that can be used to indicate if the public sector is resilient or not: *"As I mentioned, it depends a lot on early incidents because this verifies whether we are capable of facing the new incident or not. However, we can measure our preparedness plan and scenarios. For instance, the more scenarios we have, the more resilience we will be".* Also, she also added some resilience measure to be used to see if the public sector is resilient or not: *"You can measure them. For example, the government's history you can measure it by the number of unwanted changes or the severe incidents that took place in five years or ten years, so you have to list the number of incidents, and you have to list the degree of success or failure from these experiences. If we were talking about public awareness, you could measure it by questionnaires. You can even evaluate it by the number of workshops, the number of media programs that are directed to raise or to enhance the awareness of the people. You can look at your resources, and you can assess the current situation. How many executors' you have, the number of experts you have. How many experts can you approach easily when needed?".*

Meanwhile, INT17 identified some leading and lagging KPIs to measure resilience: *"We have two ways of doing it; leading and lagging KPIs. The leading KPIs are used to predict if I am resilient or not. Then lagging after the events; I measure the impact and whatever happened,*

and I judge my status based on that". Similarly, INT19 suggested also to have leading and lagging KPIs to measure resilience *"You need to have the leading and the lagging indicators; lagging indicators will be my previous responses to similar events or to other disruptive events and how successful the public sector was in responding or in managing or in mitigating these situations. The other part, the leading indicators, which are very critical, it's a type of pre-control measures, where you measure your readiness, you measure your maturity, you measure your capabilities or the level of maturity of the capabilities that you have"*. In addition, INT18 thinks that the public sector should have two sets of KPIs- one that is related to measures the readiness, and the other related to measuring the public sector performance in response to the emergent event: *"I think we need to measure resilience, to see our readiness, to have that ability to deal with emerging events. One way to measure it is through drills. The other KPIs are related to our effectiveness in how we dealt with certain events"*.

Furthermore, INT21 expressed concerns about the effectiveness of drills as people are not taking them seriously. He suggested having a controlled event that is communicated only within a certain staff of top management to test the system readiness: *"What they did was that the senior level management decided to do a penetration test of the IT system without informing the IT people. They measured the vulnerability of their systems by appointing an external company to do that"*.

Figure 5-50 and Figure 5-51 summarize the attributes highlighted by interviewees for this section. Interviewees' think that resilience can be measured by assessing the quality of business continuity plans, absorptive, adaptive and transformative capacities, and based on readiness testing through simulations or test results. They have also identified three levels to test resilience in the public sector (the whole of government, sectors, and organizational level). The interviewees highlighted the importance of defining what resilience in the public sector means

first before trying to introduce a measure. They also suggested having leading and lagging indicators to measure resilience, and they have suggested a list of various measures such as impact, cost, and recovery time. Nevertheless, some interviewees think that it may be difficult to measure resilience without assessing the performance in a real emergent event.
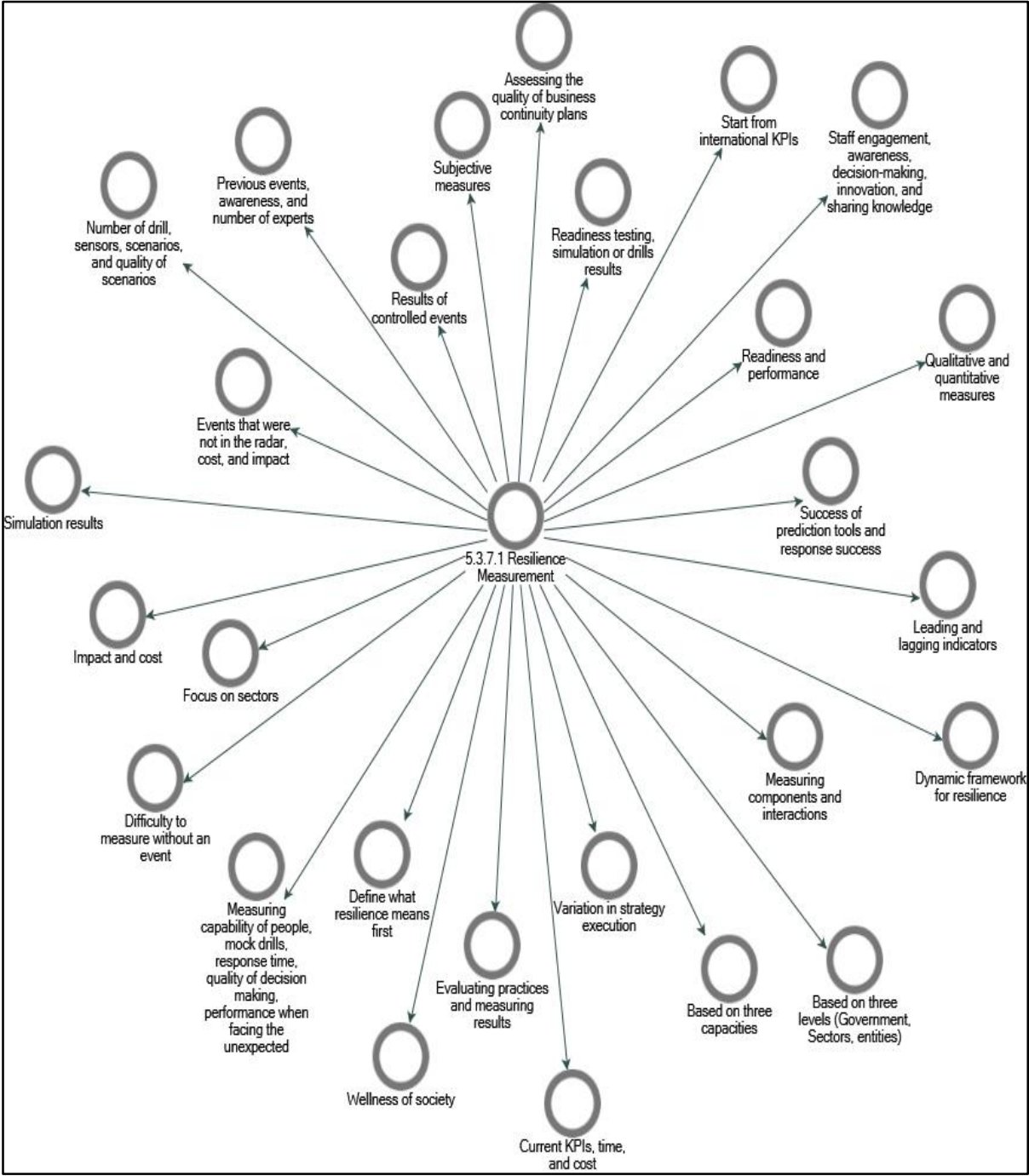
Figure 5-50: Identified attributes for resilience measurement.
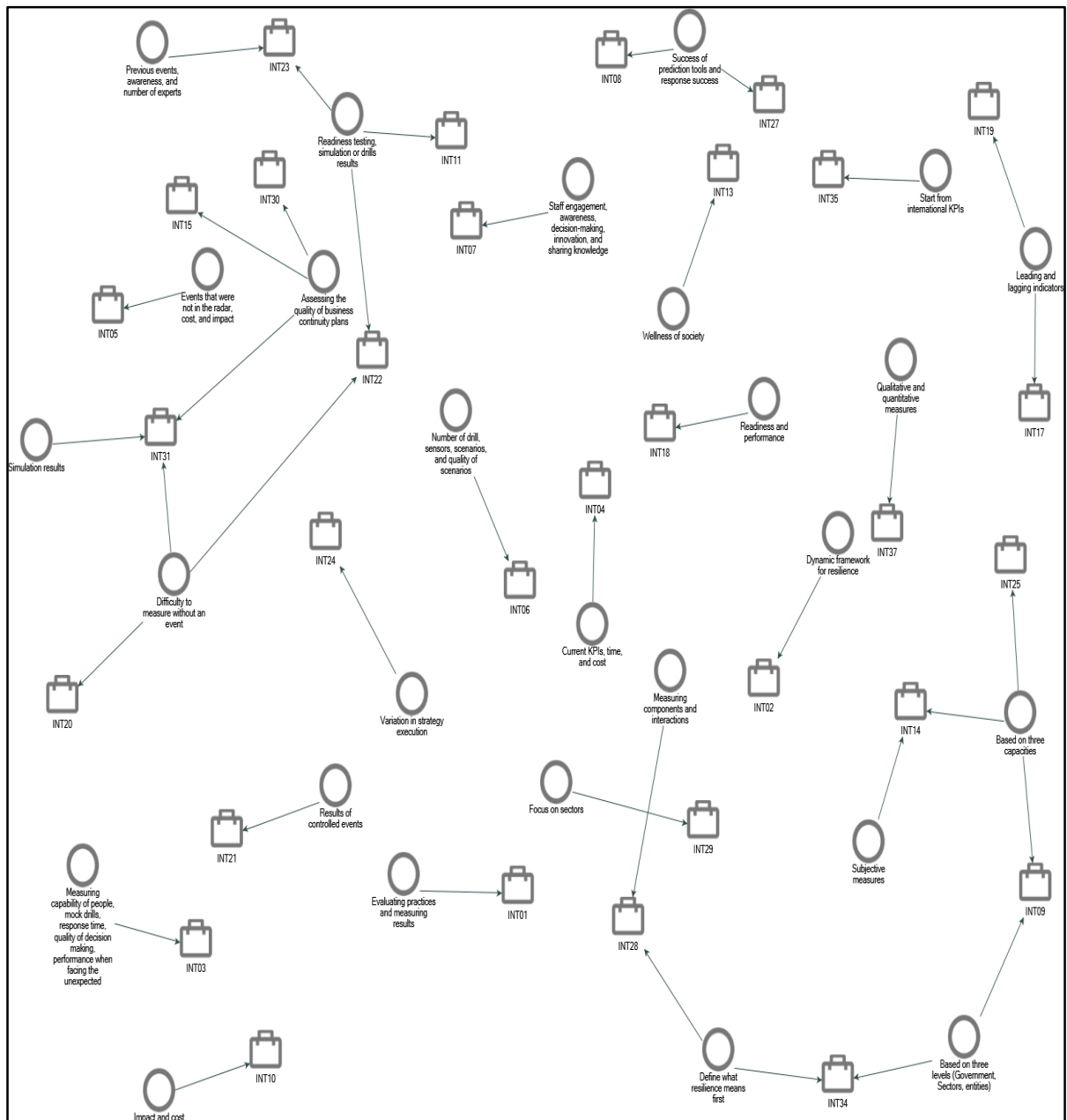
Figure 5-51: Identified attributes and interviewees inputs for resilience measurement.

Maturity Model

The following section presents the interviewees' insights about having a maturity model or a scale in the public sector to evaluate where the public sector is standing in terms of being resilient.

INT01 believes that having a maturity model for resilience in the public sector is a must and not an option, but this maturity of resilience can be embedded with other existing systems, and it is not recommended to have it as a stand-alone system: *"I think the idea of maturity is not an option, it's a must in my mind. However, I think that such maturity needs to be detecting resilience in the current operating system and not to have a system or a separate organizational system called the resilience operating system or resilience maturity system or criteria or sort of that thing"*. Nevertheless, INT05 thinks that there should be a separate system for resilience maturity in the public sector: *"I don't think there is a system to measure resilience in the public sector now. So, we need to build this maturity system, and it should also be levels in the maturity ladder"*. Along the same line, INT17 thinks that it is helpful to have a maturity model for resilience while embedding a self-assessment tool within that model: *"It is helpful; because it is good to have a ladder of resiliency levels that can help the government entities to build up or to climb up of this ladder. I suggest having something like a self-assessment tool within this ladder, so they can ask themselves the questions, and based on the answers they will position themselves in the different let's say 5 levels or ten levels of resiliency. Then based on the outcomes, they can score themselves, and they can improve and move to the upper level and so on, until they reach the maturity stage"*. Similarly, INT19 supports having a maturity model of resilience at the organizational level in the public sector. He also elaborated on the levels and on the parameters to be included within this maturity model: *"Usually there are many examples of assessing maturity, and I believe in the five-level approach as it is the most appropriate. Therefore, you start with level one, which is the most basic, and level five as the most advanced. I believe it should be something that will show you your current situation and will give you some type of recommendations on what needed to be done in order to reach the next level. Now, when it comes to the components that you need to assess in the maturity model, you have to*

consider all parameters such as people, tools, systems, procedures, and processes". Furthermore, INT20 supports having a maturity model based on best practices and international standards: *"Implement a kind of basic best practices, like an ISO standard and any kind of international standard available in the market that you can measure how resilient you are, or based on what kind of business standards that you can use. Therefore, we have the exact maturity level, and this may be part of your strategy"*. Similarly, INT23 supports having a maturity model to have the basics understanding of what is going on: *"It is very important to have a maturity model, because this will be one of the documents that you can look into in case the need arises instead of starting to draft it, you'll be having it already. It might not be very implementable, but at least you have the basic information that you can change or update or set as you go on"*. Similar opinions about the importance of having a maturity model were also indicated by INT14, INT15 INT28, INT29, INT30 and INT35.

On the opposite side, INT02 does not think that resilience can be measured through a maturity model, as it is more of a dynamic nature: *"I think a scale would make you a bit of static. I think for resilience, you have to stay dynamic. You cannot say I am now 60% of resilience. You are 60% resilient, according to this framework, that is the risk we know now. But if we agree that this framework is updated all the time, then you can't put a scale, or you can put the scale, but it will become obsolete by the time if you want to make sure that you are dynamic"*. Similarly, INT08 thinks that the public sector is not mature enough to have a maturity model for resilience, as we should focus on building readiness first, and after some time when things get more mature, then we can have a maturity model for resilience: *"I think as a first stage, you need to measure the readiness of organizations for the resilience, because the concept of resilience maybe it's still not mature. Therefore, maturity as a whole, you will not be able to assess now for governmental organizations or public sector organizations. Nevertheless, what you need to*

271

emphasize on is their readiness for being resilient. Therefore, I think that you have a kind of measurements that is related to readiness as maturity, which is more concentrating on how to use capabilities for readiness to achieve results".

On the other hand, INT09 thinks that at the organizational public sector level, we are not mature to have a maturity model for resilience and we should focus on readiness: *"I think as a first stage, you need to measure the readiness of organizations for being resilient. The concept of resilience, maybe it is still not mature yet, and for maturity, you will not be able to reach now to a good number in maturity for the governmental organizations or public sector organizations. But what you need to emphasize on is their readiness of being resilient".* Furthermore, INT12 highlighted the difficulty of having a maturity model as there will be too many changes to any resilience model. In addition, it is difficult to have a static maturity model for resilience: *"Maturity model or a scale, I think it is not possible or very difficult, even if you put a model, this model will be highly sensitive to many changes in the external and internal environment and accordingly you can't have a maturity model".* Similarly, INT25 highlighted that theoretically, we could have a maturity model for resilience. However, in practice, it is challenging to implement it, as the highest maturity is associated with results that cannot be assessed effectively: *"I think theoretically, you can do it. I do not know if we have enough data to be able to do it right now, because you cannot define it. So, let us say you are at level one resilience if you have certain processes and tools in place. You could be a level two resilience if you are somehow implementing these tools. Therefore, not only you have your tools designed, you are someone who is also using those tools, and maybe you can be at level three if you are achieving results with those tools. The first two are easier to measure because they are quality processes. The third one is tricky because it is results based. So, it's a good theoretical exercise, but it's probably too early to be able to implement".* Furthermore, INT27 highlighted that, it

could be practical to have a maturity model for resilience if we are quite sure about what will happen tomorrow, so this will be an unfeasible task: *"It will be practical only if you are hundred percent sure about what's going to happen tomorrow, which is not going to happen. So, I don't think that you can say that I have reached some sort of maturity level"*.

Furthermore, INT09 added that it is difficult to have maturity model for resilience at the organizational level, rather, this should be applied to the government as a whole: *"So, if you have the answer to all of these, then you can see the government as a whole if it is resilient or not, if you responded to more than 80 per cent of the events properly, and you fix stuff, then you are a strong government"*. Similarly, INT13 is with having a maturity model for resilience at the government level only *"I would suggest making a one government resilience maturity model"*. Meanwhile, INT18 suggested assessing maturity at a sector level and not for the whole government: *"I think this practical to do on sectors level, and then these sectors can learn from the maturity level of each other"*. Similarly, INT37 highlighted the need to have the resilience maturity on the level of the whole of government only: *"I think this maturity model is for the whole of government, as once you break it down, you will come down to various streams that are different. For instance, the resilience of a health care facility is different from the resilience of an economic body. That's why we should leave it as a whole of government"*.

On the other hand, INT21 highlighted that maturity of resilience could be done at the sector level, and the entity level and we can also use simulation of events to assess maturity. He elaborated more in having simulations of a specified event or scenario to be implemented on another sector: *"You need to assess the level of resilience in each sector, and then in each and every entity of that sector. For example, at the government entity level, you look at which one of the entities is more resilient and which one is not, based on that they have put in place their strategies to deal with emerging events. However, at the end of the day, once you simulate a*

major event, you can assess where we are now, and you can put the plans to move to the next level. I think one of the interesting things if you take a certain scenario from one sector and put it in another sector and see the simulation outcome". INT34 thinks that we can have maturity level for resilience at three levels- city, sectors, and at the government entity level. Then we can identify how they work together to achieve an overall resilience index: *"I think if you have an overall resilience index, there should be a generic framework to start with, with a set of KPIs. Then we start from a macro level at a city level, then sectors cascaded down to entity-level".* Furthermore, INT34 elaborated on the components of the maturity model in the public sector *"I think the maturity level should also be correlated to your resilience. So, for example, let us assume I am a mature government, my systems and my processes and my people should be in place to ensure that my index is high. Whereas, if I don't have the right kind of enablers in place, automatically my resilience will be low, in that case I need to investigate in the causes".* INT11 believes that having a maturity model will have pros and cons; the cons will simply be having superficial views of things, and the pros will be it is easy for people to understand: *"Now maturity in general in measuring any system, it has two sides a drawback and a positive side. The drawback back is that you just have a very superficial look at the system performance, but the positive thing is it can be captured very fast by everyone, and they can understand it easily".* Furthermore, INT06 highlighted that in the public sector, we have too many models and any resilience model should be integrated with other systems and incorporated under one governance model: *"Coming from excellence background, I don't believe in making a model for each management concept in the public administration. But I believe that resilience system and its maturity should be incorporated in the governance model of the government entity".* Meanwhile, INT16 suggested assessing some parameters as part of evaluating resilience in the public sector: *"Well, I don't know if I have an answer to should we have a maturity model or*

274

not, but one area that governments are looking at is: how do you move away from the silo mentality? So, how do you create a knowledge sharing across government bodies? How do you allow people from different government bodies to speak to each other to share information and knowledge and experience? How do you allow people to access expertise that's already there and the expertise that's present outside the government? So, a lot of knowledge sharing tools would be important to assess the maturity of resilience in the public sector".

Figure 5-52 and Figure 5-53 summarize the attributes highlighted by interviewees for this section. Some interviewees think that the public sector should have a separate maturity model for resilience different than the other maturity models that are existing for other systems. Some interviewees believe that the maturity model should be restricted to the whole of government only, and it is not advisable to have it at the organizational level. Other interviewees believe that maturity should be restricted to assess readiness only as there is no sense of having a maturity of results that are difficult to assess. Another point of view expressed is to embed the maturity of resilience within the existing management systems that are implemented in the public sector. Nevertheless, some interviewee believes that it is difficult to have a maturity model for resilience due to its dynamic nature.
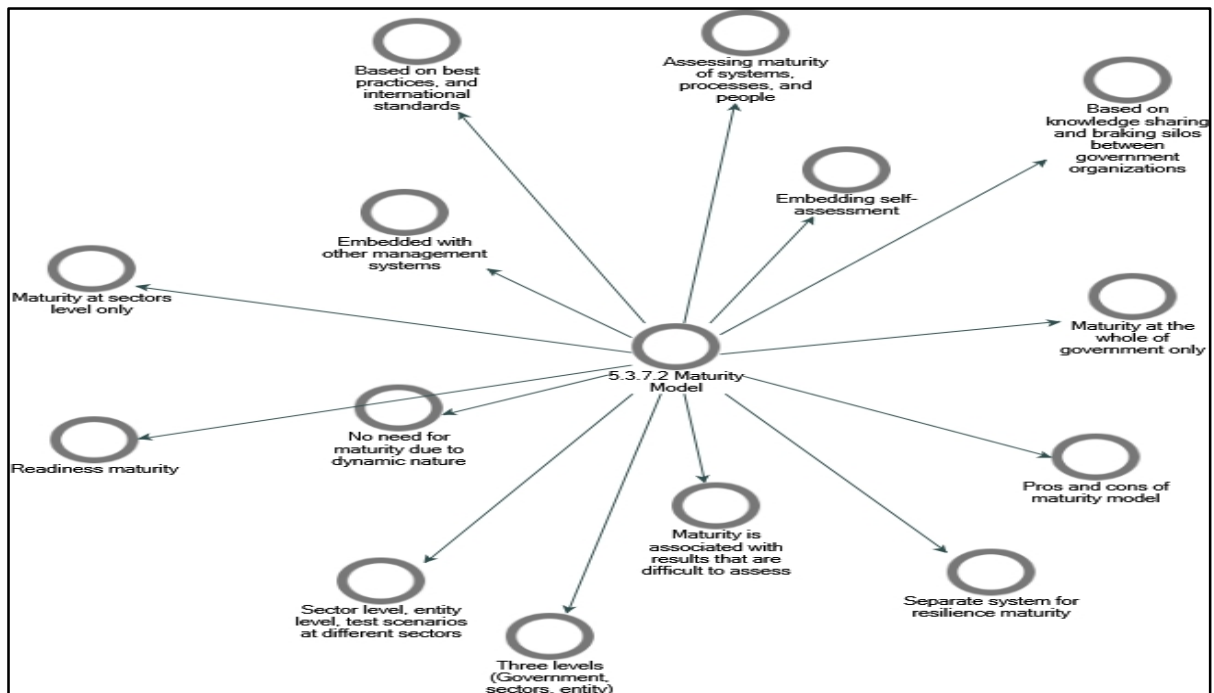
Figure 5-52: Identified attributes for maturity model.
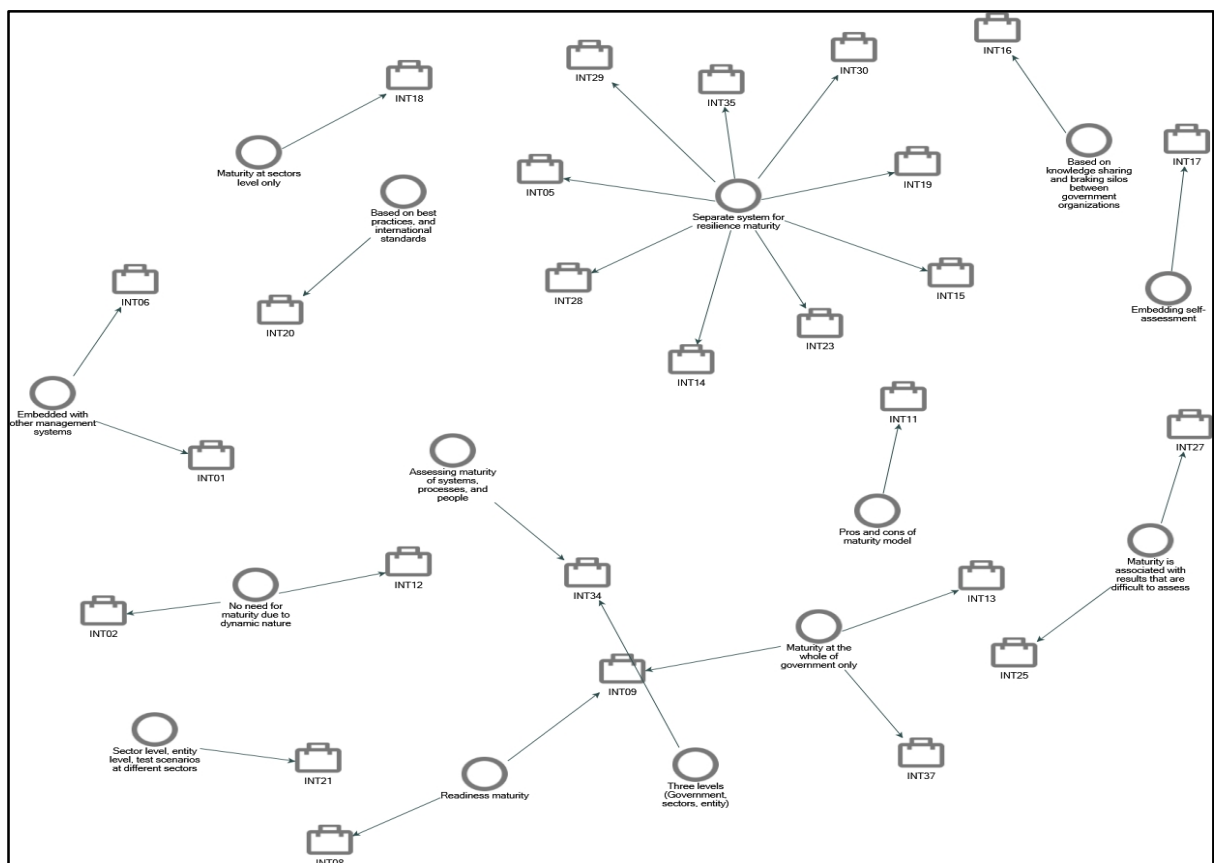
Figure 5-53: Identified attributes and interviewees inputs for maturity model.

276

5.3.8 Theme Number Eight (Turning Challenges into Opportunities)

Figure 5-54 shows the hierarchical coding structure of theme number eight, which is turning challenges into opportunities. The findings of the data will describe interviewees' insights about how the public sector can encourage the positive thinking of turning challenges into opportunities. This will also address the enablers to facilitate this transformation and the barriers that are preventing this transformation.
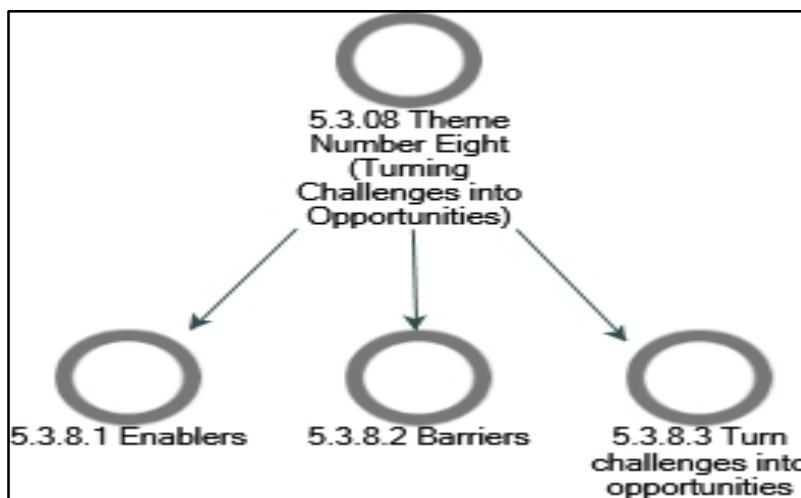
Figure 5-54: The hierarchical coding structure of Theme 8 (Turning Challenges into Opportunities).

Enablers

The following section presents the interviewees' point of view on what enablers the public sector should have to be resilient or to be able to turn disruptive events into opportunities. INT01 thinks that to identify the enablers of resilience, we should enable proper engagement of different stakeholders: *"Engaging internally and engaging externally; engage with all your stakeholders, try to have a better understanding of what's happening, and why it is happening. Try to engage internally to see how we can respond to that and in which level. Start from there to open dialogue of how we can turn this into opportunities"*. Meanwhile, INT02 is with utilizing the current tools the public sector is using to become resilient in order to identify the

opportunities: *"I think there are the same tools; the same tools you build to become resilient to events will enable you to capture the opportunities that come from them"*. Furthermore, INT06 identifies some internal and external enablers for the public sector to be resilient: *"The external is, to have a good reputation of the public sector organizations such as having integrity, having corporate governance, doing what the public wants. This will be reflected later on when the public supporting this organization in any emerging event. Within the organization, the leaders should have good communication with their people. They should have a good team structure to enable working as one team. We have to have a good organizational culture that would help you when you want to change"*. Meanwhile, INT15 thinks that to be resilient we should focus on people, systems, adopt best practices, and leverage communication channels: *"Government shall invest in building its people capabilities, establishing management systems, adopting best practices and keeping open communication channels with other governments to stay updated with what's happening worldwide"*.

INT07 believes that the public sector should have flexible strategies to be resilient: *"The public sector organizations should have proper leadership, flexible strategies and flexible organizational charts, and talented human resources to turn disruptive events to opportunities"*. Furthermore, INT08 thinks that the culture has an important role in enabling resilience and in turning challenges into opportunities: *"The culture that we have in the public sector should look at any disruptive event as a positive change and opportunity, not only as an obstacle that may face us"*. Similarly, INT27 thinks that it is all about the culture: *"I think it's about building a positive culture within the public sector; the culture can imply good communication, empowered human capital, and influencing leadership who can walk the talk"*. Furthermore, asides culture, INT08 identified other enablers like technology, processes, and people: *"I think those main enablers are also technology, processes and people, these enablers*

278

we need to take into consideration while we are designing our resilience. For instance, we need to recruit the right people who has the positive energy and who has the positive tendency while they are working under pressure within teams". Similarly, INT10 emphasizes having cross-functional teams to enable resilience *"Same thing for resilience, you can have the same thing which is to have cross-functional teams"*. Furthermore, INT11 highlighted the role of leadership to enable resilience: *"I think positive leadership is one of them"*. He also highlighted the importance of designing the systems within the public sector to be robust from the onset: *"Resilience operation wise, it means that you have a robust system which was designed for resilience. Design for resilience means that you don't design to solve the problem or to get a service only, but you incorporate all the design details and all the requirements to make sure that your system is ready if something happened and it can change easily"*. Furthermore, INT12 highlighted leadership as a main enabler of resilience: *"It depends on the leadership. I think this is one of the most important enablers"*. He added another two enablers, which are research and development and proper plans *"Other enablers: to establish research and development part of your public sector operations and also to have well prepared plans"*. Similarly, INT31 emphasised the role of leadership to have a resilient public sector: *"We need strong leadership; we need such type of leadership that really can transfer the scenario, take the advantages, and transfer the negatives into positives"*. Furthermore, another aspect, which INT12 emphasised on, is sharing knowledge and enhancing transparency across government entities: *"In addition to the data centres or information centres to share knowledge and the lessons learned. So, we have to be fully aware and transparently share the knowledge between all the entities"*. Furthermore, INT24 emphasised having good planning, transparency, and people who have awareness and recognize the need to be resilient: *"Good planning, the awareness level of the people, and transparency"*. Similarly, INT34 emphasizes awareness: *"Awareness at multiple*

279

levels; the awareness of the importance of being resilient, the awareness of the magnitude of the impact if not acting, of not being adaptive, and not being proactive and flexible enough. The second thing we need a roadmap for being resilient and within our roadmap, we should identify what it takes us to be resilient; the people, the processes, the systems in place and the structures that we need to have. Finally, we need to mobilize resources within our roadmap". Meanwhile, INT13 emphasizes having a success story to show the people that challenges can turn into opportunities: *"They should start to see a success story first. If people do not see a success story, they will not believe you. So, there should be a success story and distilling the elements of a success story of a negative event that was utilized to become a positive event".* Similarly, INT22 thinks that to be resilient, the public sector needs to change the mindset of people and this can be done in several ways: *"Changing the mindset of people is really difficult, but there are different techniques that we may consider such as awareness, campaigns, sharing lessons, and give them more incentives to do that".* Along the same line, INT23 thinks that the mindset change is an enabler for resilience. She listed other tools to change the mind-set beside the tools that were highlighted by INT2:2 *"Government workshops and seminars that have to focus on changing the attitude of the people who are by nature reluctant to change. It's all about educating the people".* Furthermore, INT26 highlighted that to change the mindset of people; we need strong leadership: *"This should be from the leaders. For example, if leaders are spreading positive thinking and grasping opportunities from challenges, then people will believe in him/her. So, changing the mindset of people should be from leaders".* INT36 thinks that changing the mind-set can be done through empowering people: *"You want to empower the positive thinking of workforce to allow them to understand and internalize their own thinking with the situation, and to put forward their recommendations on what opportunities may be arising out of a situation like this".* Furthermore, INT37 highlighted that, you need

people with imagination to be able to turn challenges into opportunities: *"People with a power of imagination, but they should have their feet well-grounded, someone who is pragmatic, but not actually focused on that, but also focus on the silver lining, you need that skill. You need people who address things in a realistic pragmatic manner, but people who still see the silver lining which means that people with an outlook to grasp opportunities from disasters"*.

INT17 emphasized the role of leadership and trust to enable resilience in the public sector and enable turning challenges into opportunities: *"When we come to the positive or negative thinking it's psychological, and it depends on the leadership way and style, how they can build the case and gaining the trust of the government entities, government leaders, and the public to show that the change will not negatively influence them. Change is good for them"*. Similarly, INT18 emphasized the role of leadership: *"Absolutely, we need a leader that sets clear policies to be followed by everyone, and that has the binding power between everyone, this is essential"*. Similarly, INT21 also emphasized the role of leadership and having a robust technological infrastructure for the public sector to be resilient: *"Yes, proper leadership is a key element. Additionally, technology is a major enabler, because you're going to build simulations"*. Furthermore, INT19 focuses on having a proper reward system for people who identify gaps, in addition to having appropriate communication to be resilient: *"If you identify an area where something can be enhanced, you should be rewarded for that. It is not about just achieving great results or achieving targets and painting the situation in a bright manner. So, we need to encourage people who are communicating the right information at the right time, and I believe this is what resilience is all about"*. Nevertheless, INT20 emphasized the culture, leadership, and the work environment to enable resilience: *"I believe the first one is changing culture. It is very important. Therefore, when a challenge happened, we do not want to finger point to each other, we should listen and learn what went wrong and try to improve. The second one, I believe*

strong leadership. The third one I believe is the workplace environment for the government". Similarly, INT25 highlighted the role of leadership and the importance of culture to be resilient and to change challenges into opportunities: *"A lot of it comes from leadership. I think also being able to kind of establish a positive culture in the government helps a lot to actually turn the challenges into opportunities with a real-life example of implementation"*. On the other hand, INT29 identifies enablers for resilience, and from his point of view, it is about having the expertise, proper information, leadership, communication, and collaboration: *"One of them will be having the right expertise. The second one will be having the right studies, analysis, and reviews. The third one will be the right leadership skills related to emergency or dealing with emergencies. The fourth one will be the correct communication, internally and externally. The fifth one will be a collaboration with the stakeholder, or as we should call them partners. Of course, to be able to react correctly with an emergency you need to collaborate with other governmental entities and collaborate with the private sector"*. Similarly, INT35 emphasizes the importance of different partnerships to enable resilience: *"As I mentioned, if you have a good partnership with the private sector and international bodies, you will have the flexibility, and you will have strong enabler to extract opportunity from the event"*. Furthermore, INT30 highlighted the importance of modern systems, regulations, and policies to be resilient: *"If you don't relook at the systems, regulations and policies, you will not be able to take advantage of the opportunities within an event, and these opportunities could go to another government"*. INT14 thinks that to be resilient in the public sector, we need to focus on the infrastructure and the policies: *"That means future readiness in terms of infrastructure. Therefore, your infrastructure needs to be smart, which means that any infrastructure that will be used in the future, you need to embed information technology component within it. Also, you need to have*

a resilience component by each government policy or new initiatives that will be implemented in the future".

Figure 5-55 and Figure 5-56 summarize the attributes highlighted by interviewees for this section. Interviewees think that the most important enabler for resilience in the public sector is leadership. They also believe that the culture and having an open-minded people are key for enabling resilience.

Figure 5-55: Identified attributes for enablers.
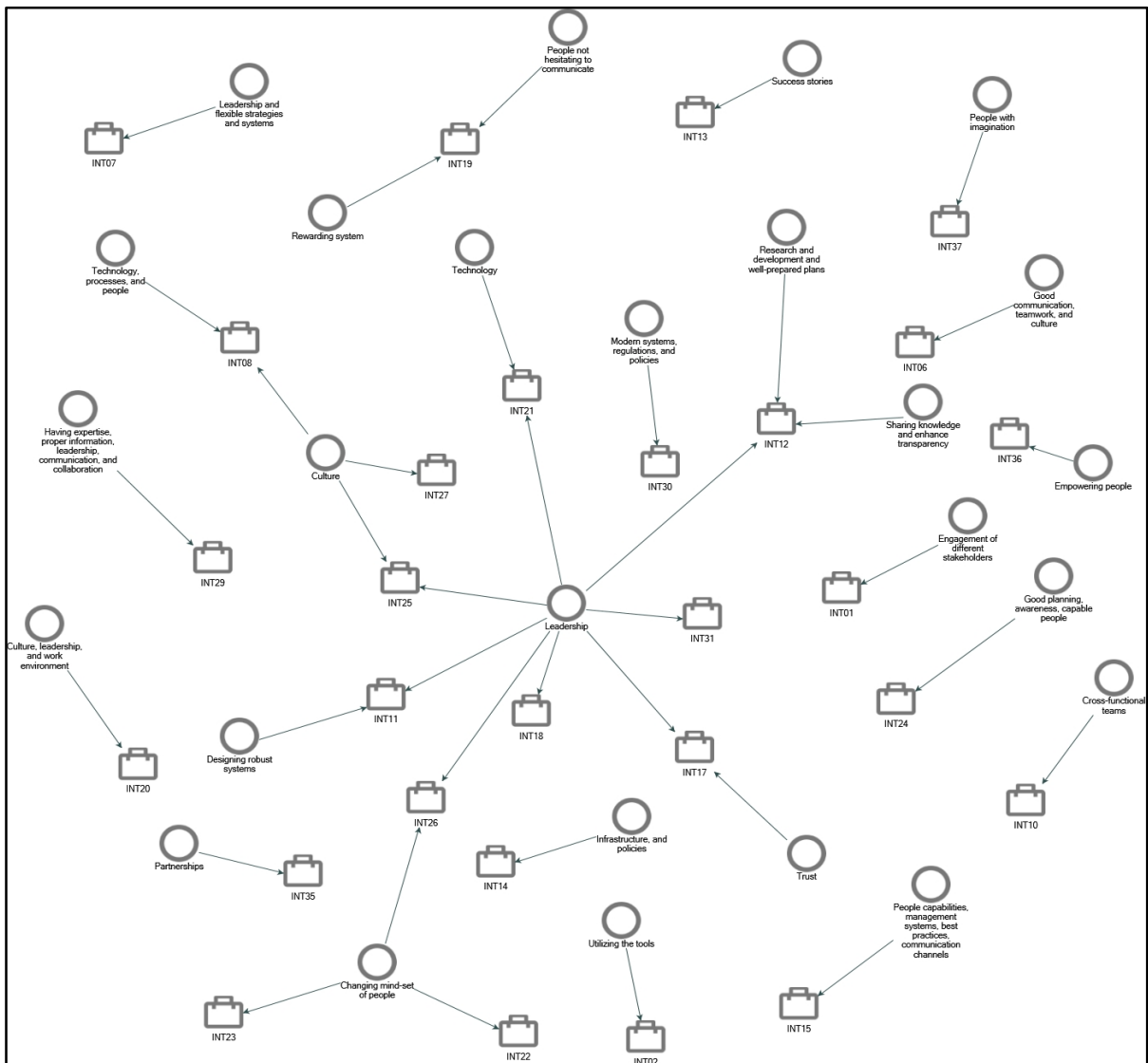
Figure 5-56: Identified attributes and interviewees inputs for enablers.

Barriers

The following section present the interviewees' point of view on what are the barriers in the public sector that prevent it from being resilient.INT01 listed three factors that are preventing the public sector from being resilient: fragmentation of recognition, bureaucracy, and the capability of people to understand and respond properly: *"I can think of more than one factor. The first factor is the fragmentation of recognition because of the traditional structure of the*

284

public sector. The second thing is really the bureaucracy in governments as traditionally it has been built on doing what you are doing better, more than questioning the value of what you are doing. Third, I think it is the capability of people to understand and to respond. People in the government mostly not tend to change; they tend to do whatever they are doing in an efficient way rather than trying to change and react effectively". Meanwhile, INT02 emphasised on the bureaucratic structure in the governments, which makes the change process slow: *"The structure of the government that is going slow".* He also emphasised on not being able to grasp the opportunities due to the fear of culture change: *"I think the biggest barrier here is the culture and the fear of change, which will never succeed, because change is inevitable".* Similarly, INT05 highlighted the fear of change and change resistance as the most important barrier for the public sector to be resilient, in addition to the level of awareness of people: *"The most obvious barrier is people hate to change; the change resistance, the fear of the unknown. Also, the awareness of people that should be up to a certain level".* Furthermore, INT04 thinks that the only barrier is the mind-set of people: *"Your mindset, that is the only barrier".* Similarly, INT31 believes that the mindset is the most critical barrier: *"I won't say a negative mind-set; rather, I would say they have a lower level of positivity, a lower level of imaginative thinking, and positive thinking".* Meanwhile, INT06 emphasized the culture: *"The barriers mainly in the culture".* Furthermore, INT07 emphasized the operational model in the public sector, in addition to the current legislation, and the level of awareness: *"Changing operating models in governmental entities need more time to get the required approvals, as it is related to legislations, laws and bi-laws that needs more time to be modified. Besides that, the concepts of resilience are newly introduced in the public sector, and the need to have specific roles/units to deal with this concept".*

INT07 also emphasised the structure of the public sector organizations as it is vertical in nature and not flexible enough, in addition to the availability of budget: *"I think that the main barrier is the vertical structure of most of the government organizations. The flexibility in the organizational structures is not there. If you need to have dynamic or agile allocation of resources, you cannot have this within vertical organizational structures. The other point is allocated budgets for our governmental organizations; this is one of the main constraints or barriers that may affect the organization on adopting these enablers. Because if you need to invest in technology, you need money. If you need to select the right people, you need to pay a good salary for them"*. INT09 identified three factors that can be considered as barriers to building a more resilient public sector. He highlighted the lack of responsibility and accountability, absence of resilience framework, and lack of cross-departmental coordination as main barriers against resilience in the public sectors: *"First of all, the barrier I could think of is lack of responsibility and accountability; if you are not responsible and accountable for your outcome regardless of what event happened, resilience can't be achieved. The second barrier, I would say, is the absence of a framework. There is no clear framework about what do we mean by resilience, how it is defined and what is expected from the public sector organizations to be resilient. Other barriers could be cross-departmental coordination; these government departments are working in silos, and this is an issue that is there everywhere globally"*. Similarly, INT10 listed group of factors that are preventing the public sector from becoming resilient: *"Obstacles will be leadership commitment, proper leadership support, a delegation of authority for the cross-functional teams, the willingness to share the knowledge among public sector organizations, and collaboration between government entities"*. INT27 thinks that the most important barrier is leadership style: *"If leadership believes in the conspiracy theory, this can be a real barrier"*. Furthermore, INT11 listed a group of factors

286

that can be considered as barriers for resilience in the public sector: *"Unified vision for resilience at all levels. Also, the knowledge that we need to have a resilient system. The analytical skills of people who do not analyse things in a more of comprehensive and robust thinking. We also need to have people who can comprehend changes easily. And again, many organizations face this, because of the risk tiny cultural aspects"*. Similarly, INT12 listed another group of factors: *"leadership, lack of trust, if you don't have the well-trained staff, lack of well-established research and development centres, if you don't have the proper channels to communicate, and lack of transparency to share the knowledge"*. Meanwhile, INT13 focused on the paradigm thinking that represents the main obstacle for being resilience: *"The paradigm thinking; So, you need to show people how to overcome paradigm thinking by practical ways, and simulations and games are effective on that"*.

Furthermore, INT14 highlighted that culture, budgets, and improper decision making are main barriers to be resilient: *"The culture is one of them and also the cost is another component. The decision-makers, if they are not wise enough to take the right decision by having those resilience strategies built into the systems, into the infrastructure, into their people, and into the networks"*. Similarly, INT15 listed four barriers to be more resilient in the public sector: resources availability, future foresight thinking, old fashion management, and unqualified employees: *"Short of available resources to build resilient systems, such as, having old buildings or old systems or technologies that can be easily hacked or attacked. Unavailability of future foresight or innovative thinking that prevents the government from seeing what is coming in the future and how to act in case of emergent events. Old fashion management that do not implement new technologies or systems. Finally, unqualified employees who are not acquiring the right knowledge or training and not capable of building or implementing management systems"*. INT17 listed two factors- resistance to change, and being in the comfort

zone, especially for public sector employees: *"Firstly, Resistance to change. Number two, I think what they call it, the comfort zone, so why if everything is OK, why to break it"*. Similarly, INT18 identified two main factors- loose policies and regulation, and mind-set: *"Loose policies, and the mindset; people are ease with how they are living now"*. In a similar vein, INT19 listed three factors that can be considered as resilience barriers in the public sector: *"Job security, very high competition between employees and culture that is not adaptive to change"*. Furthermore, INT20 listed three barriers- bureaucracy, hierarchical level, and budget: *"I believe the first one is bureaucracy. The second one is the hierarchical level, because if my manager doesn't accept an idea, I cannot go to the next level. The third one is the budget: if you have a certain budget, you can't exceed it, and you can't be more innovative"*. On the other hand, INT21 thinks that the main barrier is trust: *"Trust of the people is a huge barrier"*. Similarly, INT22 listed one key barrier, which is people behaviour: *"The obstacles could be the personal behaviour of the audience or the people. Thus, you need better communication and engagement plans"*. Furthermore, INT24 listed three main factors- unwillingness to take responsibility, budget, rules and regulations: *"You will be afraid to take action; I will hide myself and let other people do what they have to do. The second one will be budget availability. The third one will be rules and regulations"*.

Besides, INT25 listed five barriers for resilience in the public sector- human nature, limited resources, risk awareness, bureaucracy, and prioritization: *"I think human nature. I think also limited resources; you have to spend on something if you had a lot of money then great, but the case is that we always have less money than what we would like to spend. Lack of experience; most people don't really understand the public sector, and it's difficult to understand this topic, it's not an easy topic to work with or to deal with. Risk awareness. Bureaucracy: I think is also a hurdle, because this kind of thinking requires a lot of collaboration and openness, and*

governments don't tend to be structured that way. Prioritization, which is a kind of related to funding, but people tend to like to work with things that they know". Meanwhile, INT29 listed six barriers for resilience in the public sector- budgets, bureaucracy, decision-makers influence on outcomes, silos mentality, miscommunication, and information sharing: *"Budgeting. Funding: you need to secure the budget for this. Bureaucracy: it is not only bureaucracy but also having the decision-makers separated from studying and planning. Silos: each niche of the unit is living alone, planning alone, delivering alone. Miss of communication. I also think of one of the most important barriers, which is hiding the information from each other"*. Furthermore, INT32 listed five factors to be resilient- budget, infrastructure, people, leadership, accountability, and the structure of the government: *"Budget and Infrastructure; sometimes the financial budget is an extremely important obstacle, as in some countries, infrastructure is a luxury, as they are focusing only on solving today issues. The infrastructure availability is also important. Education, training, open minded people, leadership commitment, accountability and the structure of the government"*. Furthermore, INT26 highlighted that the main barrier is the public sector employees who have secured jobs and are not interested in the need to change: *"The barriers is that, most of the government employees feel entitled; they feel that their jobs are secured and that they are entitled to all allowances. If they move from their comfort zone, they will change to the better"*. Meanwhile, INT30 thinks that the most important barrier is the bureaucracy of the public sector: *"Bureaucratic systems that take a long time. Governments changing a policy and a regulation in takes long time as we know. Now, a smart government that has lean systems would tend to change the regulations and policies faster, because they are more dynamic"*. Furthermore, INT34 listed two main factors- awareness on the repercussions of not to act, and budget: *"I would say awareness on the repercussions of not to act. Because in many cases, we struggle a lot as a government with existing and current issues*

289

and our priority is to deliver on these blessings and current issues, which leads to less pressing or long-term issues. The second one is budget; definitely we have limited resources in the public sector, because we don't have open budget, so we need to prioritize".

Meanwhile, INT35 listed two main barriers- approvals, and centralization: *"Maybe approvals of things like budget or legislation; It is going on, but it's not quick as required and this is normal because of the lengthy approval process in the public sector. The other one is centralization; if you have high centralization, you will not have the flexibility to be resilient"*. Furthermore, INT36 listed one critical barrier which is "the lengthy time between taking a decision and the execution*"*. Finally, INT37 highlighted one important barrier which is opening a dialogue with people and accept their right to talk: *"You have to let people talk freely about what could go wrong, so that they have the freedom to talk about what could be right from their side. Therefore, I think there is a sanction of discussion. So, you need the people to talk freely about what could go wrong, so that eventually, they could tell you how to turn this into something good"*.

Figure 5-57 and Figure 5-58 summarize the attributes highlighted by interviewees for this section. Interviewees think that bureaucracy is the major barrier against building resilience in the public sector. In addition to that, having a non-supportive culture and budget limitation are barriers to being resilient. Some interviewee indicated non-supportive leadership, and people's behaviors as barriers. Furthermore, interviewees also pointed to the lack of responsibility, lack of trust, and paradigm thinking as barriers for resilience.
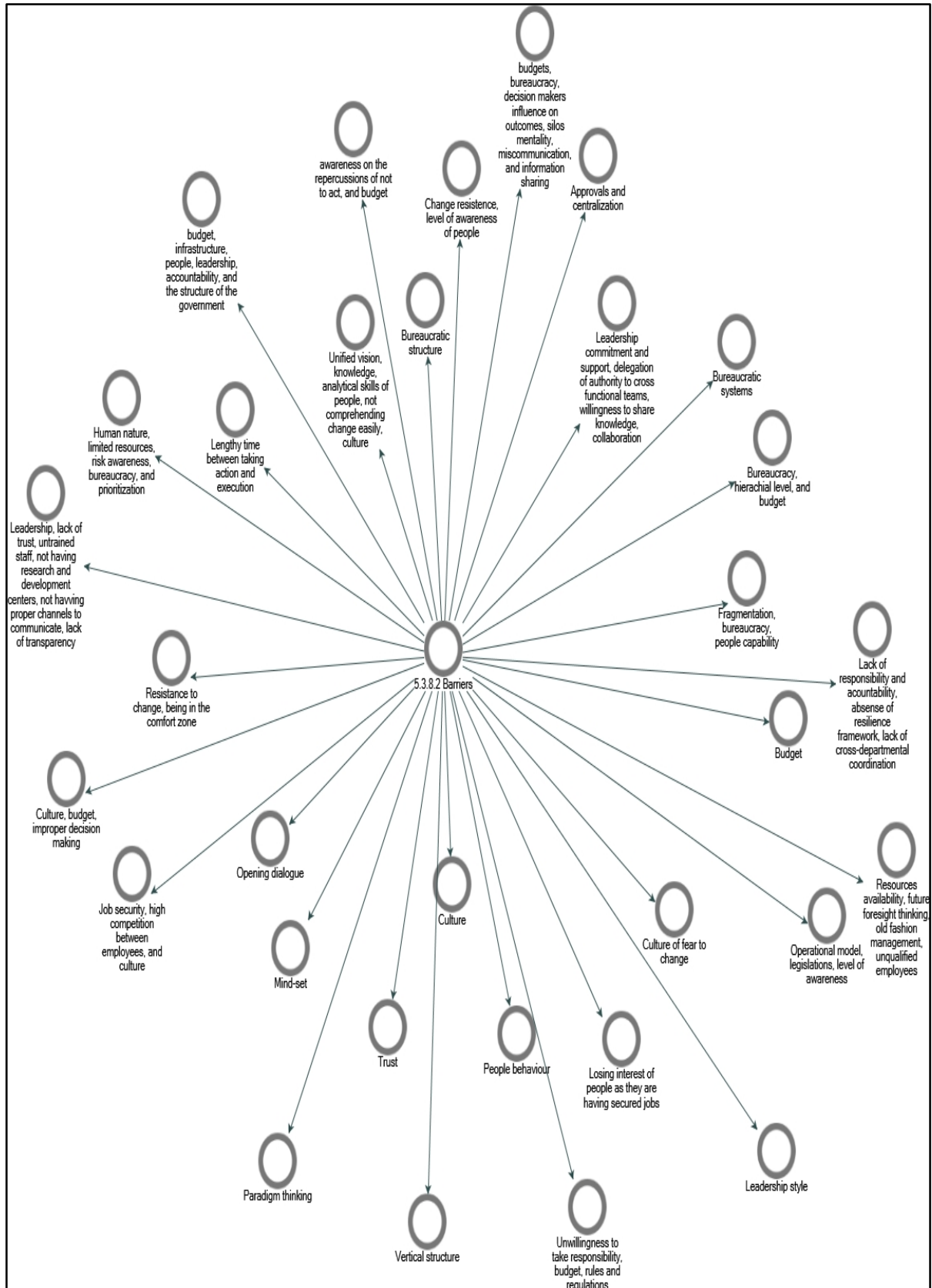
Figure 5-57: Identified attributes for barriers.
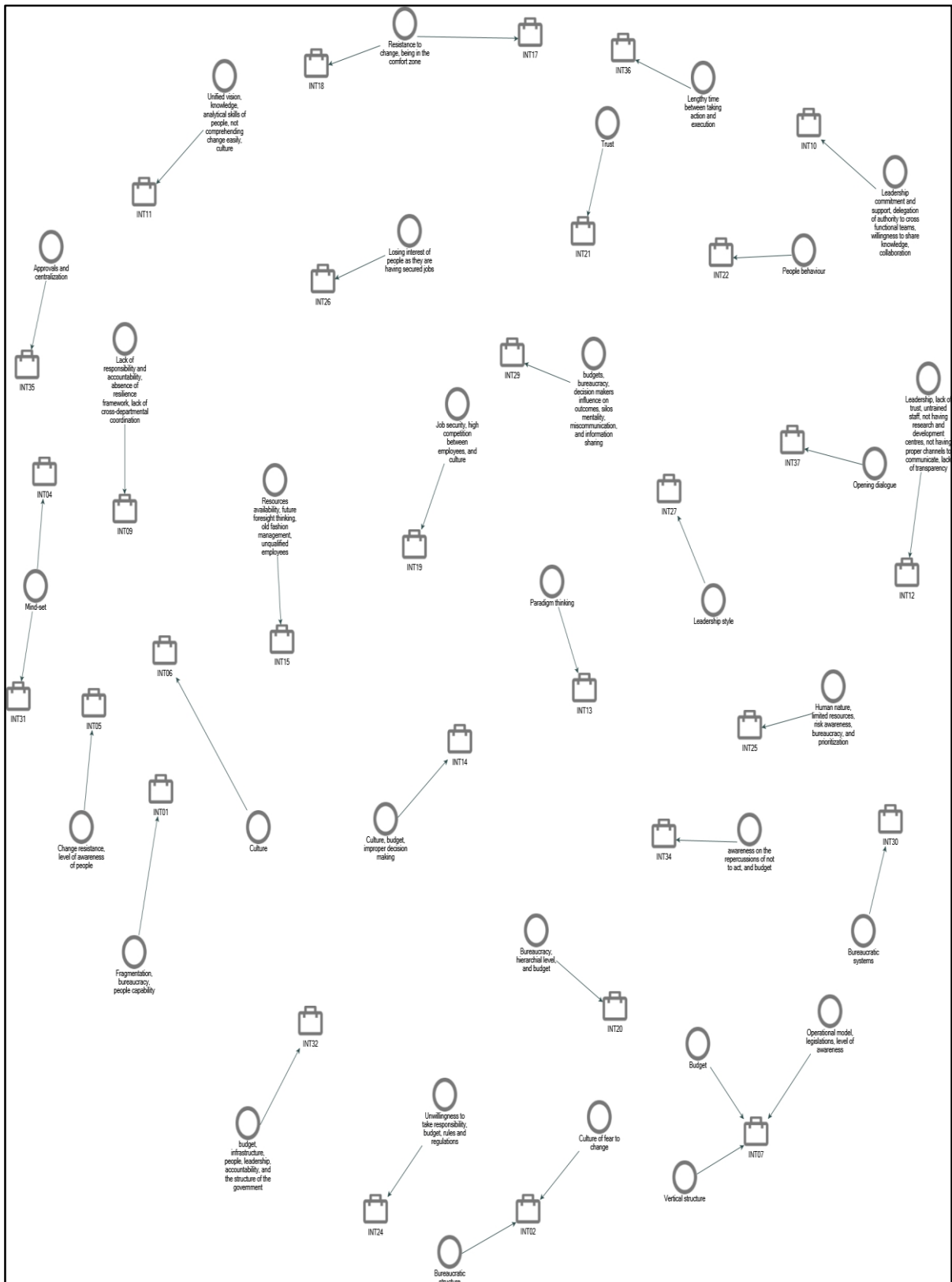
Figure 5-58: Identified attributes and interviewees inputs for barriers.

Turn challenges into opportunities

The following section present the interviewees' insights on how to turn challenges into opportunities in the public sector as part of building a positive resilience in the face of disruptive events.

INT02 gave one example related to other countries facing some major emergent events which could be an opportunity for certain countries that are in a stable mode: *"Of course, events bring challenges, but they also bring opportunities. The world is full of examples; as a war in the neighbouring country might be a challenge on the short term, but if the wealthy people from that country fled to your country, and started to bring their money with them, that is an opportunity that you can catch. Any event will bring challenges, and it will bring opportunities, and it always depends on your ability to capture these opportunities"*. INT04 emphasized having grounded optimism in the public sector in order to be able to look at emergent events as opportunities: *"One of them is they call grounded optimism; what is grounded optimism is to really be optimistic, but based on facts, based on the situations, based on the analysis on the tools you have. You cannot live nowadays without being optimistic, because things are happening, and things are always changing"*. Furthermore, INT06 highlighted the importance of being positive and giving challenges to people to help them develop problem solving capabilities that they can draw on to get out of difficult situations: *"Being positive is a key. In addition, learning by itself to get out of this is good. It is always an experience for your peoples. You can give it in the form of challenge to the people to give them the confidence on how to deal with this"*. Similarly, INT09 emphasized learning factor to improve response in the future: *"There is an opportunity to learn from it and to make you more resilient or make you to grasp the opportunity to be better in the future"*. Similarly, INT15 thinks that an emergent event by itself is a learning opportunity to improve performance in future: *"Each emerging event is an*

opportunity for improvement if it was unutilized well. Such events shall make the public sector stronger and more resilient. They give you more experience on how to react in similar situations. They make you update your plans, find out your weak points, and give you lessons to learn". Similarly, INT23 believes that every emergent event is an opportunity for learning: *"So, it is just like a learning exercise".* Furthermore, INT28 emphasized confidence and learning factors: *"For sure, whenever you feel the challenge, or when you have a risk, you should have the confidence that you can come over, and you should learn from it".* Similarly, INT29 highlighted the learning opportunity that an emergent event can provide: *"So, learning from previous mistakes is an opportunity for improvement for the future".*

Meanwhile, INT10 gave another example of a challenge in cybersecurity that can turn into opportunity by increasing confidence to bring more investments: *"Because some crisis, it can bring opportunity for you. For example, if the crisis happened in the cybersecurity, and you manage to prevent it, which will give more confidence level for financial investors to come and use your infrastructure as a hub. Why is that, because now they have a high confidence level that you are ready, and you have a system in place, and you are a resilient city".* Furthermore, INT11 emphasized the need to take advantage of new advancements in technology and try building the case for getting more opportunities: *"Disruption means that something happened because of something good or something bad. Now, the good part needs to be a new way of thinking. The disruption means that there is something new, for example, new technology took place, but your system did not absorb it. Therefore, it is a disruption for you. But if you understood the disruption very well, you know how exactly you can capitalize on it and change your business".* INT12 thinks that the lessons learned are the most essential aspect that the public sector should focus on to turn challenges into opportunities. He gave one example on how the financial crisis in 2008 made the public sector thinking of economic diversification to

294

invest in new sectors, and this opened new opportunities: *"For example, let us take the financial crisis happened here in in 2008, you can think it is an emergent event and it is a crisis, but how many lessons learned developed from that to diversify the economy of countries to be more adaptive and to be more resilient"*. Furthermore, INT14 emphasized that opportunities depend on the emergent event itself and whether the public sector has the proper transformative strategies or not: *"Of course, there is a lot of opportunities that come with disruptive events, and this depends on the event itself. If you have the proper strategy, you can use the transformational part of the strategy to enable you to benefit from this disruptive issue or disruptive problem"*. Meanwhile, INT16 thinks that there should be a shift in the paradigm thinking of governments in order to be able to look at things differently and create an environment that encourages more experimentation: *"So, governments have to become much better at uncertainty and being comfortable with uncertainty and experimentation"*. He also emphasised on the need to involve people to get a better understanding of how the public sector can open doors rather than closing them: *"I think governments need to start also involving the people in some of these policy decisions that are happening"*.

Figure 5-59 and Figure 5-60 summarize the attributes highlighted by interviewees for this section. Interviewees think that learning from the experience is the essential factor that will enable the public sector to turn challenges into opportunities. Also, engaging people, being positive and keeping the bar high will assist in finding new opportunities out of an emergent event.
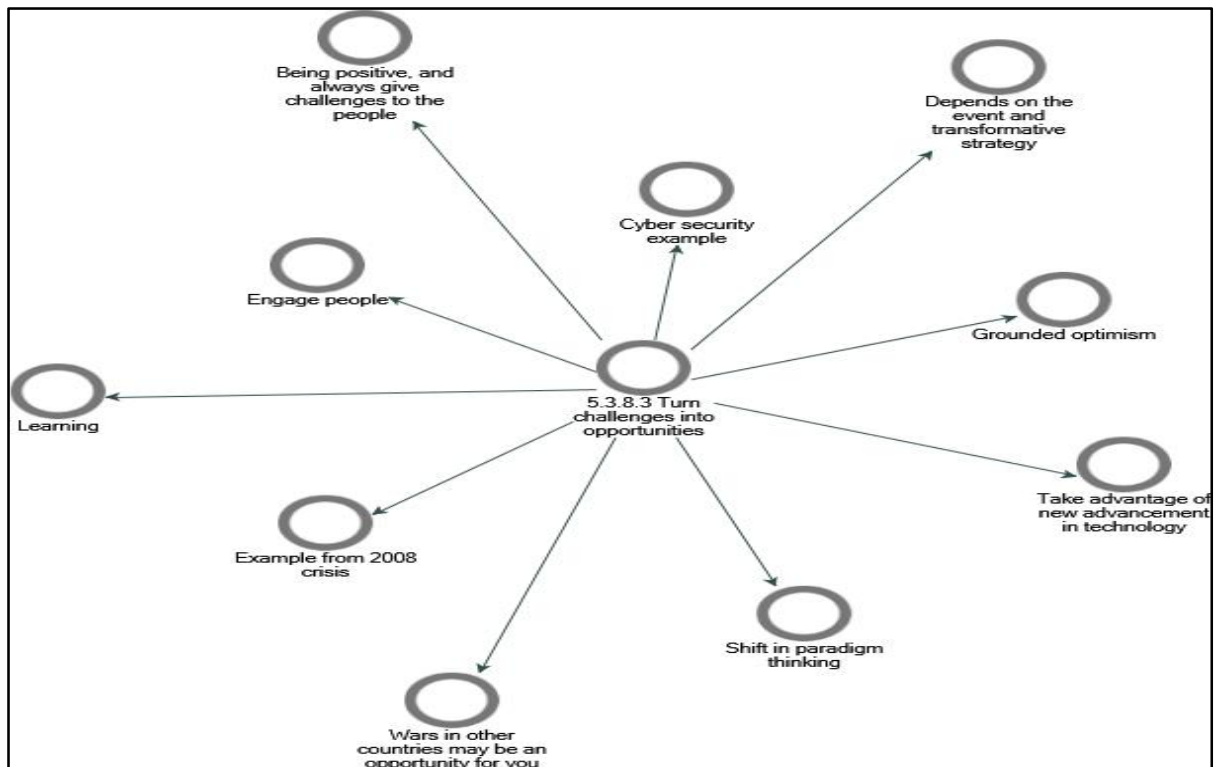
Figure 5-59: Identified attributes for turn challenges into opportunities.
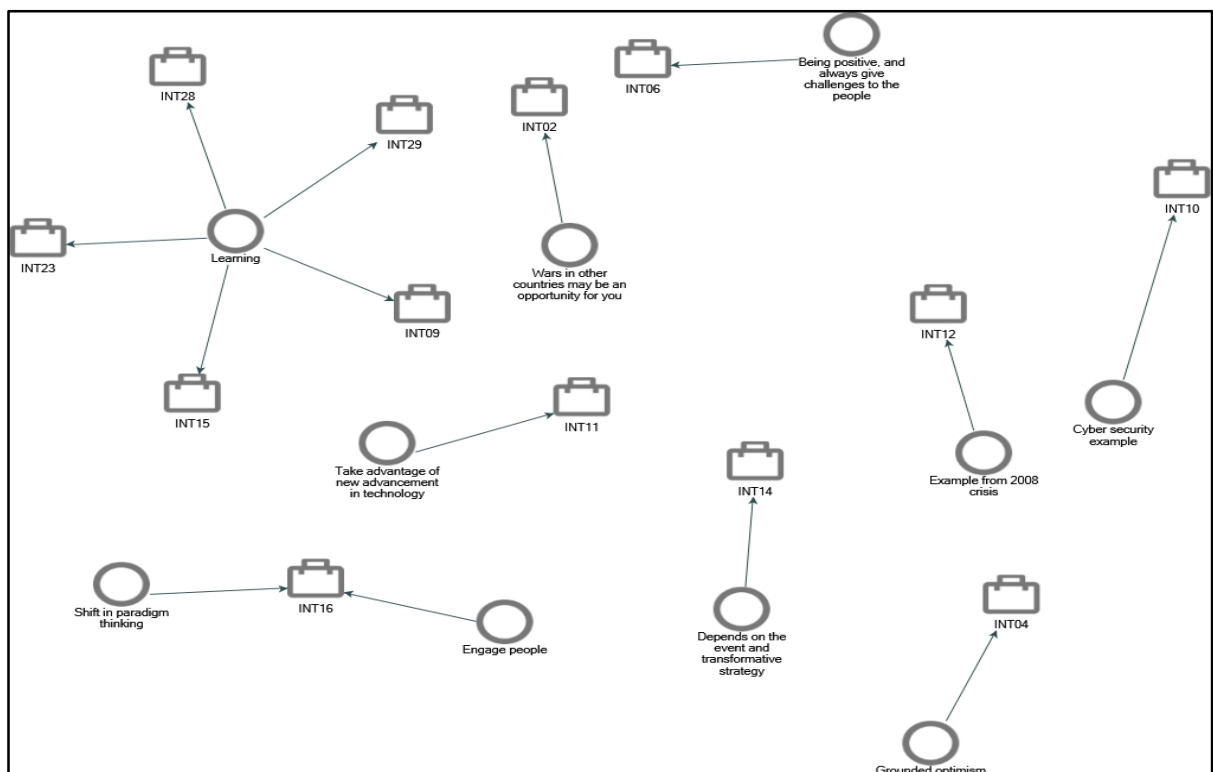
Figure 5-60: Identified attributes and interviewees inputs for turn challenges into opportunities.

296

5.3.9   Theme Number Nine (Resilience relationship with other management concepts)

Figure 5-61 shows the hierarchical coding structure of theme number nine, which is resilience relationship with other management concepts. The data findings identify the relationship between resilience and other managerial concepts and systems, such as agility, antifragility, business continuity, flexibility, governance, innovation, and risk management and how they can be integrated.
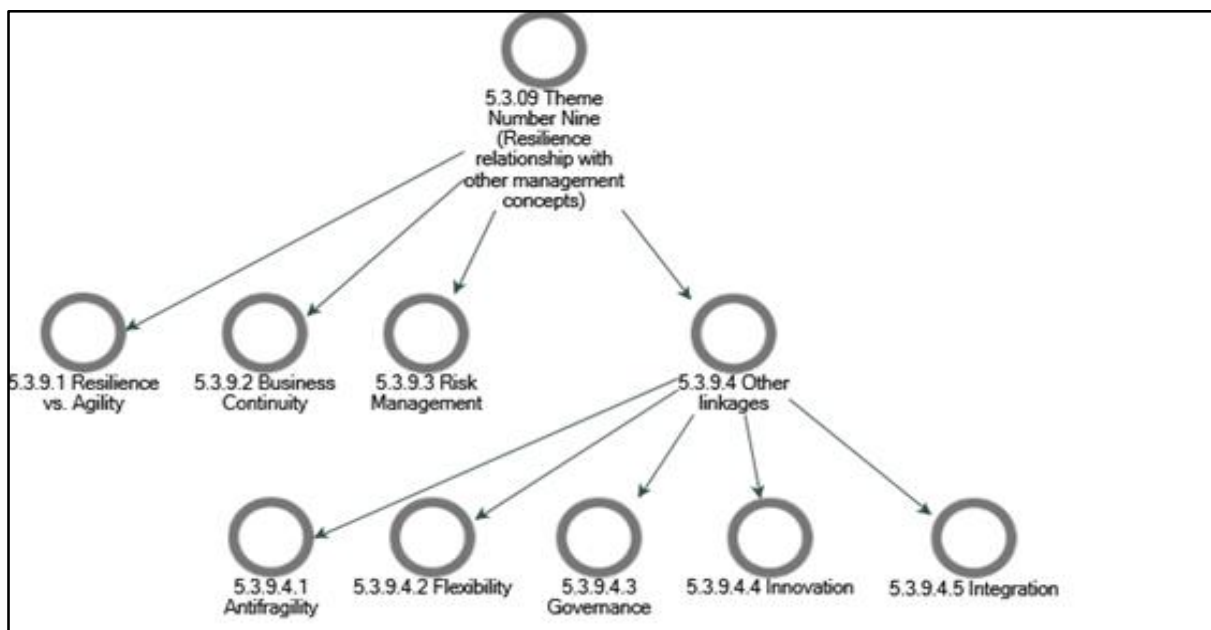
Figure 5-61: The hierarchical coding structure of Theme 9 (Resilience relationship with other management concepts).

Resilience vs Agility

The following section present the interviewees' insights about the difference between agility and resilience, whether they are different concepts, or integrated concepts, or similar concepts. Trying to distinguish between agility and resilience, INT08 thinks that resilience involves some robustness element that is not highly evidenced in agility *"To be resilient you have to be robust and agile; robustness means that you stay strong and able to achieve the vision while agility means being dynamic to whatever changes that happen. From my point of view, I don't think*

that agility or being dynamic is affecting robustness negatively, but I think that they are affecting positively the robustness". He added that resilience is a broader concept than agility *"From my point, resilience is bigger than agility"*. INT17 did not see any differences between agility and resilience, as from his point of view both are terminologies to the same concept *"Resilience is somehow tied up to the agility concept, and they are much related. Maybe agility is another terminology of resilience"*. Similarly, INT26 thinks also that resilience and agility are the same *"I think that you need in your research to differentiate between resilience and agility, because most of the people, and I'm one of them, think that resilience is the same as agility"*. In addition, INT34 highlighted that agility could be an input to resilience. She thinks that the public sector could be agile but not resilient. However, to be resilient, the public sector should be agile *"I think probably agility is one input to resilience, because if I look at the agility dimensions, it would be speed, human centricity, quality. These are the kind of inputs to resilience. However, if I look at resilience, it is most probably immunity to external shocks, and then I need to be agile to be able to respond to that. Therefore, I think maybe agility is input to resilience. From my point of view, I see you could be agile but not resilient. However, you cannot be resilient and not agile, this is what I am thinking"*. Meanwhile, INT02 considers agility as updating your tools as you go on *"All what you can do is to make sure that at least your tools are lubricated, I don't know why I'm using the engineering example here, but at least they are lubricated. With lubrication, I am ensuring that there is a proper flow of information, of data, and of decision-making. This is to be always agile and making sure that you can upgrade your tools as long as you go on"*.

Furthermore, INT03 believes that agility in the private sector is higher than the public sector, as the former is more evidently performance-driven than the later *"I think that the agility in the private sector is higher than the public sector. Because for the private sector, they are driven*

298

by income or profits, if they found that income or profit will decrease, they have the agility to

change the way of doing work in a shorter time when compared to the public sector". Similarly,

INT14 thinks also that the private sector is more agile in adopting new technologies and

accepting the changes *"The private sector is more agile in adopting technologies and accepting*

new changes". Furthermore, INT16 highlighted that agility is more related to the design

thinking process where you know the parameters, and you have most of the information.

Meanwhile, in resilience, you are not sure of the parameters, and you make assumptions as not

always you have a luxury of data available when you have an emergent event *"Design thinking*

governments or being agile governments usually depends on information and data that are

available. Unfortunately, we live in a world where you don't have time to gather all the data

and sometimes you need to make decisions with limited data or with certain assumptions.

Therefore, governments need to be more resilient to allow some of these tools that exist within

tolerable risk to evolve". He added that agility is linked to adaptability *"In order to be more*

agile, you need to be able to adapt". Similarly, INT34 highlighted the link between agility and

adaptability *"Need definitely to be more agile, which is more adaptive".* Furthermore, INT30

highlighted that agility is more linked to lean methodology *"In order to be more agile, you have*

to be leaner". Likewise, INT34 described the link between agility and being lean *"To be agile*

and lean enough, you need to adapt".

Figure 5-62 and Figure 5-63 summarize the attributes highlighted by interviewees for this

section. Some interviewees think that resilience is a wider concept and agility is an input to

resilience, while others believe that they are the same concepts. Other interviewees highlighted

that agility is more linked to adaptability and to lean methodology. Interviewees think that

agility in the private sector is more evidenced than the public sector. Meanwhile, one

interviewee highlighted that resilience means robustness in addition to agility. Finally, another

interviewee highlighted that agility is more linked to known parameters, while resilience is
linked to unknown parameters.
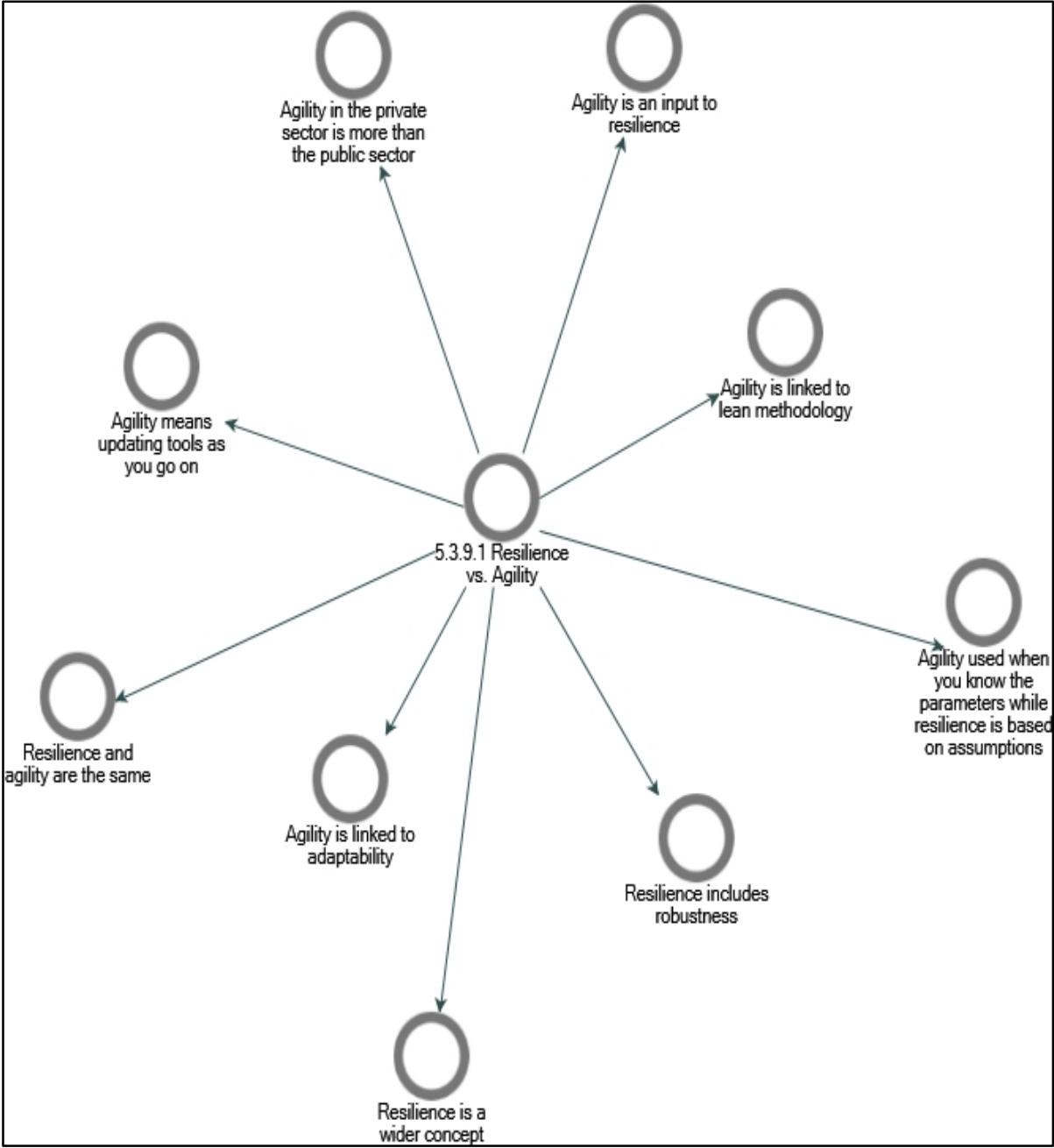
Figure 5-62: Identified attributes for resilience vs. agility.
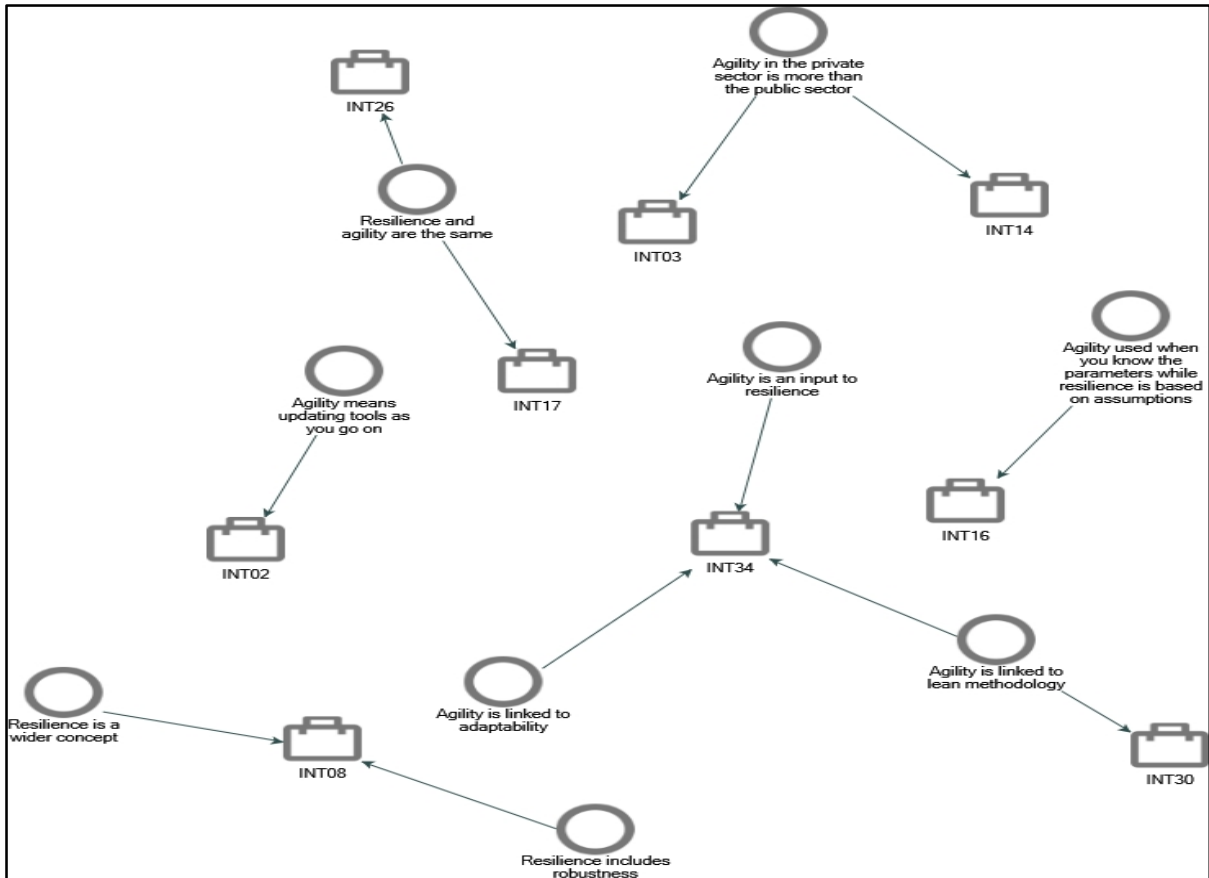
Figure 5-63: Identified attributes and interviewees inputs for resilience vs. agility.

Business Continuity

The following section presents interviewees' perspectives on business continuity as it relates to building resilience in the public sector.

INT04 emphasised that a good strategy in the public sector should involve business continuity plans *"Let me say the following, a good planning or a good strategy for a government or an organization will definitely have business continuity plans, it will have an emergency, response plans and so forth"*. INT08 mentioned that when we speak about the speed of recovery in the public sector, we should activate our business continuity plans *"When we are talking about the speed of recovery, we are talking more about business continuity"*. Furthermore, INT13 challenged the ability of business continuity to identify the root cause of the problem *"Business*

continuity helps you have mechanisms to deal with events that might happen. However, the way sometimes business continuity is being perceived is that we must have an action item for each and everything, where in reality what should happen is you should have rules for what should happen, and these rules should cover dealing with root causes. Which is not always the case". Meanwhile, INT14 linked business continuity with normal operations *"Maybe to start moving to cloud computing to make sure that the business continuity of the government would carry on the service delivery that will carry on, even if there is a catastrophic happening or an issue happened to the government's operation affecting government assets"*. Furthermore, INT15 highlighted the importance of implementing the business continuity ISO standard as part of being able to face any emergent event *"ISO 22301 helps organizations to identify alternative scenarios in case of any uncertainty that transforms to an event and ensure business continuity"*. He added that as part of the lessons learned post an event, the business continuity plans should be updated *"The business continuity plans shall then be updated along with the function recovery plans"*. Moreover, INT29 thinks that business continuity plans should be immediately activated upon identifying an emergent event *"The same idea of business continuity to say for example, if an emergent event happened in the health sector without defining what kind of specific action should I take, but I will define my reaction in stages, stage one stage two, stage three"*.

Furthermore, INT30 highlighted the importance of having business continuity as a separate function in the public sector *"The business continuity is one of the important functions that any government or any organization should have. As with business continuity you would actually identify the group of risks in which you can monitor when you have unforeseen issues or alarming points, you group them, and then you audit them from time to time"*. He added that, whenever we need to measure resilience, we could start with the measures that already exist in

the business continuity model *"I think a classical way to do that is KPIs. So, you put certain KPIs on what do people have; it is a checklist. A business continuity model has a lot of checklist points to ensure that resilience model is in place"*. Similarly, INT31 described the importance of business continuity standards to be able to measure resilience *"Business continuity certificate or some other ISOs are available, you can start from these standards to set KPIs for resilience"*. Also, INT32 highlighted the importance of having a standard for resilience or a framework, which is overlapping with business continuity and having measures associated to this standard or framework *"Resilience is an important topic as the business continuity. I can see a lot of overlap between both. Now, because business continuity is a pure business continuity, so I think if we can have a standard for resilience in the public sector that has certain measures, this will be brilliant"*.

Figure 5-64 and Figure 5-65 summarize the attributes highlighted by interviewees for this section. Interviewees think that business continuity measures should be part of resilience measures. Meanwhile, business continuity is linked with retrieving normal operations, while resilience is more focusing on the new normal after an emergent event. Furthermore, the business continuity plans should be revised based on the outcome of the lessons learned after an emerging event.
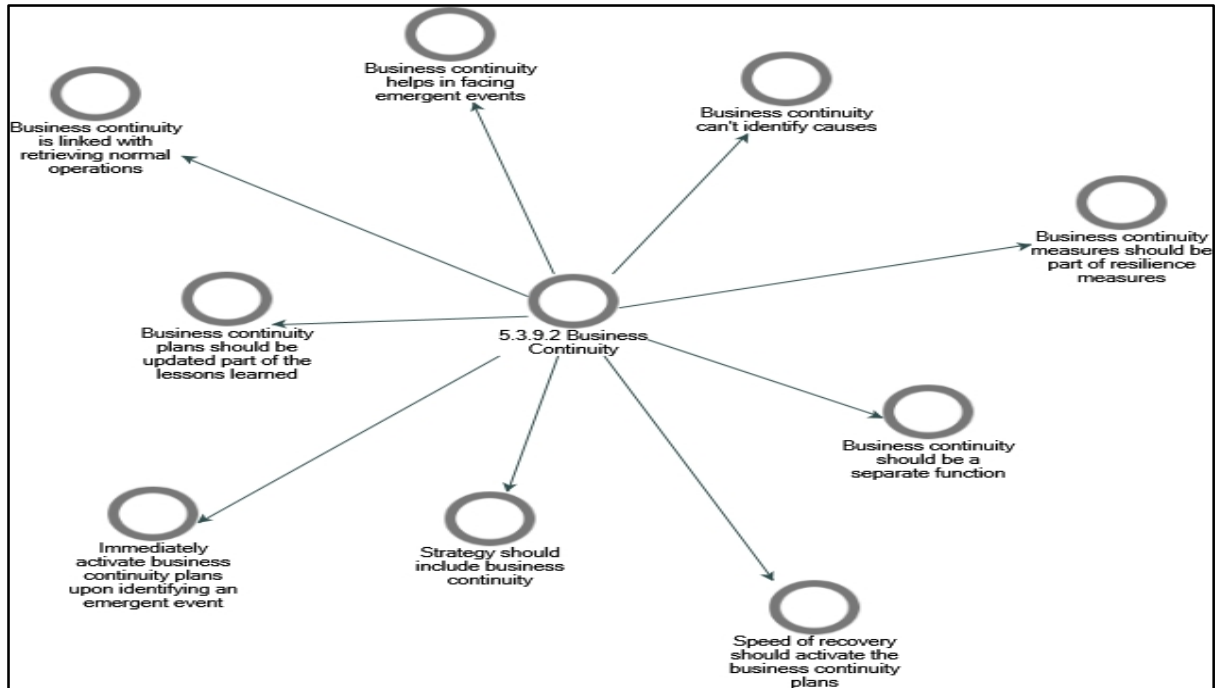
Figure 5-64: Identified attributes for business continuity.
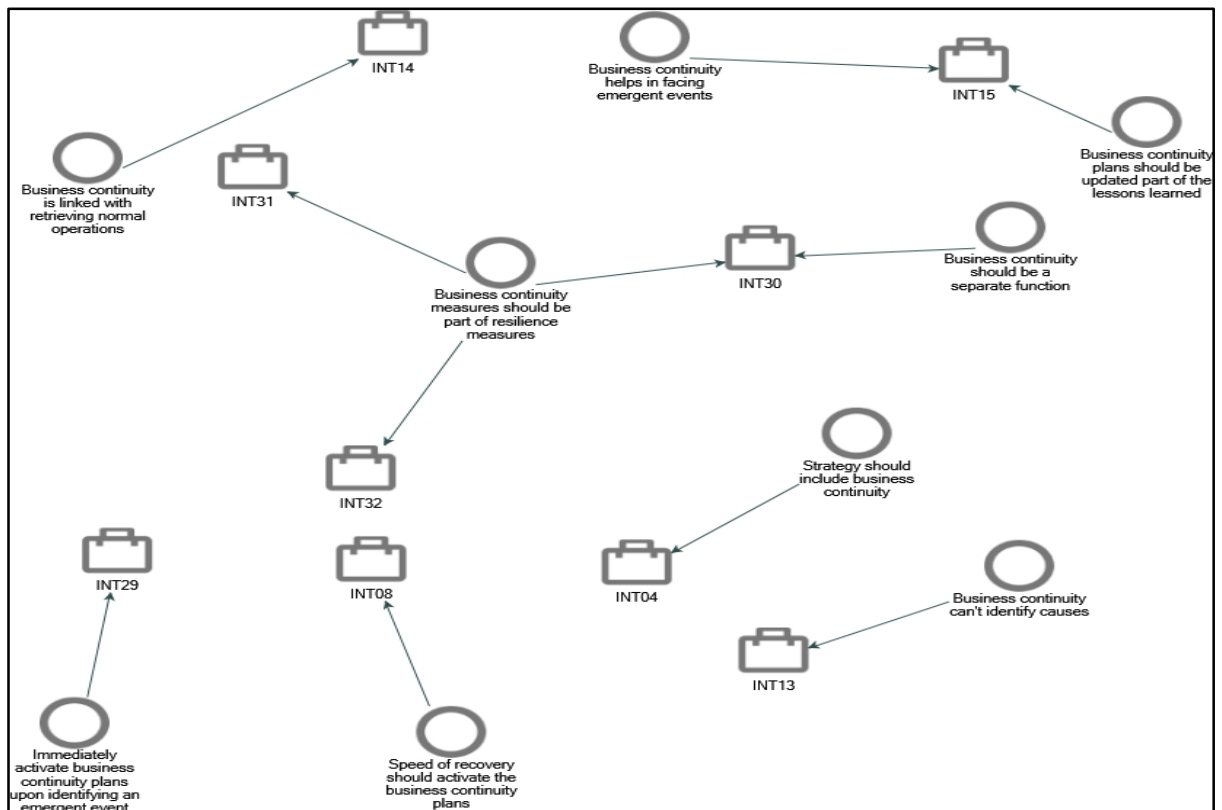
Figure 5-65: Identified attributes and interviewees inputs for business continuity.

Risk Management

The following section presents interviewees perspectives on risk management as part of building resilience in the public sector.

INT03 suggested using risk management system methodology to manage any emergent events *"In my organization, there is an automation system for risk management, the process starts from the beginning by identifying or recognizing of any risk till evaluation and putting the right actions"*. In addition, INT04 thinks that the risk management system should be only applicable to internal uncertainties *"Within the organization, I wouldn't call it uncertainties. I would call it a risk"*. He added that risk management, in addition to foresight, together can represent resilience and should be part of the strategic planning scenarios for any organization *"This should be part of our strategic planning and scenarios building, the future foresight, and the risk management"*. Furthermore, INT05 highlighted the shortcomings of traditional risk management systems to identify the soft aspects that may lead to an emergent event *"Risk management system is very standard as it addresses many things related to security, safety, data depletion, these kinds of things, but not in the soft aspects which are more related to people behaviours"*.

Meanwhile, INT06 highlighted the importance of risk management in resource planning by the public sector: *"When you have this overall risk management plan, I would know if this happens how to do and how to allocate those resources"*. He added that any resilience framework should be incorporated under a governance umbrella with other existing frameworks such as risk management *"Coming from excellence background, I don't believe in making a separate model for each concept in the public administration. However, I believe that resilience and risk management should be incorporated into the governance model of the entity"*. Furthermore, INT07 suggested using the risk management system to predict the transformation of uncertainty

to an emergent event *"By applying proper risk management tools and studies, the organization can further understand the uncertainties and evaluate its probability to occur"*. He added that risk management is highly related to the absorptive capacity *"Management control is the key defence tool for the organization to absorb any uncertainties that may include implementing robust operational management and risk management approaches and apply audit and compliance tools in a continuous manner"*. Meanwhile, INT11 thinks that risk management as a tool is used to build the preparedness and readiness of the public sector organizations to face any emergent event *"In a good government, you can see there is a trend analysis as well as macro risk management and crisis management scenarios. I believe this is enough, as we don't need to waste time in knowing the future rather than to be ready and enabled for this future"*. Furthermore, INT26 thinks that risk management tools are part of building future preparedness *"So, we need to build up our strategies and put some risk management plans to avoid such previous experiences like what happened in the financial crisis. So, through the risk management framework, you analyse the risk, the possibility of it's happening, and you can assess the impact"*. On the same page, INT31 emphasised on risk management training as part of building capability of the staff to be prepared *"Related authority they became now more prepared and working to increase their capacity by having more trainings to enhance preparedness. For example, if it was an infectious disease, they would train their professionals to have courses in epidemiology, in risk management, in infectious diseases in general. So, training is very important"*.

Furthermore, INT29 suggested using the risk management methodology to assess the impact of an emergent event *"This is similar to what we do in risk management"*. Similarly, INT32 suggested using the risk management methodology to assess the magnitude and the impact of an emergent event *"From a risk management perspective, I think the likelihood and the impact*

as part of risk assessment analysis". On the same page, INT35 suggested using the risk management methodology to assess the magnitude of an emergent event *"If you have risk management approach and you implementing this well, based on this you can classify the level of the magnitude"*. Meanwhile, INT34 suggested using risk management when evaluating the options for the response plan to an emergent event *"The options for evaluation also needs to be coupled with risk management plans to identify the proper option; I may choose one option, but what are the risks associated with choosing this option"*.

Figure 5-66 and Figure 5-67 summarize the attributes highlighted by interviewees for this section. Interviewees think that risk management can help in identifying the magnitude and the impact of an emergent event. Additionally, risk management can help in building preparedness and readiness before an emergent event. Moreover, some interviewees think that risk management and foresight together can represent resilience and risk management is more related to the absorptive capacity. Meanwhile, some interviewees think that risk management is linked more to the internal event, and it is a very standardized process that makes the public sector focusing on steps rather than the value.
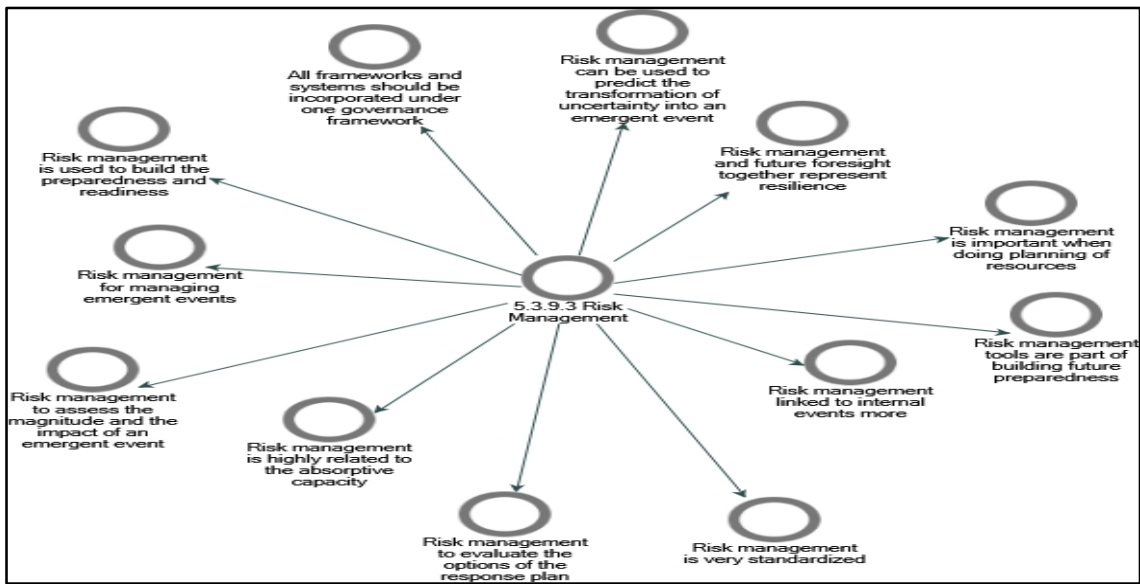
Figure 5-66: Identified attributes for risk management.
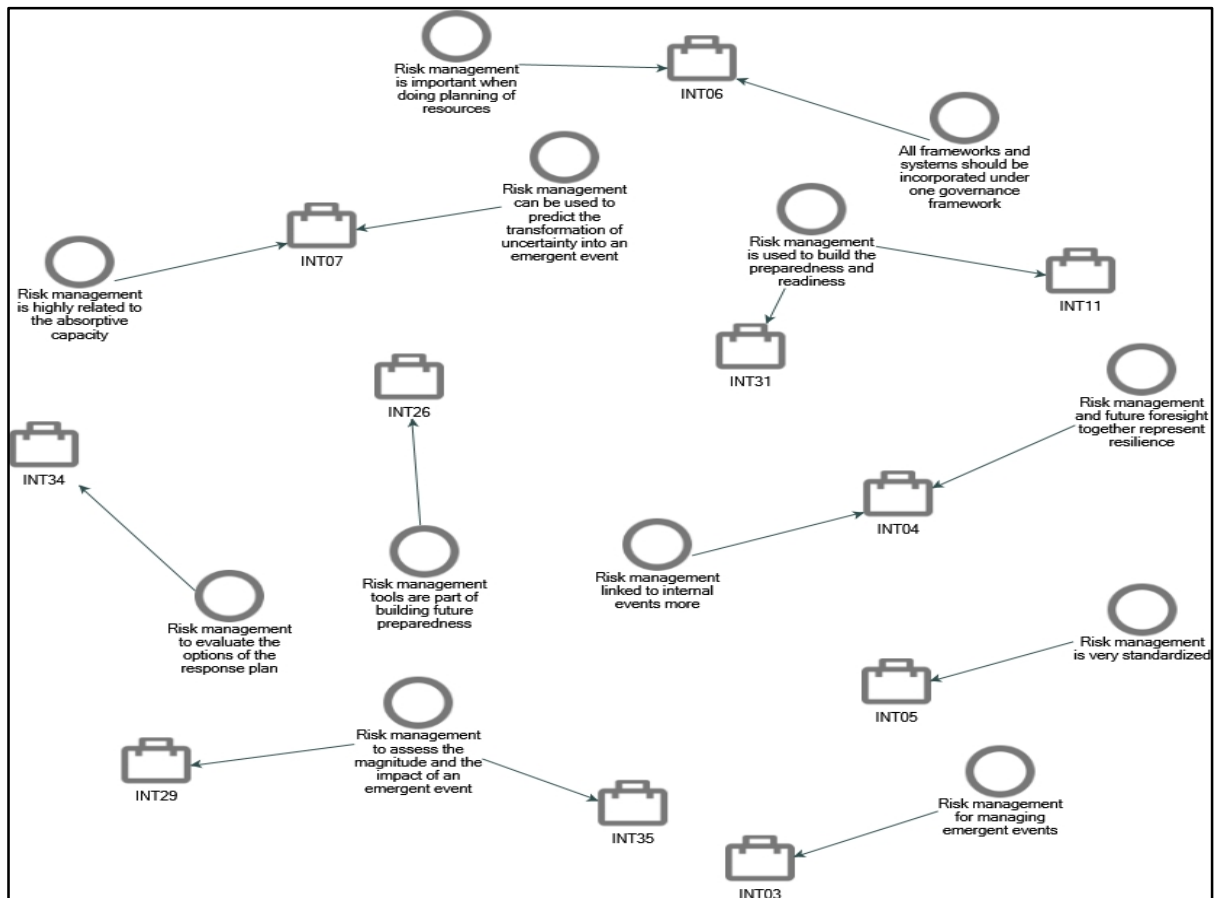
Figure 5-67: Identified attributes and interviewees inputs for risk management.

Other linkages

The following section will present the interviewees' listing of other managerial concepts that may be linked in a way or another to the resilience concept. These are antifragility, flexibility, governance, innovation, and integration.

Antifragility

There were only two points of views to distinguish between resilience and antifragility that came from INT03 and INT13. INT03 highlighted that antifragility is an advanced phase where the systems are not affected by any event *"So, not affecting the reputation is a very important*

thing, based on that, the public sector have to build all the capabilities of the people, the entities, the processes, and the systems not to be only resilient but to be anti-fragile". Meanwhile, INT13 looks at resilience and antifragility as the same concepts *"But if you're talking about resilience, resilience which is anti-fragility, to me they are the same"*.

Figure 5-68 and Figure 5-69 summarize the attributes highlighted by interviewees for antifragility as one interviewee thinks that resilience and antifragility are the same concepts, while another interviewee thinks that antifragility is an advanced phase above resilience.
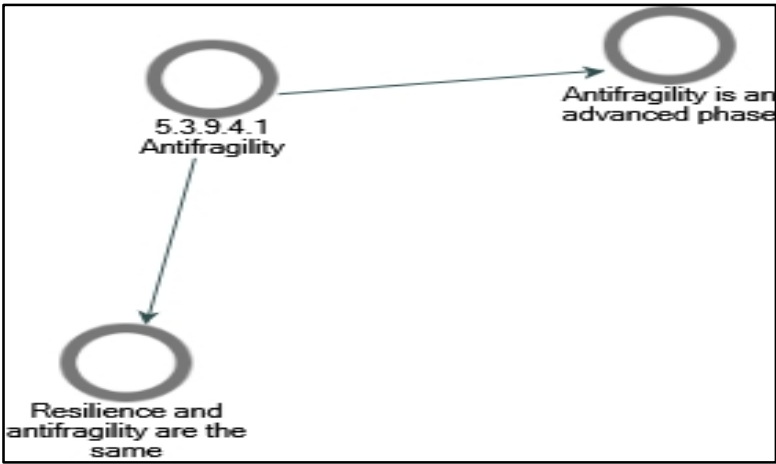
Figure 5-68: Identified attributes for antifragility.
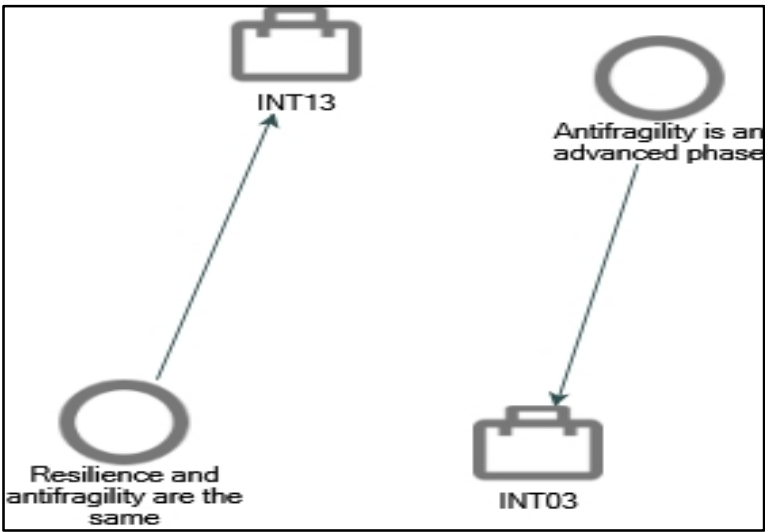
Figure 5-69: Identified attributes and interviewees inputs for antifragility.

Flexibility

For flexibility, the results of the word tree using NVivo resulted from the interview for the word

"flexible" is illustrated in Figure 5-70 and treemap table is illustrated in figure 5-71.
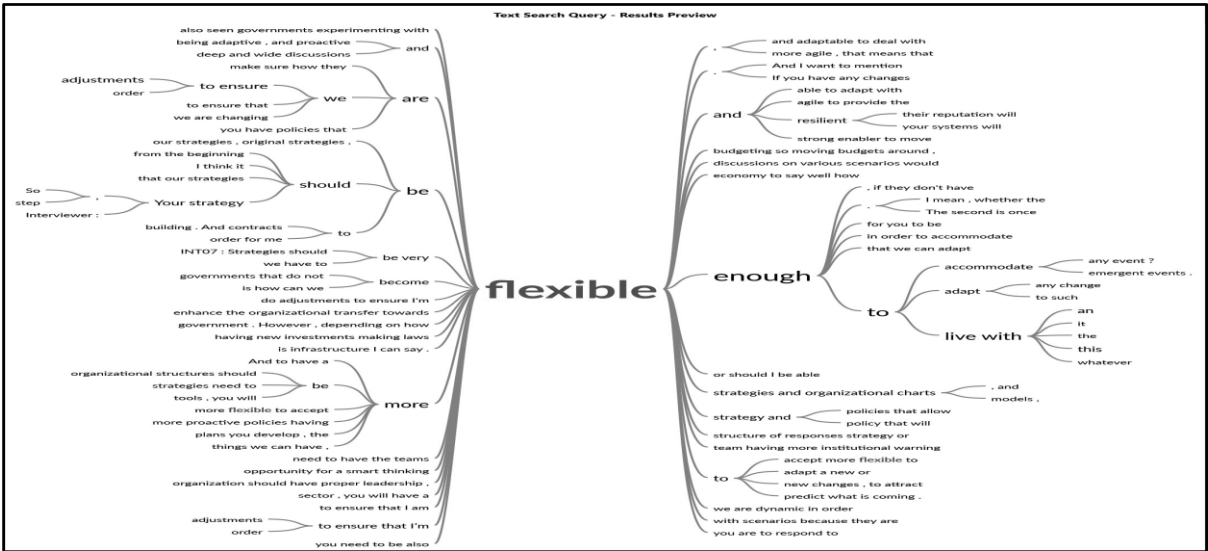
Figure 5-70: Word tree for the word *"flexibility"*.

Figure 5-71: Treemap for the word *"flexibility"*

The results of the above two figures show that the interviewees are focusing on the word

"flexibility" when it is associated with strategies, policies, structures, and budgets.

Furthermore, they link the word with adaptation (adjustment, and accommodation) and to the

"change" as sown in Figure 5-72 below:

310
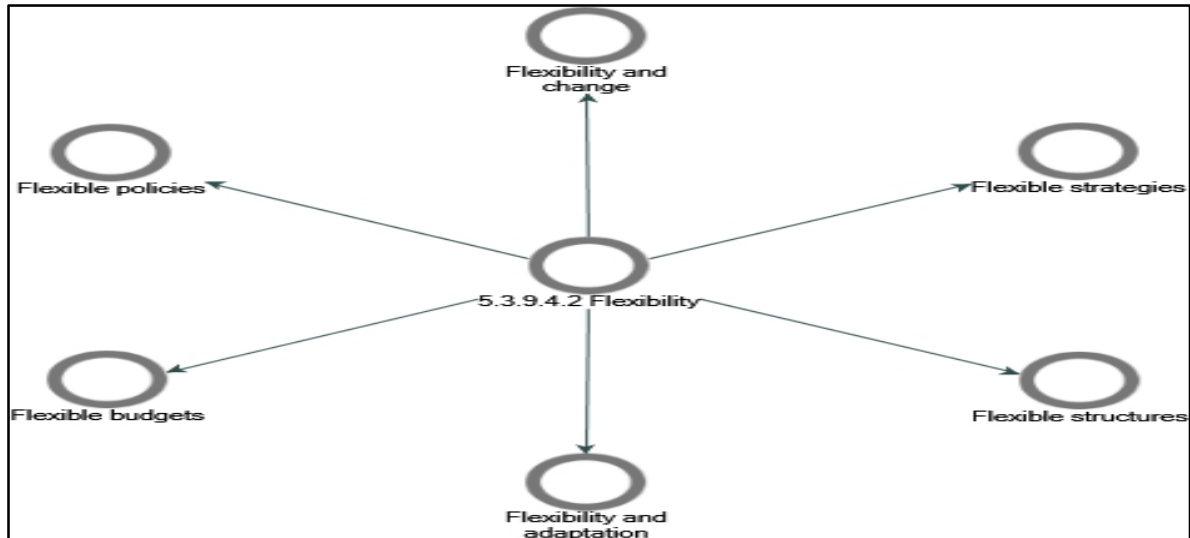
Figure 5-72: Identified attributes for flexibility.

Governance

For governance, the results of the word tree using NVivo resulted from the interviews for the word *"governance"* is shown in Figure 5-73, and the tree map table is shown in figure 5-74.
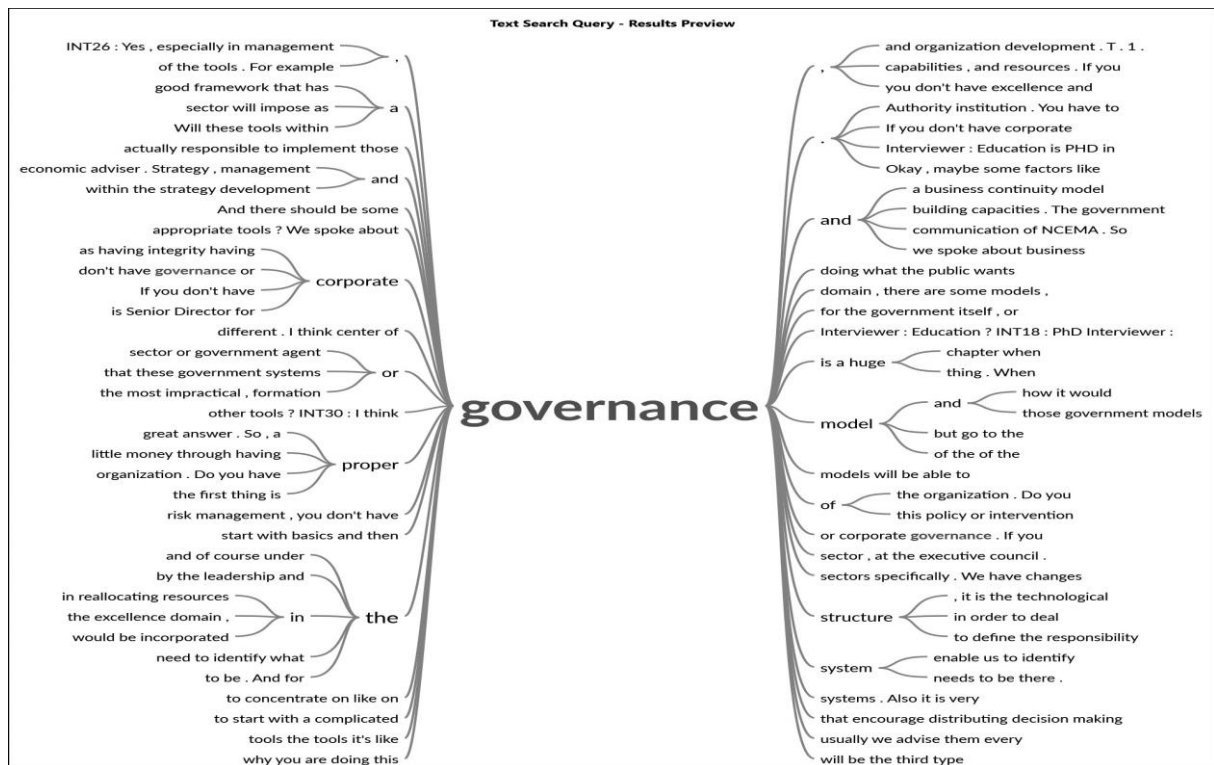
Figure 5-73: Word tree for the word *"governance."*

governance	tools	team	cross	every	indirect	syster	ager	capa	capa	case	cent	chan	chap	city
			ded	excelle	organiz	teams	ansv	comr	dad	deal	decis	defin	depe	dha
		entity					appr	comp	diffe	econ	enab	enco	end	entiti
	model		develop	function	policy	vertica	auth	conc	direc	espe	feed	first	form	forma
		level	directly	genera	resourc		basi	conti	disru	etc	form	great	group	group
	corporate	models				yes	build	coro	distri	ever	fram	happ	healt	holist
			domain	huge	strateg		busi	coun	doct	exec	goin	hos	imp	imp
	sector	structure	educati	identify	system	advise	busi	cours	duba	facto	good	imp	imp	inc	inst
						advise								

Figure 5-74: Treemap for the word *"governance."*

The results of the above two figure show that the interviewees are focusing on the word *"governance"* when it is related to tools, models, corporate, sectors, structures, and levels as shown in figure 5-75 below:
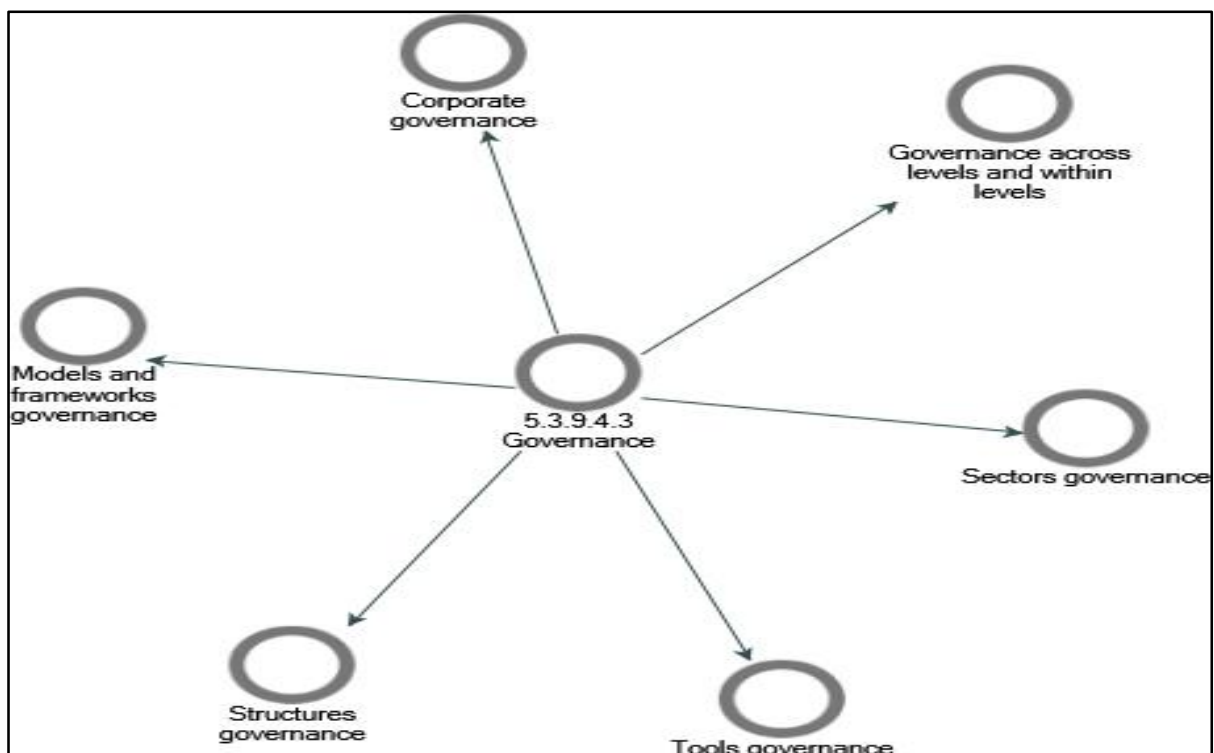
Figure 5-75: Identified attributes for public sector uncertainties.

Innovation

For innovation, INT04 highlighted that the public sector needs innovation as one of the enablers for resilience *"The government is looking for innovative and creative solutions by emphasizing innovation creativity"*. Meanwhile, INT07 emphasized measuring innovation to be able to measure resilience *"Many measurements could be used to measure organizational resilience that may include staff engagement, event awareness, decision-making, innovation, and sharing knowledge"*. Furthermore, INT08 mentioned innovation as one of the capabilities to be built to be more resilient *"They are open for any changes, they are open for disruptive technologies, and they are open for innovation"*. Similarly, INT11 emphasized also on the need to build innovation capability, to be able to absorb shocks *"For example, countries without innovation strategies or innovation visions, will not be even embraced or absorb what's happening around them, except in a later stage"*. On the same page, INT20 highlighted the importance of innovation labs to build capabilities of the public sector to be resilient *"Nowadays, a lot of governments use artificial intelligence labs and innovation labs in order to motivate the government and try to come out with something really disruptive"*.

INT09 identified the importance of having clear resilience framework, like the innovation framework, to have a better understanding about the concept *"Compare this to innovation management; remember a decade ago many people were talking about innovation and innovation journey and how much you are innovative, etc. Till the governments came and said this is my seven areas of innovation that I would focus on for the next ten years, these are my innovation targets, and these are my innovation agenda"*. Furthermore, INT13 discussed the public sector role in innovation and the private sector role within this regard *"Is innovation the role of governments? Or Is innovation the role of the private sector? Should governments be innovating? Or should governments by providing a better platform for innovation?"*. He

emphasized on the need for government sector to innovate in its business model and to provide innovation platforms *"So, what I'm saying is that innovation should happen in the business model of the government, but the government should try to provide the platforms to encourage the private sector, and the public in general to innovate"*. Similarly, INT14 emphasises on the rule of the public sector to provide innovation platforms to the public *"What about governments providing a platform of innovation that will help public sector organizations to extend and link the citizens and have citizen connected to the government by allowing them to bring innovative ideas"*. On the same page, INT16 highlighted the importance of having innovation platforms to engage the public more in the government work *"You can imagine there are so many tools being developed now, tools that exist from human-centred design thinking, and innovation tools to enhance public engagement and crowdsourcing"*. Furthermore, INT19 highlighted that you need innovation as part of the capabilities you need to activate the transformative capacity *"When you talk about transformative capacity, you need a team and tools that are utilizing state of the art the technologies that are focusing on innovation and focusing on bringing new services and new ideas"*. Finally, INT36 highlighted that, whenever the governments adopted new innovative ideas, this should not affect the stability of jobs of employees in the public sector *"They have to give the confidence that innovation will never come at the cost of employees"*.

Figure 5-76 and Figure 5-77 summarize the attributes highlighted by interviewees for this section. Interviewees think that innovation is an enabler of resilience. Meanwhile, some interviewees opine that the role of the public sector in innovation is in providing the private sector with platform for innovation. Furthermore, innovation is more linked to transformative capacity where the public sector should think of business model innovation to fulfil the new normal requirements.

314
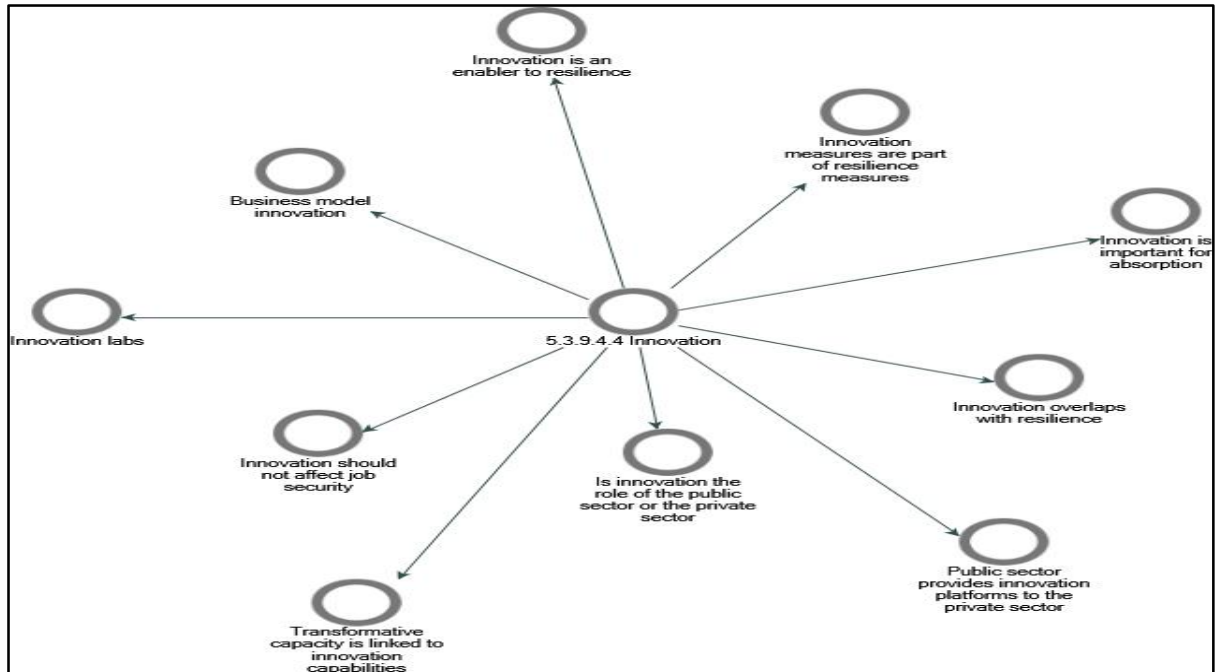
Figure 5-76: Identified attributes for innovation.
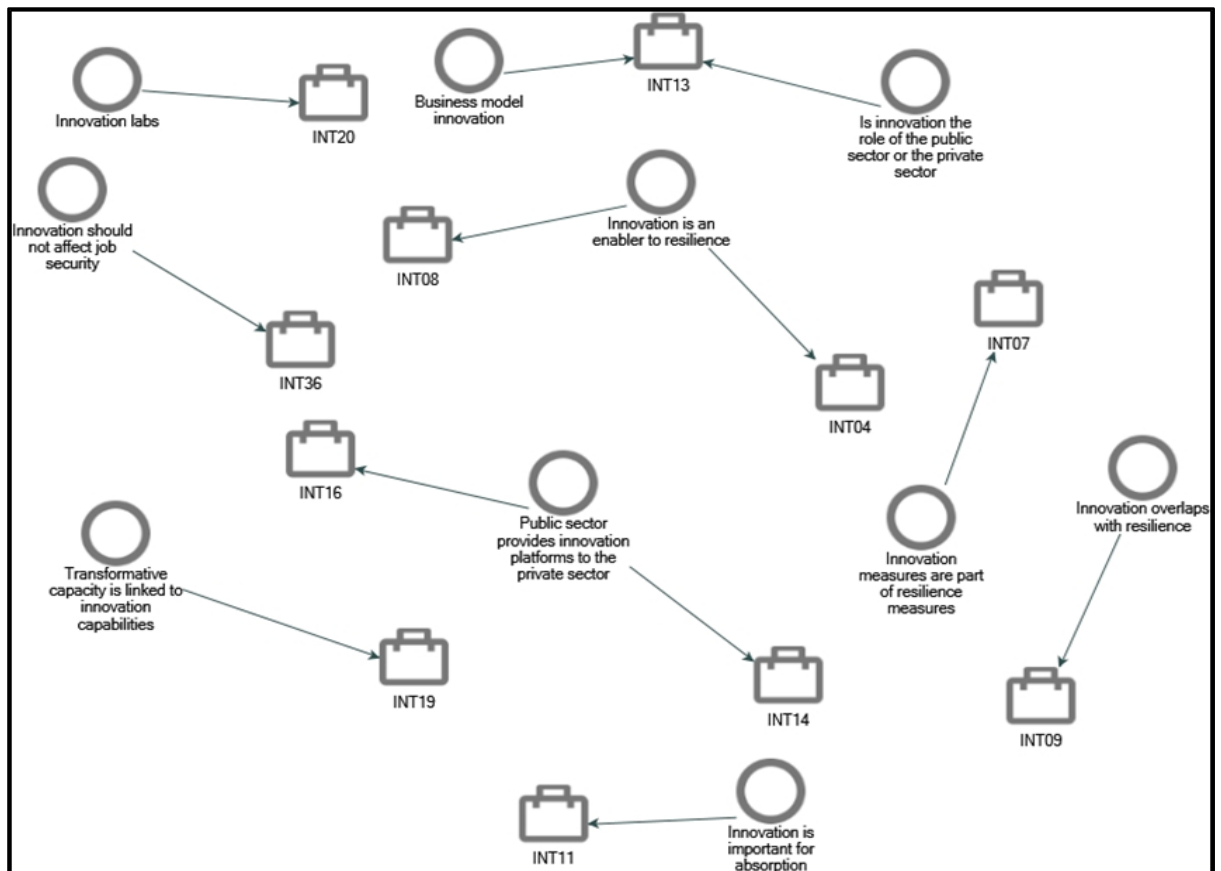
Figure 5-77: Identified attributes and interviewees inputs for innovation.

Integration

For integration, INT06 highlighted the importance of integration among government organizations to respond better to emerging events *"So, the responsiveness of this, from a government point of view, should be integrated and aligned to enable more integrated minds"*. Similarly, INT13 highlighted the importance of integration among government entities *"Integration between the government departments is not always happening"*. Furthermore, INT03 highlighted the leadership role in ensuring integrating the efforts in the face of an emergent event *"The leaders take place in monitoring that the actions are effective and are successful in facing the events, and also trying to integrate all the efforts to face the event and reduce the effect of this event to the minimum. Besides that, they have to integrate all the efforts of the private and public sectors to avoid any expected side effects of these events"*. Meanwhile, INT11 highlighted the importance of integrating the efforts between central government entities and other organizational government entities for better management of uncertainties *"Now bridging this gap can be done by the central government and the entities themselves in addition to the proper strategic planning for each entity that integrates as well with a central government"*. Furthermore, he added that the public sector should also integrate the plans and the solutions *"But it needs to be more integrated in a structured way to integrate the plans and to integrate also the solutions"*. Meanwhile, INT32 emphasised having integrated communication among different parties to face an emergent event *"The communication should become faster and more connected and integrated"*. He also added that integration of mandates among different parties within the same sector *"For sure it should be integrated, that is why Dubai has integrated some of the sectors together under combined sectors"*.

Figure 5-78 and Figure 5-79 summarize the attributes highlighted by interviewees for this section. Interviewees think that there should be some sort of integration between government organizations. This integration in government should be reflected in having integrated communication and having integrated plans and solutions. There should also be some sort of integration between sectors. The integration in the public sector, in general, is highly driven by leadership.
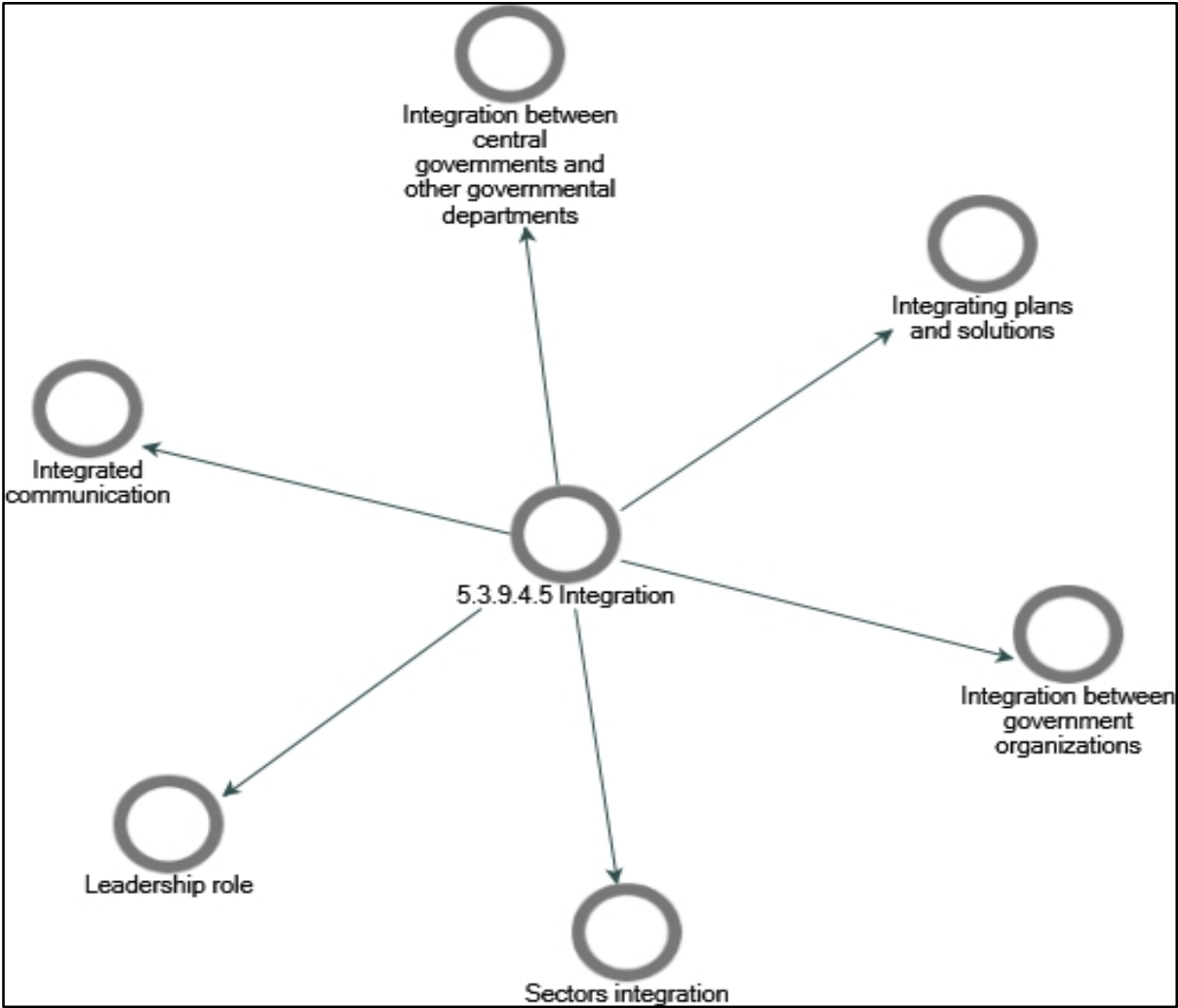
Figure 5-78: Identified attributes for integration.
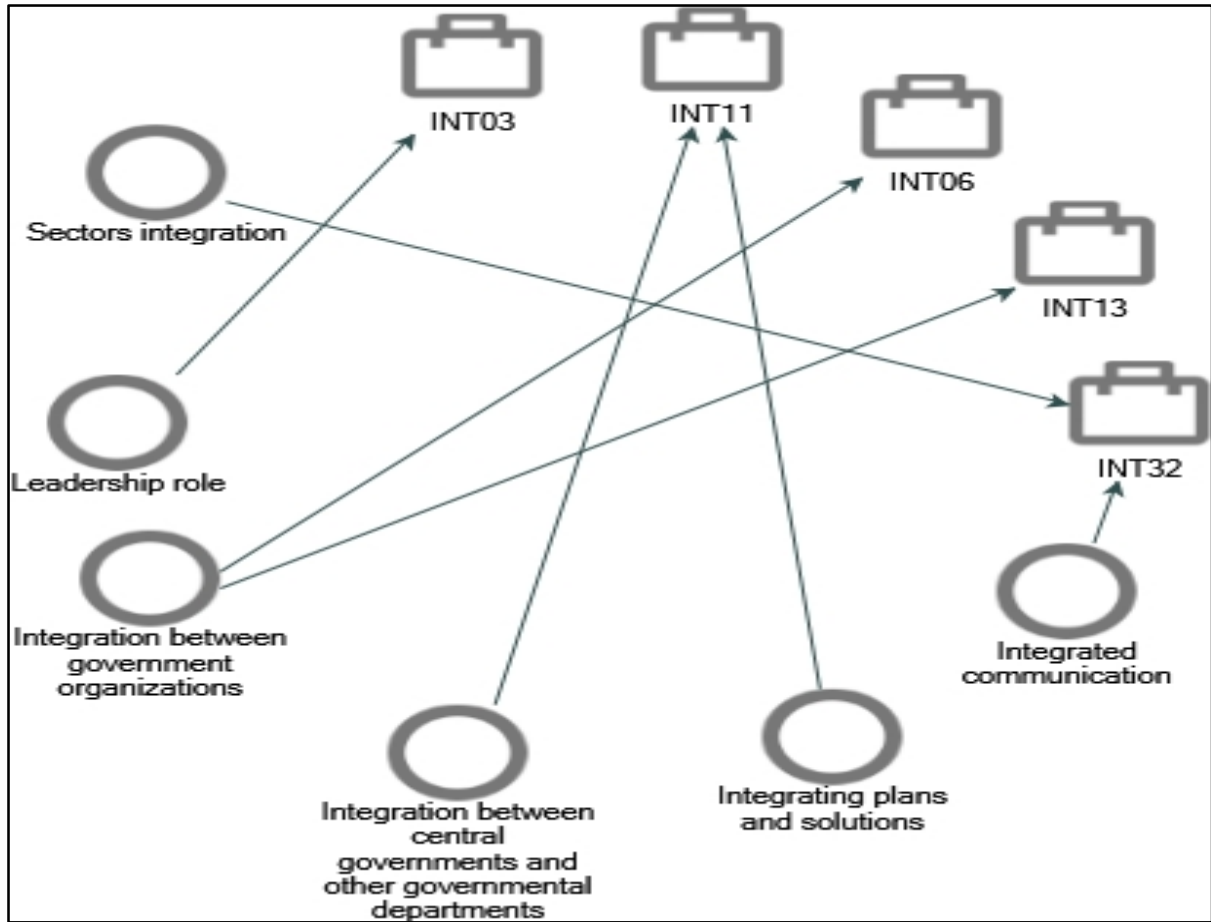
Figure 5-79: Identified attributes and interviewees inputs for integration.

5.3.10 Theme Number Ten (Collaboration and Partnerships)

Figure 5-80 shows the hierarchical coding structure of theme number ten, which is collaboration and partnership. The section shows participants' insights about the need to collaborate with other parties, such as, academic institutes, other countries, international organizations, different government parties, private sector, and research centres to effectively manage a disruptive event and build resilience:
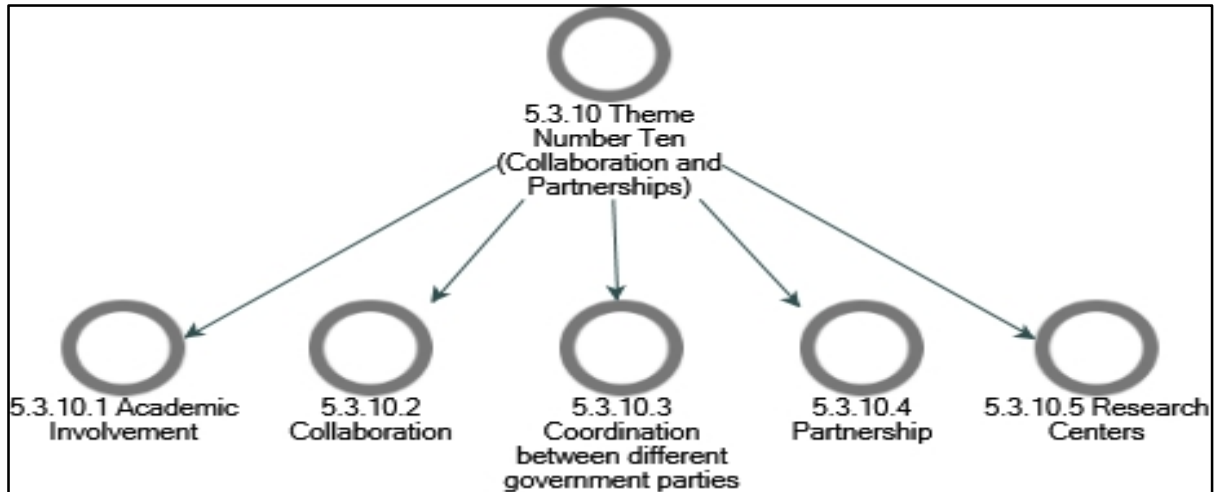
Figure 5-80: The hierarchical coding structure of Theme 10 (Collaboration and partnerships).

Academic Involvement

The following paragraph presents the interviewees' insights about engaging the academia to seek their opinion on how to deal with an emergent event or collaborate with academic institutes to do research and engage them in finding solutions to be more resilient.

INT01 highlighted the importance of alignment between the public sector and universities in order to coordinate the information related to emergent event prediction *"There should be a centralized effort where structures, practices and provision of data are really centralized. Coordination of effort doesn't mean that this entity should be doing it alone; this can be aligned with universities, this can be aligned with research centres, and this can be aligned efforts with all other government entities"*. Similarly, INT06 emphasized the importance of aligning with universities, whenever the public sector does not have the platforms for data collection and analyzing the data related to an emergent event *"One of the other tools that you need to have is, you need to have access to the people having good connections with universities and research centres"*. He highlighted the role of academia in building resilience capabilities in the public sector *"I think that this is what we call agility; if you didn't have the required capabilities*

319

as a government, there are many tools that you can use to achieve these capabilities. You can have a partnership with other sectors like the private sector, society, universities, and academia centres". On the same page, INT06 highlighted the importance of aligning with universities whenever the public sector needs to uplift the capabilities of their people, for certain subjects such as future foresight *"There is a science related to future foresight that is taught in the universities, and the public sector does not have to reinvent the wheel"*. Furthermore, INT23 suggested focusing on university students, when the public sector has to share the lessons learned, post a disruption event *"Organize a workshop or a lecture in one of the universities, you will find many young students who are impactful, and your message will be transported to their families and friends"*. Similarly, INT33 emphasized on the role of universities in deploying case studies as part of the lessons learned, post an emergent event *"We will try to see how we can use these kinds of case studies in our universities"*. Meanwhile, INT31 recognized the role of universities while dealing with certain emergent events related to the health sector *"Maybe in the health-related field, the issue is more straightforward, because we have an agreed-upon methodologies or code of practice based on these scientific researchers from universities. Before applying any solution, they piloted it very well, and they used it every time they are progressing with the issue"*.

Figure 5-81 and Figure 5-82 summarize the attributes highlighted by interviewees for this section. Interviewees think that there should be an alignment between the public sector and universities in order to better build resilience. Academia has a great role in building capabilities, developing cases studies, piloting solutions, and adopting lessons learned as part of building resilience in the public sector.

320
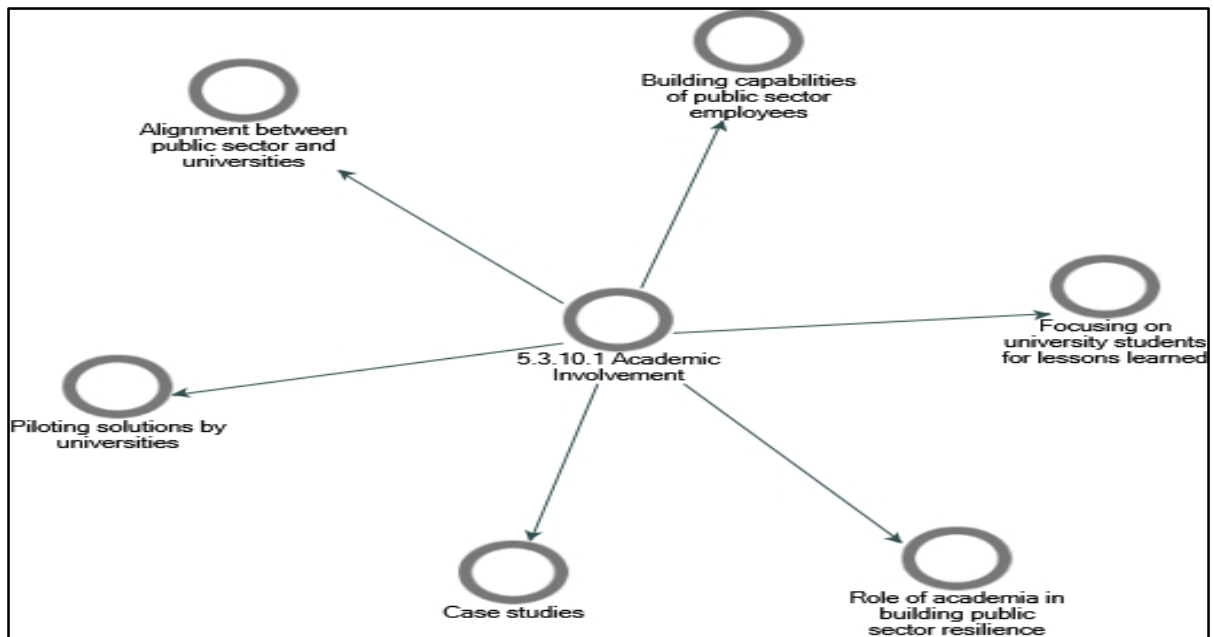
Figure 5-81: Identified attributes for academia involvement.
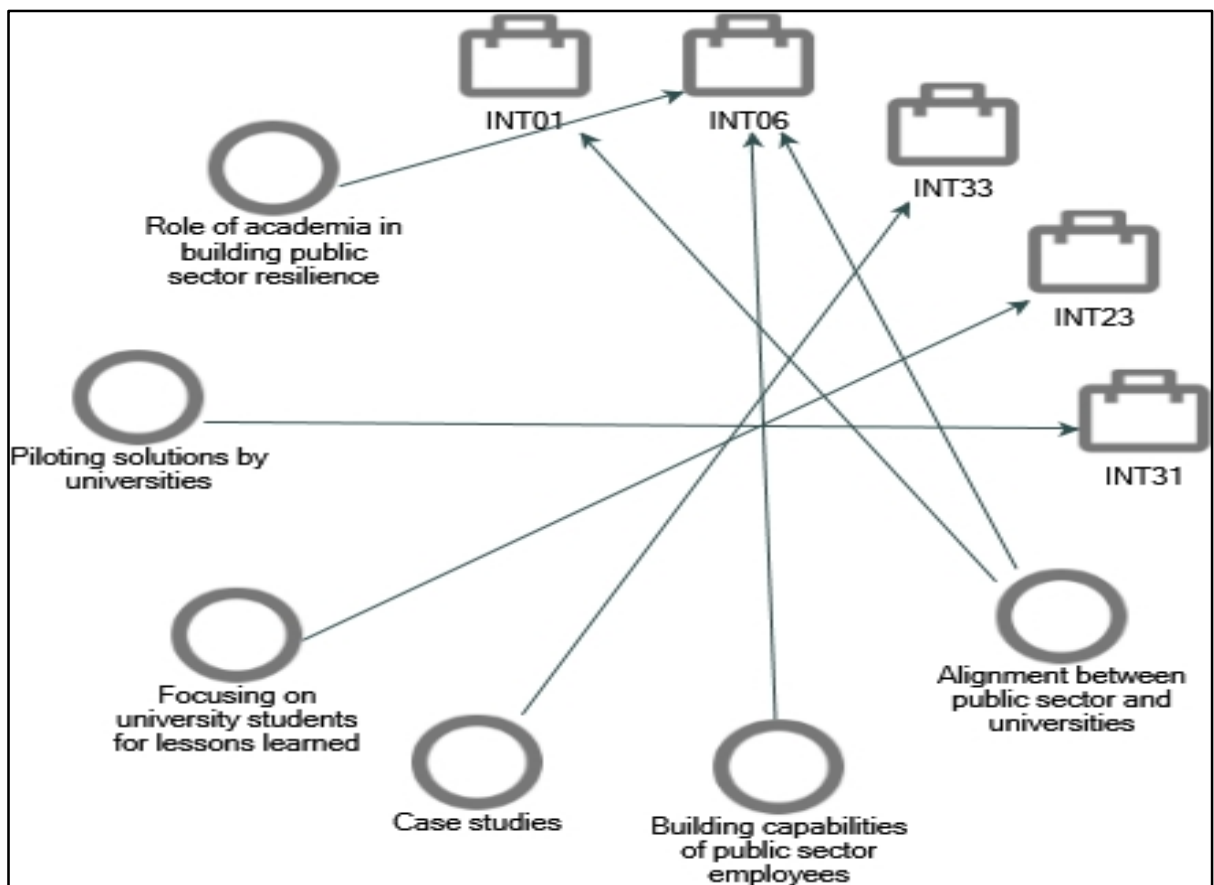
Figure 5-82: Identified attributes and interviewees inputs for academia involvement.

Collaboration

The following paragraph present the interviewees' insights about the collaboration between teams, departments, government entities, sectors, other governments, and countries:

INT11 highlighted the importance of collaboration between different government entities in order to build resilience *"Share the knowledge and share the experience with other entities. So, again, the collaboration between government entities"*. Similarly, INT29 emphasized on the need for collaboration among government departments *"We do it through collaboration with other departments"*. Meanwhile, INT15 stressed on the need for collaboration to be able to build resilience *"Building resilience management systems require lots of collaborated efforts. It needs to start with comprehensive awareness on the concept of uncertainty and how shall we face them in case they transformed into emerging events"*. On the same page, INT25 acknowledged the need for collaboration among government entities to be able to build resilience *"This kind of thinking requires a lot of collaboration and openness in the governments"*. Meanwhile, INT18 highlighted the need for team collaboration to respond to an emergent event *"The collaboration of different entities in teams; you need people to come together and solve the problems"*. Furthermore, INT26 emphasized on the need for collaboration between countries to be more resilient *"We should have integration and collaboration between countries, between two governments to build resilience"*. Meanwhile, INT29 listed some aspects of collaboration to enable resilience in the public sector *"One will be in collaboration with the stakeholders, or as we call them partners. Of course, to be able to react correctly with an emergency you need to collaborate with other governmental entities and collaborate with even private sectors"*. Furthermore, INT31 emphasized the need to have collaboration between sectors to be more resilient *"All of these; if we have a strong collaboration between the sectors, we will succeed in having better plans including*

awareness". Finally, INT36 highlighted the importance of building a relationship with international organizations for timely provisioning of the required information *"Because, at the national level, we have to tie up with international organizations, such as Word Bank, World Health Organization. In addition to financial institutions or regulatory bodies around the world. Therefore, we will have a proper transfer of information and knowledge about best practices"*.

Figure 5-83 and Figure 5-84 summarize the attributes highlighted by interviewees for this section. Interviewees think that to build resilience in the public sector. There should be better collaboration between public sector organizations, sectors, teams, stakeholders and private sector, international organizations, and countries.
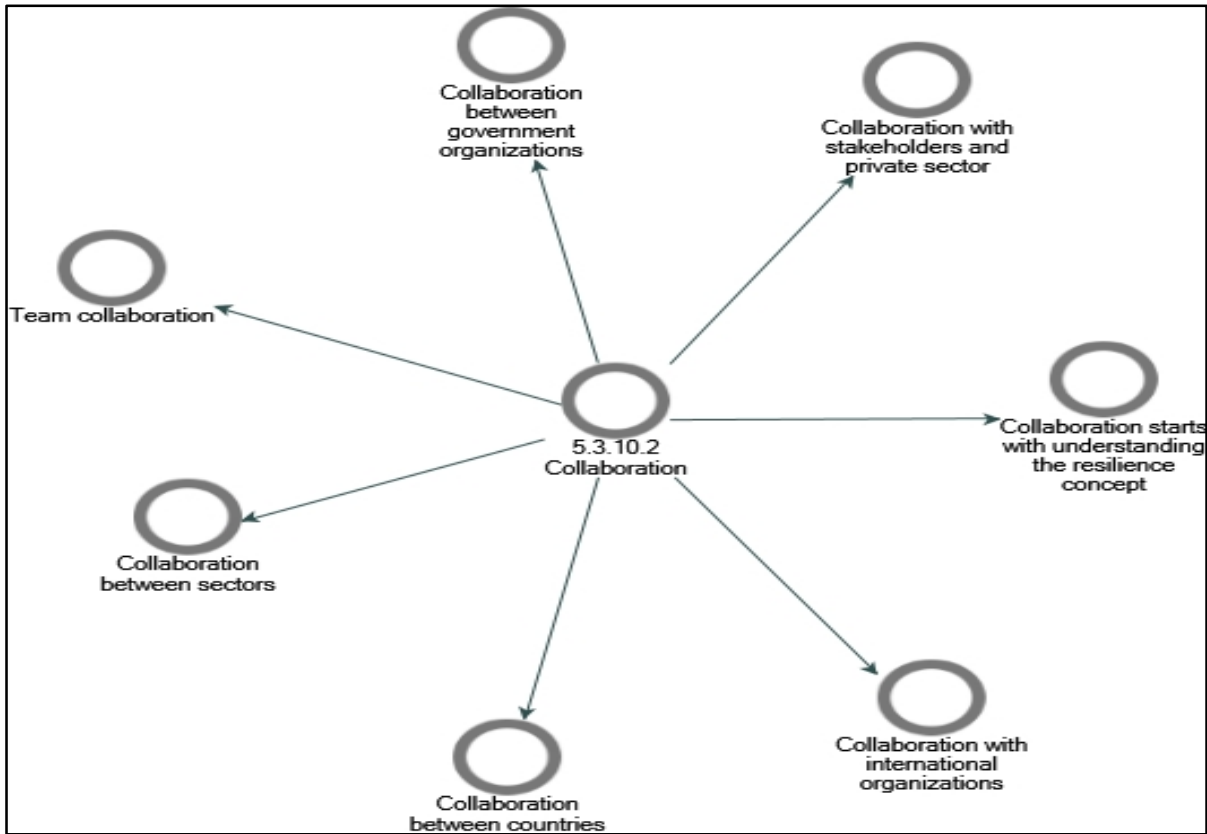
Figure 5-83: Identified attributes for collaboration.
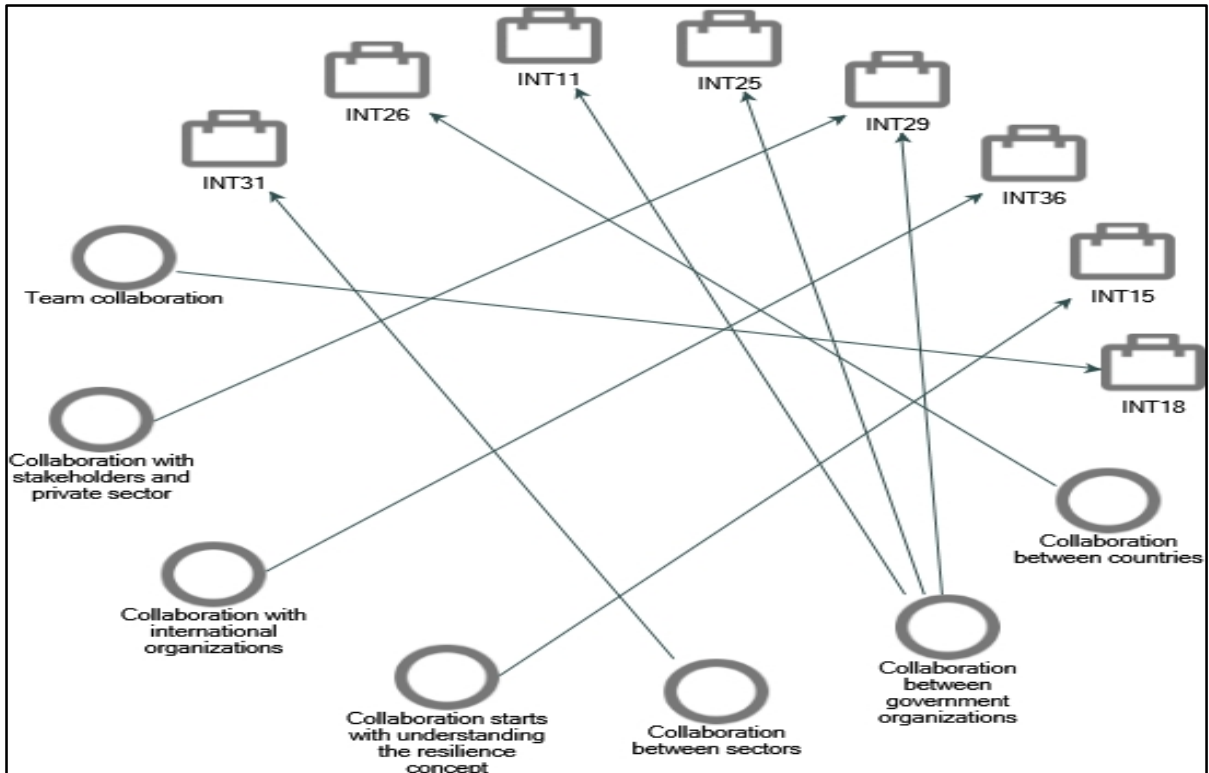
Figure 5-84: Identified attributes and interviewees inputs for collaboration.

Coordination between different government parties

The following paragraph present interviewees' insights about coordination efforts between central and non-central entities in the public sector to properly build resilience:

INT02 highlighted the importance of having a central body to deal with the emergent event across the public sector and to coordinate all the efforts *"You need some sort of a central body or a war room that would coordinate all the efforts. You need some centralized coordinating body, that would be the brain, but you need a sub-brain in each entity"*. Meanwhile, INT03 emphasized on the importance of coordinating the communication with all parties when facing an emergent event *"Coordinating the communication as an integrating effort"*. Similarly, INT35 emphasized the importance of coordination during communication *"Yes, Coordination and good communication plans between or among the entities"*. Furthermore, INT09

324

highlighted the importance of having one person to manage coordination among different parties when managing an emergent event *"You need this type of coordination from this person across different entities, because even if you have separate teams or cross departmental teams working in parallel, each team may do their hundred percent of what they believe is correct but this may not be the required action for all of the teams working in parallel. So, I would say that there should always be one responsibility lying with one person"*. He also added, poor coordination as one of the barriers that prevent public sector from achieving resilience *"With resilience, responding to a certain event requires high coordination and high contribution from different entities which are not responsible for the outcome of each other. If missing, this could be a big barrier to achieve resilience"*. Meanwhile, INT23 emphasized on the importance of coordination between different teams responding to an emergent event *"So, even if there are two or three separate parties, they should be linked together, and there should be a sort of coordination between them in order to make sure that the plans are implemented"*.

Figure 5-85 and Figure 5-86 summarize the attributes highlighted by interviewees for this section. Interviewees think that the public sector should coordinate the communication in case of an emergent event. Meanwhile, there should be a central body to coordinate in case of an emergent event, and it is better to have one person responsible for the ultimate coordination decisions between different parties.
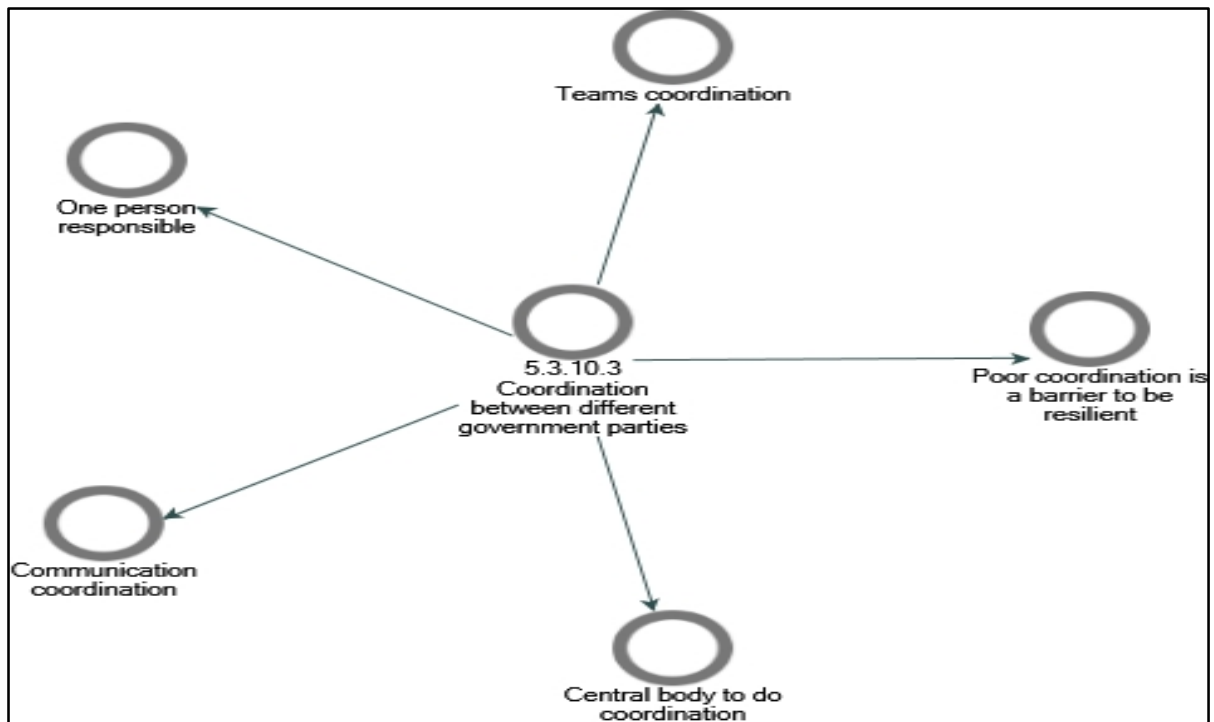
Figure 5-85: Identified attributes for coordination between different parties.
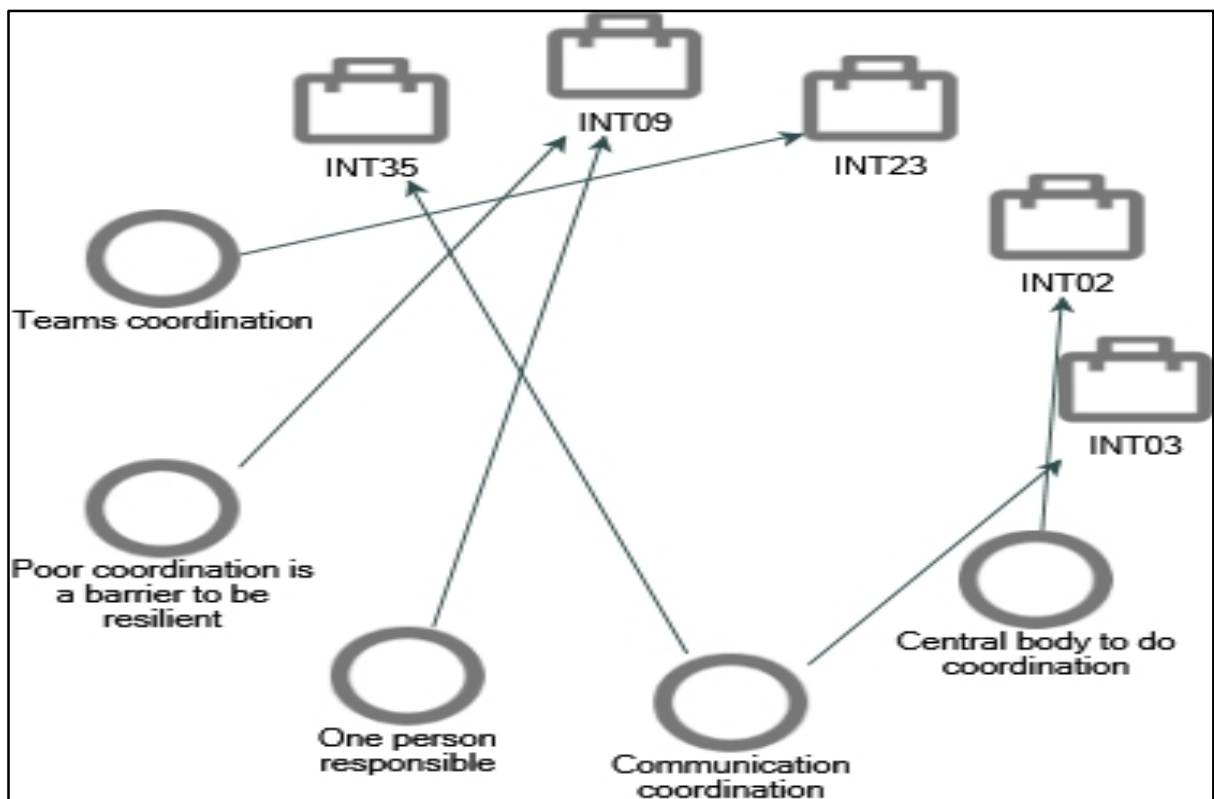
Figure 5-86: Identified attributes and interviewees inputs for coordination between different parties.

Partnership

The following section present the interviewees' insights about the alliance with other parties to do a certain mandate or manage a certain emerging event:

INT03 highlighted the importance of having a win-win partnership with the private sector in order to be more resilient *"To build a situation of win-win partnership; you need to build a relationship of winning situation. If you give the private sector a situation that they will win from it, they will come, and they search for your partnership in dealing with any event"*. Similarly, INT06 also highlighted the importance of partnership with the private sector to be able to build resilience *"A private-public partnership is like the access to finance. If you don't have access to these capacities, then you are not a resilient public sector"*. On the same page, INT13 emphasized the importance of public-private partnership *"A lot of government organizations are trying now to re-envision their role to shift more into being the regulator for the private sector to enable them providing some of the government services. They want to enforce the public-private partnership to the maximum"*. Similarly, INT35 focused on the public-private partnership to enable resilience in the public sector *"I will talk about the partnership with the private sector: Maybe, it is an approach more than being a tool. It is good to have the private sector with you as a partner as you may outsource some of the public sector services to the private sector. So, you will have the flexibility to face any threat or any issue that will affect your economy or services"*. Furthermore, INT08 emphasized the importance of having a partnership with the society and the private sector to build resilience *"I think that this can be achieved through partnership, being open for partnership, being sharing responsibility with the society and with the private sector"*. Meanwhile, INT14 emphasized the need to have partnerships with other countries to be more resilient *"Encourage also the partnership with similar situation countries"*. He also highlighted the importance of having a partnership with

327

international technology companies to enable the public sector to be more resilient *"and again, the government started building strategies by having partnership agreements with technology companies, because technology companies are making technology leap in the industry with the private or public sector"*. Similarly, INT32 highlighted the importance of having a partnership with big companies or organizations *"It could be more alliance or partnership with certain companies or certain international organizations"*. Furthermore, INT23 highlighted the importance of having partnerships between planners of the action plans required to respond to an emergent event and the executors *"Planners should have proper contact and proper partnership with those who will implement the solution"*. Finally, INT35 highlighted the importance of having a partnership with international bodies to be more resilient *"If you have partnerships with international bodies; I will mention some bodies related to food; if you are a member in FAO (Food and Agriculture Organization) or if you are a member in OIE (World Organization for Animal Health) which is for animals. So, these international organizations will send their experts to help you in crisis times"*.

Figure 5-87 and Figure 5-88 summarize the attributes highlighted by interviewees for this section. Interviewees think that public-private partnership is important to build resilience in the public sector. Furthermore, the public sector should encourage partnerships with big companies and international organizations, and most importantly, to deal with society as partners when it comes to building resilience in the face of emergent events.
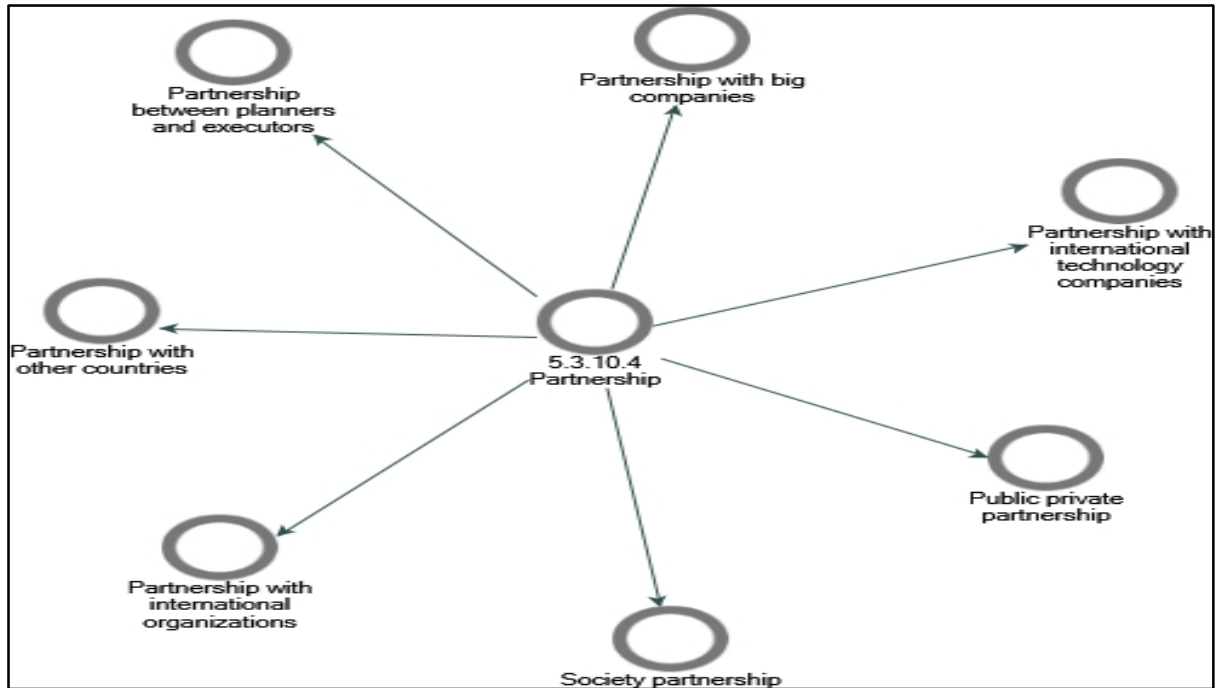
Figure 5-87: Identified attributes for partnership.
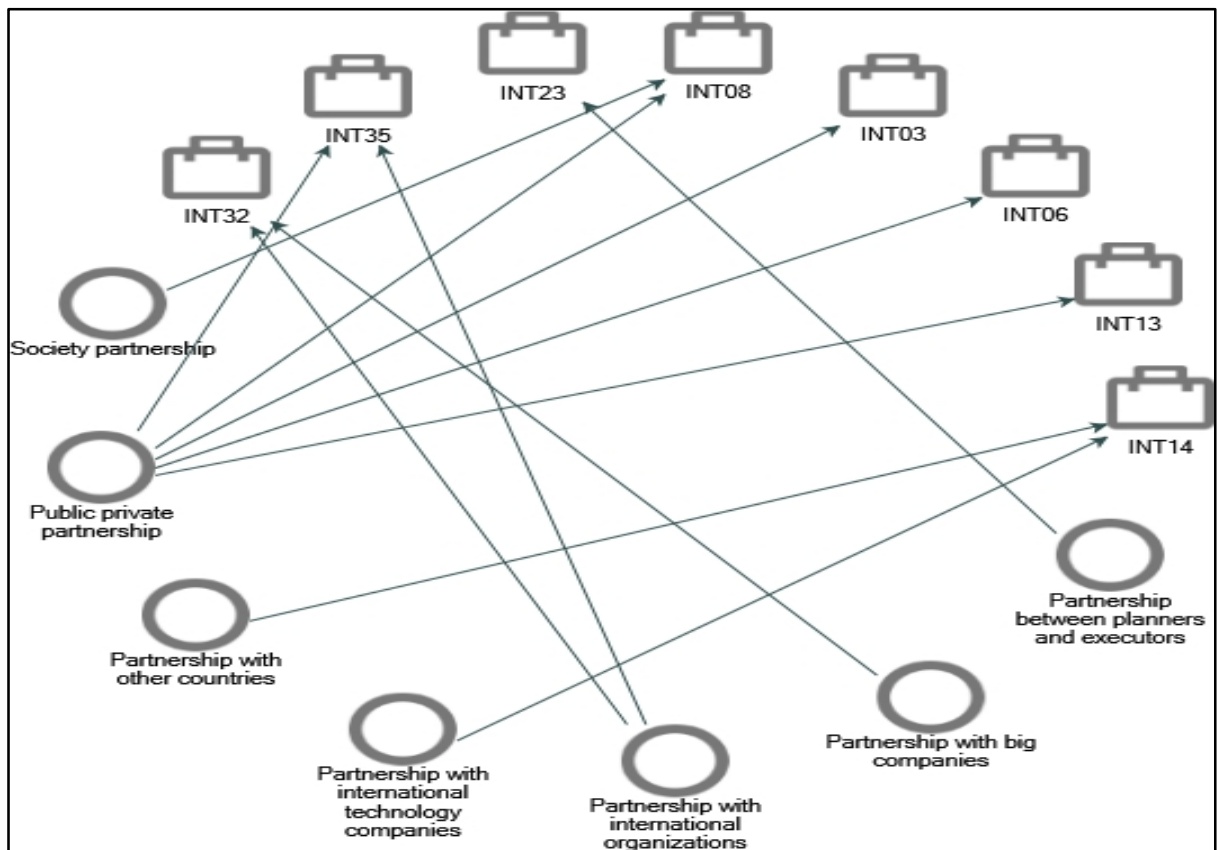
Figure 5-88: Identified attributes and interviewees inputs for partnership.

Research Centres

The following section present the interviewees' insights about the alliance with research centres to provide the required information and expertise to build resilience in the public sector.

INT01 highlighted the importance of having partnerships between the public sector and specialized research centres to provide knowledge and information related to the prediction of an emergent event *"This could be aligning with universities, this could be aligning with research centres, and aligning with other specialized parties"*. Meanwhile, INT08 highlighted the importance of the alliance with research centres to provide professional expertise about the tools to be used to predict an emergent event *"You need to have access to those people having good connections with universities and research centres that have the knowledge about how the changes are going to be"*. Similarly, INT20 emphasized on having an alliance with research centres *"I believe you should have taken an approach of creating something like research centres or research labs, which is very important. Nowadays a lot of government, international governments, you know, use artificial intelligence labs and innovation labs in order to share knowledge and try to come out with something really disruptive"*.

Figure 5-89 and Figure 5-90 summarize the attributes highlighted by interviewees for this section. Interviewees think that research centres can provide good input when it comes to the prediction of an emergent event, and they can assist the public sector to come up with disruptive solutions as part of responding to an emergent event or looking for opportunities that may arise from a disruptive event.
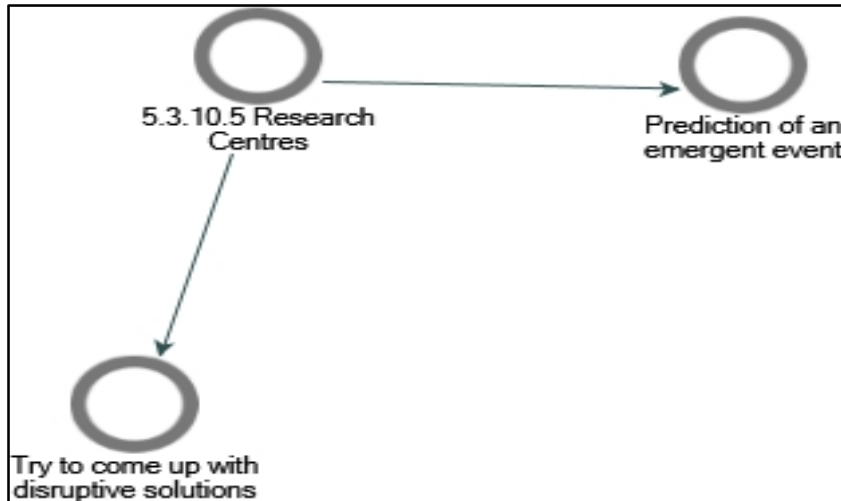
Figure 5-89: Identified attributes for research centres.
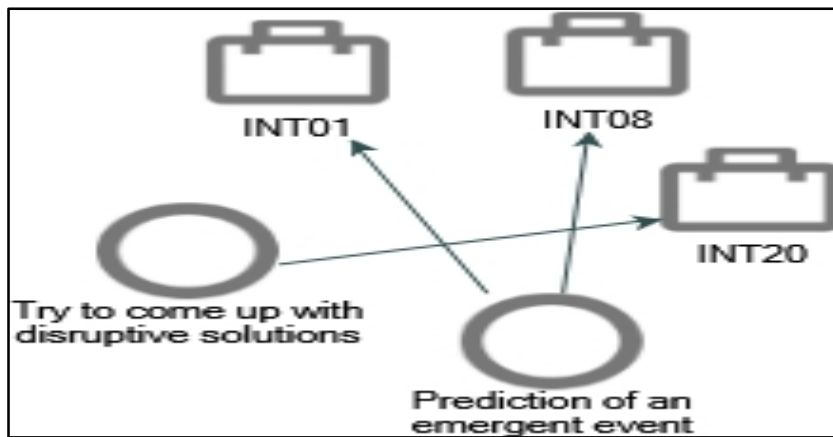
Figure 5-90: Identified attributes and interviewees inputs for research centres.

5.3.11 Theme Number Eleven (People Engagement)

Figure 5-91 shows the hierarchical coding structure of theme number eleven, which is people engagement. This section presents participants' insights about the possible ways of engaging the society and the public sector employees to face an emergent event. In addition to investigate how the public sector can better understand their requirements:
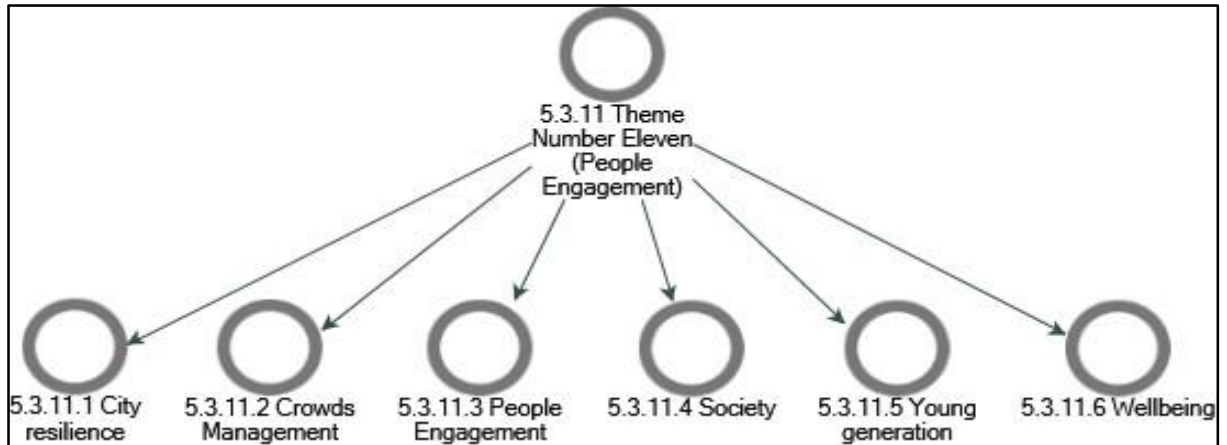
Figure 5-91: The hierarchical coding structure of Theme 11 (People Engagement)

The following section present the interviewees' insights about engaging the people, which means the public sector employees and the society to be more resilient in the face of emergent event:

City resilience

INT02 highlighted that there are certain standards specialized for city resilience that can be an input to develop a resilience framework in the public sector *"You can adopt some sort of resilience frameworks, either in a city or country level. Such as the Sendai Framework that is advocated by the United Nations Office for disaster risk reduction"*. INT13 described the urbanization problem, as more people are moving to cities, and this requires a special attention from the public sector when addressing the city resilience in the face of emergent events *"But if you dig a little bit deeper, and study what's happening within the city, you will realize that the city is expanding; expanding by size and by area. There are more buildings coming in and more people moving into a city. So, you have to address this issue"*. Furthermore, IN34 recommended, whenever we need to build a resilience framework for the public sector, to start at a city level first, then at sectors, and finally at the government organization level *"It starts*

from a macro level at a city level there could be a resilience framework for my city. Then

cascading down to a sector and then entities".

Figure 5-92 and Figure 5-93 summarize the attributes highlighted by interviewees for this section. Interviewees think city resilience models can be an input to developing a resilience framework for the public sector.
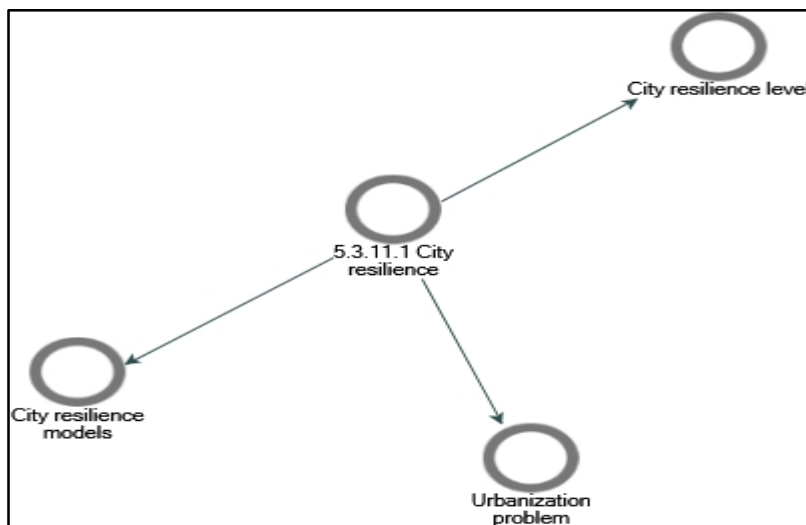
Figure 5-92: Identified attributes for city resilience.
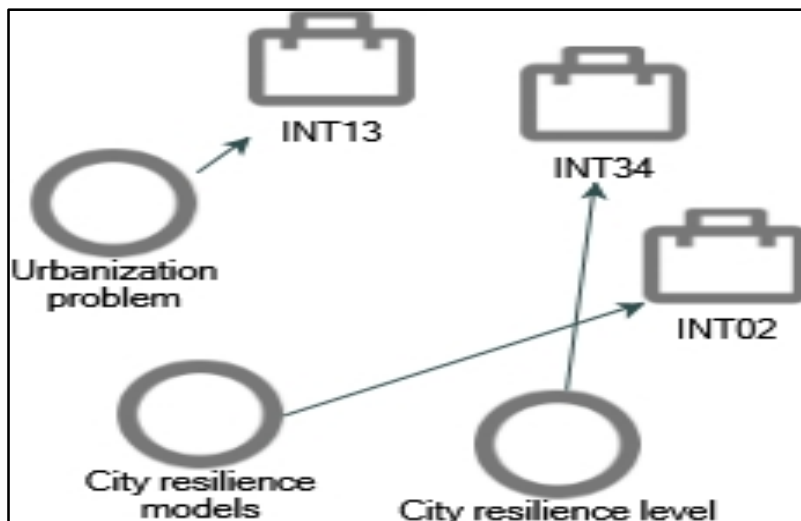
Figure 5-93: Identified attributes and interviewees inputs for city resilience.

Crowds Management

INT13 highlighted the importance of studying the crowd's psychology and try to uplift it to a positive stage to be more resilient *"The wisdom of these crowds brings them to better positions than they are, and some crowds their wisdom brings them to worst conditions. So, we should look for ways to bring the wisdom of crowds to bring us to a better position"*. Furthermore, INT16 emphasized the importance of engaging the public to put solutions to effectively manage emergent events *"You can imagine there are so many tools being developed now and tools that exist from human-centered design thinking. These tools aim to engage the public in putting solutions, such as the crowdsourcing tools"*.

Figure 5-94 and Figure 5-95 summarize the attributes highlighted by interviewees for this section. Interviewees think that crowdsourcing and studying crowds' psychology are important factors to build resilience in the public sector in the face of emergent events.
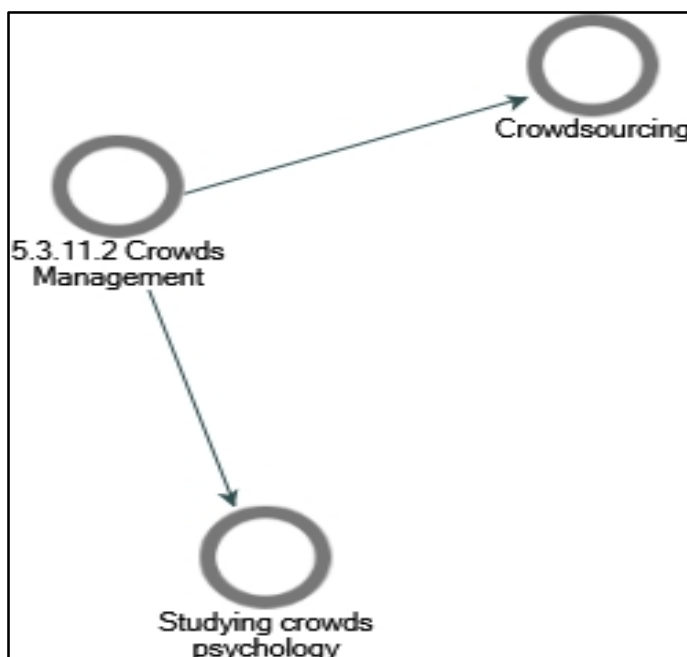
Figure 5-94: Identified attributes for crowd management.
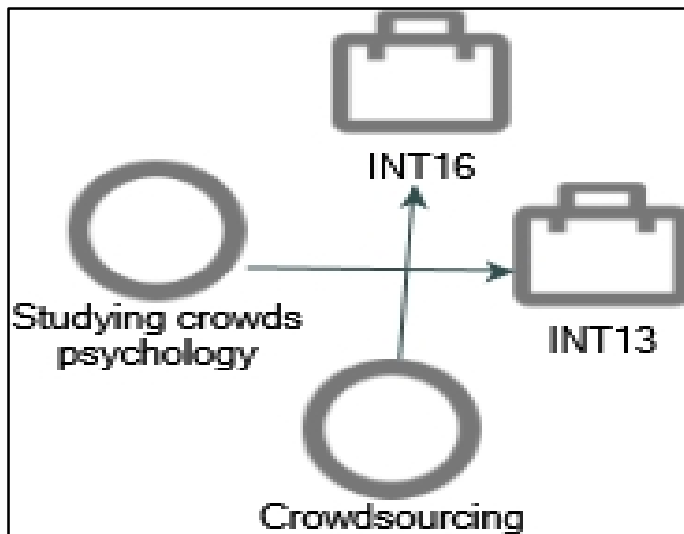
Figure 5-95: Identified attributes and interviewees inputs for crowd management.

People Engagement

INT01 emphasized the importance of engaging people internally and externally to turn challenges into opportunities *"Engaging internally and engaging externally with your stakeholders. Try to have a better understanding of what's happening, why it's happening and try to engage internally to see how we can respond to that, in what level, or what are the levels that we can respond through them"*. On the other hand, INT06 mentioned that one of the resilience measures is to assess the culture that is encouraging the engagement of employees *"If the culture is getting away from responsibility, if the culture is not engaging employees, then from these KPIs you can say that I do not have a resilient government organization"*. Similarly, INT07 emphasized the importance of measuring the engagement of employees as part of measuring resilience in the public sector *"Many measurements could be used to measure organizational resilience that may include staff engagement, event awareness, decision-making, innovation, and sharing knowledge"*. Meanwhile, INT09 stressed on the importance of engaging people or the public to be more resilient *"If there is coherence between the citizens*

335

with the government, then definitely you would see the attitude of this government is a little bit different from the attitude of other governments". INT14 emphasized on the importance of engaging the public to make policies more resilient *"So, once we start engaging with the public sector on how to make this transparent and also make citizens engaged, we will bring citizens connected to those policies"*. Meanwhile, INT22 highlighted the importance of engaging people in decision making to be more resilient *"So, the decision-maker at the end would make his decision based on insights from different people. So, everyone is involved, everyone is engaged, and this will ease the acceptance as well"*. Also, she elaborated more in engaging people when facing an emergent event to make them comfortable about what's going on and to engage them in putting solutions *"We must communicate with the people to calm them down, to make them ready, to inform them, and most importantly to engage them"*. Furthermore, INT25 highlighted the importance of engaging employees in putting plans to face an emergent event *"So, it's important to engage a lot of people in this conversation. Then you start having champions and teams who can slowly help you propagate the message across the government"*.

Figure 5-96 and Figure 5-97 summarize the attributes highlighted by interviewees for this section. Interviewees think that the level of engaging people while managing an emergent event is one of the resilience measures. This can take a form of engaging them in putting resilience policies, decision making, putting plans, and putting solutions.
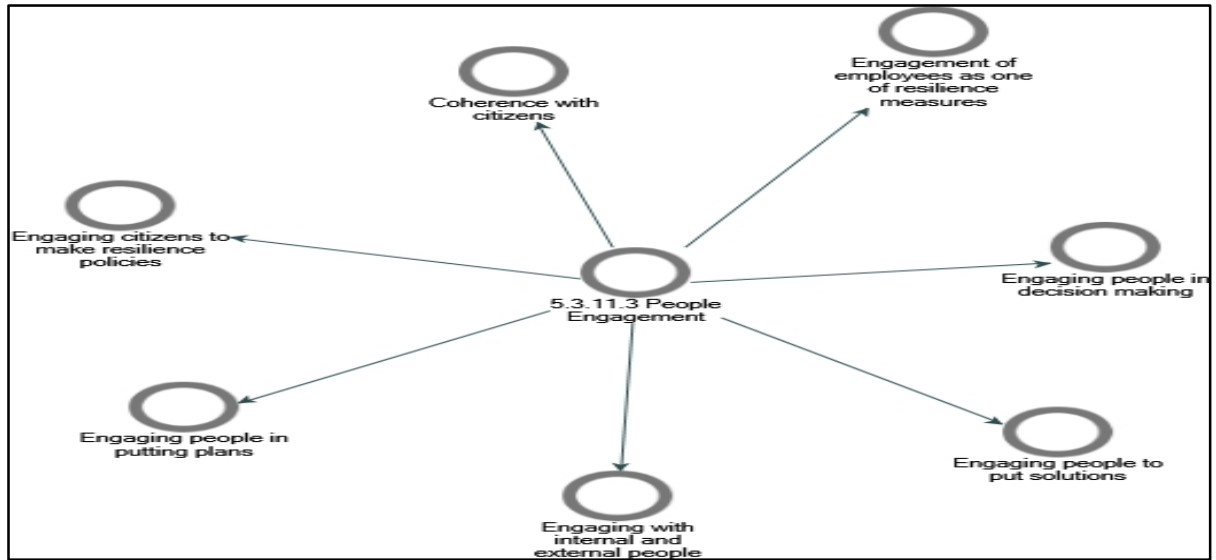
Figure 5-96: Identified attributes for people engagement.
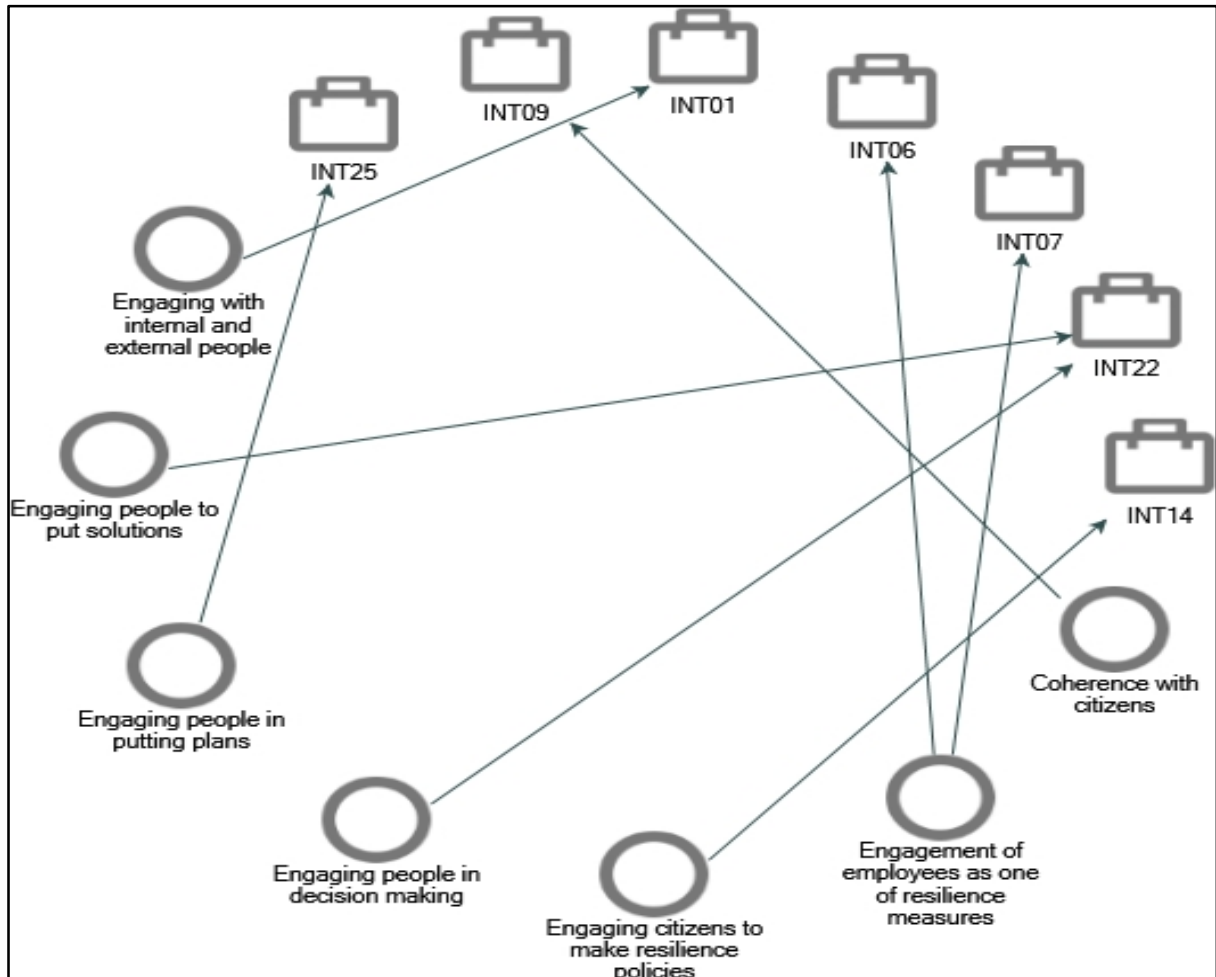
Figure 5-97: Identified attributes and interviewees inputs for people engagement.

Society

When it comes to society, INT07 thinks that the first thing that we should look at, when we are assessing the magnitude of emergent event, assessing its impact on society *"We assess the magnitude of the event by evaluating its impact on society, organization strategy, operations, services, employees, customers satisfaction, and other factors"*. Similarly, INT22 highlighted the magnitude of an emergent event can be assessed through its impact on society *"I guess the impact of each to the society will be the major criteria to assess the magnitude"*. On the same page, INT34 highlighted the impact on society as one of the triggers whenever we need to change policy *"We need to gather evidence on the impact of this trigger on our economy, our society, and our demographics, etc."*. Meanwhile, INT08 highlighting the importance of building partnership with society to be more resilient *"I think that this can be achieved through being open for partnerships, being sharing responsibility with the society, and also with the private sector"*. Furthermore, INT13 emphasized the importance of informing the society about what is going on and inform them in case this will impact them when facing an emergent event *"You have to educate the society as a whole, that there are some negative impacts that will happen"*. He added that the public sector should engage the society when addressing important decisions *"So, gaining more of the emphasis of the society on the important matters"*. INT14 highlighted the importance of proper communication with the society, which will enable them to be more engaged in putting suggestions or being part of executing actions *"That will make people start helping the government before the threat happens, and also after the threat becomes an issue"*. Similarly, INT35 emphasized proper communication with the society *"The most important thing is the awareness programs and how to build the messages for the society"*. Furthermore, INT25 suggested measuring resilience by assessing the confidence of society *"If there's a lot of uncertainties going around and people continue to have strong confidence within*

the public sector, then you probably have a very resilient society". Similarly, INT19 suggested measuring resilience through assessing the public sector ability to open channels with the public *"One of the key capabilities, is the ability to properly communicate and listen to Public opinion"*. Meanwhile, INT29 highlighted the importance of having society trust to be a more resilient public sector *"In general, you need to make sure that society trusts you"*. Similarly, INT30 emphasized society trusting the public sector *"A keyword is trust; trust plays a major role in this. If the society do believe and have trust in the government about what they need, what they do, and they have experienced that the government are always thriving the best for them"*.

Figure 5-98 and Figure 5-99 summarize the attributes highlighted by interviewees for this section. Interviewees think that whenever the public sector faces an emergent event, it should first assess the impact on society. There should be also proper communication with society and being active to obtain society trust while handling an emergent event.
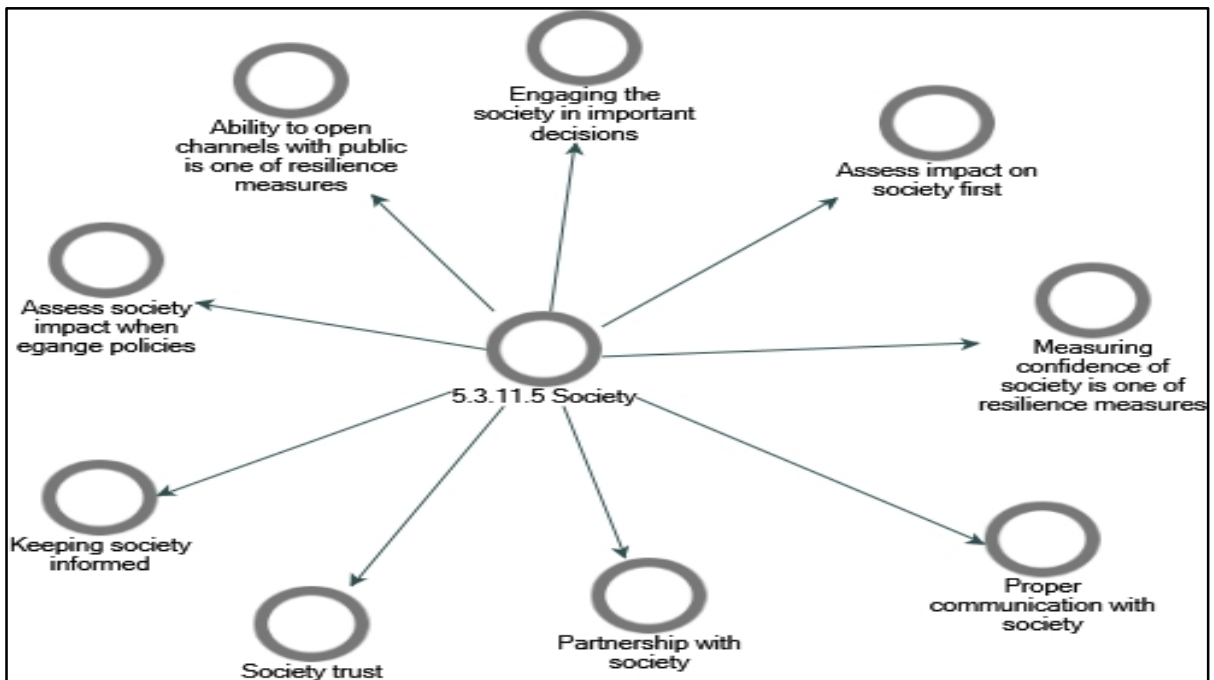
Figure 5-98: Identified attributes for society.
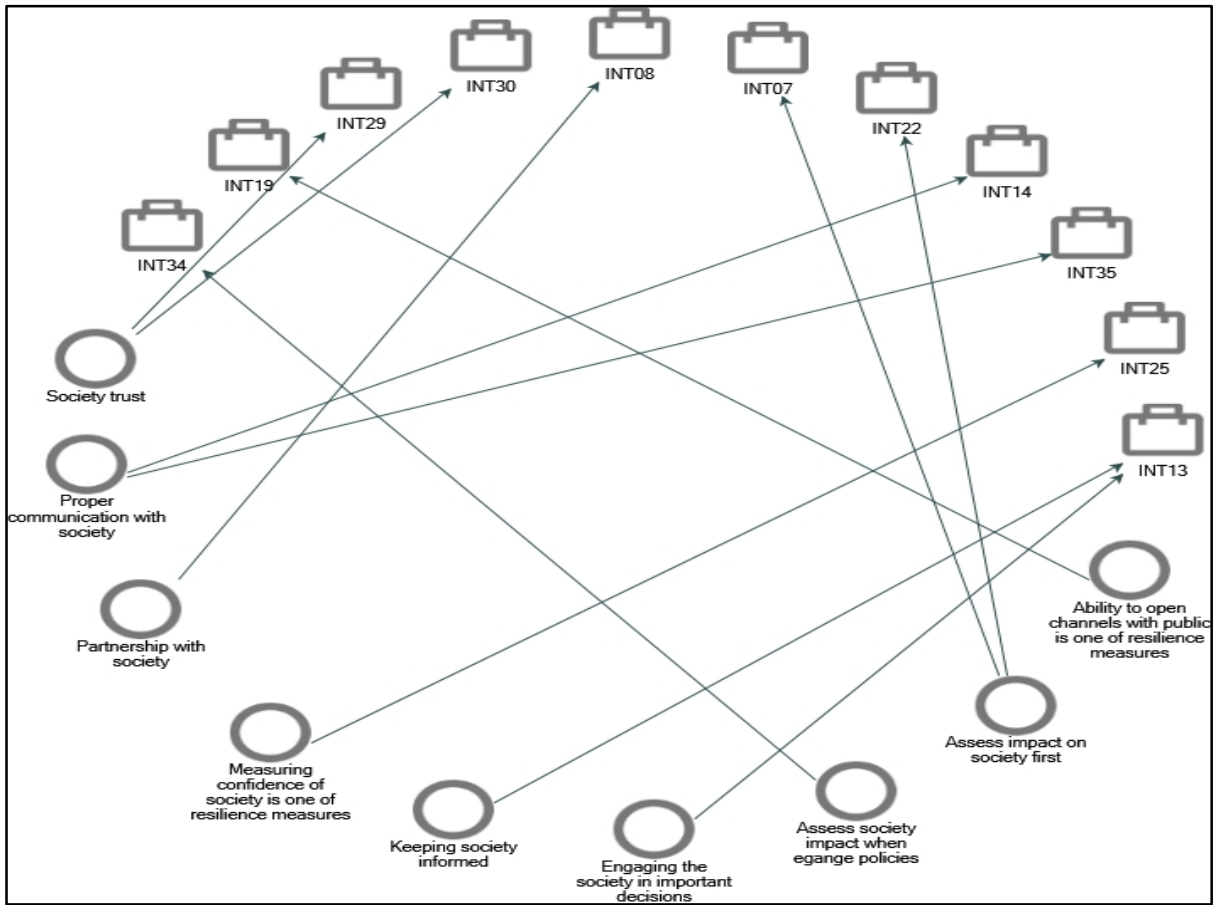
Figure 5-99: Identified attributes and interviewees inputs for society.

Young generation

Another important aspect of building resilience in the public sector is to look at an important
segment which is the young generation, as highlighted by INT05 *"The public sector is based
on serving the old generation, but it's not up to the level to serve the Millennials and fulfil their
expectation. So, this will result in uncertainty within this domain"*. Furthermore, INT23
highlighted the importance of proper communication with the new generation in case of an
emergent event took place *"It might have been valid in our era, but now the young generation
does not believe in speeches of great people who are trying to convince them that they know
everything, and we just want to educate you"*. Similarly, INT27 thinks that there should be a

340

proper way of using the proper tools when trying to address the new generation's needs *"Which means that we need to think of something more sustainable for the new generations"*. Furthermore, INT23 suggested if the public sector wants to build a resilience society in the future, they should start at the early stages in schools *"It starts with schools; we have to focus on the young children, we should let them understand that if anyone of them fall this time, next time he won't fall easily. He might fall again but not very easy, and the third time he will not fall"*.

Figure 5-100 and Figure 5-101 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted the importance of taking into consideration the young generation needs by the public sector to be resilient. This implies opening communication channels with the young generation and providing solutions that address their needs when facing an emergent event.
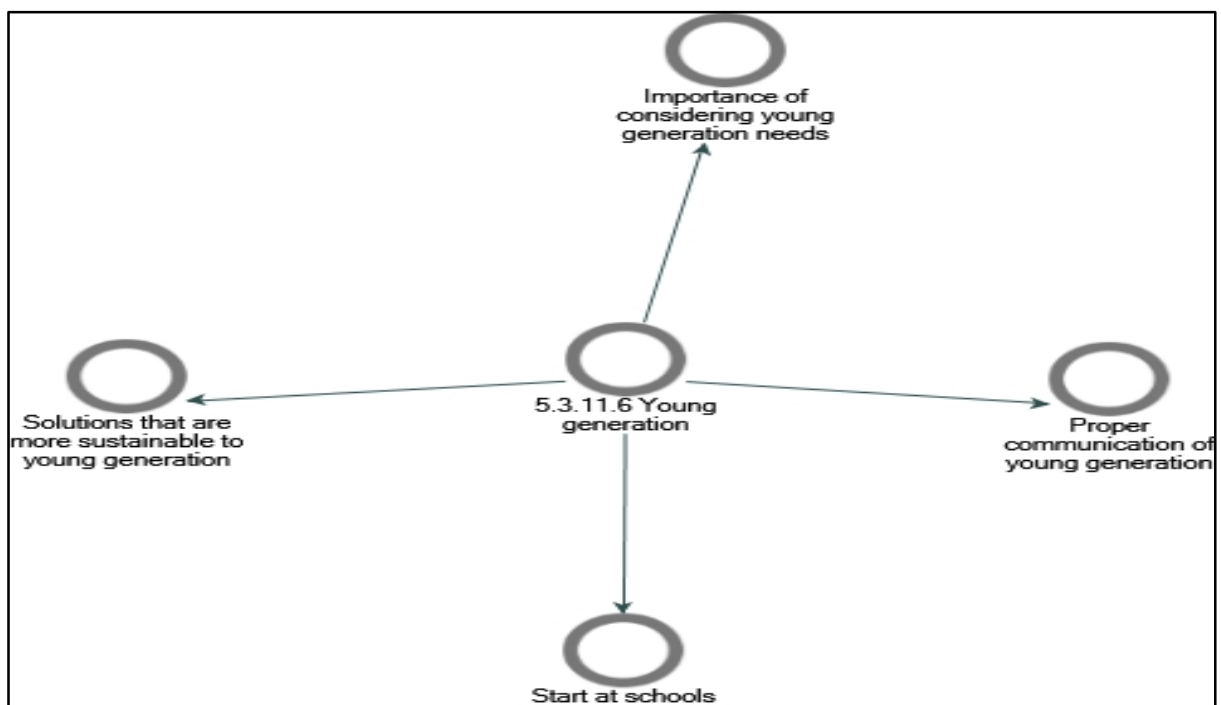
Figure 5-100: Identified attributes for young generation.
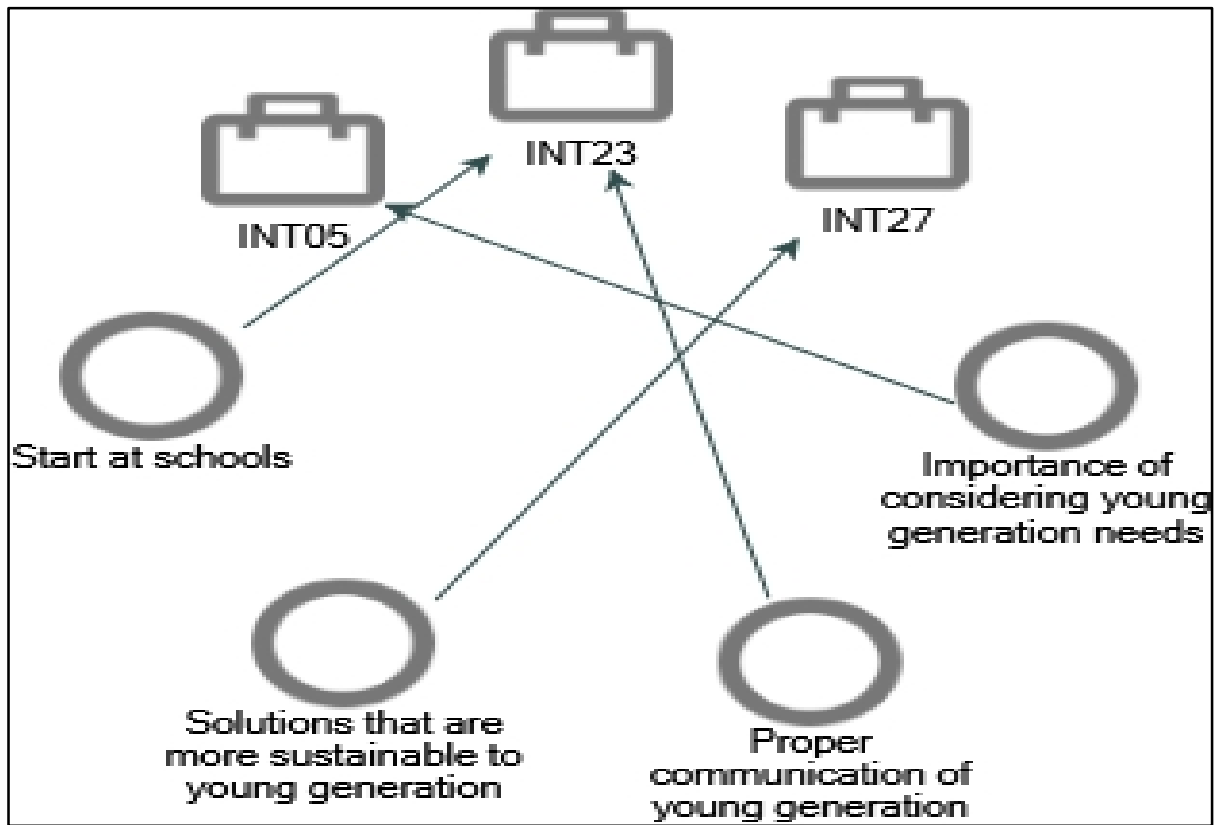
Figure 5-101: Identified attributes and interviewees inputs for young generation.

Wellbeing

INT34 highlighted the importance of assessing the wellbeing impact when developing or revising a policy in case the public sector faced an emergent event *"Something called the wellbeing impact. In fact, we have a tool called the policy to people impact assessment tool"*. Meanwhile, INT01 emphasized the essence of having a public sector, which is the wellbeing or welfare of the public *"The uncertainties will shuffle or will rearrange the country's capabilities or country's success, and this by itself will add reflection on the economic levels or the social comfort of these countries. This will also affect the core business of the public sector, which is mostly guaranteeing the welfare and wellbeing of the public"*. Furthermore, INT23 emphasized on the importance of not losing trust with the society, as this will affect the wellbeing of the

342

country *"The final issue is that the government is totally responsible for everything that happens, so if it failed, the people would lose trust. Nevertheless, if people were involved, and we all failed, then they say that they as a people also failed, and not just the government. So, this trust-building will affect the wellbeing of the country"*.

Figure 5-102 and Figure 5-103 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted that the essence of the public sector is ensuring the welfare of the public. Accordingly, the public sector should continuously assess the wellbeing of society while revising policies due to an emergent event, to ensure maintaining trust with them.
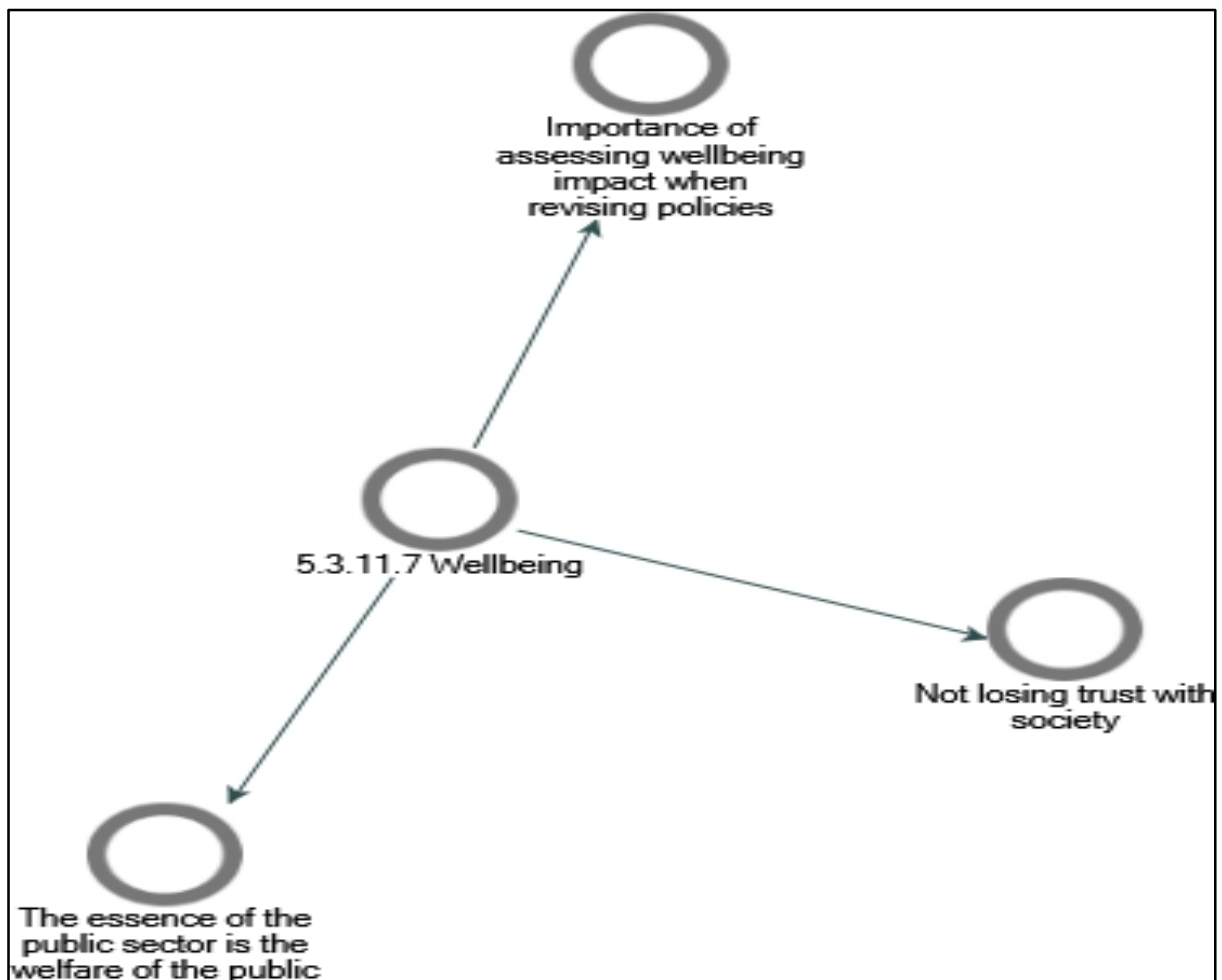
Figure 5-102: Identified attributes for wellbeing.
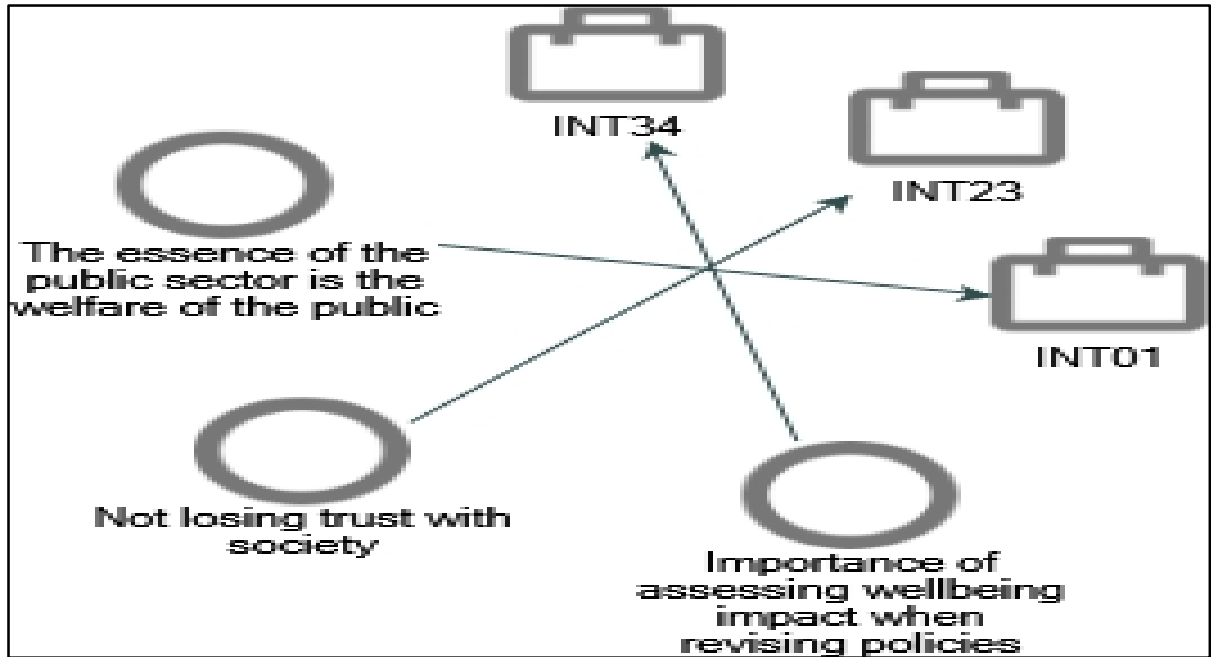
Figure 5-103: Identified attributes and interviewees inputs for wellbeing.

5.3.12 Theme Number Twelve (Public sector current and future mandate)

Figure 5-104 shows the hierarchical coding structure of theme number twelve, which is public

sector current and future mandate. The findings of the data will try to investigate participants'

insights about the evolving role of the government and what will be its expected role in the

future. In addition, it will address the perspectives of how the business model of the public

sector and the value provision is changing upon facing an emergent event:
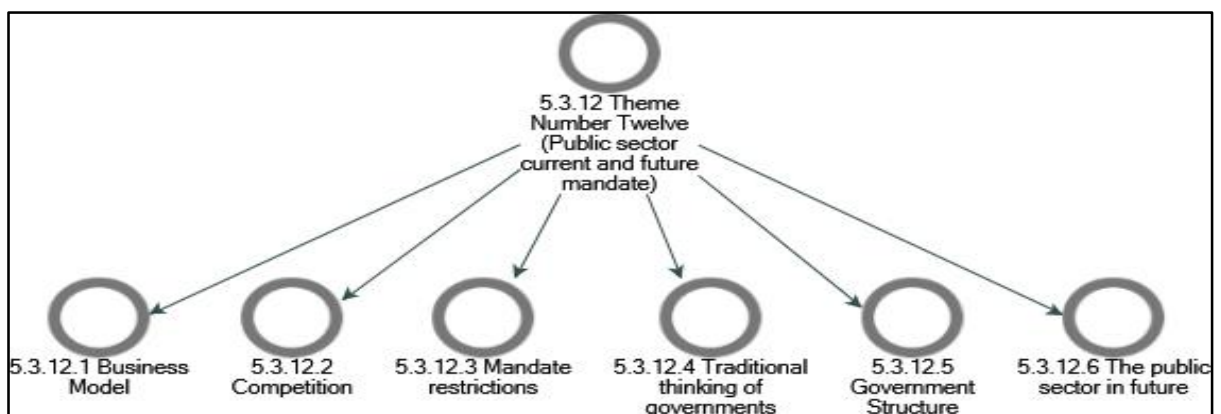
Figure 5-104: The hierarchical coding structure of Theme 12 (Public sector current and future mandate)

The following section presents interviewees insights about public and future mandate of the public sector:

Business Model

INT13 highlighted the importance of governments to innovate its business model to comply with the future challenges and uncertainties surrounding us *"The government should at least innovate its business model and the way it delivers value; the innovation should touch on the economic value to the society as well as to investors"*. Furthermore, INT14 requested to have more alignment between the new business models in the surrounding environment and the business model in the public sector *"Why it is a challenge, because eventually it changes the dynamic of business, so it creates new business models like e-commerce. The public sectors need to modernize their government operation and they need to know that there are changes happening to their business models, to adapt to new changes, whether they like it or not"*. Meanwhile, INT17 requested the public sector to change its business model before others can come and provide another business model that is competing with the current business model of the public sector *"So, you need to change your business model before someone come and give another business model that will serve the purpose better than you"*.

Figure 5-105 and Figure 5-106 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted that the public sector should align its business model with external business models in order to be more resilient. Meanwhile, the public sector should always look at business model innovation and upgrading its business model to fulfil the new normal requirements.
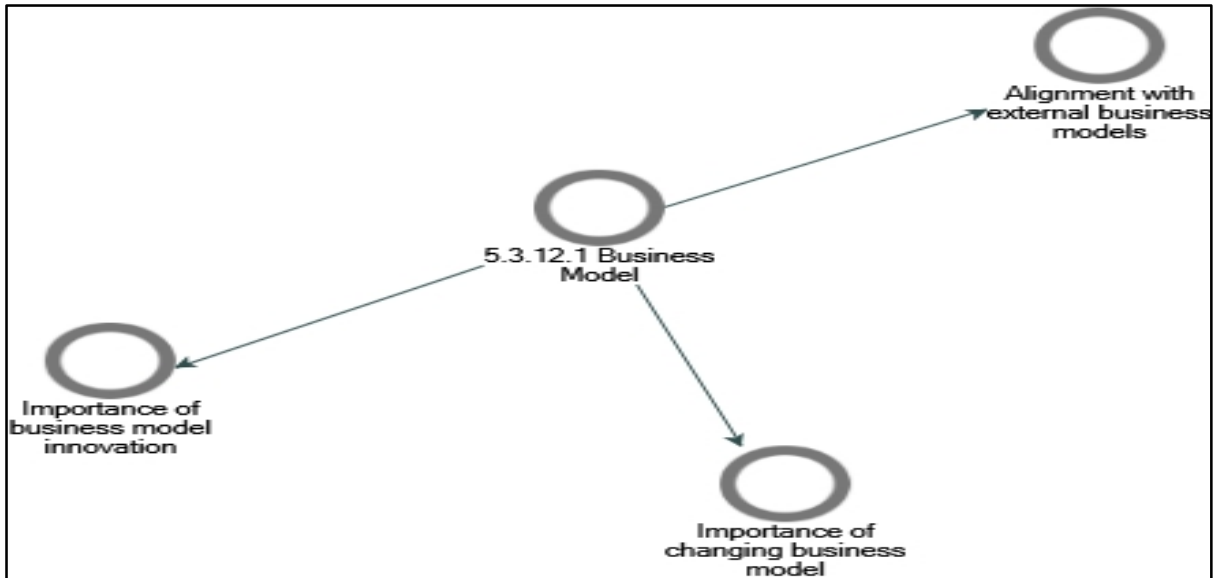
Figure 5-105: Identified attributes for business model.
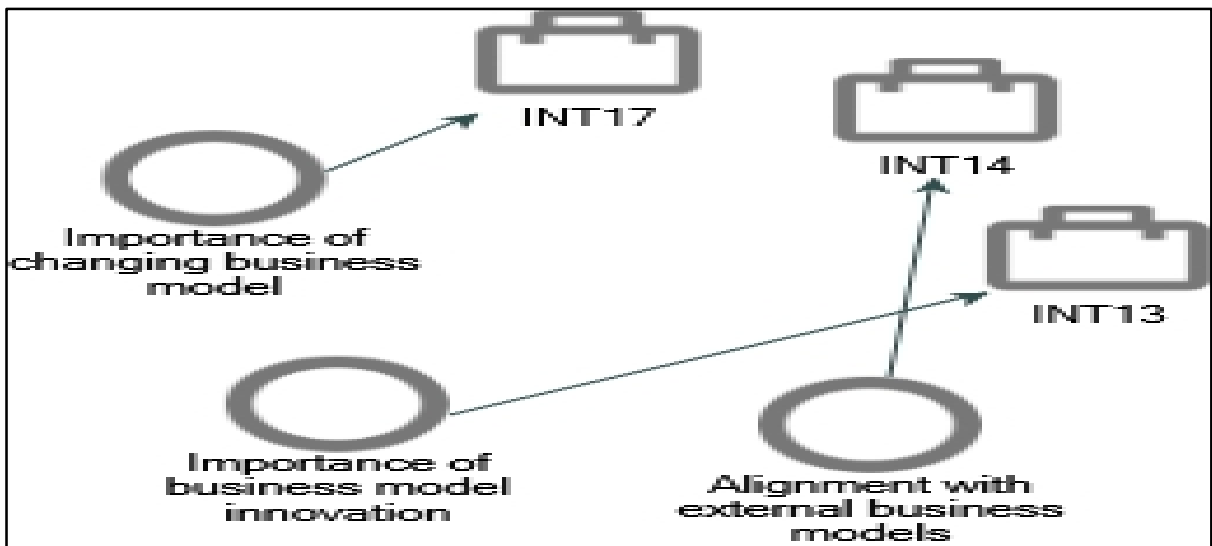
Figure 5-106: Identified attributes and interviewees inputs for a business model.

Competition

INT01 highlighted that the competition is now between the public sector in different countries, and this requires the public sectors to change the traditional way of narrow thinking *"The public sectors in different countries are in direct competition between each other. The more successful*

346

the public sector is, the more successful the country is, and the more competitive the country is". Similarly, INT08 believes also that there is competition among public sector in different countries *"So, there is competition between the local governments with other countries".* Furthermore, INT04 thinks that, in the future, the public sector will have competition from outside the country for the public services that is currently provided *"I believe very soon we are going to see a competition coming from outside".* Similarly, INT11 believes that the public sector in future will be competing with global leading organizations for the public services that it is providing *"At the same time, keeping the level of competition with the global leading organizations that may dictate some of the public sector services in future".* Furthermore, INT13 highlighted the issue of the public sector competing with the private sector in interfering in some of private sector businesses, and this could affect the private sector negatively *"The public sector is sometimes competing with the private sector in its business, which should not be the case".* Furthermore, INT20 highlighted that, any advancement in technologies could change the traditional service-provisioning portfolio of governments *"So, competition is now rising up, even though currently no one is competing with the government, but you can have disruptive technology that forces the government to change".*

Figure 5-107 and Figure 5-108 summarize the attributes highlighted by interviewees for this section. Interviewees think that the public sector is increasingly facing competition that exists between countries. Meanwhile, also a competition that the public sector is also facing will be coming from international companies. However, for the public sector to be more resilient, it should enable the private sector to do its work without trying to compete with them in their core businesses.
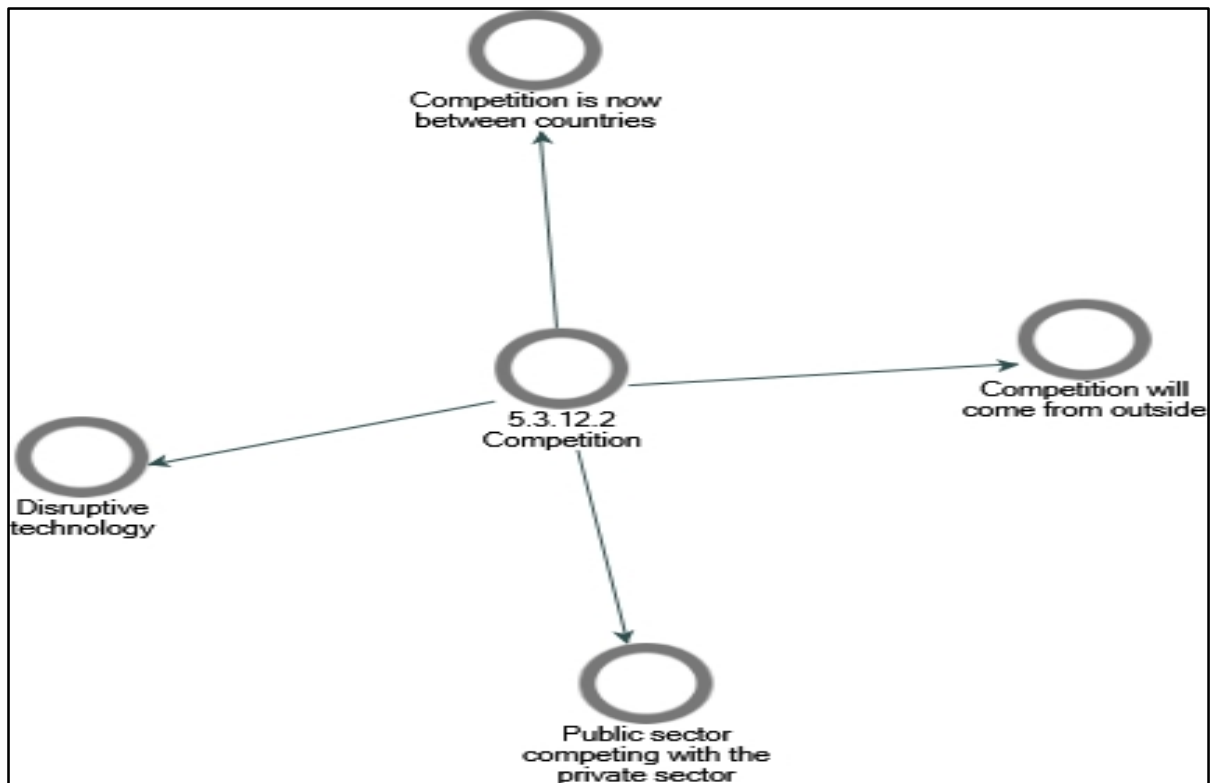
Figure 5-107: Identified attributes for competition.
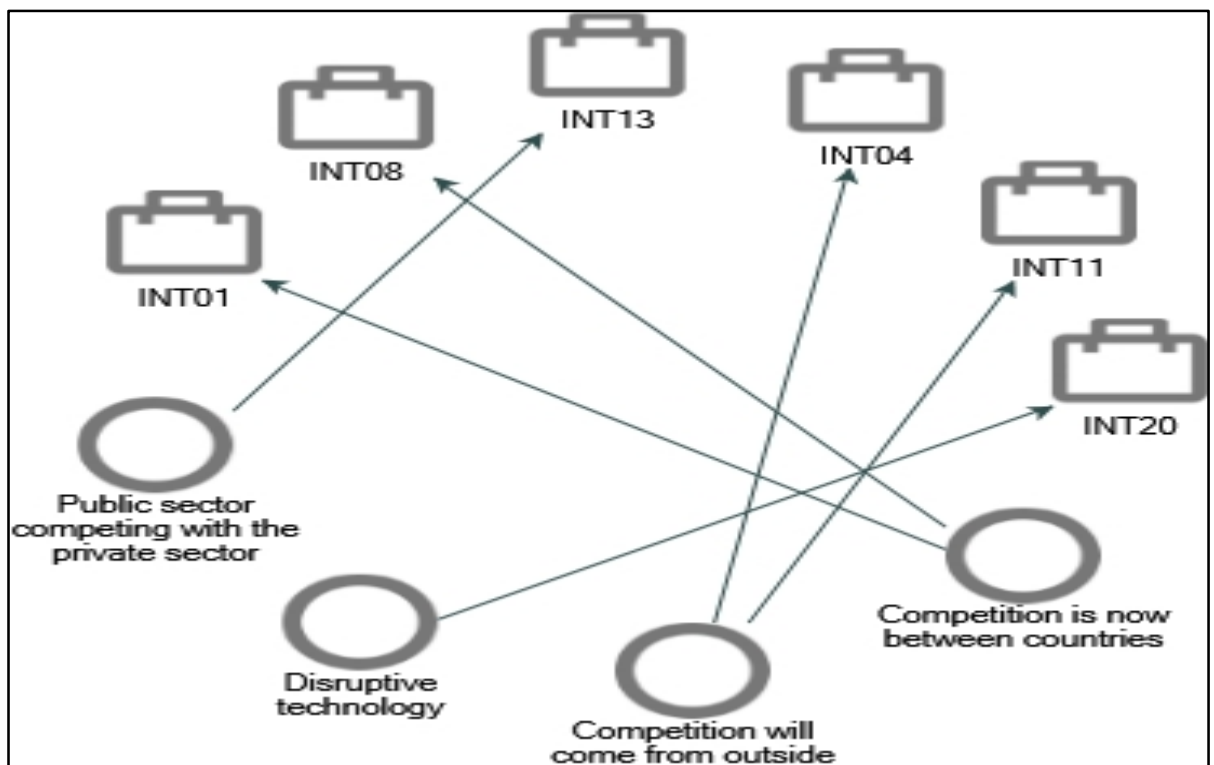
Figure 5-108: Identified attributes and interviewees inputs for competition.

348

Mandate restrictions

INT01 highlighted that the government organizations are restricted to their mandates, which makes them more traditional *"Each public entity itself has its own mandate that has been cleared in the law of establishment of that organization, and usually there will be complacent by doing whatever they're doing now"*. He added that these mandates would prevent the holistic thinking of the government entities as a whole, to respond to an emergent event *"Why I'm saying that, because if you think about the government from mandate point of view and service point of view, you can really deal with each entity by itself. But if you're talking about disruptive or about change, and we come back to the concept of value, then maybe, the current way of structuring the government is not the optimum way of providing values within new realities"*. Similarly, INT08 highlighted the mandate restrictions of the public sector entities *"Most of the public sector organizations are having mandates, and they are strict to their mandates. Most of the time, this mandate is difficult to be changed"*.

Figure 5-109 and Figure 5-110 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted that the public sector organizations are restricted by their mandates which is limiting their scope of work and prevent holistic thinking.
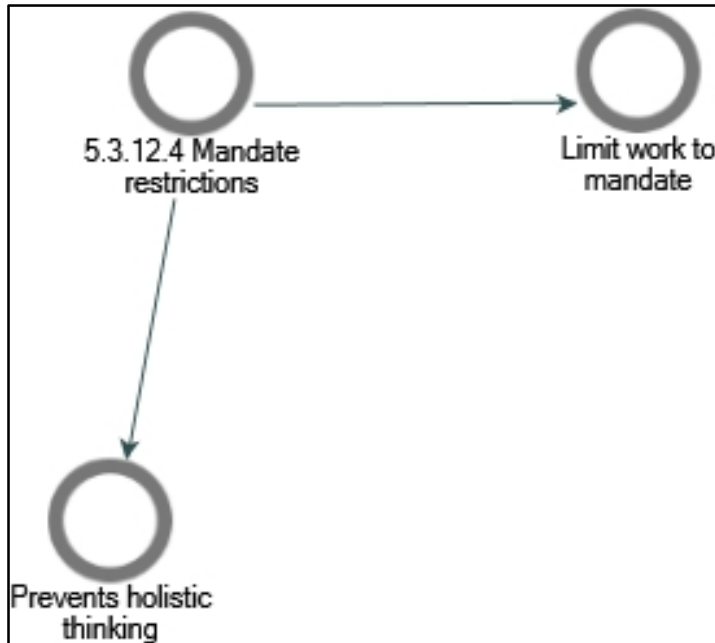
Figure 5-109: Identified attributes for mandate restrictions.
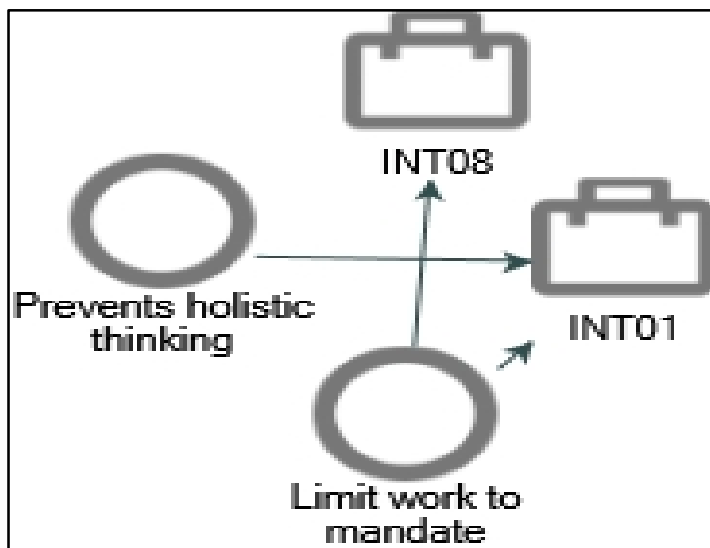
Figure 5-110: Identified attributes and interviewees inputs for mandate restrictions.

Traditional thinking of governments

INT01 argues that compared to private sector organizations, public sector organizations are less likely to go into extinction due to an emergent event: "*The problem with the public sector organizations is that: the public sector is not allowing any public sector organizations to die*

350

as what happens in the private sector; you can't kill ministry of health because it's out of date for example". Meanwhile, INT02 highlighted that governments also need to change *"I need to believe governments gets old; therefore, governments change all the time. If they don't change by themselves, people will change them in the hard way"*. Furthermore, INT03 emphasised on the role of leadership to always keep the bar high for the public sector, so it will not be tied up to the status que *"It will not die, especially, when you are having a leadership that haven't any boarders to reach the top of the hill. When you reach it, they will always look for new hills"*. Meanwhile, INT06 believes that public sector organization can die, and they will transform into new public organizations with new mandates *"They will die; they give birth to other public sector entities"*. Similarly, INT16 thinks that government organizations die under political pressure *"For sure you can have governments collapse; a single entity I think can collapse under political pressure. So, a single entity that doesn't respond well to public needs or to shocks, then the government can choose to get rid of it"*.

Figure 5-111 and Figure 5-112 summarize the attributes highlighted by interviewees for this section. Interviewees think that over time, governments need to change. The role of leadership is highly important within this regard to keep the bar always high. Meanwhile, there should always be an option of restructuring across the whole public sector to introduce new government organizations or to get rid of some of them.
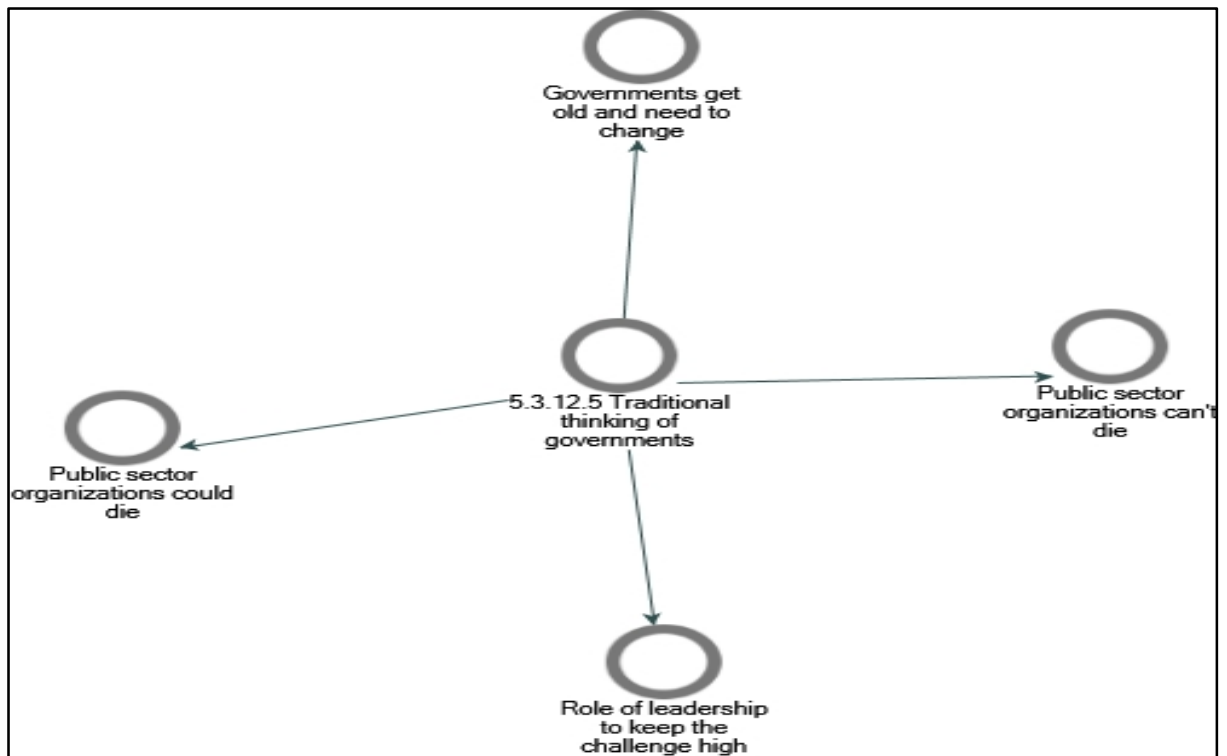
Figure 5-111: Identified attributes for traditional thinking of governments.
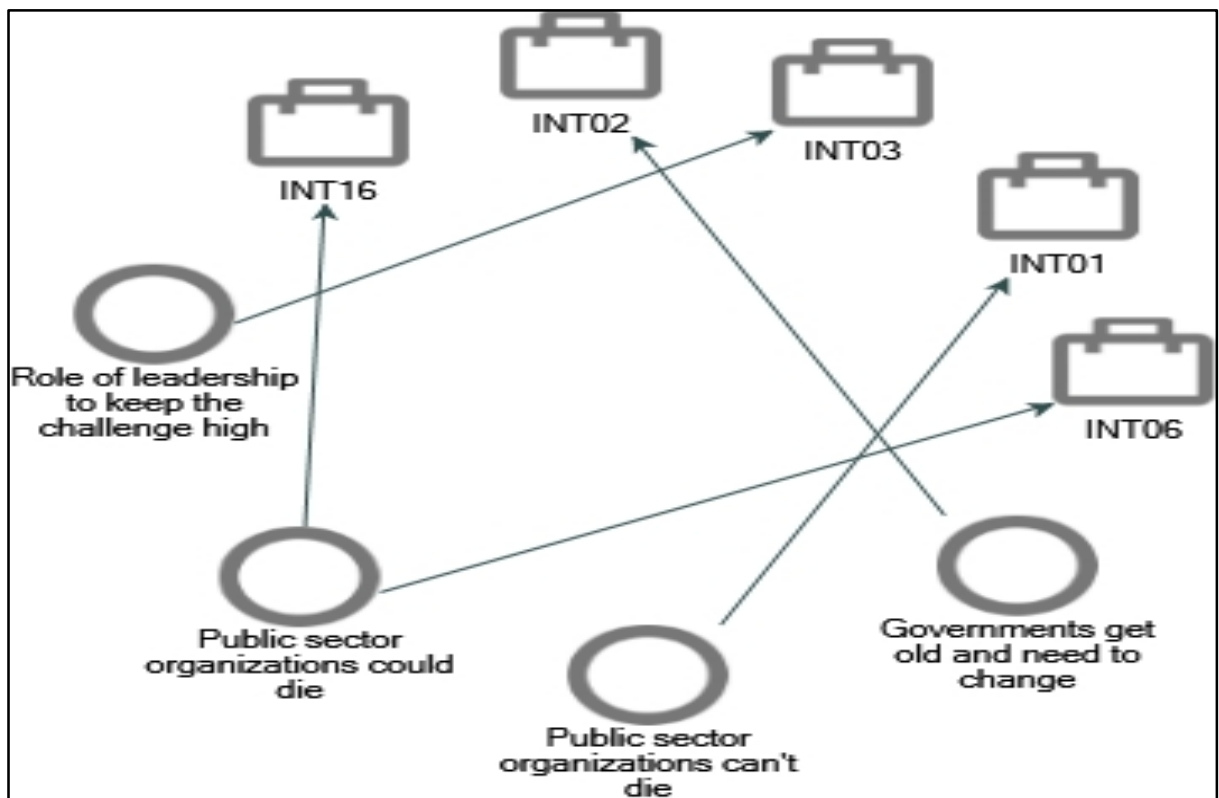
Figure 5-112: Identified attributes and interviewees inputs for traditional thinking of governments.

Government Structure

The following paragraph presents the interviewees insights about how the structure of the public sector should be in order to be more resilient.

INT01 suggested having a government wide structure to enable governments to better positioning in the future *"There should be a government wide structure that will enhance the government mind and awareness about the changes, about the trends, and about the potential events, not only to predict the future, but also to enable better positioning in the future"*. He elaborated more on the inability of the current structures to respond properly to an emergent event, due to inability of recognizing the big picture *"This is one of the challenges that we have: the current structure of government is still is not clear. I just want to stress the point that if you leave each entity by itself, each entity itself has its own mandate that has been cleared in the law of establishment of that organization, and usually there will be complacent by doing whatever they are doing now. The best thing that they can do for improvement, is improving the tools of doing what they are doing now. When the events happen, they are questioning the essence of what they're doing, and this is something that will be beyond their ability to recognize because that's not in their radar as per the definition"*. Similarly, INT13 suggested having new government structure that is more resilient to fulfil future requirements *"You need to have one resilience model for the government, because it is not impossible that the whole government structure that we know today will change, but the main functions and outcomes needed of a government will continue to be the same"*. Meanwhile, INT33 thinks that the current government structure is based on efficiency and we need to think of a more resilient structure *"At the same time, the government structure is based on efficiency and this will not always work in case of an emergent event, as we need to have a more resilient structure"*.

Figure 5-113 and Figure 5-114 summarize the attributes highlighted by interviewees for this section. Interviewees think that the public sector should have more flattened structures in order to be more resilient as the current structures are not enabling proper understanding of the big picture.
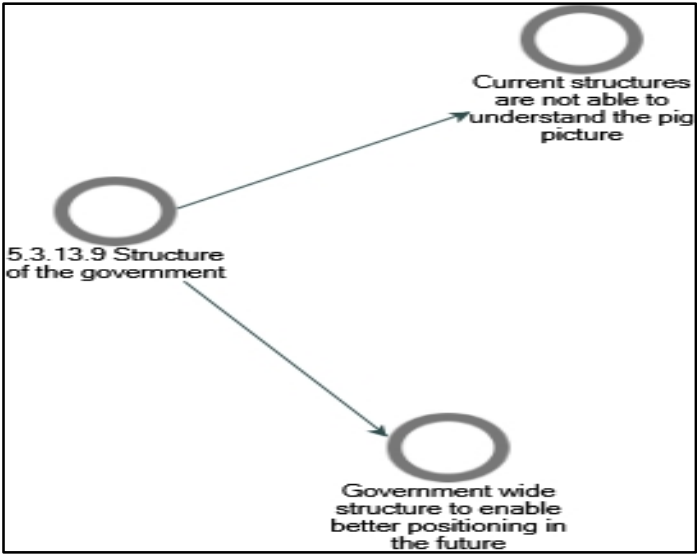
Figure 5-113: Identified attributes for government structure.
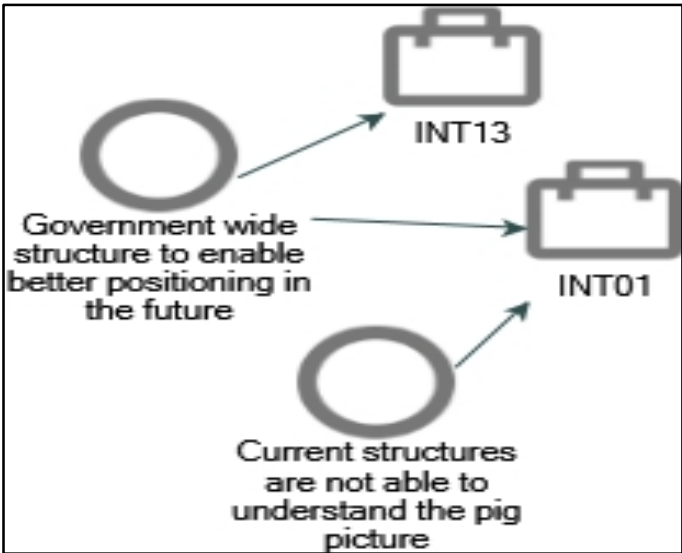
Figure 5-114: Identified attributes and interviewees inputs for government structure.

The public sector in future

When it comes to change management, INT01 suggested to maintain the value that is supposed to be maintained by the public sector, but with changing the mechanisms *"What I'm trying to say is that: when event is happening, the value of the public sector which is to guarantee safe wellbeing of the interest of constituents will always be maintained, but how to translate this value into operations? This is the question. For instance, you can be there as a public sector when it comes to providing electricity to homes, this is one option, or you will allow homeowners to generate electricity from the sun, this is another option. But in the long term, the second option is better for the wellbeing of the public, as it is more sustainable in case if an emergent event happens"*. Furthermore, INT08 believes that governments are changing the way they are doing business, as in the future they will be highly depending on new technologies *"I think a new shape of government; the government is changing the way it is doing business. It will be depending on artificial intelligence and the smart devices"*. Meanwhile, INT13 thinks that government sometimes put very rigid policies that may have a negative impact on some sectors *"Where sometimes the policies, although they look for the good of the country. However, the government's policies are affecting some sectors negatively, which might affect a big outcome that the government is looking forward to achieve"*. Furthermore, INT04 believes that the public sector in future will no longer be protected, and it should look of new ways to create value to the public like private sector mentality *"So, the concept of public service being protected, and the public administration offices are protected by the law and so forth. This is declining and diminishing. In future, you have to do a great job serving your clients, stakeholders, your country, your city, and so forth"*.

Another aspect for future tendencies of the public sector is outsourcing, as the public sector will have to outsource some of its activities to build capacities to face an emergent event as

highlighted by INT06 *"Even in security sector, the military now would go for outsourcing for logistics, even in hard times. So, economic effectiveness is a key in the department. I am with having enough capacity for you to be prepared and access to extra capacity when needed"*. Similarly, INT24 is suggests also for the public sector to study the outsourcing option if they do not have the capacity to deal with the emergent event *"Maybe, you can restructure your entity, form teams, hire experts from outside, or utilize outsourcing to deal with this situation"*. INT35 also supports considering outsourcing to deal with emergent events *"You can outsource some of the services to the private sector. So, you will have the flexibility to face any threat or any issue that will affect your economy or services"*. Furthermore, INT37 thinks that outsourcing is not an option, as it will be mandatory for the public sector in future, *"The government will be pushed for outsourcing and privatization to seek efficiency"*. Meanwhile, INT09 requested the public sector to put proper controls when it comes to outsourcing, as at the end, this will affect the reputation of the government *"The government as the sole provider, or in partnership with the private sector, or outsourcing etc. The reputation of the government should be maintained at the end of the day. So, that's why if you look at all the changes, they depend on what type of changes we choose, and how it is affecting the government"*.

Furthermore, INT26 highlighted one of the obstacles for the public sector transformation, which is due to the secured jobs for government employees *"The barriers are that: most of the government employees feel entitled, they feel that their jobs are secured and that they are entitled to allowances. If they move away from their comfort zone, they will change to the better"*. Similarly, INT20 thinks that this is also an obstacle for change *"Especially, their jobs are more secured than in anywhere else"*. Meanwhile, INT15 believes that the technology advancements will no longer provide this job security in the future *"Jobs in the public sector are no longer secured due to the new technologies"*. INT27 has the same thinking about public

sector job security in future, *"These constant factors are no more valid, which means that your job is not fixed, it's not something which is secured"*.

Another issue that was highlighted by INT14, which relates to the dependency of the public sector on the private sector to come up with solutions *"The public sector comes always behind the private sector so the private sector is more agile in adopting solutions or new technologies"*. Similarly, INT24 is requesting the public sector to be in the same base of the private sector, *"The public sector needs to keep up with the private sector"*. Meanwhile, INT30 requested the public sector to have the same mentality of the private sector to provide its services *"Governments should act as the private sector"*.

Figure 5-115 and Figure 5-116 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted that the trend of outsourcing of public sector services will continue to grow in future. Meanwhile, the public sector should learn from the private sector experience for better positioning in the future and accordingly it should maintain value but change mechanisms. Furthermore, the current secured jobs of public sector employees should not be the norm in future.
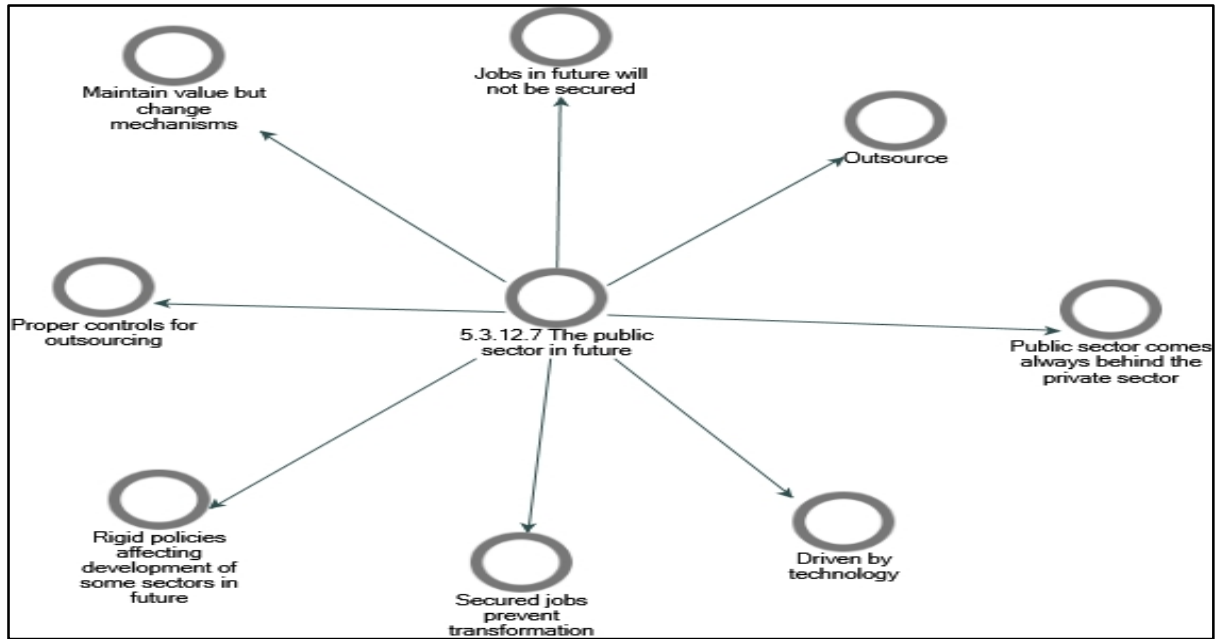
Figure 5-115: Identified attributes for the public sector in future.
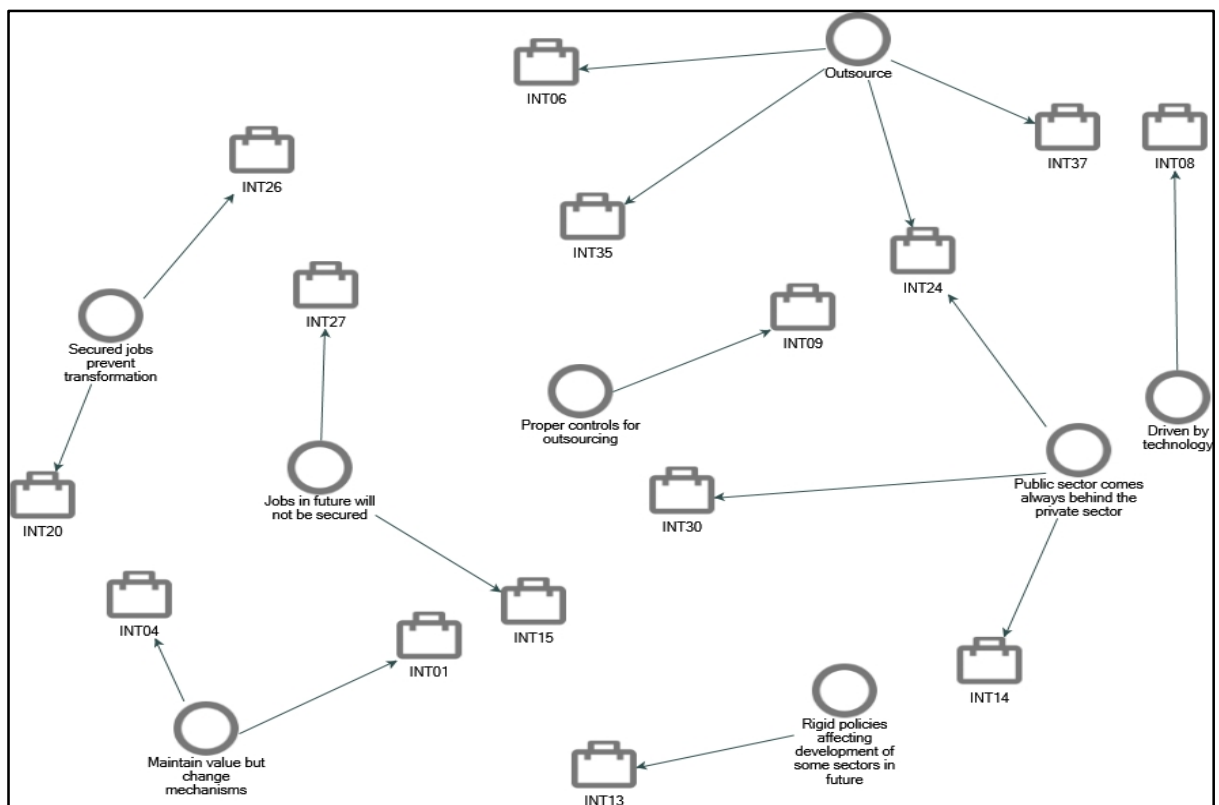
Figure 5-116: Identified attributes and interviewees inputs for the public sector in future.

358

5.3.13 Theme Number Thirteen (Government Systems)

Figure 5-117 shows the hierarchical coding structure of theme number thirteen, which is government systems. The findings of the data will try to investigate the participants insights about how to define various components of government systems in relation with resilience and how these systems can be tested to assess their readiness before an emergent event occurs:
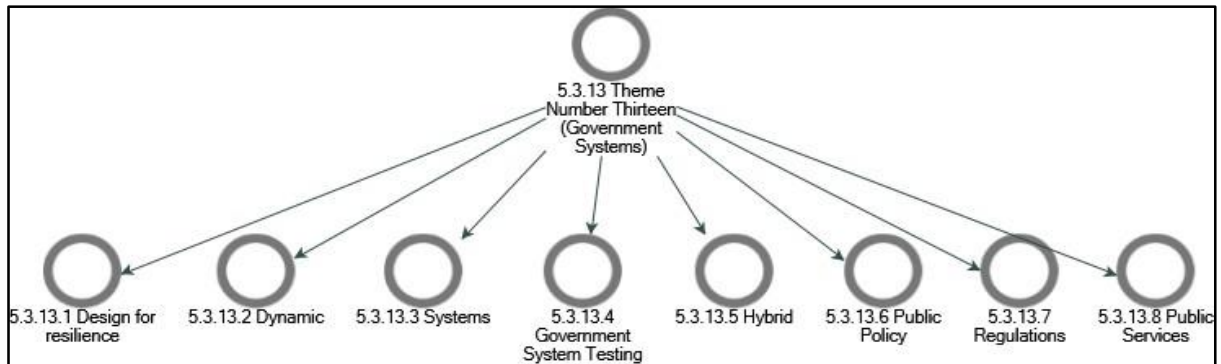
Figure 5-117: The hierarchical coding structure of Theme 13 (Government Systems)

Design for resilience

This section presents the interviewees insights about how to ensure the design details of government systems are equipped to respond effectively to emergent events, and to adapt to changing conditions.

INT02 emphasized the proper design of the government systems to be able to be ready for any emergent event *"If your tools are the right tools, and if your design is the right design. I don't see that you may face a major issue, unless these are not responsive enough or they are highly challenged with an external event"*. Meanwhile, INT08 thinks that the enablers for resilience should be considered when the public sector design its systems to be resilient *"These enablers we need to take into consideration while we are designing our systems to be resilience"*. Furthermore, INT11 highlighted that when you design your systems in the public sector you should make sure that these systems are robust enough to claim that these systems are resilient

"Resilience operation wise, it means that you have a robust system which was designed for resilience. Design for resilience means that you don't design to solve the problem or to get a service, but the design details should have all the requirements to ensure that if something happened, systems can change easily". Meanwhile, INT16 requested the public sector to engage more people in designing its policies and its services to have more resilient systems *"To involve a greater group of people in policy design and service design, so there's a recognition in government that we don't have all the answers and that despite the experts that we have, despite the knowledge that we have, there is also significant expertise and knowledge outside the government that need to be considered"*. Finally, IN37 suggested having self-reflections checks to see if your system is resilient or not *"Self-reflection checks and balances of the design of our systems"*.

Figure 5-118 and Figure 5-119 summarize the attributes highlighted by interviewees for this section. Interviewees think that enablers for resilience should be embedded when designing government systems. Furthermore, people should be engaged while developing these systems and there should be self-reflection checks within these systems.
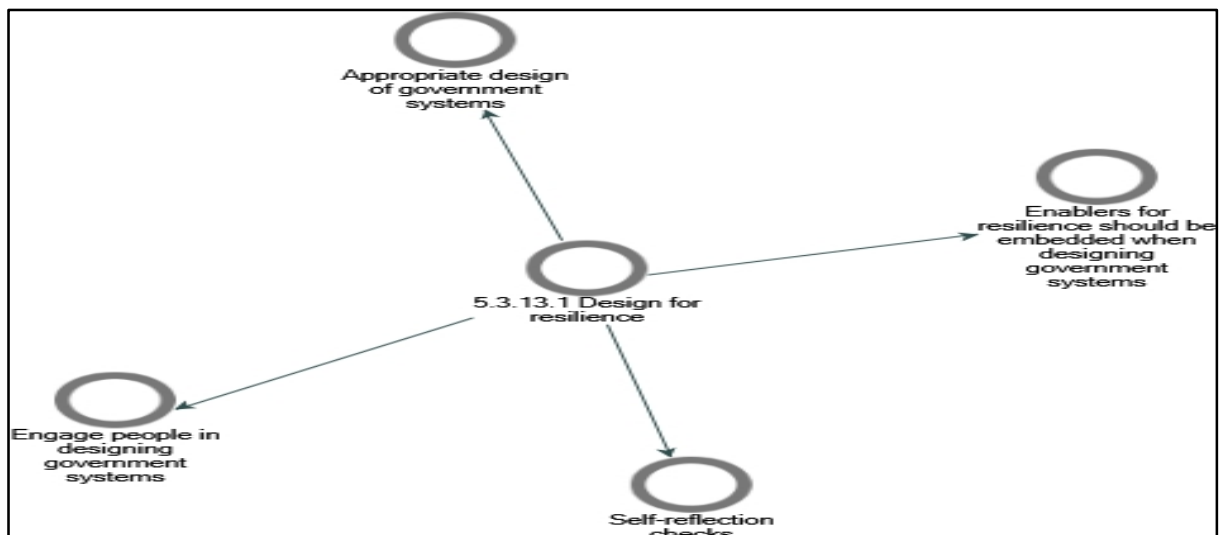
Figure 5-118: Identified attributes for government systems.
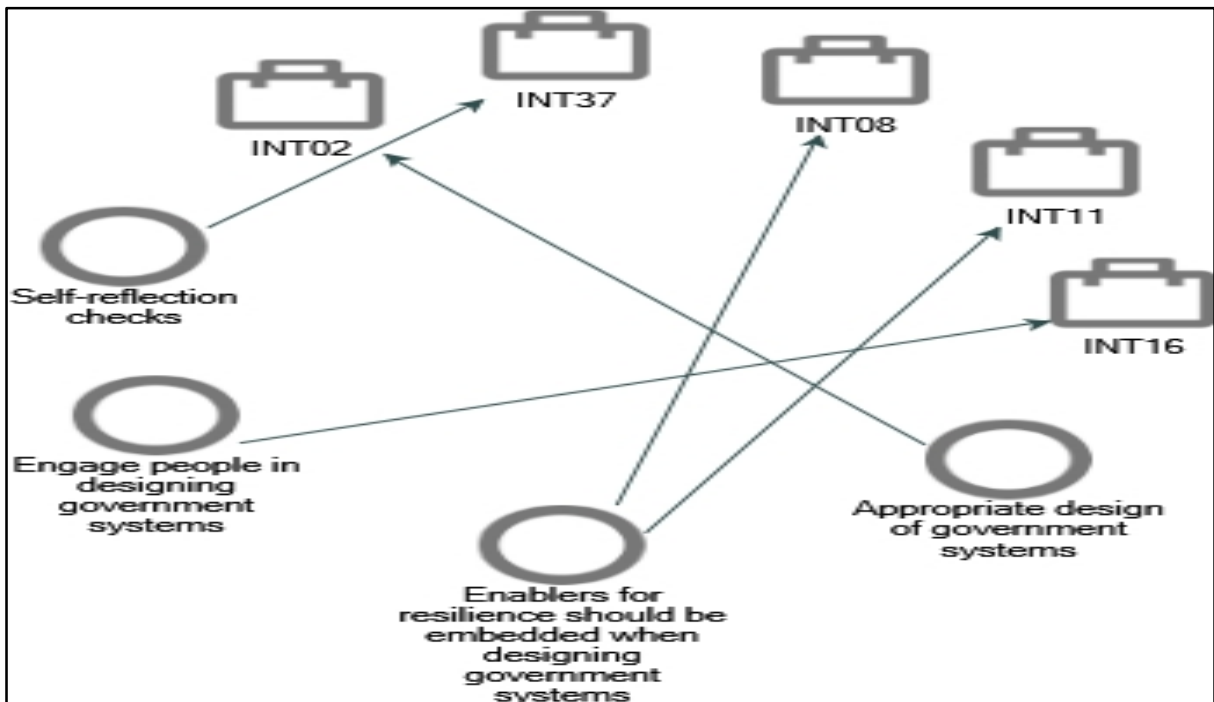
Figure 5-119: Identified attributes and interviewees inputs for government systems.

Dynamism

This section presents the interviewees insights about the dynamism of circumstances or systems, which means that they are constantly changing, and in resilience it may imply ability to adapt to changes constantly.

INT01 highlighted that the environment after an event maybe a very dynamic one, so the public sector should not expect the same situation to be maintained before the emergent event *"But event when it happens, it is really a big force that distorting all energies. So, if you want just to come back and settle as soon as possible, maybe you're settling in a very dynamic environment, so you will be settling in the wrong way"*. Meanwhile, INT02 emphasized the difficulty of having a scale to measure resilience, due to the dynamism of any resilience framework that needs constantly to be updated *"I think a scale would make you a bit of static and this is a risk*

if you want to keep resilience dynamic. You cannot say I am now 60% resilience. You are 60% resilient, according to this framework. If we agree that this framework is updated all the time, then you can't put a scale or you can put the scale but it will become obsolete by the time, if you want to make sure that you are dynamic". Similarly, INT04 highlighted the difficulty of having maturity model for resilience as the systems and the ecosystem are very dynamic *"You need to understand what happened, what effects it has within your organization, and how the system dynamics here"*. Meanwhile, INT08 is requesting to have more dynamic and agile strategies to enable incorporating any changes related to an emergent event *"I think because we are living in a changing environment, our strategy needs to be more dynamic and more agile"*. He also highlighted the importance of having more dynamic allocation of resources and dynamic structures to be more resilient *"If you need to have a dynamic or agile allocating of resources, you cannot have only vertical organizational structure. You need to have more dynamic structures"*. Furthermore, INT12 requested more diversification in order to be more dynamic and more resilient *"Once you rely more on diversifying, your economic system will be more dynamic to deal with the emergency"*. Meanwhile, INT14 highlighted the importance of having dynamic business models in the public sector to adhere to any changes *"Eventually it changes the dynamic of business, so you need to create new business models"*. Furthermore, INT17 thinks that there are accelerated changes surrounding us, and these changes are very dynamic *"I think these are the main three dimensions that are very dynamic; political, economic and technological. Other dimensions are also very dynamic and affecting any corporate, which are the social, and the cultural"*. Meanwhile, INT30 believes that to be resilient in the public sector you need to have a dynamic budgeting exercise *"A proper budgeting exercise that is lean and dynamic, is crucial for resilient governments"*. He added, in order to be resilient, you need to have also dynamic systems to change policies and regulations *"Now a smart government that*

has lean systems would tend to change the regulations and policies faster, because they are

more dynamic". Furthermore, INT32 highlighted the importance of understanding the

dynamism of international market to be able to predict any emergent event *"So, it's extremely*

important to understand what's the mechanism and the dynamics in the international market in

order to predict".

Figure 5-120 and Figure 5-121 summarize the attributes highlighted by interviewees for this

section. Interviewees highlighted the importance of having a dynamic framework for resilience

in the public sector. Meanwhile, resilience in the public sector implies having dynamic

allocation of resources, dynamic budgeting, dynamic business models, dynamic strategies, and

dynamic systems. Furthermore, dynamism means having a proper understanding of

uncertainties around us that keep changing.
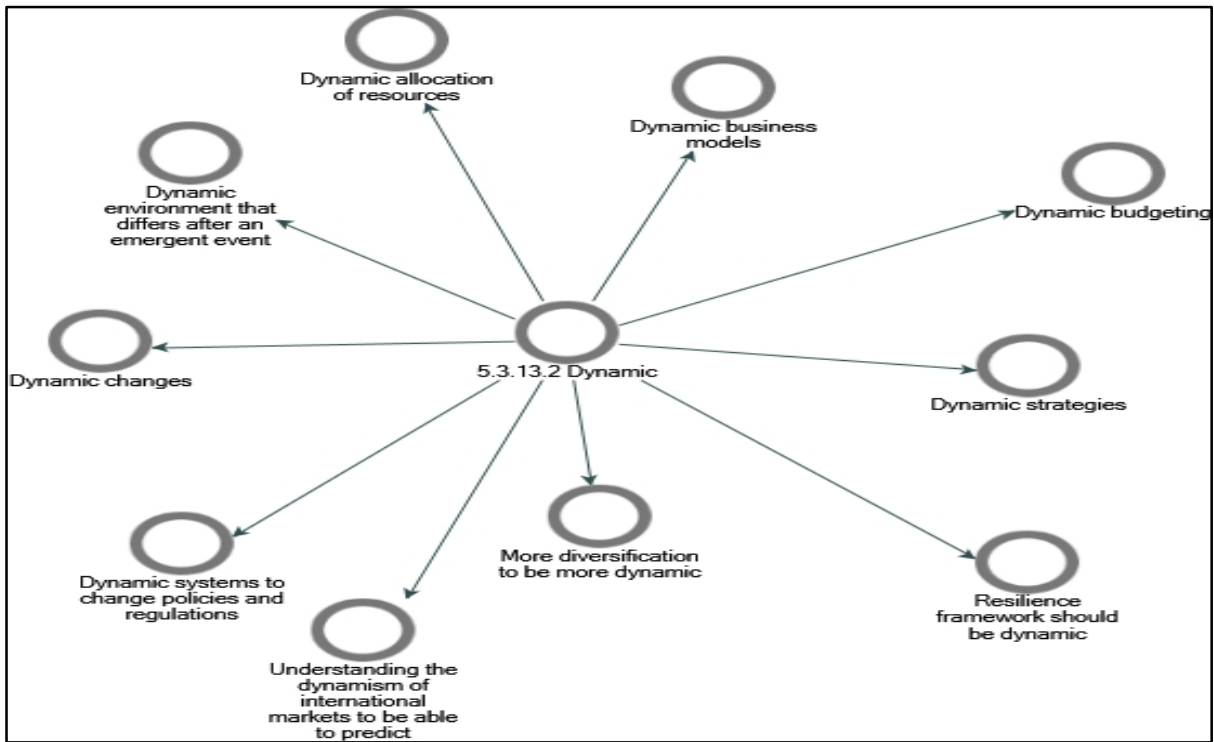
Figure 5-120: Identified attributes for dynamic.
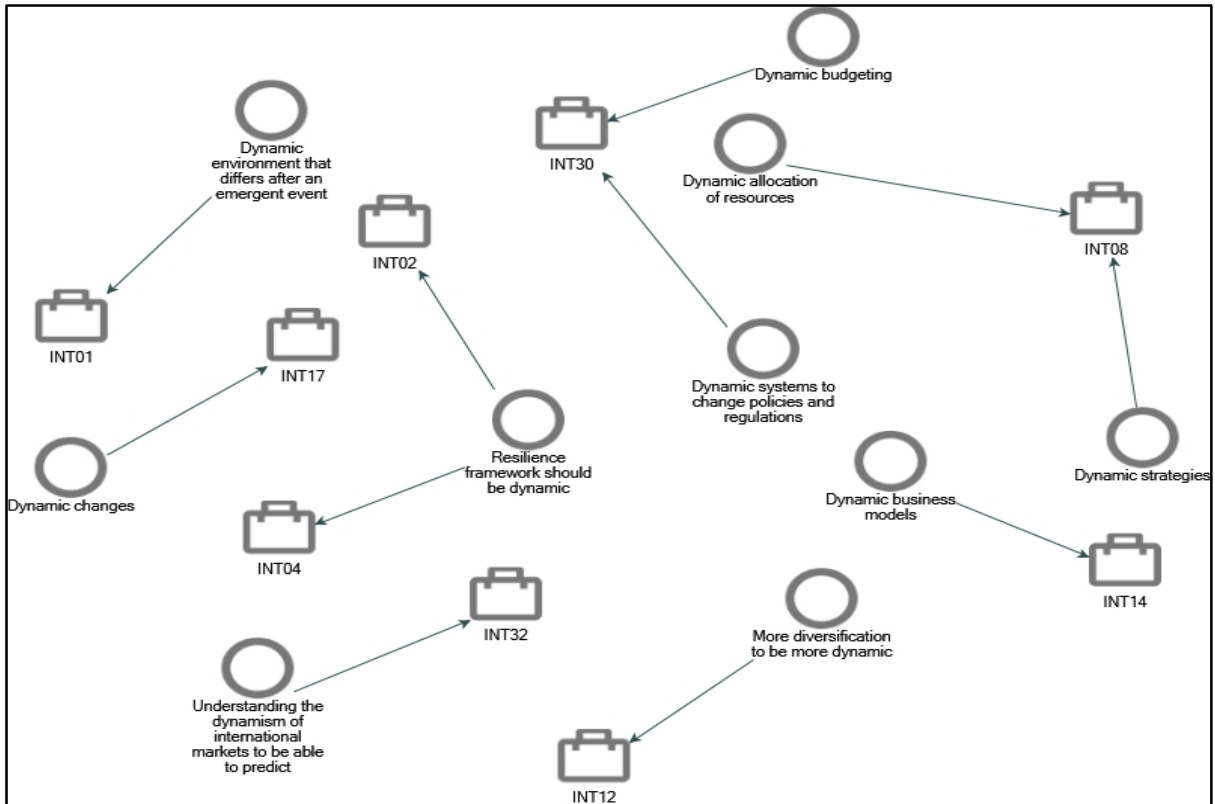
Figure 5-121: Identified attributes and interviewees inputs for dynamic.

Systems

This section presents the interviewees insights about the set of policies, procedures, processes, and actions in the public sector working together to ensure fulfilling a certain requirement by the society.

When trying to understand what a government is, INT04 suggests that the government is a system comprised of entities that are forming the government *"Again, the government is a system made of a collection of major entities, together they form the government"*. Furthermore, INT01 highlighted that resilience should be embedded within the current management systems implemented by the public sector *"Resilience needs to be impeded in the strategy management systems, process management systems, service provisioning systems, and organizational resource management systems"*. Meanwhile, INT02 defines resilience as having systems in the

364

right place *"I think that resilience is about making sure that you have the right tools in place, the right information in place, and the right systems in place"*. This implies also continuous assessment of systems as part of the learning cycle as per INT02 *"You always need to go back and assess your policies and systems"*. Furthermore, INT03 thinks that, people are the essence of any system and you need to focus on them in order to have systems properly running *"First of all you need to have capable people who can use those systems to face the events. You need to work on the people first, and after this, build the right systems. This means having the right people using the right systems to face emergent events"*. Meanwhile, INT11 is looking to have a unified vision for resilience, which means enabling the capabilities in the public sector to have the mindset of accepting change by people and introducing this change through systems *"Unified vision for resilience at all levels. In other words, it can be overcoming the change resistance for changing the system to be more robust or resilient. The big problem is to change people behaviors rather than to change systems. First people then systems"*. Furthermore, INT12 highlighted the importance of having adaptive systems and capable people in order to be resilient *"Some systems that are adaptive, well developed, they are capable, and they are flexible. But the main idea is we need staff capable to operate the systems"*. Meanwhile, INT13 emphasized on the need to test the systems readiness to see if they are capable to manage uncertainties *"We need to build the systems, test them, and try to find out if they work to deal with the uncertainties as they may happen"*. Furthermore, INT14 is looking for modernized systems that the public sector can use in order to engage the society more *"They are changing or at least accepting the change, opening the door for transformation and modernization of the systems, trying to fulfill this gap between the government operation and the citizens"*. He added that this gap also exists because of the different systems and platforms that are used by the public sector *"Most of the government organizations are working in silos because they have*

different IT platforms and different systems. Then they interact with each other and they interact with citizens in different ways". Meanwhile, INT15 looks at resilient as a time factor to implement systems, which means that the more time it took the public sector to implement a system, the less resilient it is *"The longer each phase took to be implemented, the less resilient we can call them"*.

However, INT16 thinks that there are tensions between traditional government systems that resist change and new government systems that adapt to change *"Ggovernments' have to accelerate the pace at which they made decisions and at which they innovate. This has put a lot of stress on the government systems that resist change and government systems that try to reduce risk by not taking any action. Currently, you have this tension in the public sector between rapid change and transformational mentalities, and between the conservative decision makers' government officials"*. He added that, the government systems should allow new tools to be implemented *"But you also need to make sure that you have a government system that allows these tools to exist"*.

Furthermore, INT19 thinks that all resilience systems are highly related to decision support systems tools *"I think some organizations are depending on getting tools that can help them in decision support systems tools"*. Meanwhile, INT22 emphasized on systems working with people in parallel to achieve resilience *"It's not only the systems, it's not only the people, and it is not only the policy. It's all of them working together in parallel"*. Furthermore, INT25 highlighted the importance of having the proper systems in place in order to identify the big picture and develop different scenarios if an emergent event occurs *"If you actually have proper robust systems that allows you to engage with the right people on a regular basis, when the warning signs or the warning bells start ringing. Then you have a better chance to kind of paint a picture of what could potentially happen"*. Meanwhile, INT26 emphasized on having the

proper human resources systems in order to be more resilient *"Yes, we need to put in the HR systems and build competencies and competitiveness"*. Furthermore, INT30 requested to have a push from the public sector leaders to implement new systems *"If there isn't a big push to modernize and cope with the new technological revolution to implement the new systems. I think there will be very minimal impacts in terms of how resilient they could be"*. He added that, there should be proper governance systems associated with any formation of any teams or committees to respond to an emergent event *"They are actually creating certain committees within the organizations or in governments that are actually responsible to implement those governance systems"*. Meanwhile, INT34 thinks that the public sector systems should be adaptive and agile to be able to properly respond to and emergent event *"I mean, whether it is in the teams, the processes, and the systems that we have. All of them should be adaptive and agile enough to respond to these changes and emergent events"*. She added that the public sector should have proper monitoring and evaluation systems in place in order to be more resilient in the face of emergent events *"But we should have like monitoring and evaluation systems in place that allow us to actually see the impact of these events and evaluate the impact"*. She also added the importance of having systems in place to be resilient *"So for example, let's assume I am a mature government, my systems, my processes, and my people should be in place to ensure that my resilience index is high"*. Furthermore, INT35 requested the public sector to change its system if these systems are not improving *"So, they can for example change their database or their systems if they are not working or not improving"*. Finally, INT36 requested to assess the current systems capabilities before introducing any transition plans *"Based on current systems capabilities assessment, as the transformation is not going to happen overnight"*.

Figure 5-122 and Figure 5-123 summarize the attributes highlighted by interviewees for this section. Interviewees think that resilience means having systems in the right place. Meanwhile,

367

resilience in the public sector implies having adaptive systems and capable people. Furthermore, resilience will imply testing of systems to ensure their readiness to face emergent events before putting them into implementation.
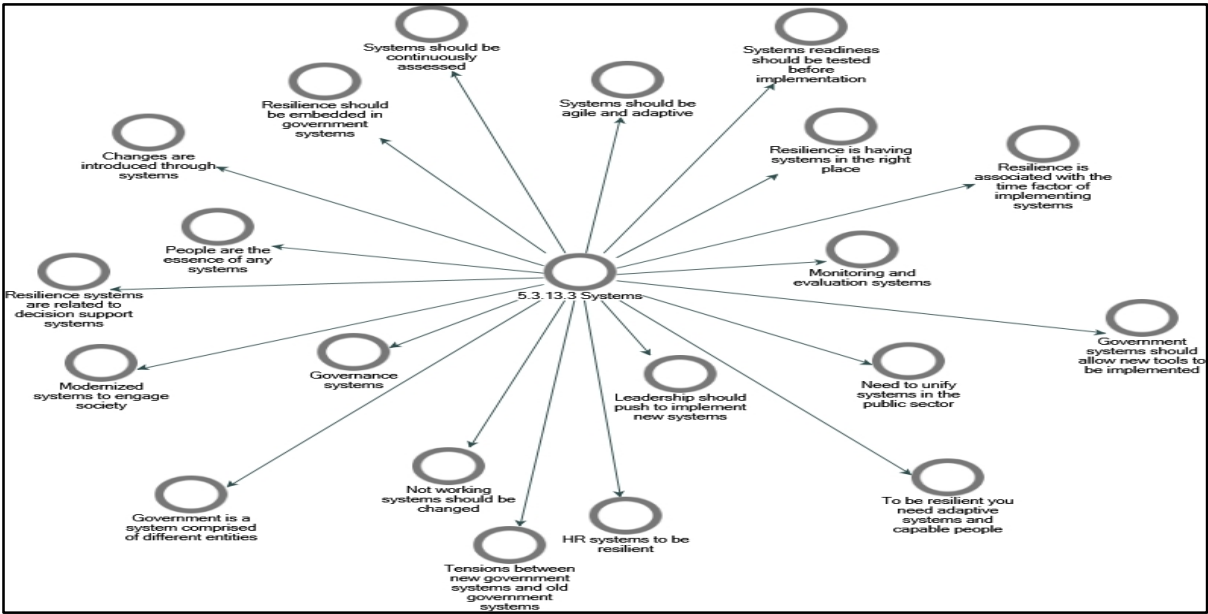
Figure 5-122: Identified attributes for systems.
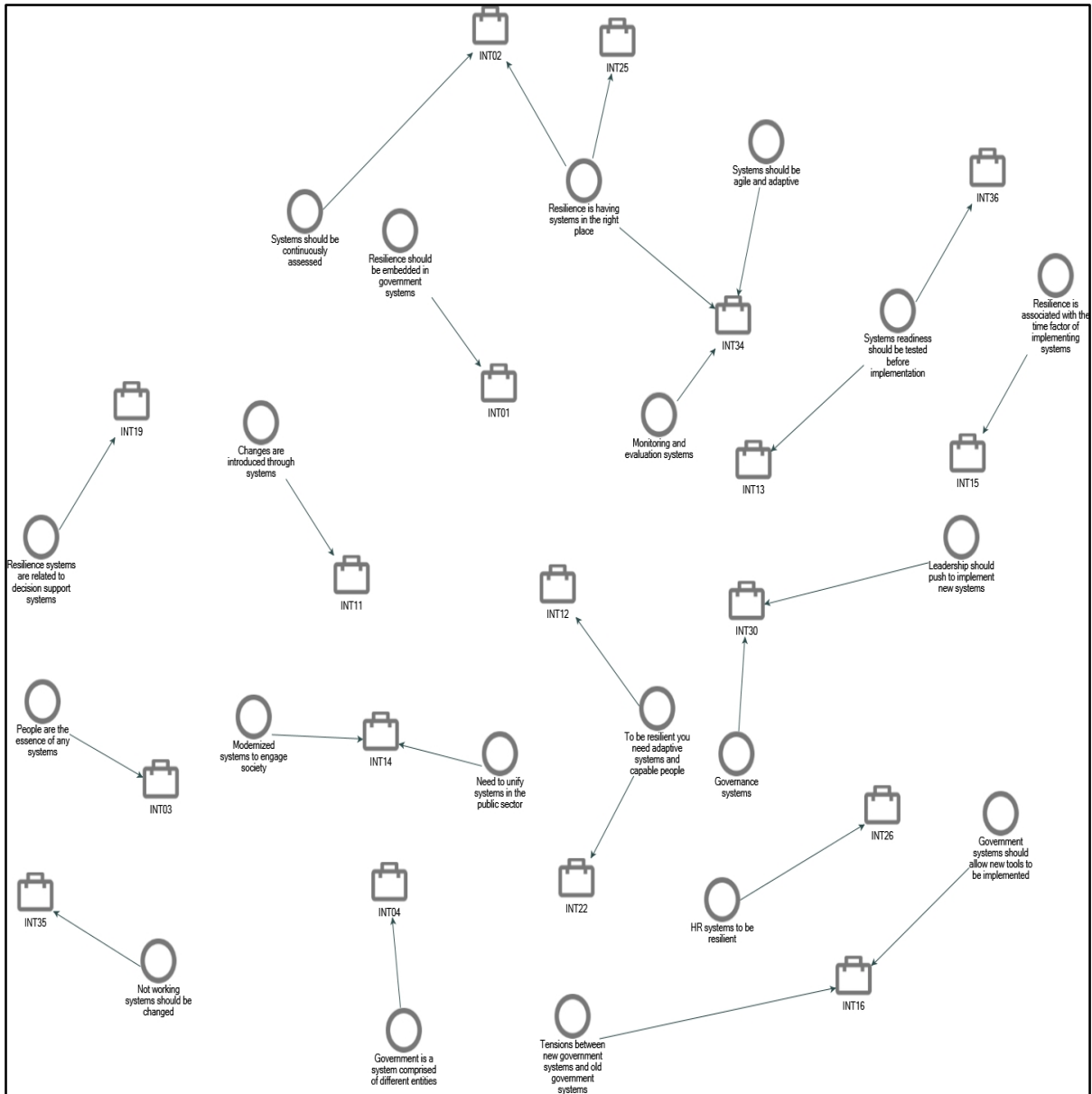
Figure 5-123: Identified attributes and interviewees inputs for systems.

Government System Testing

The following paragraph will present the interviewees insights about how we can experiment a

government system to examine its practicality and ability to adapt with changes:

INT09 highlighted that any emergent event that happened suddenly, will be testing the public

sector systems resilience *"Something that you're not prepared to, it happened suddenly, and*

369

this basically tests your agility, your resilience, and the speed of reaction to these events". Meanwhile, INT09 thinks that testing of your preparedness and resilience is based on the public sector response to previous emergent events *"You could do the same thing, look at these three categories and then look at different government departments, and test them against certain events that happened".* Furthermore, INT10 highlighted that the public sector can test the prediction tools through piloting *"You can use it on a trial period, or you can pilot and test the tool itself".* He added also, any resilience framework for the public sector should be tested before deployment *"Once you have the framework built and adopted and tested. The next step is to define roles and responsibilities".* Additionally, he thinks that to ensure preparedness, we should test scenarios and do mock drills *"Test scenarios; you can run a drill and test a similar situation or a different situation and see how the public sector react accordingly".* Similarly, INT11 believes that the public sector should always test its readiness *"Always test readiness in the public sector to ensure that you are always ready for any situation".* He suggested using new advanced techniques such as artificial intelligence and big data to do testing *"Using advanced techniques like big data and artificial intelligence will assist also in testing and expecting more accurate results".* Meanwhile, INT15 asks for frequent testing to check public sector system preparedness *"The organization shall conduct drills more frequently to test the updated plans to ensure that lessons learned are implemented and taken into consideration".* Similarly, INT29 suggested to have frequent testing of plans *"We can make some testing for our reactions. We can make tests and provide training for our staff like a drill to implement this".* Furthermore, INT16 argues the accuracy of testing resilience of systems without having an emergent event *"So, unless that event has happened, this is when you can really test how well you reacted".* Meanwhile, INT18 suggested having some stress testing to assess preparedness to a certain emergent event related to information security *"You can do some*

stress testing for your cyber security to show people how mature you are in responding to emerging events". Similarly, INT31 suggested having trainings to enhance preparedness. Through this training, the public sector employees will be trained on how to respond to an emergent event *"There are different training techniques in which you assume a disaster is coming, and then you test your capacities in this, either they call it table exercises or they call it sometimes drills. Especially when it is related to a big event"*. Furthermore, INT37 suggested having stress testing to have more information about how uncertainties transform into an emergent event *"You can do stress testing for possible scenarios"*. He added that to ensure we are using the appropriate prediction tools; we should test the theories against actual cases *"We test theories against cases"*. The final testing INT37 suggests testing scenarios while developing or revising strategies *"I think strategies during their design or review stage should go through a stress testing of scenario planning, and should come up with the most worst dream in terms of scenario testing, extreme situations, and then test your strategy; does your strategy work in certain situation better than the other, or is your strategy agile enough to adapt and still function through these choices"*.

Figure 5-124 and Figure 5-125 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted the importance of continuous testing of public sector readiness. They recommended having stress testing of systems and using various technological tools and management tools for testing.

371
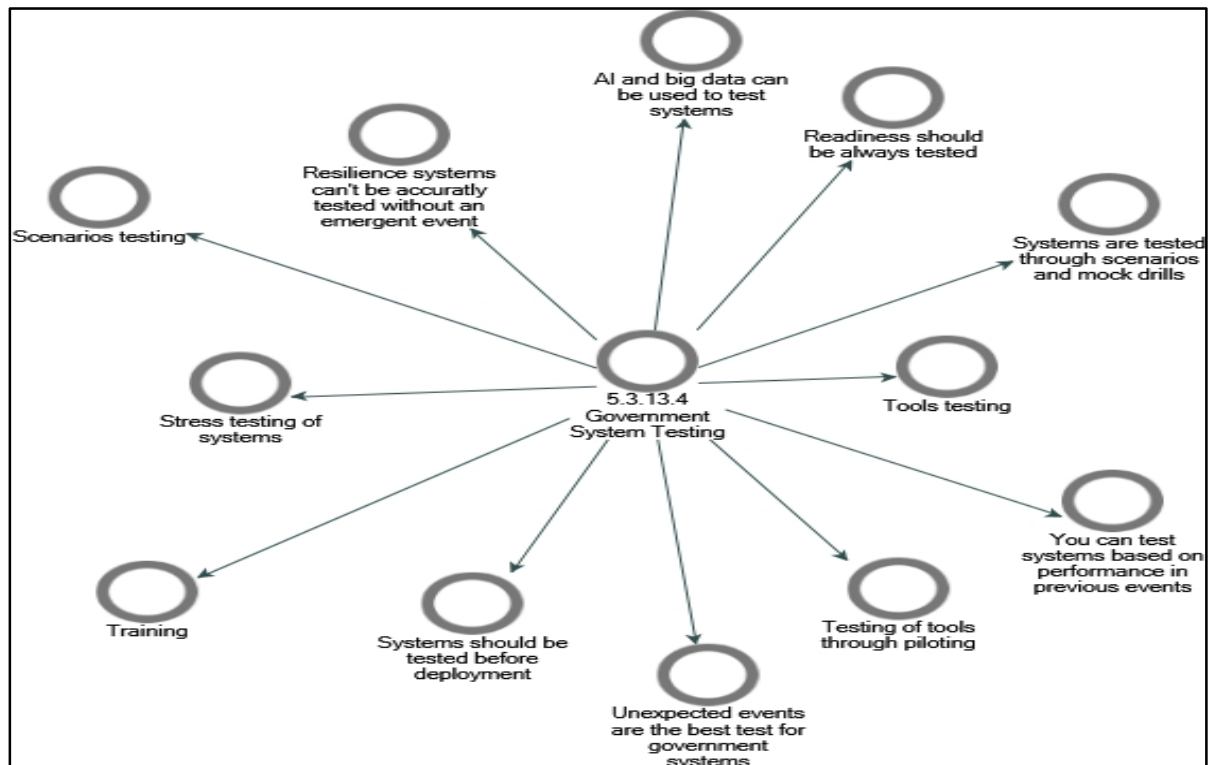
Figure 5-124: Identified attributes for government system testing.
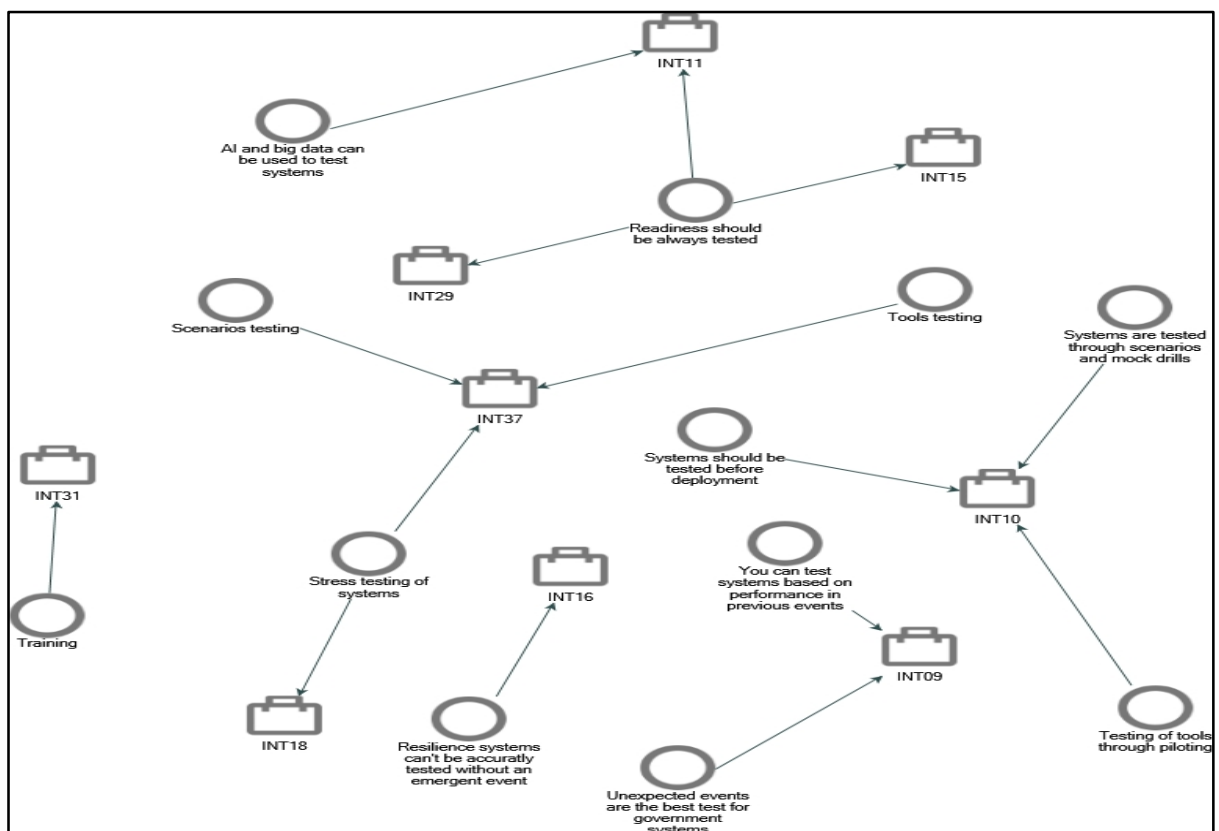
Figure 5-125: Identified attributes and interviewees inputs for government system testing.

Hybrid

This section presents the interviewees insights about when we need a hybrid system, which represents a mix of two different elements, or systems.

INT01 highlighted the importance of having a hybrid system to do anticipation, that is taking into consideration the interests of the central planning unit in the government as well as the government entities interests *"In my mind this should be a hybrid structure; there should be a centralized effort in the government, where it is really pumping in or enabling practice and enabling data information sourcing in government entities"*. Meanwhile, INT11 thinks that the public sector should have hybrid system between the central planning unit and the government departments to properly respond to an emergent event *"If we go to a centralized against decentralized. Centralized government public sector will be better; because things are going from top to bottom, but it has some negative effects as well, because it can be in one view and not considering other viewpoints. The best scenario is to have a hybrid system which can achieve the results"*.

Figure 5-126 and Figure 5-127 summarize the attributes highlighted by interviewees for this section. Interviewees suggested having hybrid structures and systems between the central government entities and the other public sector organizations to enable predictions and response to emergent events.
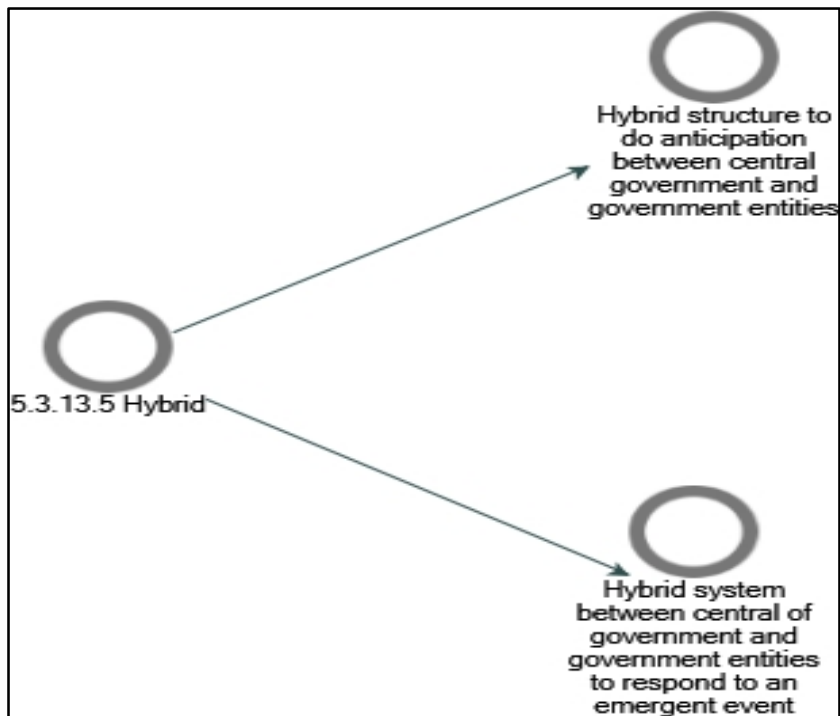
Figure 5-126: Identified attributes for 'hybrid'.
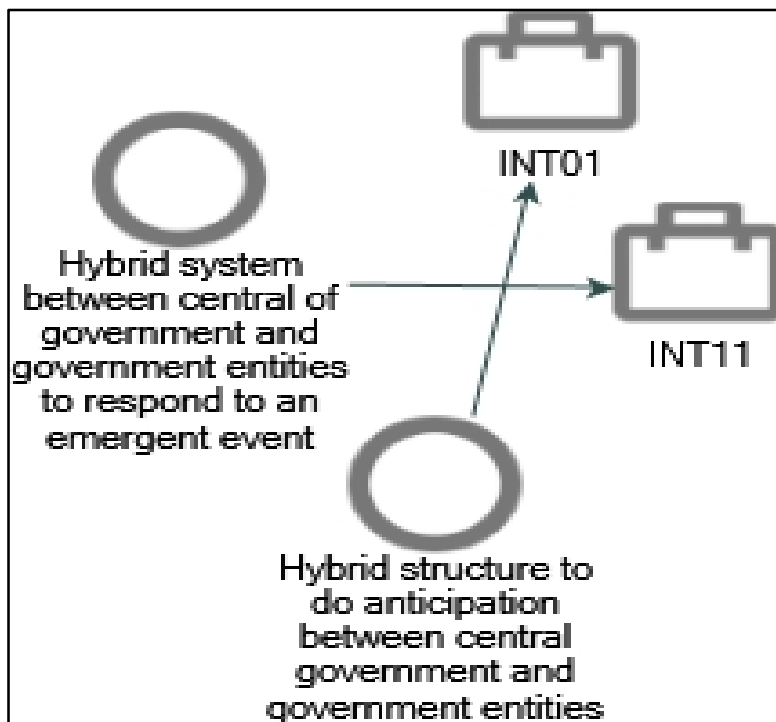
Figure 5-127: Identified attributes and interviewees inputs for 'hybrid'.

Public Policy

This section presents the interviewees insights about public policy: which represents principles or actions or steps that govern a certain scope of work in the public sector.

INT02 thinks that the public sector comprises of entities responsible for policymaking, public services delivery, and public legislations *"So, when we are talking about public sector, we're talking about the institutions that are responsible for policymaking and service delivery, as well as regulatory functions"*. He added that the public policies would affect people and societies *"Policies that would eventually affect people and societies"*. Another aspect that was highlighted by INT02, is to incorporate resilience while developing or reviewing policies in the public sector *"I think part of your process when you develop your policy, you will always need to have the resilience component in that policy. Therefore, in a policy, you need to plan for the impact, and you need to plan for the risks, you need a platform, and you need to embed your resilience strategy in each policy. When they plan for their policies, they need to plan also for the worst-case scenarios, which means that they need to have the resilience tools embedded in each policy"*. Furthermore, INT04 suggested having a policy in the government for responding to emergent events *"You have to have a reaction plan, or you have to have a policy and a strategy on how to deal with it"*. Meanwhile, INT05 suggested having a specialized unit in the public sector organization to develop the resilience strategy and policy *"Initiating this department is important: part of its responsibility is to restructure the organization or to develop new policies for the reaction mechanism"*. Furthermore, INT07 suggested to form a team after triggering an emergent event and this team will be responsible to change the strategy, policies or even the structure *"Forming teams representing all concerned parties would be my first step. The team should come up with analysis and recommendation that may include changes in strategy, initiatives, processes, policies or even the organization structure"*.

Meanwhile, INT08 suggested having more engagement of all parties to develop dynamic policies to be more resilient *"It's a kind of contribution from all parties on different levels that they are participating in building policies. This will make them more dynamic, more applicable and more implemented"*. Furthermore, INT09 suggested to measure resilience at the government level or sectorial level similar to measuring overall policies and strategies *"Resilience in certain sectors or aspects is what we need to measure in government as a whole. Like when you measure a strategy, or when you measure a policy. So, I would say go very specific"*. Meanwhile, INT10 recommended reviewing policies and strategies if the public sector faces a major event *"We should review strategies and policies accordingly"*. Similarly, INT13 believes also that a big emergent event will lead to change in policies *"It should lead to changing the policies"*. He added that in general, public policies intend to change behaviors, and this is where the public sector should focus *"Look at the policies that drive the behavior. So, what within these policies needs to be changed and then disseminate this as fast as possible, and get the buy in of why they should be changed"*. Furthermore, INT14 highlighted the effect of the fiscal policy in the public sector that is affecting its resilience *"A lot of factors embedded within the fiscal and monetary policies that regulate the economy"*. He added that, any public policy should address the resilience components *"You need to have a resilience component by each government policy or new initiatives that will be implemented in the future"*. Similarly, INT32 highlighted the importance of fiscal policy in the public sector and its relationship with resilience *"Fiscal policies are extremely important, either for the local or the federal government, in order to make it sustainable"*. Furthermore, INT16 argues the high dependencies of developing new public policies or revise them based on the historical data, as there are too many changes that are happening rapidly *"I think the biggest reason is that: governments have traditionally used historical evidence when they develop policies. They have*

used inputs that are historic in nature, so they look back. I think what's happening now is that the pace of change has become faster now, which means that these traditional inputs to public policies are no longer reflecting the real picture on the ground". Meanwhile, INT20 highlighted the importance to have flexible policies and strategies in the public sector to allow fast adaptation *"Flexible strategy and policies that allow you to adapt fast"*. Furthermore, INT25 emphasized on having flexible policies in the public sector to be able to deal with any shock *"So, on the policy level, you have to make sure that you have policies that are flexible enough for you to be able to deal with any changes. Also, you need to have a policymaking body that is adaptable quickly enough to be responsive to these things and not to wait too long before the impact of this happens"*. He added that, at the end, the public sector has to adjust its policies to deal with an emergent event *"You have to adjust on a policy level to be able to deal with it"*. Another aspect of policy that was highlighted by INT25, is to measure the ability of your public policies to do the transformation *"So, this is basically a measure of how transformative your policies are"*. Meanwhile, INT30 suggested to have adaptable policies that can be immediately changed to take advantage of positive events, or to prevent the tendency of having escalated impacts due to negative events *"Adapt your policies to take advantage of the opportunity that unforeseen events bring. There could be also negative ones, where you have to adjust your policies accordingly, to ensure that you are making benefit of the lessons learned"*. The main input for the relationship between resilience in the public sector and policymaking came from INT34. She highlighted that in order to be resilient, you need to have a tendency in the public sector towards proactive policies rather than reactive policies *"This could be by having proactive policies, because in many cases, we used to have reactive policies"*. She added that there should be a balance while developing a public policy between the current requirements and future expectations *"From a policy side, we need evidence-based policies that are based*

on the current and the future. Also, the benchmarks". She also highlighted that; the resilience

component is already embedded within the policy making cycle in the public sector *"I think the*

policy cycle is addressing the resilience component". Another aspect that was emphasized by

INT34 is the need to refer to the related policy governance structure to identify the response

plan to a particular emergent event *"For a particular disruption, we need to identify what the*

governance of this policy or the needed interventions".

Figure 5-128 and Figure 5-129 summarize the attributes highlighted by interviewees for this

section. Interviewees highlighted the importance of incorporating resilience components while

developing or reviewing any public policy. Furthermore, fiscal policy should also incorporate

resilience components while being developed. Meanwhile, the public sector should have

flexible policies and the related policies and strategies should be revised post an emergent event

to ensure they are aligned with the new normal.
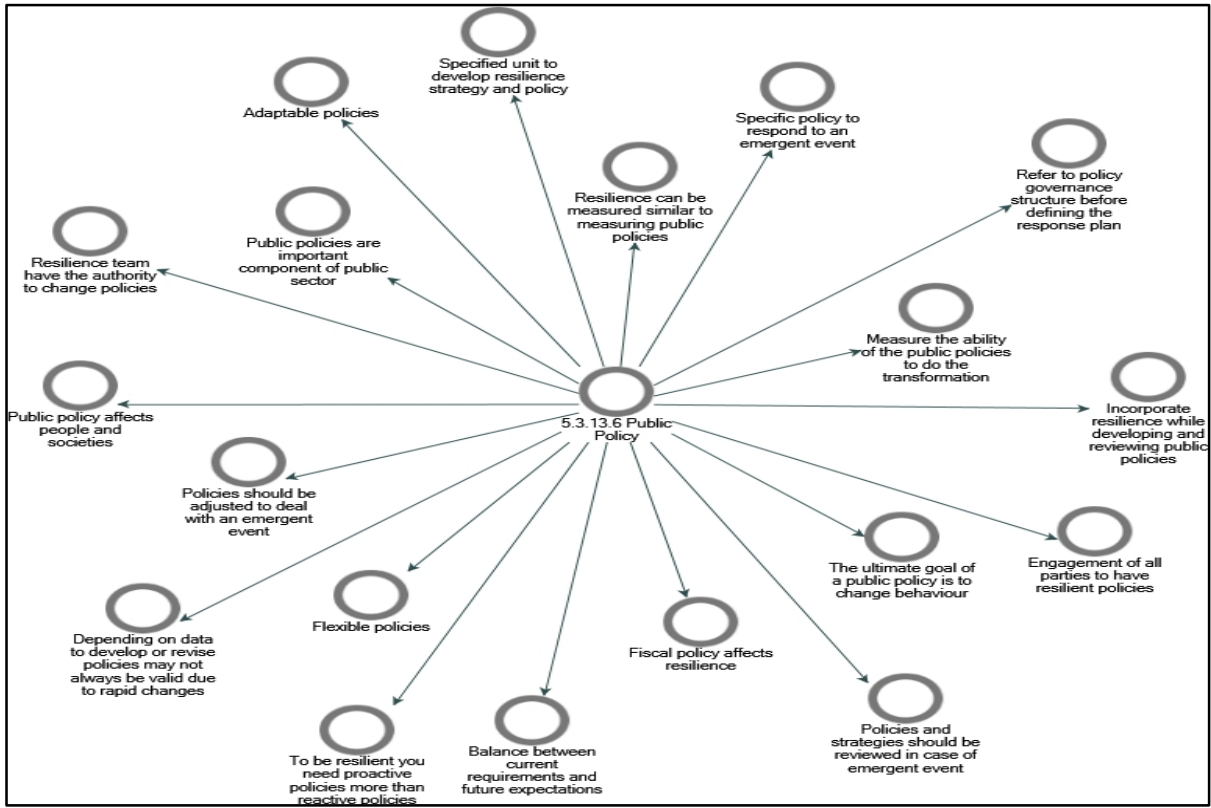
Figure 5-128: Identified attributes for public policy.
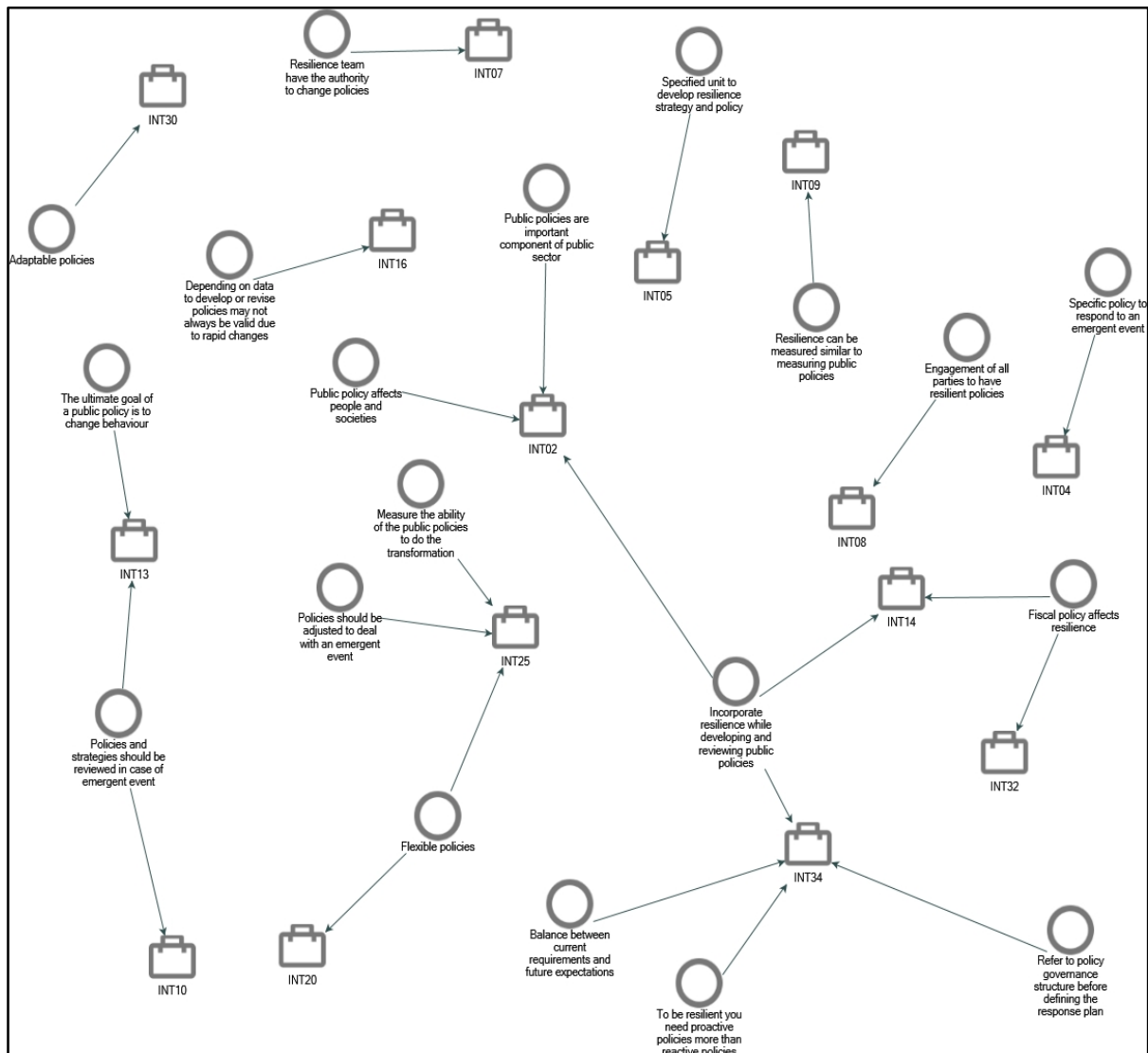
Figure 5-129: Identified attributes and interviewees inputs for public policy.

Regulations

This section presents the interviewees insights about regulations, which represents a rule, or a directive made by a public sector authority that needs to be followed.

INT01 highlighted that over the last period, the role of governments has been changed from providing public services to enacting regulations, and we do not know what the next transition in the role of government will look like *"Over the last hundred years, the role of governments*

changed drastically from being executive body to being regulated body, and we don't know how future of government should be looking like". Similarly, INT05 explained the regulation part of the governments evolving role *"So I think as the government has evolved, it started going from basically providing very basic services to providing more advanced services. This will imply providing higher level thinking in providing advanced laws, regulations, and policies"*. Meanwhile, INT02 emphasized the current role of the public sector in three main functions; policymaking, public services delivery, and regulations *"So, when we are talking about public sector, we are talking about the institutions that are responsible for policymaking, service delivery, as well as the regulatory functions"*. Furthermore, INT13 thinks that the role of governments should be expanded to not only being a regulator, but also to empower the public-private partnerships *"A lot of government organizations are trying to re-envision their role to enable the public private partnership is in its full force by putting new regulations"*. Meanwhile, INT14 requested to have more engagement of the society while developing public regulations *"Once we start engaging with public sector on how to make this transparent, bring also citizens engagement, and uplift the government regulations"*. He added that developing public regulations in closed doors would not be the norm in future for governments that need to supersede *"So, governments cannot just close the doors and create more regulation to protect themselves; the more they protect themselves by this way, the more the isolate themselves"*. Meanwhile, INT16 criticizes the need to regulate everything by governments, as this may lead to losing the new opportunities *"For example, somebody starts selling electronics online. It's never been done before, but it emerges, it's growing. Immediately that is good, it's a positive event. However, for the government it is negative, because they have to regulate it. So, what does the government do when they want to regulate? First step is shut it down until they understand, they do an assessment if it is positive or negative from their perspectives and*

sometimes things that are good for the public are bad from the point of view of governments".
Similarly, INT20 emphasised the hardening role of regulations that will limit new opportunities
to come into surface *"They have laws and regulations, you cannot do that one, because the*
approval process is slow and regulations limit them" Furthermore, INT18 highlighted the
importance of revising regulations as part of the lessons learned process, to prevent the
consequences of an emergent event to happen again in the future *"So, what's the lesson learned*
from this? That you have to tighten your policies and your regulations. You can put in place
that regulations that will prevent that kind of crisis to happen again". Meanwhile, INT30
emphasised the limiting capabilities of government systems that need new regulations to make
them more agile *"They don't have the capacity to use them, because the kind of structures that*
they have is very old. This makes them very heavy to move, and it requires certain regulations
that they're not able to pass through their old systems". He added that, processing new
regulations take a long time and the people who develop regulations often do not recognize the
effects of the changes ahead of time *"But regulations require time to change, and those people*
in regulation, the regulators themselves, may not understand the importance of the change".
Another important point that INT30 added, is the need to immediately changing regulations to
be able to grasp the opportunity of unforeseen event *"Look at immediate change or changing*
the policies and regulations that take advantage of unforeseen events. That's one of the key
definitions of the resilient governments". Furthermore, INT31 highlighted that some sectors
may have strong regulations more than other sectors *"We have a strong regulation in the health*
sector". Meanwhile, INT36 emphasised on having flexible regulations to allow for some
concessions in the case of uncertainties *"It is within the rules and regulations of that institution*
to allow in the situation of uncertainty, leaders and managers and executives can exercise their
authorities to create exemptions or over right some of the work in regulations and to allow for

concessions. So that nobody would be affected greatly". Finally, INT37 thinks that in the future, countries will impose more regulations, and this will affect the free markets and international trades *"We will be faced by less of free markets, as there will be more regulatory frames"*. Figure 5-130 and Figure 5-131 summarize the attributes highlighted by interviewees for this section. Interviewees think that the tendency of the public sector to try to regulate everything may lead to lose some opportunities that are embedded within an emergent event. Meanwhile, the public sector should more engage different parties while developing regulations and should always look for flexible regulations.
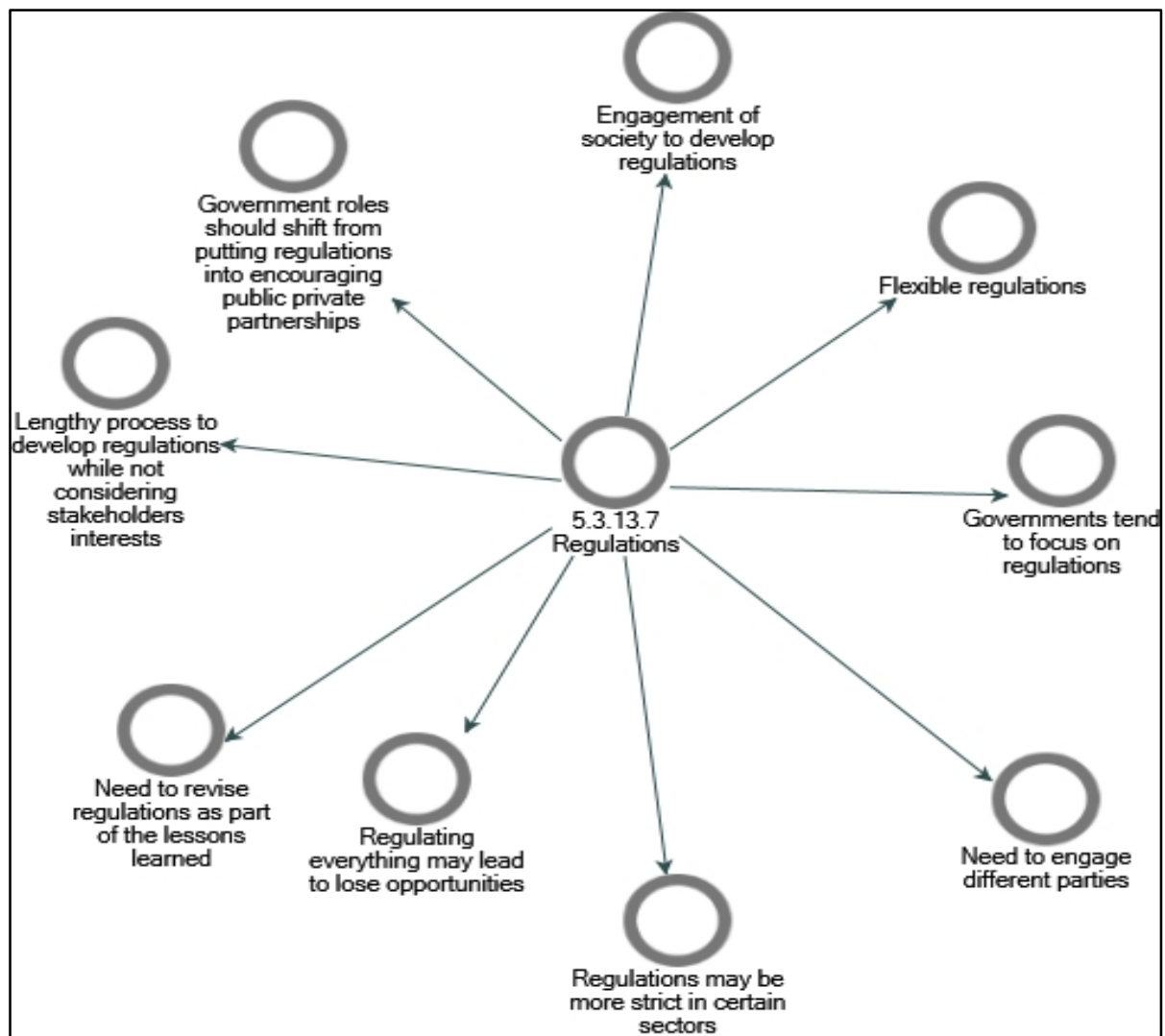
Figure 5-130: Identified attributes for 'regulations.
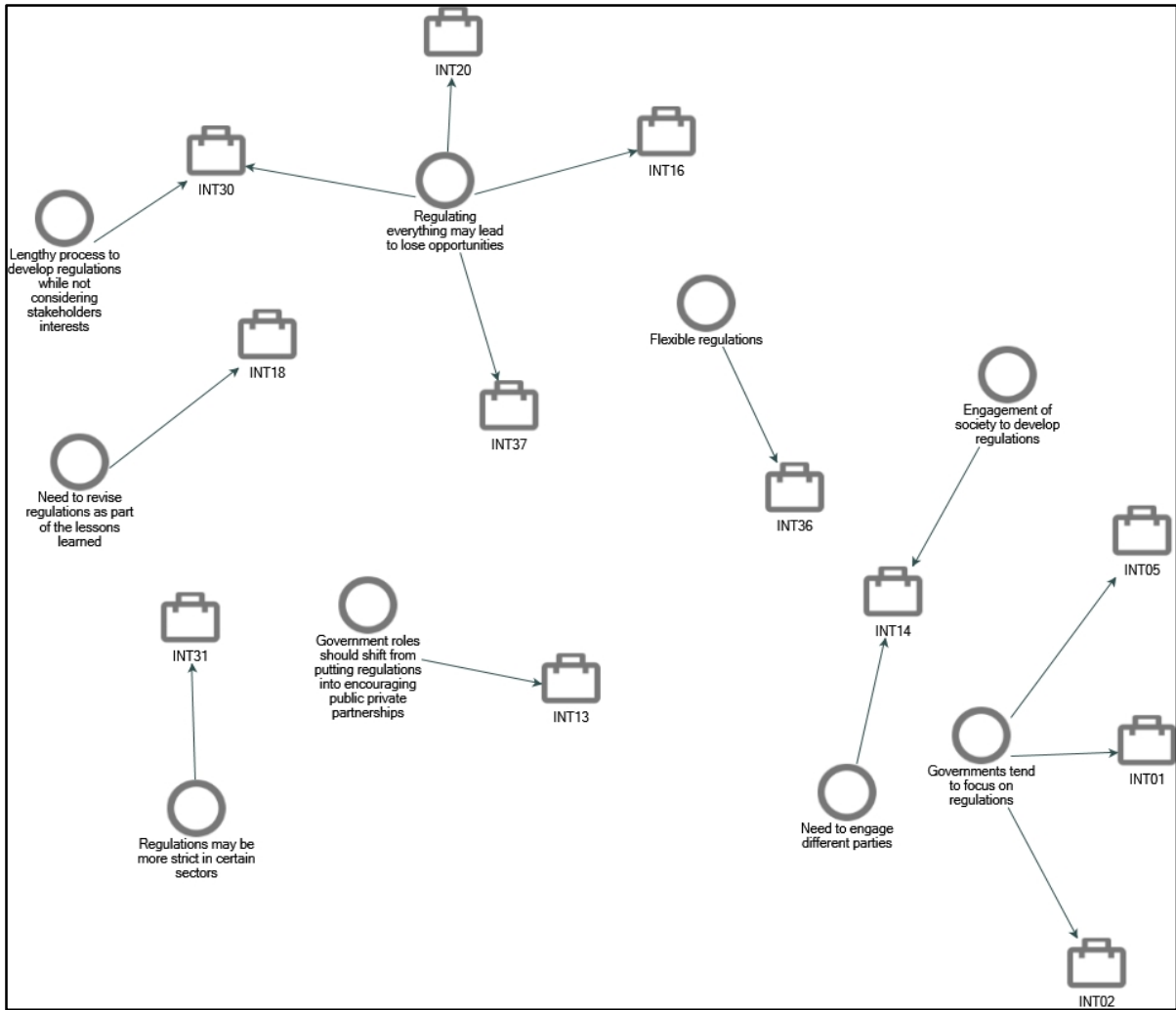
Figure 5-131: Identified attributes and interviewees inputs for 'regulations.

Public Services

The following paragraph will present the interviewees insights about the public services, which represents a set of activities or outputs carried out by the public sector to the society, aiming to fulfil their requirements or provide a certain value to them:

INT04 highlighted that in the future, the public services would no longer be secured by governments *"So, the concept of public service being protected, and the public administration offices are protected by the law and so forth. This is declining and diminishing; you have to do a great job serving your clients, stakeholders, your country, your city and so forth"*. He added

383

that the public sector should work hard to innovate its services *"The public sector organizations have to know that the society is not looking for business as usual. The society is looking for more innovative and creative services"*. Meanwhile, INT08 requested the public sector to invest more in technologies in order to improve its services *"So, the way technology is changing, this is imposing more challenges to the public sector to align with the technology advancement"*. Furthermore, INT18 believes that the role of the public sector is shifting to be more into service orientation *"In the past, the public sector acted or behaved like authority. Today, it is service orientation. Public service is there to serve people not to exercise authority"*.

Figure 5-132 and Figure 5-133 summarize the attributes highlighted by interviewees for this section. Interviewees think that in future the public services will not be restricted to governments. Meanwhile, the public sector should invest more in technology in addition to innovate the way it is provided its services, to be more of a service-oriented nature.
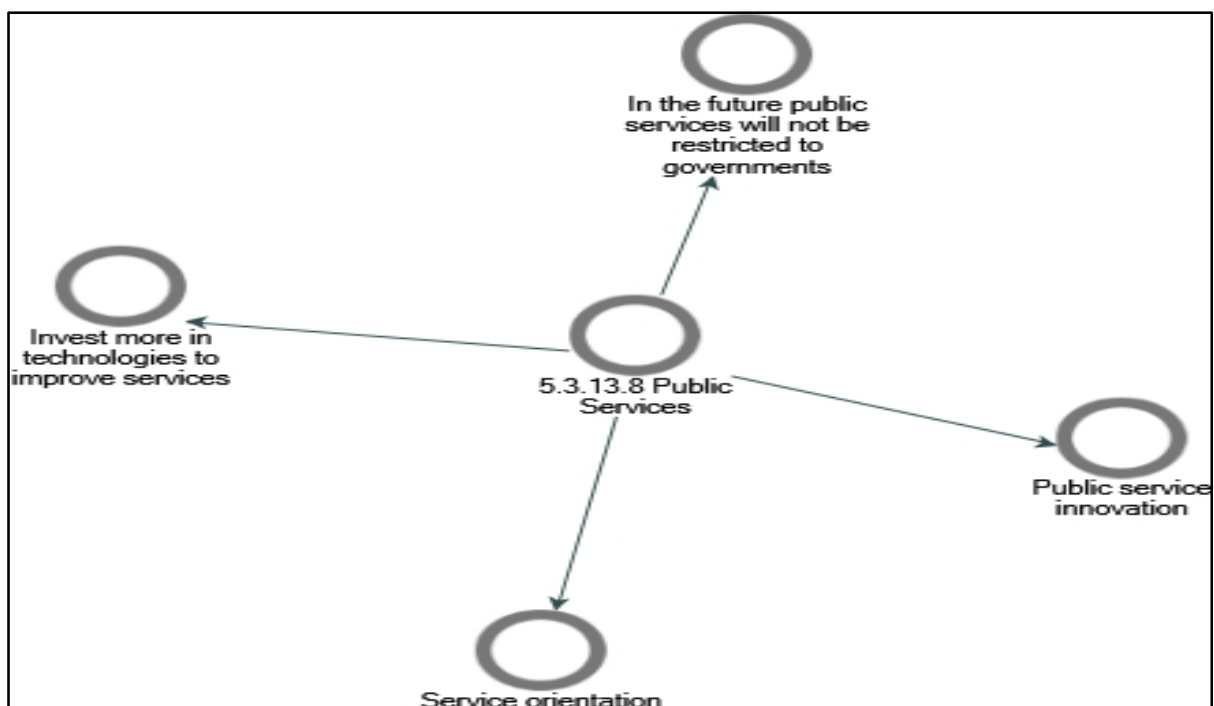
Figure 5-132: Identified attributes for public services.
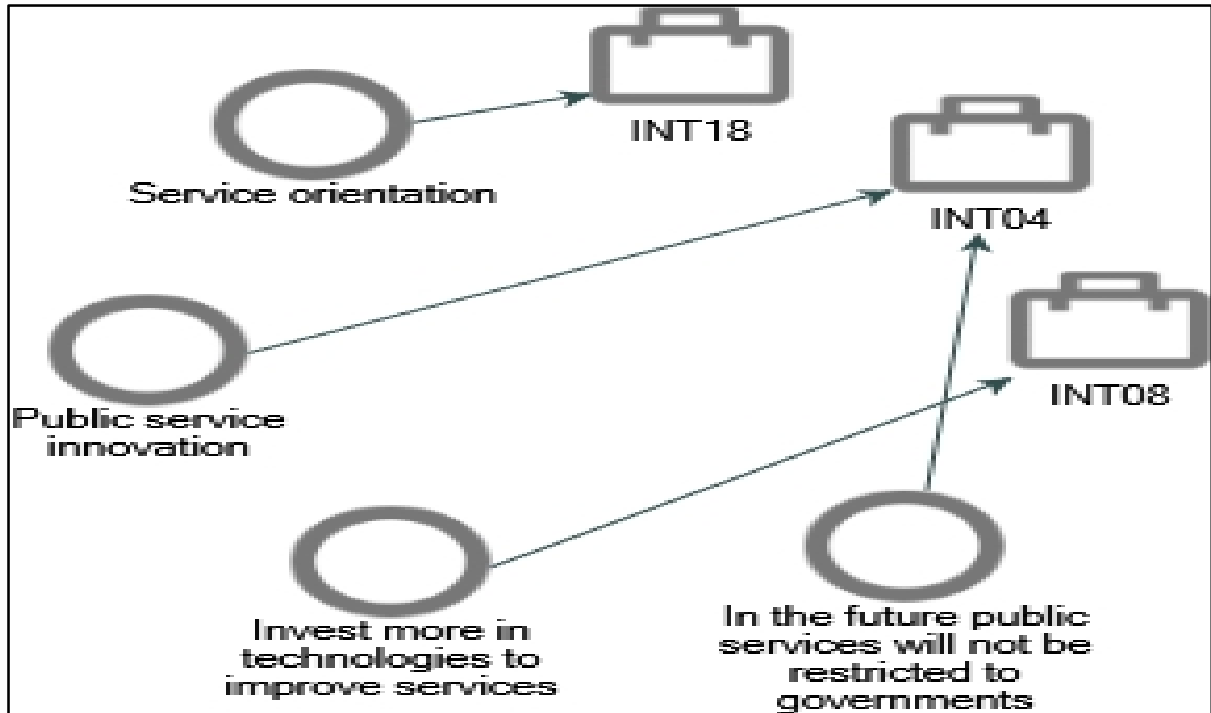
Figure 5-133: Identified attributes and interviewees inputs for public services.

5.3.14 Theme Number Fourteen (Government Sectors)

Figure 5-134 shows the hierarchical coding structure of theme number fourteen, which is government sectors. The findings of the data will try to investigate the participants' insights to identify linkages between different sectors addressing various specialties embedded within the public sector such as economy, health, and education:
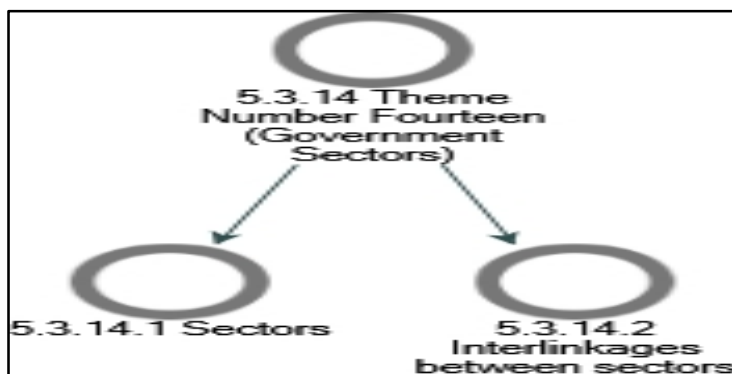
Figure 5-134: The hierarchical coding structure of Theme 15 (Government Sectors).

Sectors

The following paragraph will present the interviewees insights about sectors, which are certain areas in the public sector representing a specific scope of functioning, and their relationships with resilience:

INT03 highlighted that when an emergent event that is unexpected occurs, then all the efforts within different sectors should be integrated *"You always need to expect something not expected, how can you deal with it? how can you control it? and how can you integrate all the efforts of all the private and public sectors to avoid any expected side effects of these events?"*. Meanwhile, INT04 highlighted that the GDP of any country is depending on the revenues generated from different sectors *"So, you are talking about very significant effect, because these sectors at the end of the day, they are revenue generating and they are contributors to the growth of the GDP, they are highly affecting the economy"*. Furthermore, INT09 thinks that resilience maturity in the public sector should be assessed at a sectorial level *"Resilience in certain sectors or aspect is what we need to measure in government"*. Meanwhile, INT21 suggested having more diversification to be more resilient, and the impact of this diversification should be assessed against each sector *"Not only how it has affected these sectors, but also how these sectors changed with the diversification"*. He also suggested having a prioritization of sectors to ensure we are not affecting the most important ones *"The way that they treat the emerging situation is based on how they prioritize their sectors. Doing this is important to know how to deal with emergent events"*. On the other hand, INT30 thinks that there should be no prioritization based on sectors; as all sectors are forming the government. However, when an event occurred, some sectors will be moving faster than the others *"You can't divide sectors because usually whether it's a government or an organization, look at it as a whole, or one entity, or one organization. Therefore, I do not see a sector that could be impacted more than*

386

other, because it is the entire system of the government and how it would function. However, having said that, there are some sectors or organizations within governments in general that could try to move faster than others". He added that, because of big emergent events, new sectors will emerge, and the public sector should accommodate these new sectors and give them the proper support *"New sectors will come up; if you don't cope with understanding that there are new sectors that will come up, you will not be able to accommodate these sectors in your government"*. Meanwhile, INT33 thinks that the most critical sectors to look at during any emergent event related to advancement in technology will be economy, education and health *"I think the main three sectors to be affected: economy, education and health"*. Furthermore, INT36 thinks that technology advancement will affect all sectors in the future *"Definitely. I think it will come across all sectors"*. Nevertheless, INT34 highlighted the importance of building sector level resilience for the public sector as a mid-level between city level and entity level *"From a macro level, at a city level, there could be a resilience framework for the city, then sectors cascading down to entities"*.

Figure 5-135 and Figure 5-136 summarize the attributes highlighted by interviewees for this section. Interviewees suggested having prioritization of sectors that may differ from a country to another but always the economy, education, and health sectors should be part of the priority list. Furthermore, some interviewees recommended having resilience at the sectors level while others highlighted the emergence of new sectors as a result of big emergent events.
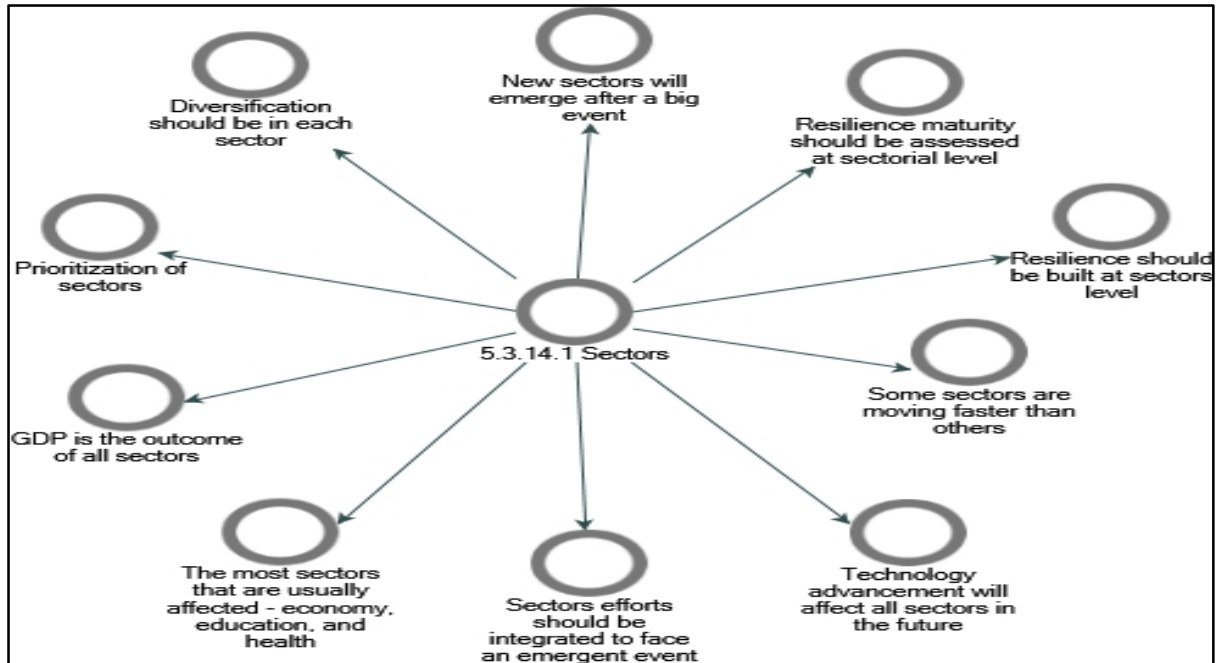
Figure 5-135: Identified attributes for sectors.
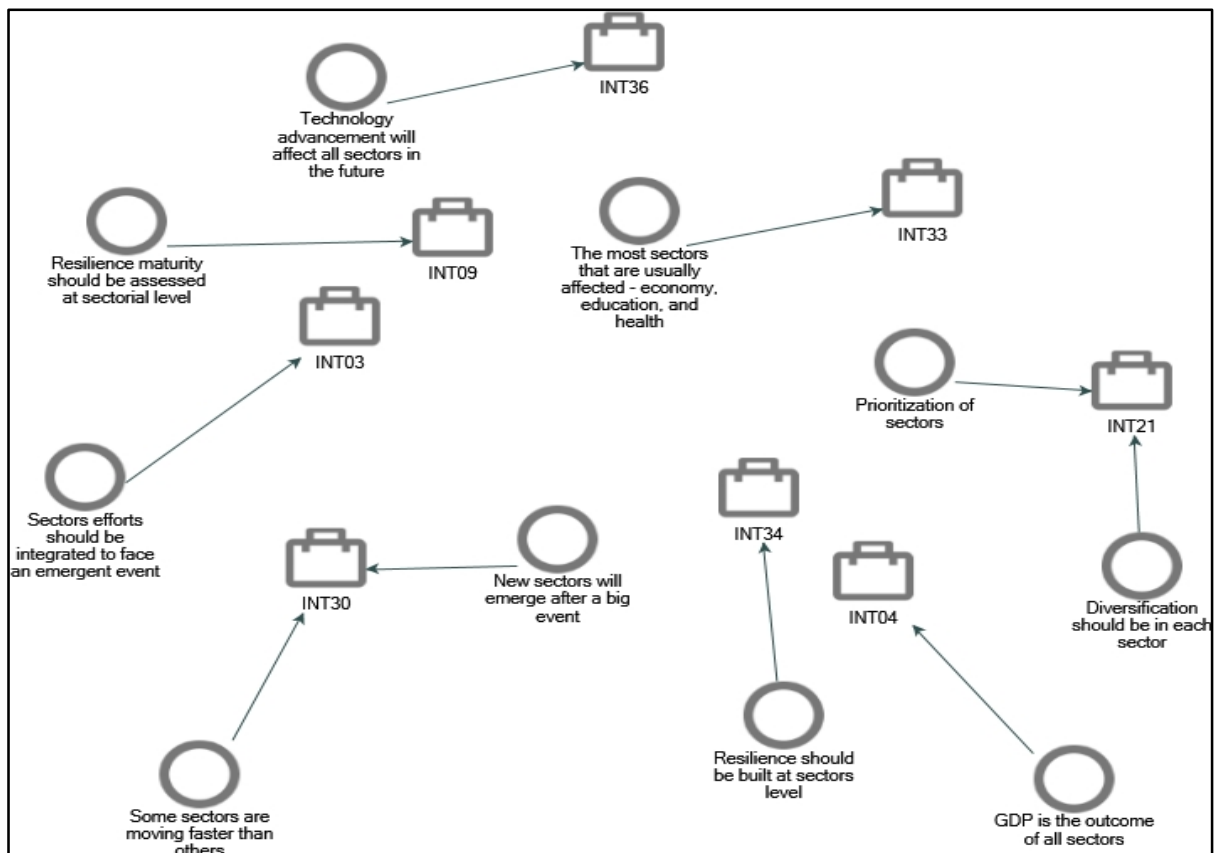
Figure 5-136: Identified attributes and interviewees inputs for sectors.

388

Interlinkages between sectors

The following paragraph will present the interviewees insights about the influence of different public sectors on each other. This means that the impact of an emergent event may not be limited to a specific public sector, as other sectors may be impacted:

INT07 recommended to measure resilience at the government level, as any emergent event could have multiple impacts at different sectors at the same time *"Mostly it would be more accurate if it is measured on governmental level, as an emergent event could affect many sectors at the same time"*. Meanwhile, INT09 highlighted that resilience measurement at the public sector level could be done through assessing the impact of previous events on various sector *"You look at several events that occurred in different sectors, and how did you respond to these in the past"*. He added that, the public sector has to assess the sensitivity on different sectors because of an emergent event *"So, if you're too sensitive because there are certain sectors, the impact transforms and passes quickly to them. Like when we look at financial markets, for example. However, if you take other markets like tourism probably or real estate. Sometimes it takes time to pass over this impact or it may not pass over to them at all"*. Furthermore, INT11 thinks that any emergent event within any sector will at the end affect the economic sector *"Sooner or later, they will face it in the economic side in the public sector, which is the economic sector"*. Meanwhile, INT12 highlighted the importance of sharing the information between different sectors in order to turn challenges into opportunities *"Many sectors are sharing the information together. So, this creates opportunities"*. Similarly, INT18 emphasised the need of the sectors to learn from each other *"I think this is practical to do, because sectors can learn from each other"*. Furthermore, INT13 thinks that some of the government policies affect some sectors negatively, so there should be a proper assessment of these policies on different sectors before implementation *"But the government's policies are affecting some*

sectors negatively; which might affect a big outcome that the government is looking forward to doing within this regard". Meanwhile, INT17 highlighted the importance of engaging experts from different sectors when responding to an emergent event *"They are responsible to appoint the relevant experts from different sectors accordingly"*. Furthermore, INT21 emphasised on the importance of having good communication between different sectors in order to effectively capture the lessons learned *"The communication between the government sectors is very important to say what has happened, how they have dealt with the issue, and what is their plan to do if it happens, which is the lesson learned"*. He added that, we can test other sectors readiness by analysing the effect of a certain event related to a specific sector into another sector, and see what will be the impact *"For example, something that might happen in a certain sector like the financial, political, or something like this, and then put it in another sector and see how they deal with it. Does it have the same kind of effect or maybe different effects"*. Meanwhile, INT30 highlighted the importance of engaging different sectors when forming a committee to respond to an emergent event *"If you have a disaster that's happening, then you have a committee for that, that committee would actually be from different sectors, with people who have the knowledge in how to deal with these things. People that know how to communicate with people, from people, and to the people"*. Similarly, INT31 emphasised on the need to mobilize all the sectors to work together to respond to an emergent event *"We need to mobilize all the sectors to work together"*. Furthermore, INT32 highlighted the importance of integration between different sectors *"For sure they should integrate, that's why Dubai has integrated some of the sectors together under combined sectors"*.

Figure 5-137 and Figure 5-138 summarize the attributes highlighted by interviewees for this section. Interviewees highlighted the importance of sharing information and proper communication across various sectors, in case the public sector faces any emergent event.

Meanwhile, the public sector should have the ability to utilize various resources and expertise from different sectors while facing an emergent event. Furthermore, when introducing or revising public policies as a result of an emergent event various sectors should be engaged to ensure having various inputs.
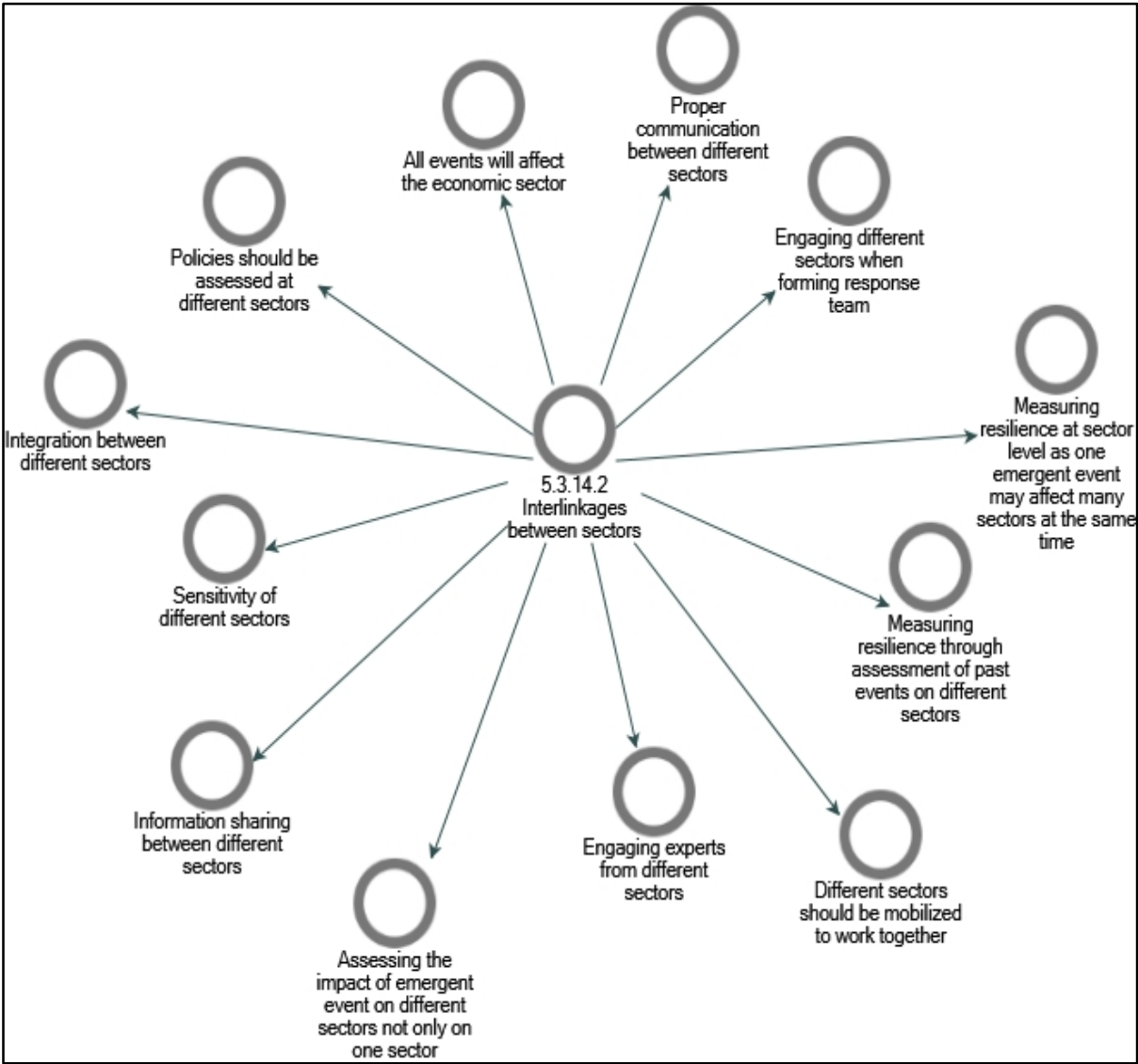
Figure 5-137: Identified attributes for interlinkages between sectors.
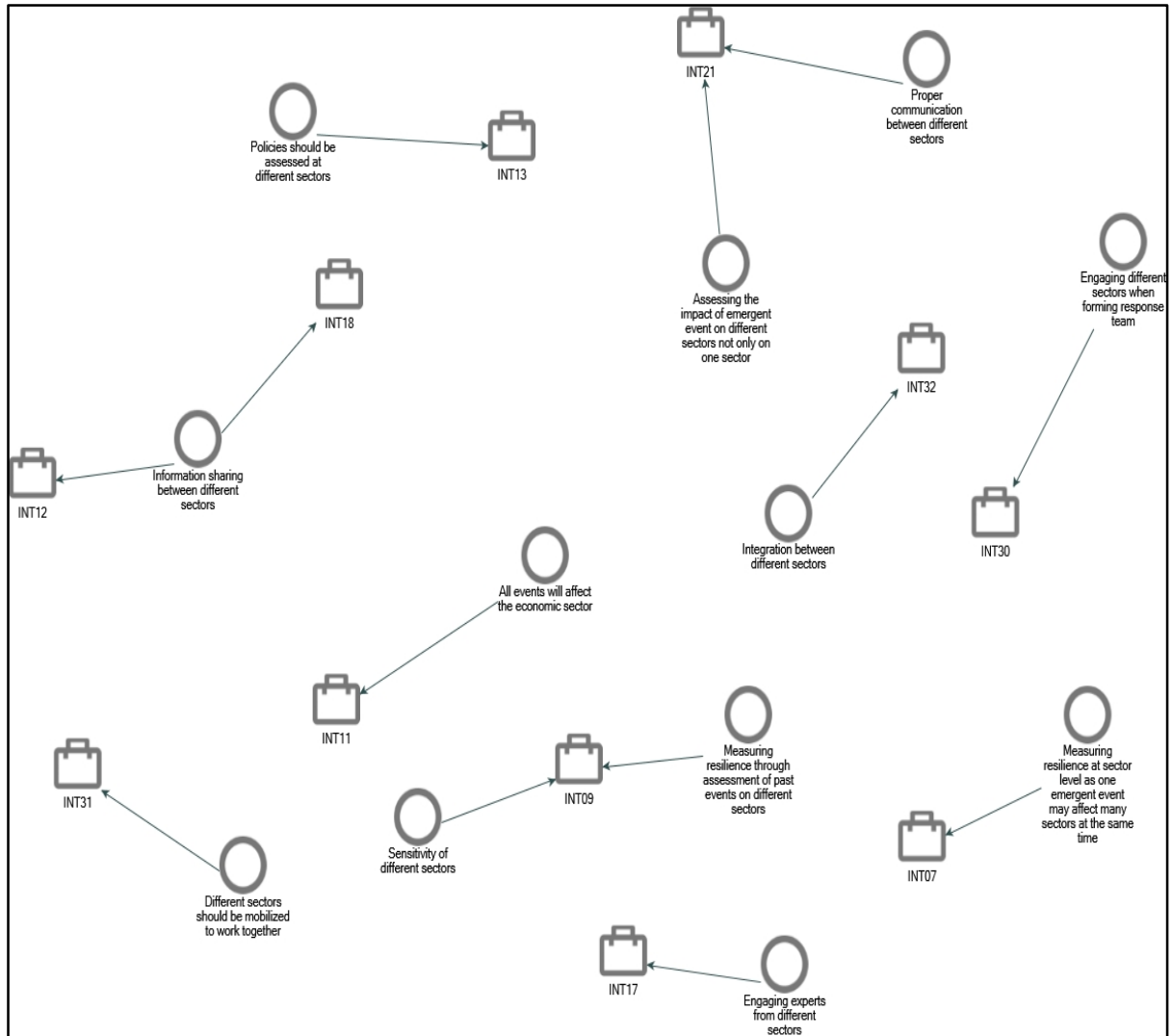
Figure 5-138: Identified attributes and interviewees inputs for "interlinkages between sectors".

5.3.15 Theme Number Fifteen (Holistic View)

Figure 5-139 shows the hierarchical coding structure of theme number fifteen, which is holistic view. The findings of the data will try to investigate the participants' insights about the general terms frequently used by interviewees to try to build the big picture. In addition to missing anything important, that may not have been highlighted in the other themes:
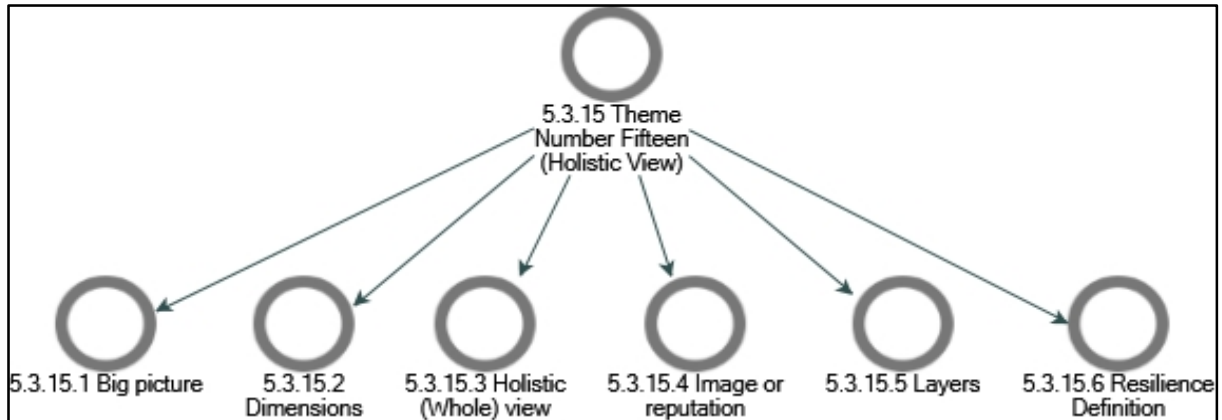
Figure 5-139: The hierarchical coding structure of Theme 15 (Holistic View)

The following section will present the interviewees insights about important topics that were highlighted by them:

Big picture

INT01 highlighted that the public sector organizations or even the government sectors are fragmented, and they usually miss the overall look at the big picture *"The big picture is not in anybody's table. It's really fragmented"*. Similarly, INT11 thinks also that there is always narrow thinking of government entities to achieve short results related to their work and usually they miss the big picture *"In addition to the result-oriented thinking, sometimes they go narrow in trying to achieve specific targets associated to their work, rather than taking the big picture. For example, there may be one option in future, as we may don't need all these departments, we need one government"*. Furthermore, INT13 highlighted the importance of addressing the holistic view when responding to an emergent event *"Suppose we reached to a stage where we can make use of the negative impacts. Can we do this? We don't know, because we don't have an idea of the big picture"*. Meanwhile, INT01 requesting the public sector to think collectively to achieve resilience *"The first thing is to really think collectively and aligned, so that you can*

really reengineer value streaming and value development". Similarly, INT04 thinks that this collective work should be clearly evidenced when dealing with emergent events *"You should not be alone in dealing with this, there should be collective efforts for the government entities to work together to cope with the emergent event"*.

Figure 5-140 and Figure 5-141 summarize the attributes highlighted by interviewees for this section. Interviewees think that there should be a collective thinking to manage an emergent event across the government and everyone should understand the pig picture and work holistically to fulfill it.
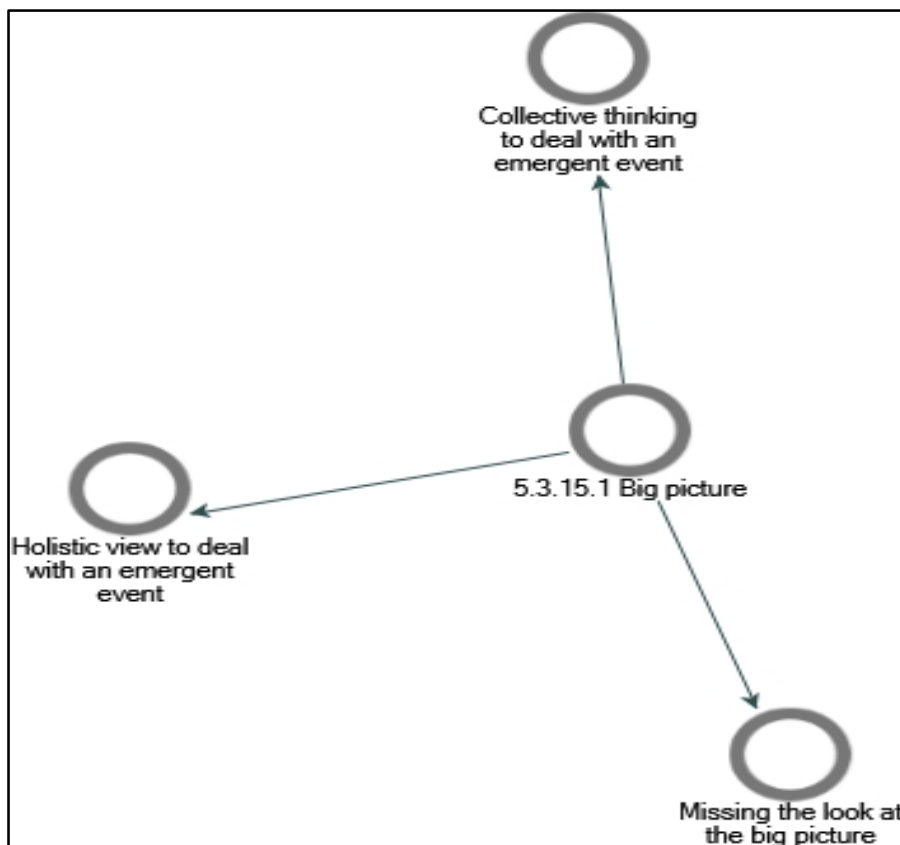
Figure 5-140: Identified attributes for big picture.

394
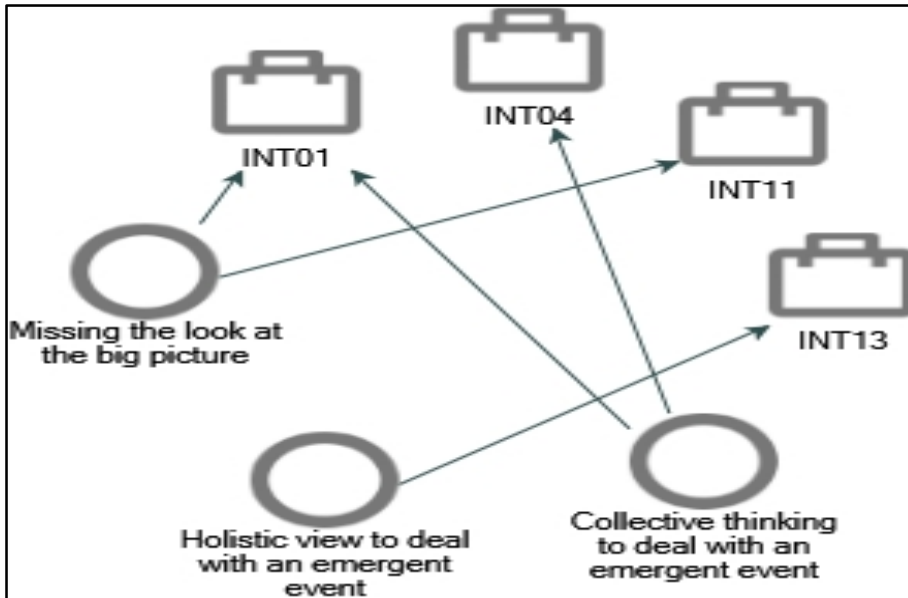
Figure 5-141: Identified attributes and interviewees inputs for big picture.

Dimensions

For the dimensions term; INT02 thinks that the emergent events facing the public sector can have two dimensions; one is spatial and the other one is sectorial *"So, I think we have two dimensions to deal with; One is the spatial, which targets basically either the global, regional or local. The sectoral one is the sectoral level; which I'm here talking about political, economic, and social events"*. He added that an emergent event can be assesses through two dimensions; one is the scope of the effect, and the other one is event deepness *"The first one, how wide it is, and the second one; how deep the impact is. I think you can always have a diagram, a two-dimension type one with a scope of effect and one with how deep the effect is"*. Meanwhile, INT08 emphasized on considering all dimensions when building a strategy to face an emergent event with considering agility *"If you are building a good strategy with the most acceptable scenarios and you think in all dimensions and being more agile"*. Furthermore, INT09 emphasized on two dimensions when building capabilities to be resilient; people and technology *"Building capabilities is always about two main dimensions, people and*

395

technology". He highlighted also two dimensions to assess the scalability of an emergent event, which are connectivity and size *"First of all, the two dimensions: connectivity and size"*. Meanwhile, he identified two dimensions for measuring resilience; the outcome on the sectorial level and the efficiency on the government entity level *"When you want to measure resilience, you're probably measuring it in two dimensions; the first one is the outcome of the sector level, and the second one is the efficiencies within the government department itself"*. The dimensions term was also addressed by INT17 when trying to categorize uncertainties surrounding us and these dimensions are very dynamic *"The world is changing rapidly in all directions; of course, the political dimension is affecting all other dimensions especially the economical. The third very dynamic dimension is the technological. Advancement has been recorded in different directions; internet of things, artificial intelligence, and the fourth industrial revolution. So, I think these are the main three dimensions that are very dynamic"*. He elaborated more on how the changes in these dimensions are changing the way the public sector is operating *"Changes in these dimensions would affect the policies, the regulations, and the laws. Because what is applicable now, or what can be a rule or policy now, might not be valid after five years or ten years, because everything is changing"*. Meanwhile, INT29 looks to emergent event as multi-dimensional *"You can make a classification for the event. You can say for example, it will be multi-dimensional, but it's not easy"*. Furthermore, INT34 identified three dimensions when formulating a decision to face an emergent event cost, money and wellbeing *"I would kind of club them into three dimensions; the costs, the monetary, and the wellbeing impacts"*. She also identified two dimensions to communicate to the public for the updates of an emergent event; stakeholder engagement, and communication and change management plan *"You need to assess on a couple of dimensions; one is stakeholder engagement, the second thing is you need to have a communication and change management plan"*.

Figure 5-142 and Figure 5-143 summarize the attributes highlighted by interviewees for this section. Interviewees think that an emergent event is multi-dimensional and the response to it is also multi-dimensional. Meanwhile, to build resilience and to measure it there is multi-dimensions factor also, as the scope of spread of resilience concept is very wide and interacting with too many concepts.
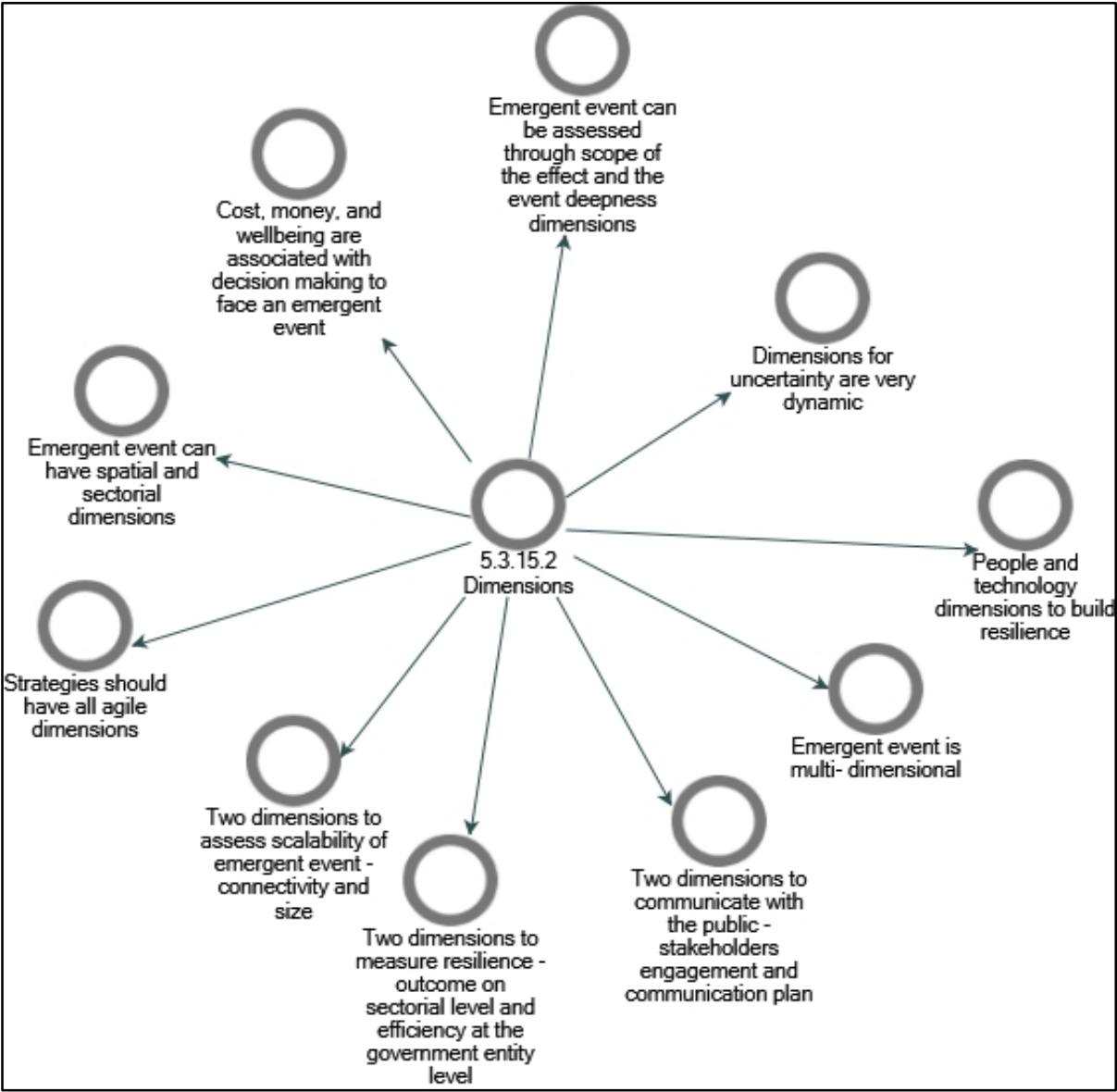
Figure 5-142: Identified attributes for "dimensions".
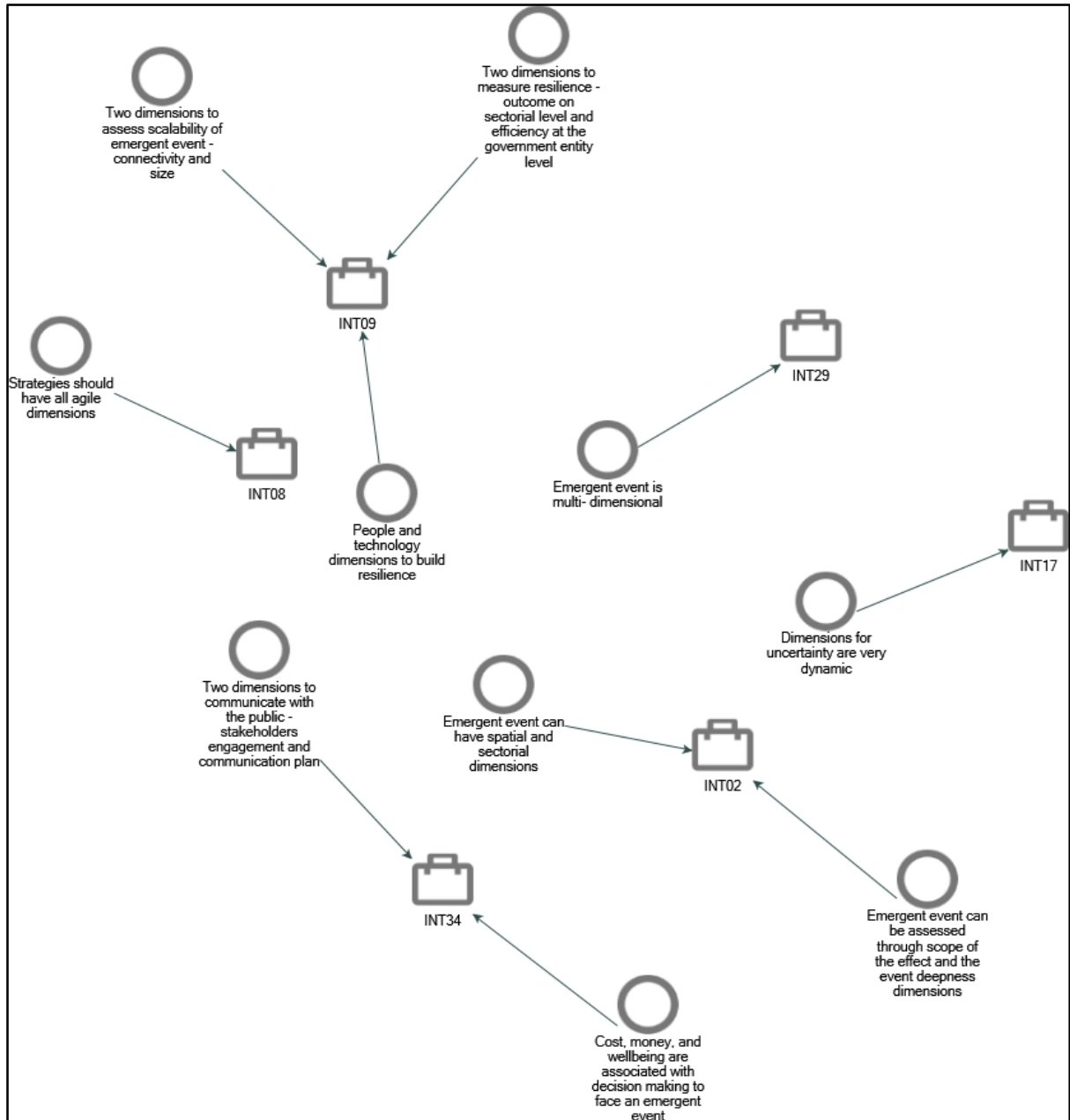
Figure 5-143: Identified attributes and interviewees inputs for "dimensions".

Holistic (Whole) view

For the holistic view, INT11 thinks that changes in political factor are affecting the holistic view of the country or the public sector *"But in general, the political aspect is a great one because it's affecting the holistic view of any country or the public sector"*. Meanwhile, INT34

398

highlighted that, in the public sector, we need some central party, which looks at things from the big picture scene *"There should be somebody at the top who is actually looking into these. From there, they have the holistic view of everything happening and how it's impacting the city"*. Furthermore, INT01 suggested trying to understand the whole picture of the emergent event to be more resilient *"Recognition of the whole picture of the event"*. Meanwhile, INT07 thinks of emergent events as either having negative impacts, or they can have opportunities to the whole country *"Emerging events could be either having a negative influence, or bring great opportunities to the organization or even the whole country"*. Furthermore, INT09 suggested to measure resilience for the government as a whole *"So, if you have the answer to all of these, then you can see the government as a whole, if it is resilient or not"*. Meanwhile, INT10 suggested having training programs across the whole government to be resilient *"You have to have training programs and capacity building programs across the whole government"*. Furthermore, to assess the public sector vulnerability, he suggested doing business impact assessment at the whole of the government level, then it can be cascaded to public organizations level *"Once you do it across the whole government of the whole public sector, then you can cascade it down to the government entities"*. He added that the lessons learned after an emergent event should be shared within the whole government *"And you publish it within the whole government sector, so they can learn from their experience and from the government experience"*. Furthermore, he thinks that a resilient framework should be for the whole of government *"Resilient framework at the whole of government is an enabler"*. Meanwhile, INT12 suggested having a data bank of the lessons learned for the whole government *"I think till now there is no data bank that deals with the lessons learned of the whole government"*. Furthermore, INT13 suggested to educate the society as a whole to be more resilient *"So, if you're going to talk about this, you have to educate the society as a whole, that there are some*

negative impacts that may happen". He added that, we need to have a resilience framework for the whole of the government as the structure of the public sector may change in future but the functions will be the same *"You need to have one resilience model for the government, because it is not impossible that the whole government structure, we know today will change, but the main functions and outcomes needed of a government will continue to be the same"*. Meanwhile, INT14 thinks that there should be a plan to transform the whole services of the government to be digitized in order to be more resilient *"This is one of the things, make the whole government services future ready by digitally transforming the government operations"*. Furthermore, INT16 is recommending reviewing the whole paradigm of decision making in the public sector *"I think it's about rethinking the whole paradigm of decision making in government"*. Meanwhile, INT29 thinks that the world is fragile, and any emergent event could affect the whole system in the public sector *"We see now the world is more fragile, anytime a problem may happen, this may affect the whole system everywhere"*. Similarly, INT30 thinks that, not properly addressing the emergent event, could negatively affect the whole system in the public sector *"If you know them, and you don't react to them, that's a drastic problem that requires revamping the whole system"*. Furthermore, INT32 thinks that, not properly communicating the information and not being transparent while dealing with an emergent event, may affect the whole economy or the reputation of the country on the long term *"Whatever information is manipulated or are not true, it will impact the whole economy or the whole reputation of the country"*. Meanwhile, INT37 suggested to have a resilience framework for the whole of government *"I think this maturity model is for the whole of the government, as once you break it down the whole of government, you will come down to various streams and resilience of health care facility, or for a health issue, which is different from resilience of a*

trade and economy or something else. So, I think the resilience depends, that's why we should

leave it as a whole of government".

Figure 5-144 and Figure 5-145 summarize the attributes highlighted by interviewees for this section. Interviewees think that the resilience framework should be for the whole of the government as any emergent event could affect the whole system of the government. Furthermore, when it comes to lessons learned, the public sector should have proper mechanisms to ensure that the lessons learned are communicated and captured across the whole of government.
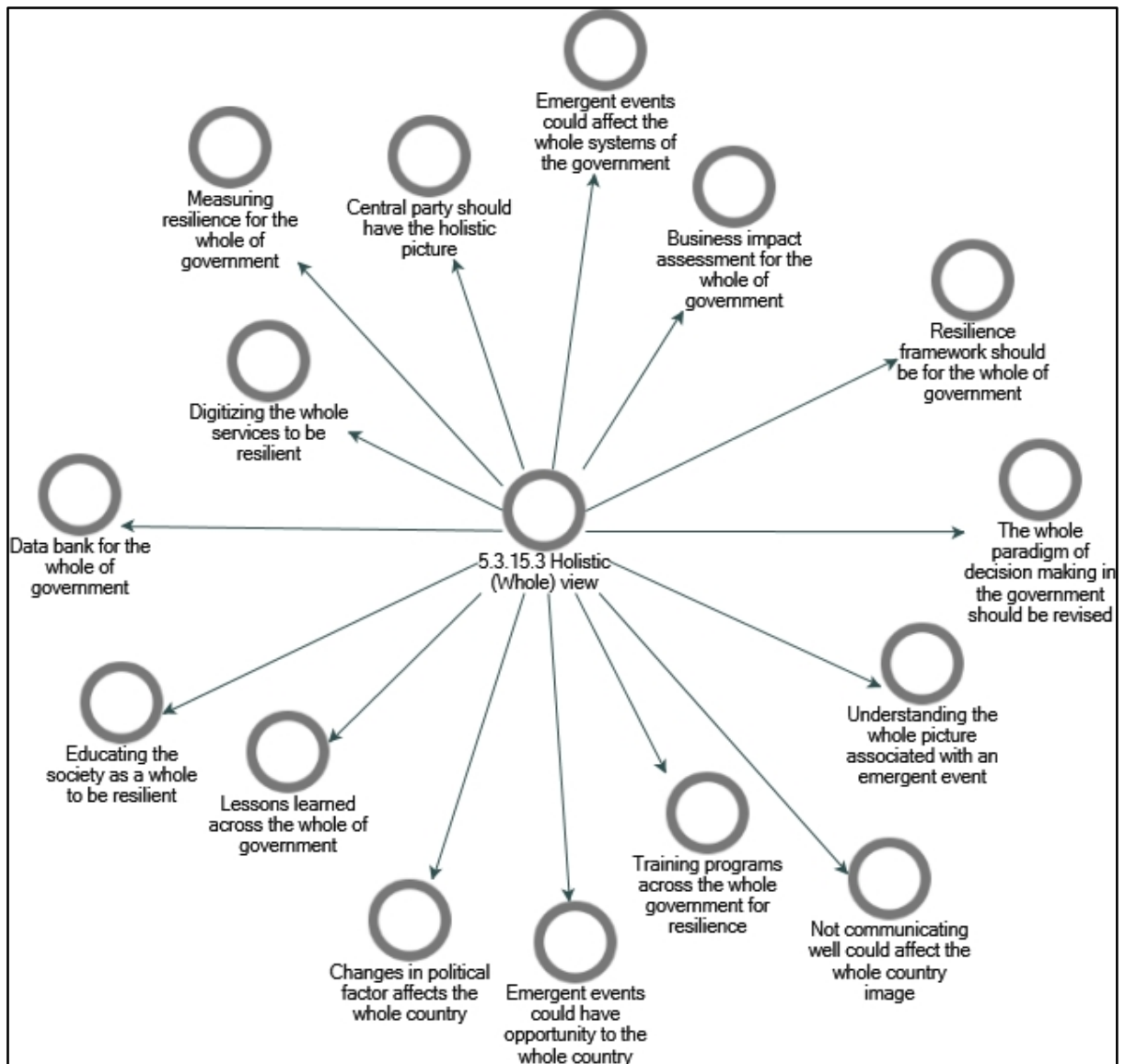
Figure 5-144: Identified attributes for holistic view.
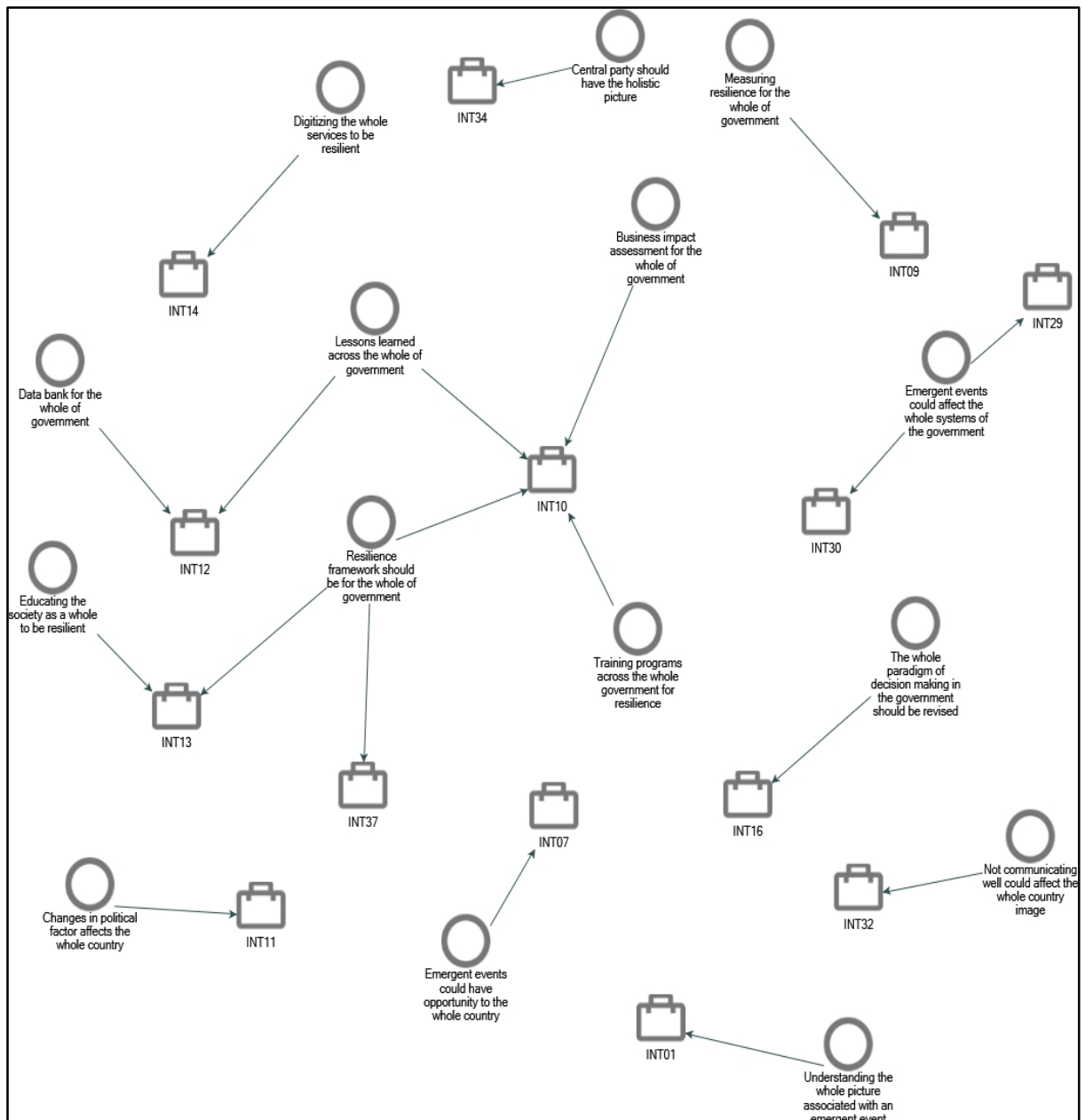
Figure 5-145: Identified attributes and interviewees inputs for holistic view.

Image or reputation

For image and reputation, INT09 believes that although the image is an important aspect while dealing with an emergent event, but it is not as important as people *"I wouldn't defend that the image is very important, but I wouldn't say that the image is more important than the people"*. Meanwhile, INT13 thinks that although the public sector image is important, but also, we

should consider the economic factor *"You need to have a sustainable economy plus image because the image affects the economy and vice versa"*. Furthermore, INT24 highlighted that an image could be an obstacle on taking actions by the public sector, as they may decide simply to hide *"Maybe you will be afraid that your image will be affected, and maybe the public sector decide not to action, and simply to hide"*. Furthermore, INT31 identified a strong relationship between preparedness and the image *"The well preparedness you can succeed in transforming this event into a protective position, you can get a better reputation and strengthen your image"*. Meanwhile, INT03 thinks that reputation of a country is a very important thing, and the public sector should not only focus on being resilient but also to be anti-fragile *"The reputation of a country is a very important thing, based on that, they built all the capabilities of the people, the entities, the processes and the systems to be not only resilience, but also to be anti-fragile"*. Furthermore, INT06 believes that the reputation will be affected negatively, if the public sector was not able to fulfil people needs while addressing an emergent event *"The external is to have good reputation of the organization as having integrity, having corporate governance, doing what the public wants from this organization"*. Meanwhile, INT10 thinks that resilience in the public sector can be measured indirectly by assessing the impact of the emergent event on its reputation *"Indirect, something similar to the impact on your reputation"*. Furthermore, INT12 highlighted that governments that are not flexible and resilient, their reputation will be affected *"I can tell you that governments that do not become flexible and resilient, their reputation will deteriorate automatically"*. Meanwhile, INT20 thinks that the most important thing in the public sector while facing an emergent event, is to recover fast although this may affect efficiency, as reputation is depending on fast recovery *"So being efficient in spending versus reputation; to recover from the current state, we should always put*

recover fast as a priority even if we spend more". The reputation factor was also emphasized by INT32 and INT34.

Figure 5-146 and Figure 5-147 summarize the attributes highlighted by interviewees for this section. Interviewees think that being resilient will positively affects the reputation or image of the public sector. Meanwhile, reputation should not supersede the people factor.
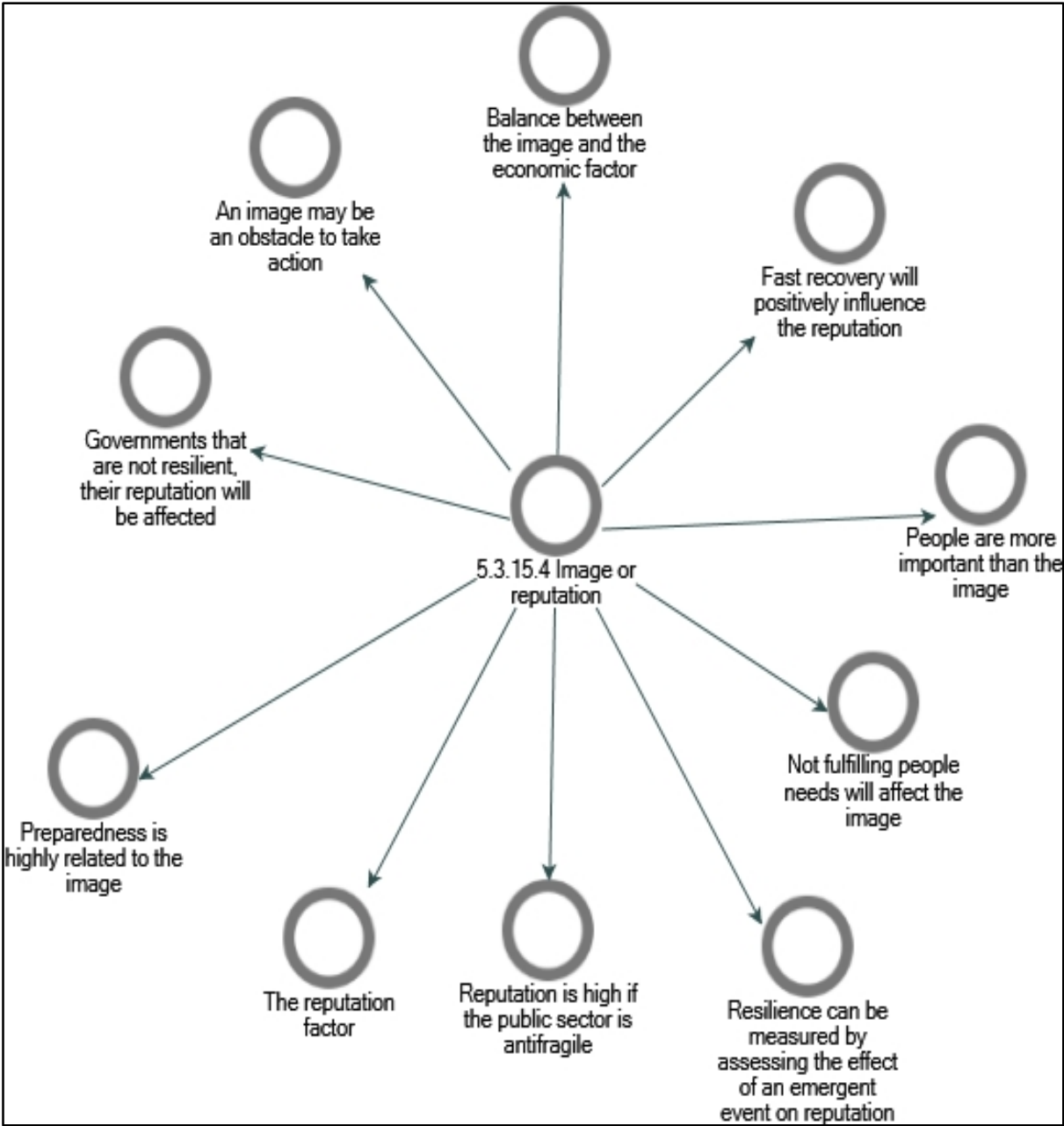
Figure 5-146: Identified attributes for "image or reputation".
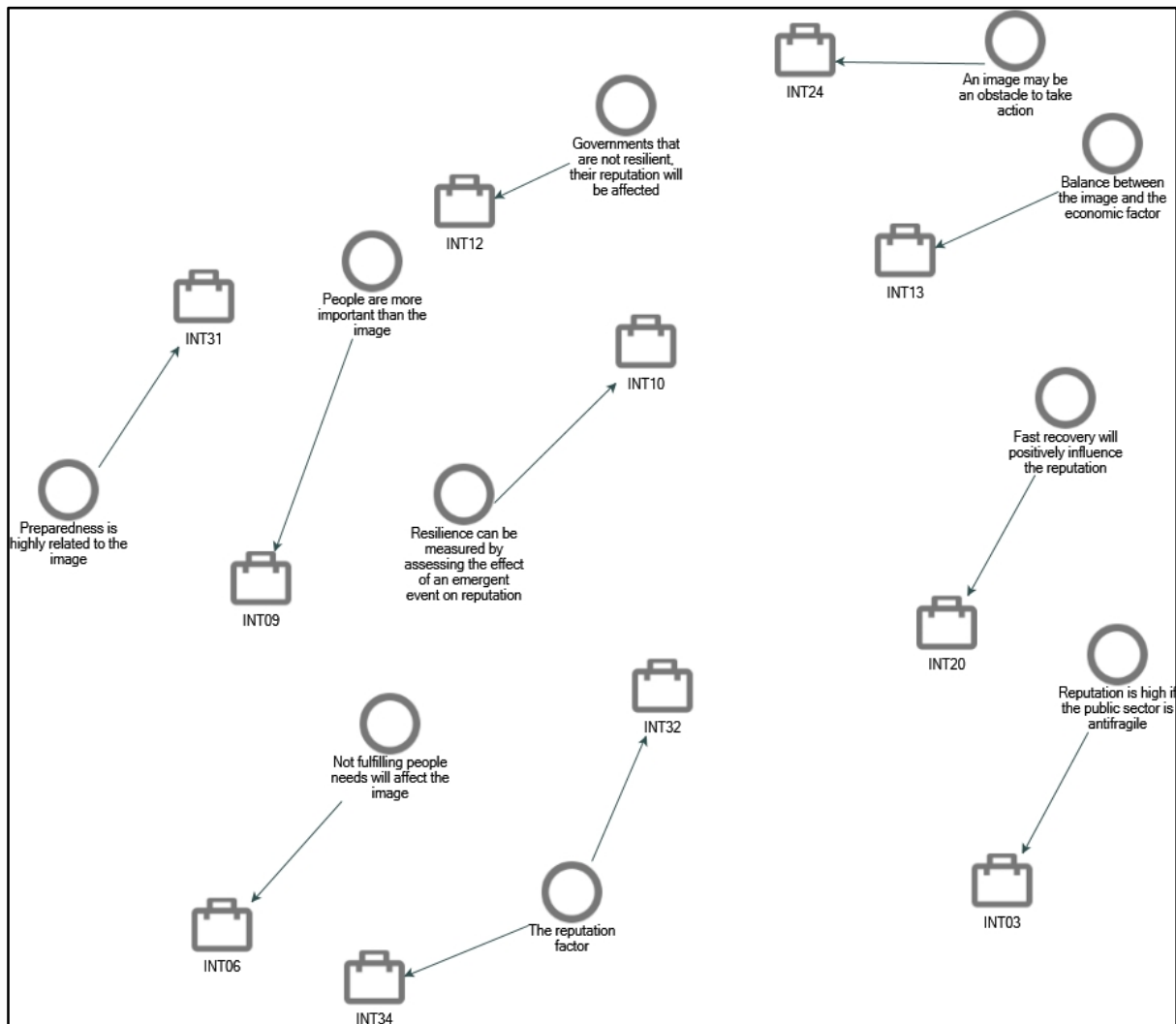
Figure 5-147: Identified attributes and interviewees inputs for "image or reputation".

Layers

For an effective response to an event, INT11 defined three layers in the public sector that need to coordinate with each other *"It's like three multi-layers; the central government of public sector, the department itself, and the sub departments"*. Meanwhile, INT23 thinks that uncertainty itself comprises different layers *"You know what uncertainty is: It is layers; uncertainty is one word, but it implies layers"*. Furthermore, INT34 thinks that when

responding to an emergent event, we should make our priorities based on layers starting from citizens first *"As a government now, what I care about is that citizens have education and health, the basic needs, and then from the basic needs we can shift our focus to secondary needs"*. Meanwhile, INT35 highlighted that, it is important of the public sector to build the second layer of management to be more adaptive *"For the adaptive, you need to build the second layer of the management and other people, because this needs some actions from the operations"*. Furthermore, INT37 suggested having many layers when validating information related to sustainability *"One layer is doing the assessment, another layer is to look at reports coming from other entities, such as WHO make a report on the impact of the event globally, and they have regional impact and local impact. Therefore, we will take this report and compare it to our self-assessment report in our first layer. To aggregate layers of data, this is part of the analysis"*.

Figure 5-148 and Figure 5-149 summarize the attributes highlighted by interviewees for this section. Interviewees think that uncertainties have different layers and also the public sectors have different layers to respond to any emergent event.
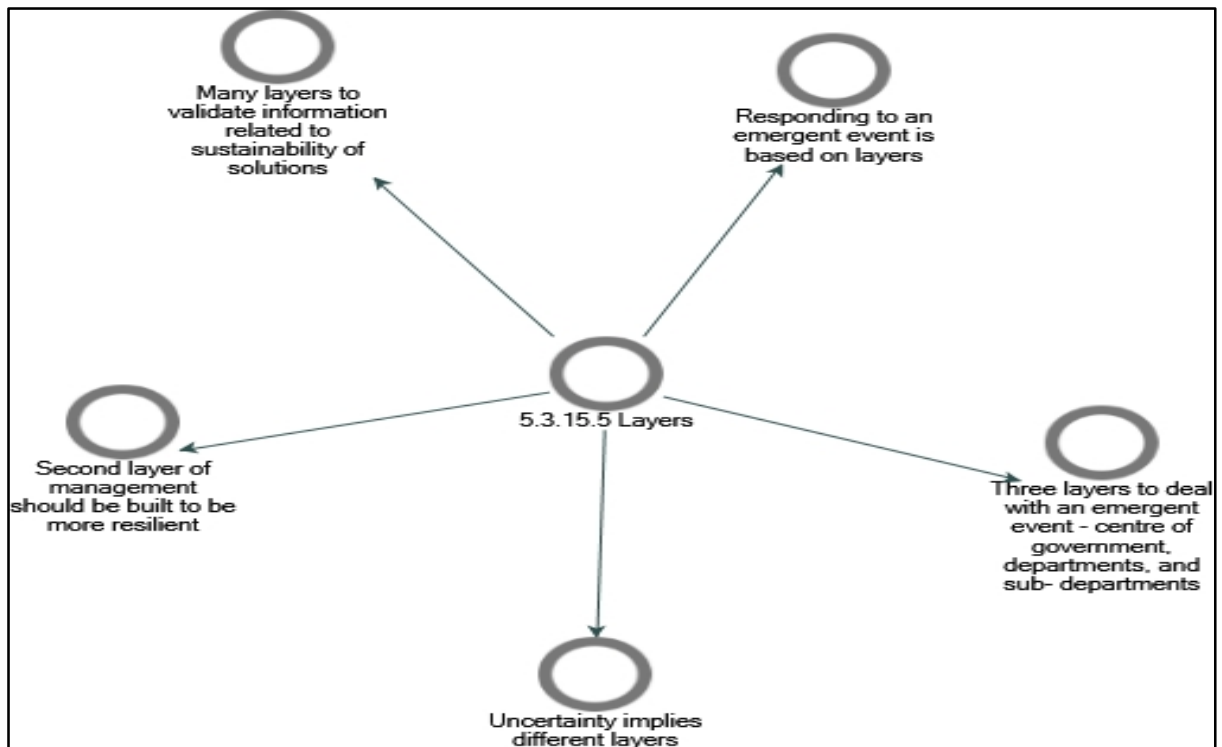
Figure 5-148: Identified attributes for layers.
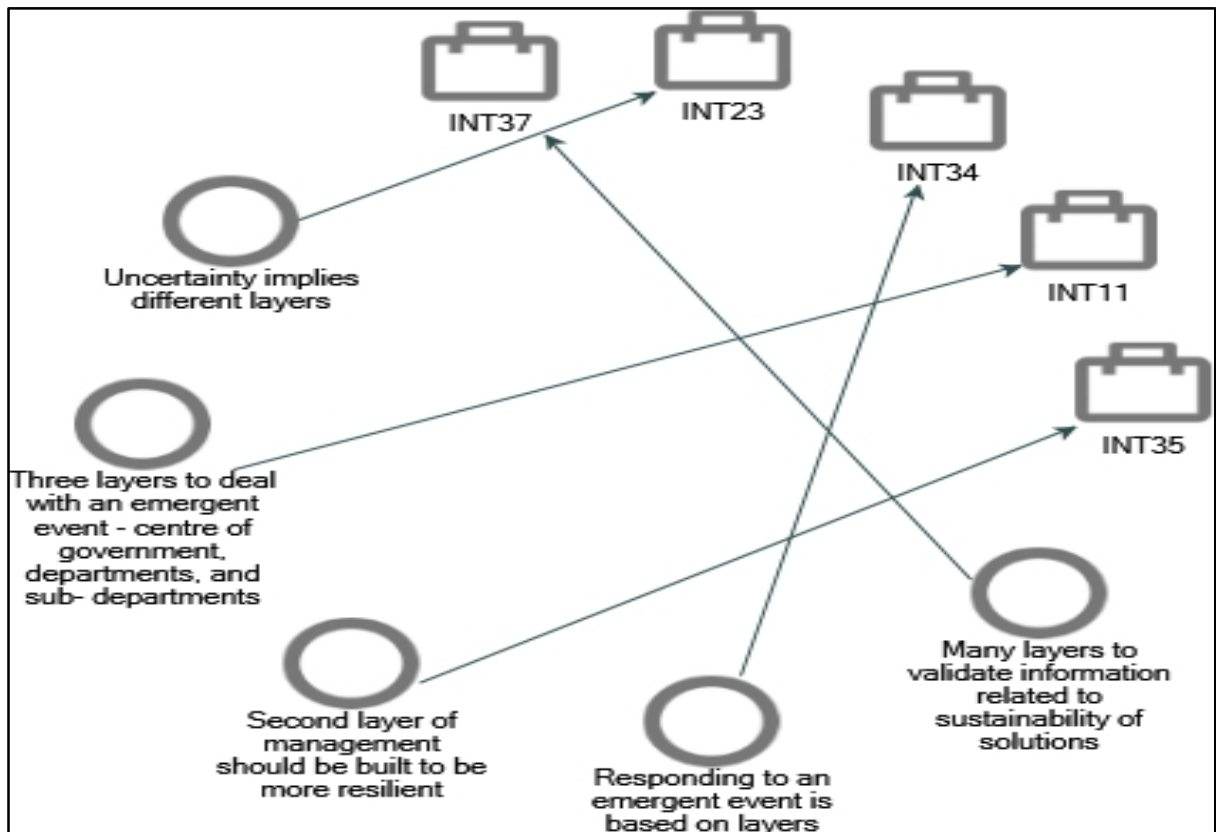
Figure 5-149: Identified attributes and interviewees inputs for layers.

Resilience Definition

INT09 identifies the need to have a resilience framework in the public sector to have a clear definition of what resilience means *"Clear framework of resilience, because as I said, ask ten people in the government, how would you define resilience? You'll get ten different answers. But if you have set a defined framework, this will make it easy for people to have consensus on what resilience means"*. Similarly, INT28 suggested having a decision framework to identify what we mean by resilience in the public sector *"What do I mean by resilience? How do I define it? In addition, how I am going to measure it? Putting all of these in steps; if you do this one then you're considered as resilient, and if you do this one, that you're not resilient. This would be like a decision tree in order to make sure that it is clearly defined"*. Meanwhile, INT34 emphasised on the need to define what resilience is *"We need to define what resilience means, and maybe benchmark what resilience means in different places"*. Furthermore, INT23 raised too many questions about what resilience means, if the GDP increased or decreased *"When we say resilience, we say what if our GDP decreased, because this would be a difficult case, but what if it will increase. Will this imply that I am more resilient or not?"*.

Figure 5-150 and Figure 5-151 summarize the attributes highlighted by interviewees for this section. Interviewees emphasize the need to have a resilience framework in the public sector to have a proper definition for what do mean by a resilient public sector.
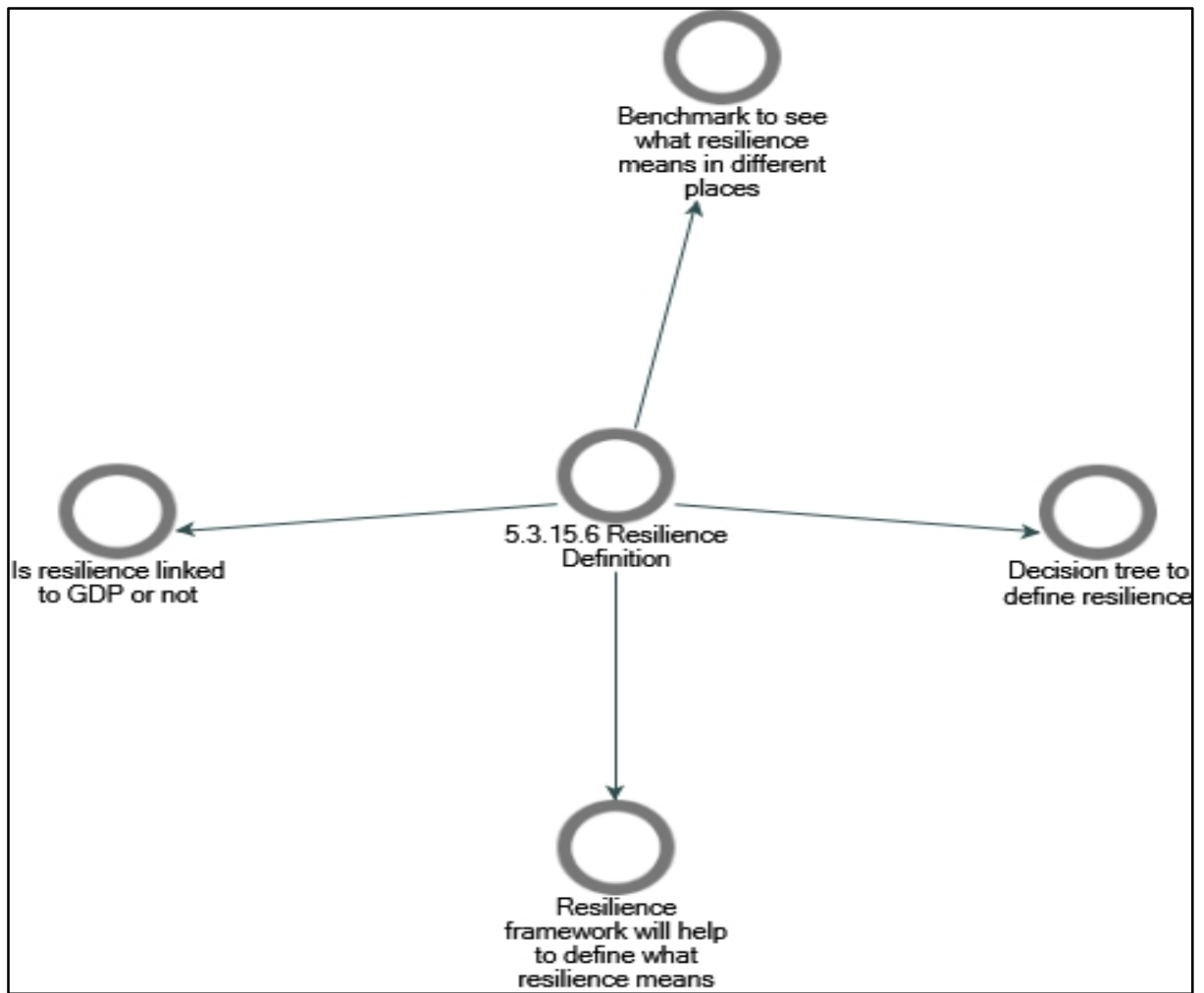
Figure 5-150: Identified attributes for "resilience definition".
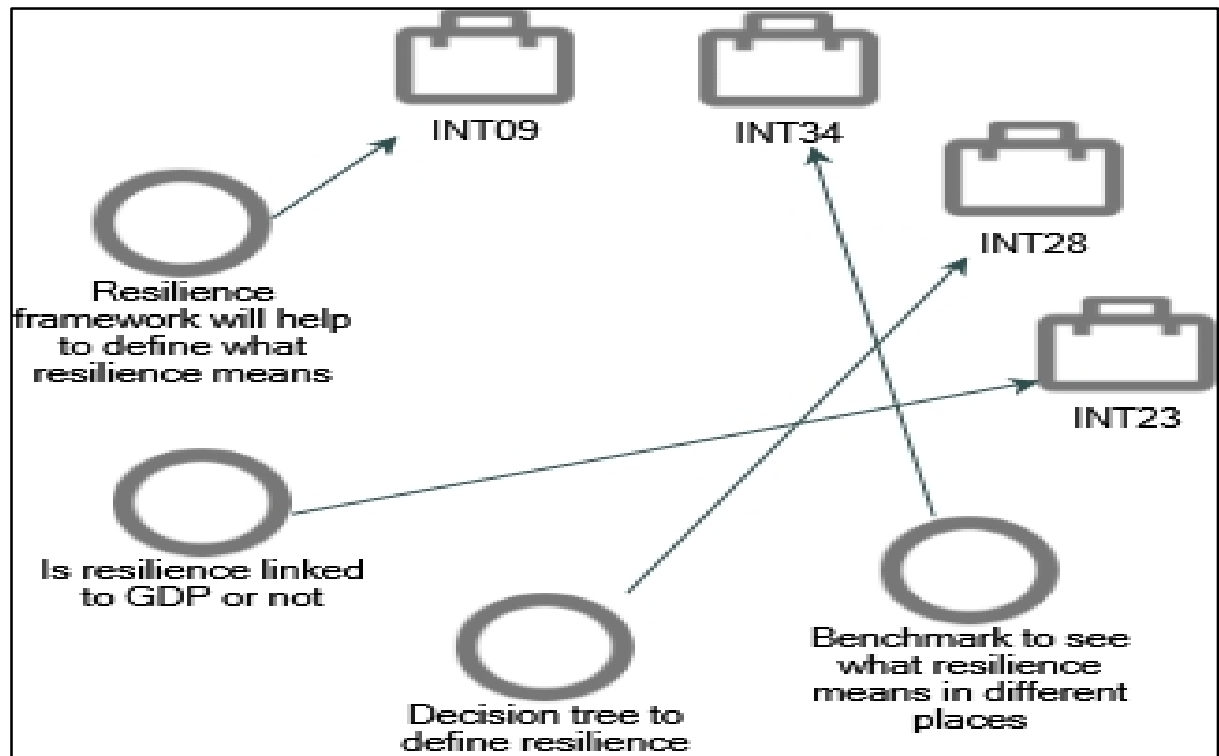
Figure 5-151: Identified attributes and interviewees inputs for "resilience definition".

Chapter Six: Discussion and developing the framework

6.1 Introduction

This chapter presents a discussion of the development of a resilience framework for the public sector based on the theoretical framework developed from the literature review, the initially developed framework, the findings presented in the previous chapter, and the research questions. First, the concepts, principles, and attributes for resilience in the public sector will be identified. Second, connecting the dots between the proposed theoretical framework identified in Chapter Three, the concepts, principles, and attributes of resilience discussed in this chapter, and the research findings will be developed. Third, a discussion of the results will be presented based on the connected dots in the previous step. Finally, the developed resilience framework for the public sector will be verified by drawing a comparison with the ISO 22316:2017 (Security and resilience – organizational resilience – principles and attributes).

6.2 The concepts, principles, and attributes of resilience

The following sections will discuss the concepts, principles, and attributes of resilience based on the existing information that was presented in the literature review, developed theoretical framework and interviews findings. Moreover, extra references were added to fulfil the purpose of this section.

6.2.1 Resilience concepts

Fletcher & Sarkar (2013) defined a concept as "an abstract notion that is derived from a combination of personal intuition and consistent evidence". There were several concepts for resilience discussed in the literature review. Table 6-1 summarizes these concepts.

Table 6-1: Summary of resilience concepts that were presented in the literature review chapter.

Resilience Concept	References
The resilience concept has evolved more into building capacities and capabilities to face both epistemological and ontological internal and external uncertainties.	(Carayannis et al., 2017; Ilmola & Rovenskaya, 2016).
The original understanding of the resilience concept is represented by the power to bounce back after a disruptive event or multiple events.	(Meng et al., 2019; Sahebjamnia, Torabi & Mansouri, 2018; Sawalha, 2015; Sawalha, 2015).
The resilience concept is becoming an 'umbrella' that covers all facets of management focus and efforts not only to face turbulence but also to grasp the chance of becoming more innovative and competitive.	(Castellacci, 2015; Kantur & Say, 2015; Nussbaum, 2016; Teoh, Yeoh & Zadeh, 2017).
Prevention, detection, response, and recovery.	(Nussbaum, 2016).
The superior capacity of organizations to reinvent their business models before circumstances have the ultimate power to force them to do so.	(Hamel & Välikangas, 2003).
A governing concept binding risk management, crisis management, and business continuity.	(Capano & Woo, 2017; Koronis & Ponis, 2018; The Business Continuity Institute, 2018; Tracey, 2015).
Bouncing back to optimum performance.	(Linnenluecke, 2017).
Bouncing forward through learning from the disruption to have better performance than the earlier performance before the disruption.	(Denyer, 2017; Ilmola & Rovenskaya, 2016; Megele, 2014; Rudrajeet, 2013).
Resilience in government systems can be strengthened through processes of social learning and adaptation (Resilience Thinking).	(Duit, 2016).
Network-centric organizations are more resilient compared with other organizations that they do not build strong networks with other stakeholders.	(Allenby & Fink, 2005).
The ability of a system to remain integral and to operate despite the presence of a threat.	(Patriarca et al., 2017).
The ability to respond to various disturbances and to regular and irregular threats, the ability to flexibly monitor what is going on, the ability to anticipate disruptions, and the ability to learn from experience.	(Kantur & Say, 2015).
Resilience has a more in-depth exploration of the concept to link it to the organizational complexity theory.	(Barasa, Mbau & Gilson, 2018).

In addition to the above resilience concepts highlighted in the literature, Table 6-2 illustrates

other definitions for the concept of resilience.

Table 6-2: Other definitions for the concept of resilience.

Resilience Concept	References
Define the decision-making context for short term decisions and to provide understanding of how this context may change or transform over longer periods.	(Anderies et al., 2013)
Stress- resistance and recovery.	(Lawford & Eiser, 2001)
Endurance, recovery, stasis, or return to a steady state, and also transformation.	(Panter-Brick, 2014)
Resistance to environmental risk experiences, or the overcoming of stress or adversity.	(Rutter, 2006)
Adversity and positive adaptation.	(Fletcher & Sarkar, 2013)
What constitutes positive, rather than negative adaptation or outcomes.	(Kolar, 2011)
Persisting with change on the current path of development, adapting, improving, and innovating on that path. It is about having the capacity to continue to learn, self-organize, and develop in dynamic environments faced with true uncertainty and the unexpected.	(Folke, 2016)
Persistence, adaptability, and transformability.	(Folke, 2006; Walker & Salt, 2012)
Recovery and return time following a disturbance, the other focusing on how much a system can be disturbed and persist without changing function.	(Miller et al., 2010)
Transformation to a fundamentally new system state often viewed as more 'desirable.	(Miller et al., 2010)
Understanding how and when complex adaptive systems undergo fundamental changes in their structure and function.	(Folke, 2006; Rockström et al., 2009; Scheffer, 2001)
Must be defined in relation to a given perspective and problem.	(Cumming, 2011)
Maintenance of key components and relationships and the continuity of these through time.	(Cumming & Collier, 2005)
Absorption, self-organization, and build and increase capacity for learning and adaptation.	(Folke et al., 2010)
Resistance, reorganization, and recovery.	(Davies et al., 2018)
Future conditions may be different, more extreme, and rapidly changing than previously experienced.	(Strickland-Munro, Allison & Moore, 2010)
Combines adaptation (dynamic) with resistance (static).	(Olsson et al., 2015)

All of the previous concepts share one common concept for resilience, which is recoverability; when we are addressing the recoverability, there are two key pathways, as shown in Figure 6-1 below, which is part of the theoretical framework presented in Chapter 3.
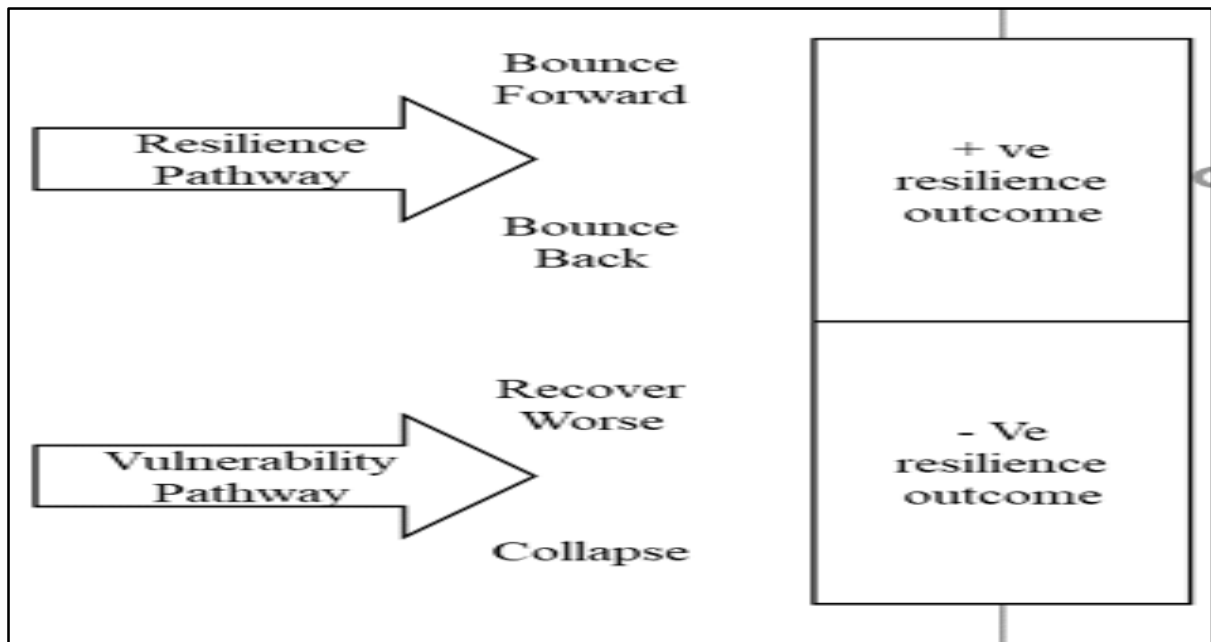
Figure 6-1: Two recoverability pathways.

The two pathways are the resilience pathway or the vulnerability pathway. The resilience pathway has two outcomes; either the organization bounces forward to a status better than the previous status, or it bounces back, representing recovery to the previous status before the emergent event. The other pathway representing the vulnerability pathway will not be considered, as it contradicts the concept of resilience which is aimed at obtaining a desirable outcome. Based on that, a recoverability concept for resilience can have two key facets, which are normal recoverability and positive recoverability. In addition to the recoverability concept, there is a complexity concept that was thoroughly discussed in the literature review chapter. The complexity theory posits that the whole, which is the system, is more than the sum of its parts, and the development of the whole stems from the interaction of its parts (Klijn, 2008). The other conceptualization of resilience is as a binding concept for risk management, business continuity, disaster recovery, agility, antifragility, fore-sighting, and many other management concepts.

Figure 6-2 illustrates the four key concepts of resilience that upon which this research is based

Figure 6-2: The four key concepts of resilience upon which this research is based.

Tables 6-3 presented the distribution of the previous concepts illustrated in Tables 6-1 and 6-2 with the four resilience concepts.

Table 6-3: Mapping of resilience concepts presented in Tables 6-1 and 6-2 with the resilience concepts for this research.

Resilience Concept:	Recoverability	Positive Recoverability	Complexity	Binding
	• Bouncing back • Preventability • Detection • Adaptation • Remain integral and to operate • Responsiveness • Decision-making context for short term decisions • Stress-resistance • Endurance • Recoverability to a steady state • Recover quickly • Persistence • Maintenance of key components and relationships • Absorption • Resistance • Withstanding	• Bouncing forward • New business models • Learning • Positive adaptation • Understanding of how to change or transform over longer periods • Improvement • Innovation • Transformability • Future conditions may be different, more extreme and rapidly changing than previously experienced	• Building capacities and capabilities to face both epistemological and ontological internal and external uncertainties • Network-centric • Linkage to the complexity theory • Self-organize • Development in dynamic environments • Understanding complex adaptive systems • Fundamental changes in the structures and functions • Defined in relation to a given perspective and problem • Combines adaptation (dynamic) with resistance (static)	• A governing concept binding risk management, crisis management, and business continuity • The resilience concept is becoming an 'umbrella' that covers all facets of management focus and efforts not only to face turbulence but also to grasp the chance of becoming more innovative and competitive

6.2.2 Resilience principles

The Oxford English Dictionary defines principle as "a fundamental source, a primary element force, or law, which produces or determines practical results" (Little, Coulson & Onions, 1968).

There were several principles for resilience discussed in the literature review and in other sources. Table 6-4 summarizes the principles and their associated references

Table 6-4: Summary of resilience principles.

Resilience principles	Reference
Shared purpose and vision, understanding internal and external context, adaptive capacity, effective management and governance, diversity of skills, leaderships, knowledge, and experience, and coordination across management disciplines.	(International Organization for Standardization, 2017)
Maintain diversity and redundancy, manage connectivity, managing slow variables and feedbacks, foster complex adaptive system thinking, encourage learning, broaden participation, and promote polycentric governance system.	(Clarvis,M., Bohensky & Yarime, 2015)
Modes of reorganization, variations in the adaptive cycle, cross-scale interactions, rule of hand, fast and slow variables, ecological versus social domains, functional and response diversity, mental models, learning, adaptability versus resilience, multiple thresholds, transformation, and determinants of transformability.	(Anderies, 2014)
Efficiency, adaptation, redundancy, independence, stability, diversity, foresight capacity, creativity, coordination, recovery, and self-organization.	(Sharifi & Yamagata, 2016)
Self-organization and autonomic behavior, adaptability, and evolvability.	(Sterbenz et al., 2010)
Flexibility, controllability, early detection, minimization of failure, imitation of effects, and administrative controls.	(Dinh et al., 2012)
Adopt a system approach, look beyond design events, build and prepare infrastructure according to remain functioning principle, increase recovery capacity, and remain resilient into the future.	(de Bruijn et al., 2017)
Redundancy, diversification, buffering, flatness, homeostasis, and high flux.	(Wardekker, 2018)
Absorption, physical redundancy, functional redundancy, layered defense, human in the loop, reduce complexity, reorganization, repairability, localized capacity, loose coupling, drift correction, neutral state, inter-node interaction, and reduce hidden interactions.	(Jackson & Ferris, 2013)
Resilience occurs in contexts of adversity; resilience is a process; there are trade-offs between systems when a system experiences resilience; a resilient system is open, dynamic, and complex; a resilient system promotes connectivity; a resilient system demonstrates experimentation and learning; and a resilient system includes diversity, redundancy, and participation.	(Ungar, 2018)
Controls, coherence, and connectedness.	(Reich, 2006)
Maintain diversity and redundancy, manage connectivity, manage slow variables and feedbacks, foster an understanding of complex adaptive systems, encourage learning and experimentation, broaden participation, and promote polycentric governance systems.	(Biggs et al., 2012)

The seven themes derived from the analysis of participant data, along with the principles of resilience summarized in Table 6-4 were used to develop the core elements of the public sector resilience framework shown in Table 6-5.

418

Table 6-5: The principles related to the public sector resilience based on the seven identified themes, resilience principles and interviews findings.

Theme	Associated principles based on Table 6-4	Resilience principle for the public sector
Theme 9 (Resilience relationship with other managerial concepts)	• Coordination across management disciplines • Manage connectivity • Foresight capacity	Integration with other management concepts
Theme 10 (Collaboration and partnerships)	• Promote a polycentric governance system • Manage connectivity • Broaden participation • Coordination	Collaboration and building partnerships
Theme 11 (People engagement)	• Broaden participation • Flatness • Human in the loop • Coherence	Engaging the society and the public sector employees
Theme 12 (Public sector current and future mandate)	• Leadership • Determinants of transformability • Remain resilient into the future • Reduce complexity • Controls	Understanding the evolving role of the public sector and define determinants of future transformability
Theme 13 (Government Systems)	• Promote polycentric governance system • Diversification • Maintain diversity and redundancy • Knowledge, and experience • Manage connectivity • Adopt a system approach • Look beyond design events • Flatness • Inter-node interaction • There are trade-offs between systems when a system experiences resilience • A resilient system promotes connectivity • A resilient system demonstrates experimentation and learning	Promote systems thinking
Theme 14 (Government Sectors)	• Ecological versus social domains	Sectors approach for better management of the public sector
Theme 15 (Holistic view)	• Shared purpose and vision • Understanding internal and external context • Foster complex adaptive system thinking • Encourage learning • Layered defense • A resilient system is open, dynamic, and complex • Connectedness	Collective understanding of the big picture

The following section will illustrate further discussions on the resilience principles in the public sector:

Principle 1: Integration with other management concepts

Resilience evolved as an advancement of business continuity management, risk management, crisis management, and disaster recovery (Florin & Linkov, 2016). Meanwhile, resilience as a concept overlaps with other concepts such as agility, flexibility, innovation, and governance as based on the findings from the interviews discussed in the previous chapter.

Implementing a resilience framework in the public sector will require identification of the areas of overlap with other management concepts and ensuring the integrity of information.

Principle 2: Collaboration and building partnerships

It is not always that organizations cannot effectively respond to emergent events by themselves unless they collaborate with other stakeholders. The collaboration dimension is required when an organization by itself cannot effectively respond except it networks with other organizations or agencies (Allen, 2011). Without this principle, managing networks with partners will not succeed in the face of a disruptive event. This principle was also emphasized by Allenby & Fink (2005) as they argued that network-centric organizations are more resilient than other organizations that do not build strong networks with other stakeholders. To be resilient, and as was presented in the previous chapter, the public sector needs to build collaboration and partnerships with academic institutions, research centres, international organizations, the public sector in other countries, the private sector, and other stakeholders. Meanwhile, collaboration among the public sector organizations and between sectors should be maintained to ensure better resilience building.

Principle 3: Engaging the society and the public sector employees

ISO: 37123 (Sustainable cities and communities' indicators for resilient cities) identified certain requirements and indicators to ensure the engagement of different society segments in building resilience at the city level. Furthermore, Kantur & Say (2015) studied the cohesion among employees as a significant dimension in the development of a resilience model for building organizational resilience. Meanwhile, Meng et al. (2019) studied mechanisms of resilience at the workplace through the social exchange perspective to develop a resilience model between a Team-Member Exchange and a Leader-Member Exchange. Furthermore, Liu, Reed & Girard (2017) developed a resilience model that comprises three factors; intra-individual factors, interpersonal factors and socio-ecological factors based on the psychological field. People engagement, as presented in the previous chapter, is a requirement for building resilient cities. Aspects of people engagement include crowd management, evaluating crowdsourcing options, ensure people engagement, and social engagement, especially with the younger generation.

Principle 4: Understanding the evolving role of the public sector and define determinants of future transformability

The ISS 2014 publication, a 2020 Vision White book entitled "Future of Public Sector Outsourcing", describes twelve future trends of the public sector (International Service System (ISS), 2014). These trends are managing demographics and society segments, growing customers' expectations, harnessing technology and innovation, consolidation towards larger and integrated contracts, task providers, from providers to commissioners, outsourcing across public sector levels, profits contingent upon outcomes, increase the involvement of other parties, affordable government, and more empowered shadow governments. Furthermore, theme twelve, developed from study findings and discussed in the previous chapter, indicates

that the public sector should have a proper understating of the expected business model for its operation in the future and the expected business models for the stakeholders. A proper understanding of the current role of the public sector and how it will evolve in future will enable the public sector to be more resilient.

Principle 5: Promote systems thinking

A systems orientation to thinking about public sector components will enable the identification of the relationships between these components and their added value. The system thinking in resilience is highly related to the resilience-engineering concept, which was thoroughly discussed in the literature review chapter. According to Patriarca et al. (2018), resilience engineering as a general concept is a property of any system that gives systems the ability to remain integral and to operate despite the presence of a threat. Furthermore, resilience engineering is the deliberate design and construction of resilient systems. Proper understanding of this principle, as was presented in the previous chapter, will enable the public sector to properly design systems to be more resilient, understand the dynamic nature of systems, conduct proper testing for these systems, understand the need for having hybrid systems, and define the relationships between different outcomes of the public sector (public policies, regulations, and public services).

Principle 6: Sectors approach for better management of the public sector

Building resilience in the public sector depends on understanding the impact of an emergent event on a certain sector in addition to understanding its effects on other sectors. Furthermore, Theme 14 (government sectors), developed from study findings and discussed in the previous chapter indicate that the public should prioritize various sectors based on its needs. Meanwhile,

422

to be more resilient, there should be a diversification across sectors balanced with adequate sharing of information and expertise and coordination between sectors when an emergent event occurs.

Principle 7: Collective understanding of the big picture

Collective understanding of the big picture will lead us to complexity theory that was thoroughly discussed in the literature review chapter. Allen, Strathern & Baldwin (2007) argued that knowledge captured by each agent in a complex system is not an end in itself, but tangible benefits can only be realized when complex systems use this knowledge to create successful strategies to adapt and to continue learning from different changes over time. Nonetheless, acquiring a holistic understanding of the context, as was presented in the previous chapter, will give the public sector a big picture perspective of what resilience really means within the public sector. This big picture perspective will also allow the public sector to understand the different components, dimensions, and layers of resilience that may be affected by an emergent event and the complex relationship between them. Furthermore, understanding the big picture will help the public sector define what positively or negatively impacts its image while responding to an emergent event.

6.2.3 Resilience attributes

Walker and Avant (2011) defined attributes as "characteristics of a concept that are most frequently associated with the concept and allow the analyst the broadest insight into the concept" (Garcia-Dia et al., 2013). Also, Walker and Avant (2005) gave a simpler definition of the attribute. They defined it as "the characteristics of a concept that repeatedly appear in the literature and are consistently present when the concept occurs" (Earvolino-Ramirez, 2007).

423

There were several attributes for resilience discussed in the literature review and in other sources. Table 6-6 summarizes the attributes and their associated references.

Table 6-6: Summary of resilience attributes.

Resilience attributes	Reference
Shared vision and clarity of purpose, understanding the influencing context, effective and empowered leadership, a culture supportive of organizational resilience, shared information and knowledge, availability of resources, development and coordination of management disciplines, supporting continual improvement, and ability to anticipate and managing change.	ISO 22316:2017 (International Organization for Standardization, 2017).
Uncertainty sources.	(Ilmola & Rovenskaya, 2016)
Anticipation and adaptation to in-depth, irregular trends.	(Hamel & Välikangas, 2003)
4Rs (Robustness, Resourcefulness, Recoverability and Rapid recovery).	(Kantur & Say, 2015)
Absorptive, adaptive and transformative capacities.	(Béné et al., 2012)
Resilience measurement.	(Zhao, Liu & Zhuo, 2017).
Ability of learning.	(Righi, Saurin & Wachs, 2015)
Ability of monitoring.	(Tengblad, 2018)
Ability to respond, adaptability and adaptive capacity.	(Eraydin, 2016)
Rebounding, determination, and self-efficacy.	(Garcia-Dia et al., 2013)
Self-efficacy, hope, and coping.	(Gillespie, Chaboyer & Wallis, 2007)
Rebounding, reintegration, high expectancy, positive relationships, social support, flexibility, self-esteem.	(Earvolino-Ramirez, 2007)
Rebounding, self-esteem, determination, and prosocial attitude.	(Dyer & McGuinness, 1996)
Stability category (single points of failure, pathways for controlled reduction in functions, resistance, balance, and dispersion), adaptive capacity category (response diversity, collaboration capacity, connectivity, abundance/ reserves, and learning capacity), readiness category (situational awareness, simplicity/understandability, preparedness, false subsidies, and autonomy), and enabling traits (leadership and initiative).	(Kerner & Thomas, 2014)
Knowledge, skills and learning; community networks; people-place connections; community infrastructure; drivers and innovative economy; and engaged governance.	(Maclean, Cuthill & Ross, 2014)
Diversity, modularity, tight feedbacks, innovation, overlap in governance, ecosystem services, social capital and allowing for variability.	(Allan & Bryant, 2014)

To achieve the purpose of this study, the eight themes that were part of the theoretical framework, the attributes highlighted in the previous table, in addition to the findings from the

interviews were used to develop the principles of public sector resilience framework shown in

Table 6-7.

Table 6-7: The attributes related to the public sector resilience based on the identified themes that are part of the theoretical framework, resilience attributes and interviews findings.

Theme	Associated attributes based on Table 6-6	Resilience attribute for the public sector
Theme 1 (Uncertainty Sources)	• Understanding the influencing context • Uncertainty sources • Anticipation and adaptation to in-depth, irregular trends	• Understanding external and internal context and the relationships
Theme 2 (Triggering an emergent event):	• Connectivity • Anticipation and adaptation to in-depth, irregular trends • Understanding the influencing context	• Understanding external and internal context and the relationships • Ability to anticipate
Theme 3 (Emergent Events):	• Effective and empowered leadership • Readiness category (situational awareness, simplicity/understandability, preparedness, false subsidies, and autonomy) • Diversity • overlap in governance	• Ability to anticipate • Define response strategy
Theme 4 (Resilience capabilities):	• Availability of resources • 4Rs (Robustness, Resourcefulness, Recoverability and Rapid recovery) • Ability to respond • Rebounding • Flexibility • Balance • Community infrastructure	• Building resilience capabilities
Theme 5 (Resilience Capacities):	• Absorptive, adaptive, and transformative capacities • Adaptability and adaptive capacity • Coping • Resistance • Innovation	• Building resilience capacities
Theme 6 (Post Event Scenarios):	• Ability of learning • Reintegration • Tight feedbacks	• Learn and adjust
Theme 7 (Resilience Measurement):	• Ability of monitoring • Resilience measurement	• Monitoring and resilience measurement

Them 8 (Turning challenges into opportunities):	• A culture supportive of organizational resilience • Shared information and knowledge • Development and coordination of management disciplines • Supporting continual improvement • Determination, hope and self-efficacy • High expectancy, positive relationships, social support, self-esteem • Prosocial attitude • Collaboration capacity • Enabling traits (leadership and initiative) • Community networks • Engaged governance	• Enabling traits (Leadership, culture, cross-functional teams, trust, and mind-set)

Attributes of resilience in the public sector are further discussed in the following section.

Attribute 1: Understanding external and internal context and the relationships

It has been identified in the literature review that the current government systems are lacking in adaptive systems for managing epistemological and ontological emergent events resulting from internal and external uncertainties (Barasa, Mbau & Gilson, 2018). Nevertheless, enhancing the understanding of the internal and external contexts will give the public sector a big picture perspective and a comprehensive understanding of what resilience really means within the public sector context. This will also enable the public sector to understand the different dimensions of uncertainties and the layers that may be affected by an emergent event.

Attribute 2: Ability to anticipate

As discussed in the literature review chapter, strategic resilience is positioned as not merely responding to a one-time crisis or rebounding from a setback. It is about the continuous anticipation of, and adaptation to in-depth, irregular trends that can negatively affect the core business (Hamel & Välikangas, 2003). Building an anticipation capability, as discussed in the previous chapter, include choosing the right tools and appointing qualified people to use these

tools. Developing capacity for anticipation also involves the integration of information by the public sector into a central hub which helps to ensure that information is efficiently utilized for developing better anticipation mechanisms. Leadership also has a vital role to play in anticipation as they are the ultimate users of anticipation tools for effective decision making.

Attribute 3: Define response strategy

The response strategy is the core element of resilience as it represents the reaction to the emergent event. Each emergent event has certain characteristics in terms of magnitude, impact, scalability, and speciality and should have a designated response strategy. Linkov and Trump, (2016) highlighted that responses are based on anticipation and are enabled by learning from previous disruptive events or experiences. The response strategy includes the decision formulation process, defining responsibilities to take action, diffusion of knowledge and communicating information about the emergent event.

Attribute 4: Building resilience capabilities

During the development of resilience capabilities to manage disruptive events, organizations should consider the following 4Rs (Robustness, Resourcefulness, Recoverability and Rapid recovery) (Kantur & Say, 2015). Robustness represents the ability to maintain critical operations and functions in the face of crisis, Resourcefulness represents the ability to skillfully prepare for, respond to and manage a crisis or disruption as it unfolds, Recoverability represents the ability of the system to recover quickly -and at low cost- from potentially disruptive events, and rapid recovery representing the ability to return to and/or reconstitute normal operations as quickly and efficiently as possible after a disruption. Based on the four concepts identified at the beginning of this chapter, there are two kinds of recoverability related to resilience in the

public sector. These are recoverability and positive recoverability. Therefore, resilience could mean recoverability but to a position better than the organization's position before the disruptive event occurred.

Attribute 5: Building resilience capacities

Based on the literature review, theoretical framework, and the research design, three key capacities were identified to represent the cushion of the system in response to disruption and are incorporated in the theoretical framework. These three capacities are absorptive, adaptive, and transformative capacities. Absorptive capacity is "the ability of a system structure or organization to absorb the impacts and maintain its function during disruption scenarios" (Zhao et al., 2017). Adaptive capacity is "the capacity of actors in the system or organization to influence and manage resilience" (Engle, 2011). The transformative capacity is required to "do alterations in the function, structure or status of the system or organizations to cope with the enormous magnitude of change required" (Béné et al., 2012). Furthermore, some scholars consider transformative capacity as being able to see the crisis as a window of opportunity for transformation, which typically begins on a smaller scale and amplified to build resilience at a broader level. This transformation is achieved by recombining sources of knowledge and experience in ways that allow the organization to innovate thereby crossing thresholds into newly developed trajectories (Folke et al., 2010).

Attribute 6: Learn and adjust

The learning dimension represents "the ability to learn from what has happened or being able to benefit from learning by experience" (Hollnagel, 2015). The outcome of the learning process, as presented in the previous chapter, should be a feedback loop to adjust the systems, including

tools, business model, policies, and the provision of services, to make the public sector more resilient against future disruptions.

Attribute 7: Resilience measurement

Resilience can be measured by assessing 3R capabilities (robustness, resourcefulness, and recoverability) and the three resilience capacities (absorptive, adaptive, and transformative) in addition to other resilience principles and attributes. Furthermore, as was discussed in the literature review for this study, Zhao, Liu & Zhuo, (2017) identified the following as four main factors that influence setting a proper system for resilience measurement: 1) the dependency and interdependency of system capacities and time-varying, 2) the severity of consequences and potential losses caused by disruptions and their association with uncertainties, 3) the dependency of system performances based on resources dispatch/input strategies and design attribute, and 4) the incompleteness of historical information on major disaster prevention. In another study, Ilmola & Rovenskaya (2016) identified two principal ways to approach resilience measurement, which are either to collect organizational information about as many functions as possible or to use an indicator to measure organizational management of an unexpected event.

Attribute 8: Enabling traits (Leadership, culture, cross-functional teams, trust, and mind-set)

As highlighted in the literature review, there should be a paradigm shift from building resilience based on current practices and capabilities to a more strategic paradigm where resilience is constructed based on enhancing the organizational (public sector in this case) enablers to better understand the future outlooks and build transformative capacity to deal with various challenges

due to ontological and epistemological uncertainties. Based on the interviews outcomes, five enablers were identified as the main drivers for resilience in the public sector: Leadership, culture, cross-functional teams, trust, and mind-set.

6.3 Connecting the dots

Figure 6-3 illustrates the theoretical framework identified in Chapter 3, the research questions of this study, and the concepts, principles, and attributes identified earlier in this chapter.
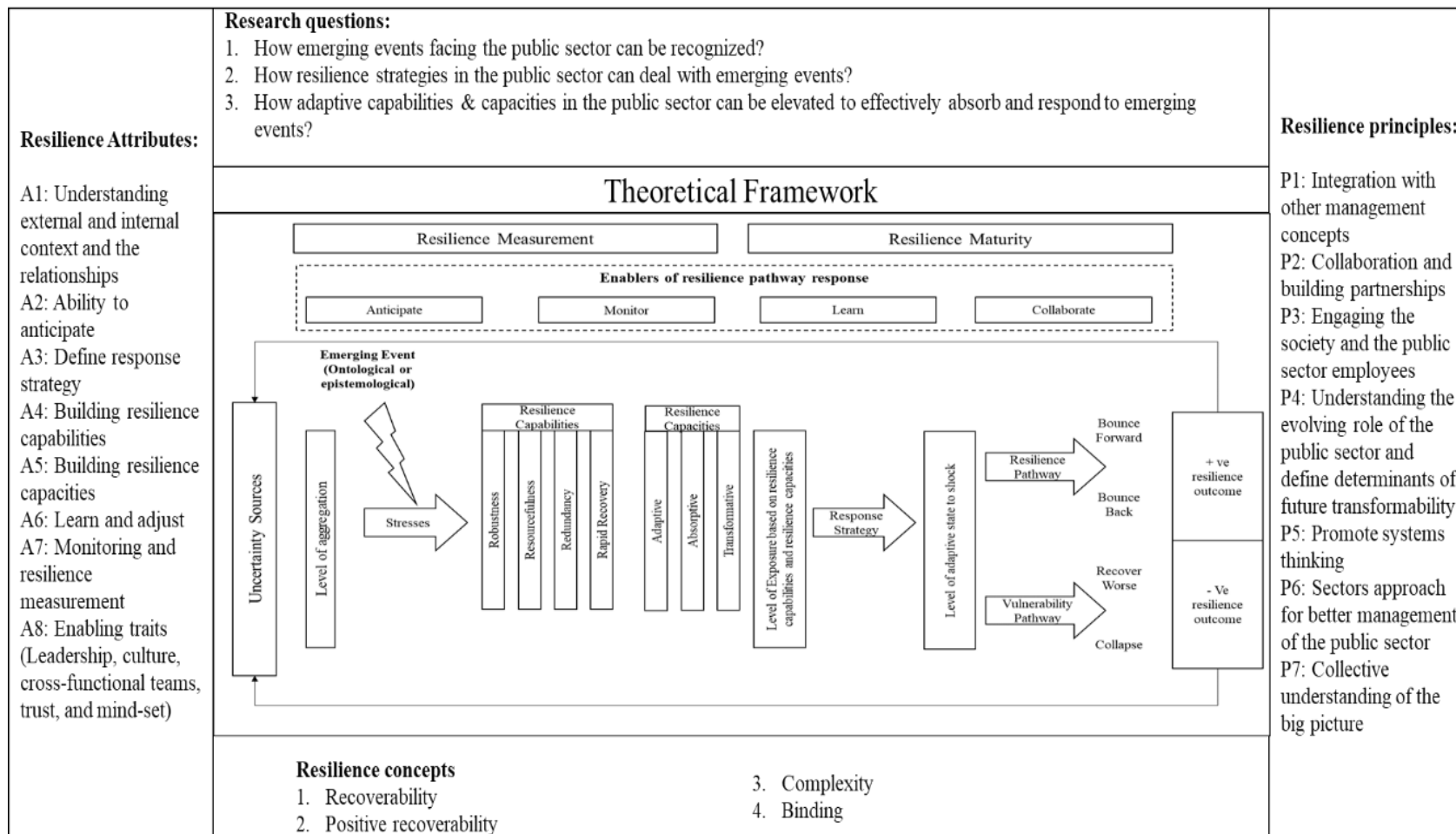
Figure 6-3: The theoretical framework identified in Chapter 3, research questions, the concepts, principles, and attributes identified earlier in this chapter.

To draw connections between the theoretical framework, research questions, and findings of this study, first, the resilience principles and attributes are mapped against the main components mentioned in the theoretical framework to identify the relationship between them. Then the theoretical framework was amended based on the defined principles and attributes that were identified. Figure 6-4 illustrates the amended framework for public sector resilience after incorporating the principles and attributes.
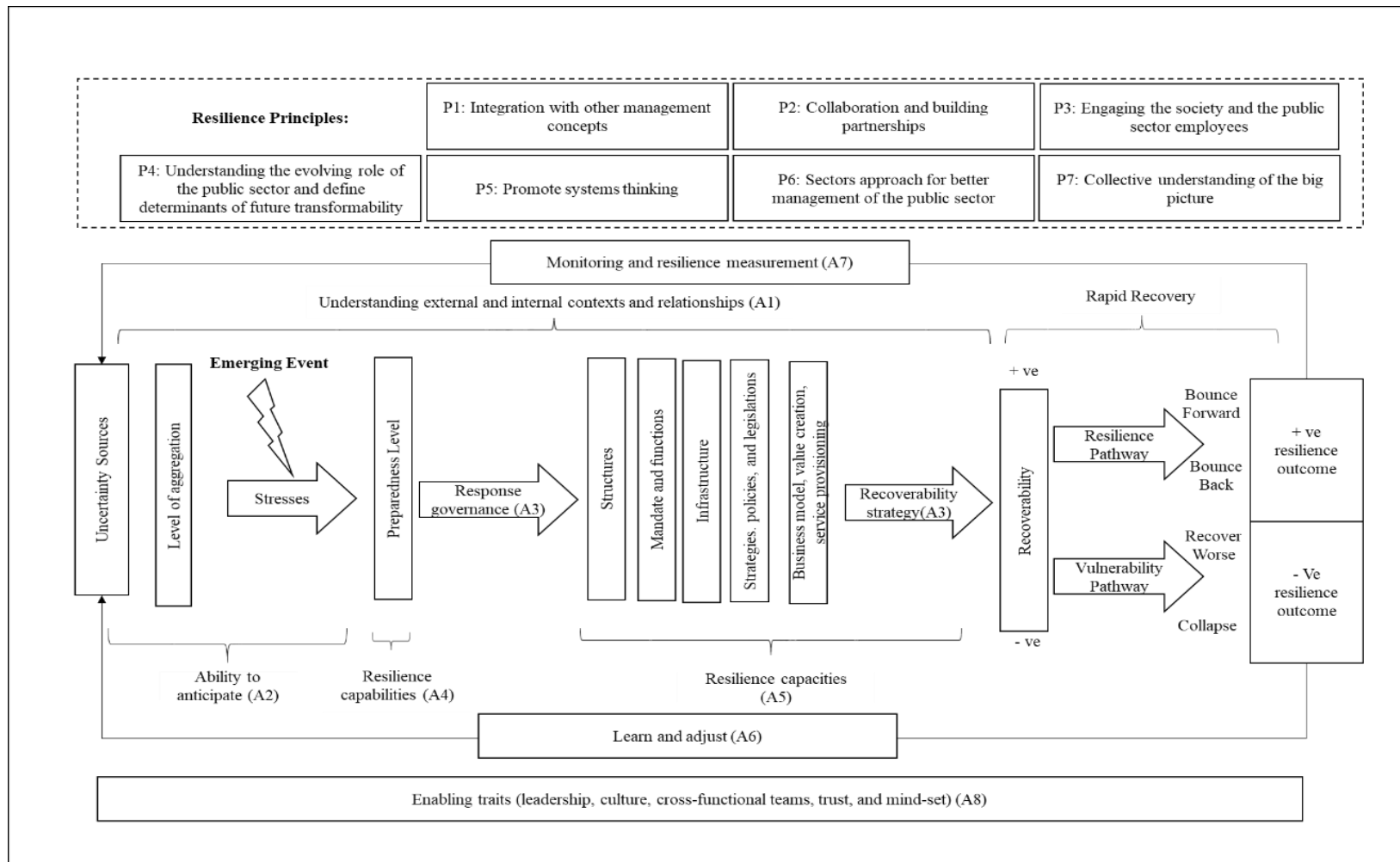
Figure 6-4: Amended framework for public sector resilience after incorporating the principles and attributes.

The amended theoretical model, along with the findings in the previous chapter, is used as a base to drive discussions as per the following sections:

6.3.1 Discussions of the first attribute (A1: Understanding external and internal contexts and the relationships)

Figure 6-5 illustrates the summary of the findings related to understanding external and internal contexts and the relationships as presented in the previous chapter.
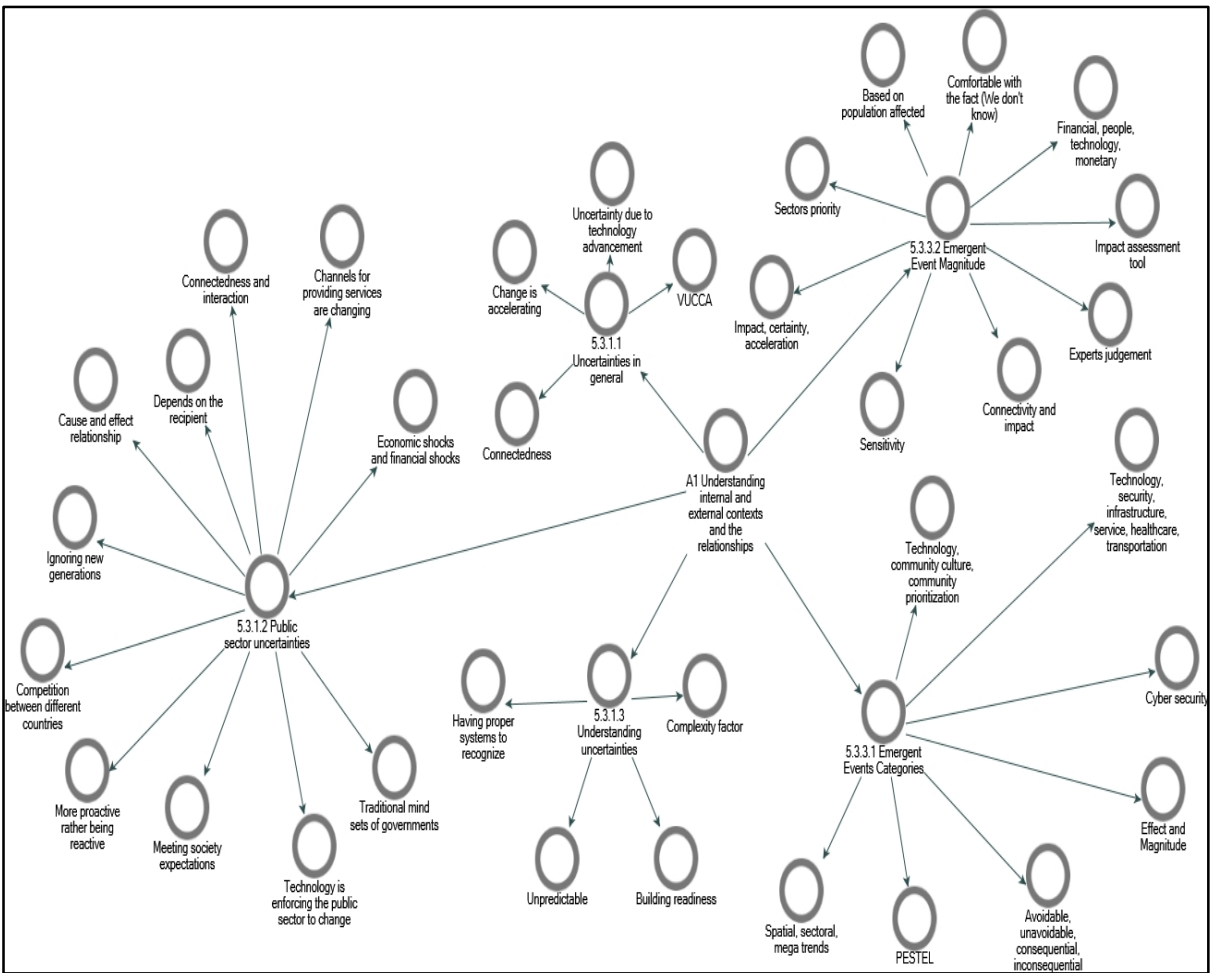
Figure 6-5: Summary of the findings related to understanding external and internal contexts and the relationships.

Based on study findings presented in Chapter 5 and Figure 6-5, the public sector is surrounded by uncertainties related to political, economic, social, technological, environmental, and legal areas. However, interviewees think that technology advancement is the main source of uncertainty in the public sector. Although, there is accelerating advancement in technology especially in the areas of artificial intelligence, data science, and the internet of things, it seems that the public sector is uncoordinated when it comes to having data integration and collective thinking due to limitations from current bureaucratic structures (Van de Walle, 2014).

The findings of this study show that the public sector is vulnerable to many accelerated uncertainties due to connectedness, and accelerated changes especially in the technology, social and political dimensions. These accelerating future challenges such as the fourth industrial revolution, change in economic structures, security challenges, and other social cohesion challenges are forcing the public sector to build their resilience capabilities and capacities (World Economic Forum, 2017). Technology and connectedness were identified by interviewees as significant to building resilience in the public sector. However, the researcher recognizes that these can mean different things to different people depending on factors like their worldview, their professional background, etc. This lack of a definition limits how precisely these concepts can be applied and incorporated into building resilience by public sector organizations.

Furthermore, interviewees think that the public sector needs to change its traditional mindset of how to deal with uncertainties; it needs to focus on meeting the expectations of society by handling uncertainties proactively rather than reactively. BSI: 65000 also emphasizes addressing the need to strengthen societal and community resilience (British Standard Institution, 2014). Another important factor that was highlighted by interviewees is competition among different countries, which exposes consumers of public services to different experiences

when they visit other countries. This may raise their expectations from the public sector or may lead them to patronize other places where the elsewhere that the public sector is capable of meeting their expectations (Docquier & Machado, 2016).

More so, study findings show that there is a complexity factor surrounding uncertainties, which makes this topic ambiguous. Accordingly, some public sectors prefer to stay in their comfort zones by focusing on building readiness rather than trying to find answers that may not exist. This should no longer be the case as highlighted by many researchers. They emphasized the need to explore the horizon and not limit ourselves to traditional tools to find simple answers. This has been documented by many researchers who have studied how to improve resilience using more advanced tools (d'Errico & Di Giuseppe, 2018; Hillman, 2013; Kolay, 2017; Teoh et al., 2017; Tracey, 2015; Zhao, Liu & Zhuo, 2017).

When addressing emergent events, it was highlighted by some interviewees that emergent events in the public sector can be generally categorized based on their likelihood or the effect and magnitude of their impact. There also emphasized cybersecurity (an aspect of technology category) and health category. Study findings highlighted the importance of using impact assessment tools to measure the magnitude of the effects of an emergent event. The magnitude can also be assessed based on the people affected and in terms of the financial and technological implications. Meanwhile, results showed that one of the most important factors for categorizing emergent events is based on its effect on the society or community. As highlighted by INT36, the public sector should consider the Maslow pyramid of needs to guide its response to the effects of emergent events on the community. The more basic needs and service are affected by an emergent event, the more critical is the effect. Those basic needs and service should receive priority attention. When it comes to internal context, the results show that the silos mentality, using the same tools, and the mind-set of people may affect the understanding of the internal

context. Another important factor that was highlighted by INT05 is the inability of the public sector to understand the needs of Millennials (younger generation) who are an important segment of society.

To summarize the points discussed above, the public sector needs to collectively understand the internal and external context not only to survive, but also to excel and thrive in a very complex world. The public sector should strive for and develop tools to deal with uncertainties and not limit itself to the status quo to guarantee the future welfare of the society. This has become pertinent as the rules of competition are changing such that public sectors of different countries now compete among themselves to attract talents and investors. Concerning emergent events, the public sector should develop tools to identify the emerging events and should have a consensus on what are the proper impact assessment tools to evaluate the magnitude of the impact of these events when they occur. There should be also a collective understanding of how to deal with emergent events and utilize the opportunities that may emerge because of them.

6.3.2 Discussions of the second attribute (A2: Ability to anticipate)

Figure 6-6 illustrates the summary of the findings related to ability to anticipate as presented in the previous chapter.
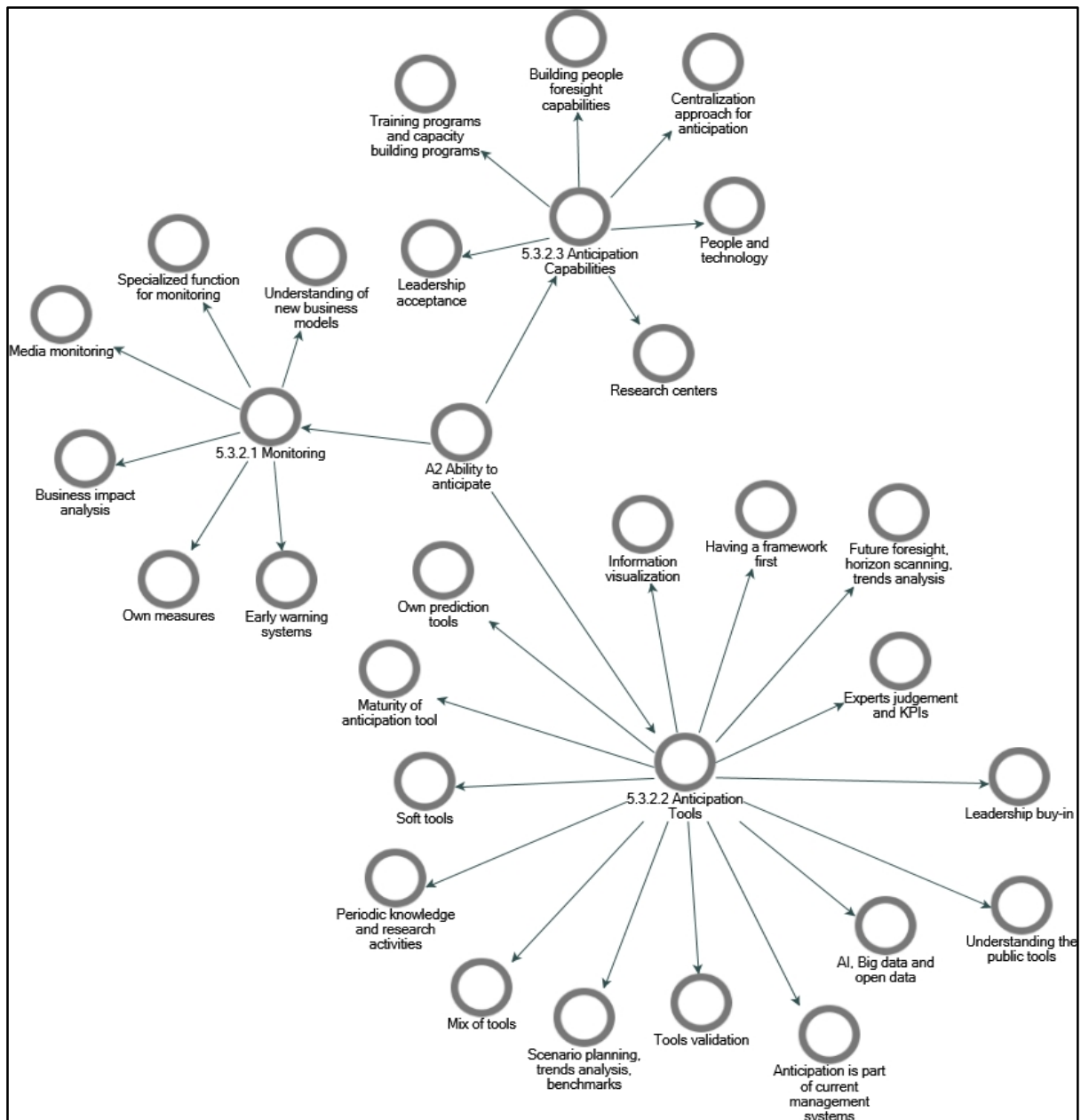
Figure 6-6: Summary of the findings related to ability to anticipate

The summary of findings shows that the public sector should have its own measures for monitoring. This means e having certain leading indicators or dashboards that will trigger a change in the performance due to some emerging trends. However, this is not sufficient, and the public sector should work on building preparedness parallel to monitoring. The public sector should also have in place early warning systems to identify any potential emergent event and it

should utilize current systems to provide the necessary information required to monitor internal and external events. Meanwhile, the public sector should think first of how to validate the anticipation tools before choosing the appropriate tools. These findings align with findings from other research in resilience as they highlight the importance of continuously monitoring the possibility of emergent events and enhancing the ability of anticipating disruptions (Hollnagel, 2015; Kantur & Say, 2015; Patriarca et al., 2017), but go further by highlighting the need for public sector organizations to use the proper tools for continuous monitoring of public opinion. Another important finding is that monitoring does not imply watching everything. Study participants highlighted the importance of having a framework to first define what the public sector should look at, then decision can be made on whether to use new tools or currently existing tools for anticipation. Furthermore, participants preferred to focus on the usage of tools derived from artificial intelligence and data science to be able to properly monitor the trends and define causal relationships. However, the question arises: does the public sector owns this data or is the data owned by someone else?

When it comes to anticipation tools, interviewees think that the public sector should own the tools, that is, not depending on a third party to provide these tools as doing this will not enable the public sector to properly build the knowledge within this regard. Meanwhile, the findings show that the public sector should depend on more than one tool for anticipation. In response to the recurring question of how to validate the anticipation tools, INT17 opines that we will never be able to validate these toolsو because we do not now the future outcome.

Regarding the type of tools to be used, participants mentioned future foresight, scenario planning, horizon scanning, trends analysis, and experts' judgement. This aligns with the discussions in the literature review section as some of the identified tools that were addressed are: heuristic judgement capabilities (Manfield & Newey, 2018), foresight capability building

439

(Aguirre-Bastos & Weber, 2018; Dufva & Ahlqvist, 2015; Heiko et al., 2015; Durst et al., 2015; Ilmola & Rovenskaya, 2016), scenario planning enhancement (Hills, 2015; Ilmola & Rovenskaya, 2016; Sircar et al., 2013; Stewart & O'Donnell, 2007), and build metamorphosis capabilities (Morais-Storz & Nguyen, 2017).

To build capabilities to use the anticipation tools, interviewees think that the public sector should first focus on training and capability building programs for the employees. These programs should focus on new technologies and how to use these technologies to better understand uncertainties. However, building capabilities to use anticipation tools does not mean training everyone in the public sector to use these tools as highlighted by INT33. Capability building in this regard should focus only on the people who need this knowledge in their work. The other important factor identified by interviewees is getting leadership buy-in to understand these tools and to utilize the outcome of these tools to take proper decisions. This highlights the importance of data visualization to enable the people who are doing the anticipation to present the data in a way that supports decision making while incorporating all supporting facts. Another key point highlighted by interviewees is defining who is responsible for doing anticipation in the public sector. This should be done at the holistic government level, the sectors level, or at the government entity level. There should be an evaluation of all the anticipation efforts that are done by the public sector at all levels to ensure that all anticipation information is aligned and are integrated to support proper decision making. It will amount to a waste of resources if anticipation is done using all the tools already discussed and there is no plan to use the information obtained in strategy development. The results also emphasized the importance of aligning anticipation efforts in the public sector with specialized research centers, and to have a culture that believes in anticipation and utilize its outcome.

To summarize the above discussions, the ability to anticipate is based on the people, the tools, and the decision-maker who should utilize the anticipation information in making proper decisions. The public sector should also ensure integration of anticipation information across all public sector levels into a central hub while ensuring all the information is accurate as much as possible and are well visualized.

6.3.3 Discussions of the third attribute (A3: Response strategy)

Figure 6-7 illustrates the summary of the findings related to response strategy presented in the previous chapter.
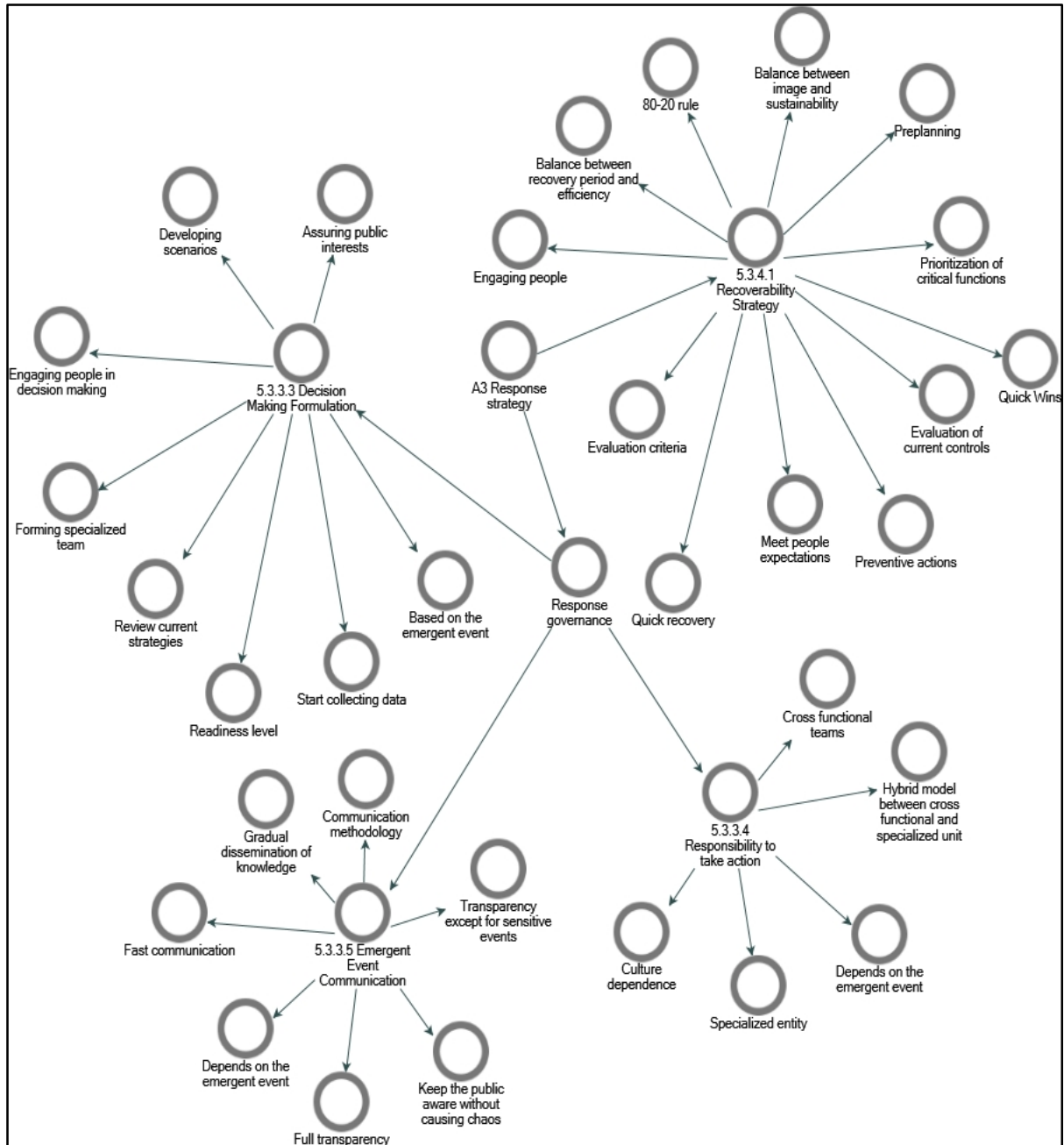
Figure 6-7: Summary of the findings related to response strategy

The response strategy comprises two main aspects: response governance and response strategy.

6.3.3.1 Response governance

Findings showed that the decision-making formulation is mainly based on the event itself. Meanwhile, decision-makers should assure public interests while taking a decision, and they should develop different scenarios to support their decision-making process. The first thing the public sector should do after triggering an emergent event is to start collecting data and review the current strategies to determine if they are still applicable or not. They should form a specialized team to evaluate the readiness level immediately. Moreover, decision-makers should study mechanisms to engage people in the decision-making process. Decision making, when faced with emergent events that are unexpected, is not an easy process as too many factors to be taken into consideration, especially when people's lives are at stake (Cox, 2012). Also, Grafton (2012) emphasized the importance of decision-makers to adapt their actions to their own circumstances actively.

Furthermore, study findings show that forming a cross-functional team is the approach most preferred by interviewees for handling an emergent event. They also think that this will work based on the event itself and based on the culture. Geneviève et al. (2010) emphasized the effectiveness of cross-functional teams. In their study, they compared cross-functional teams and functional teams when facing a certain situation and concluded that cross-functional teams are more effective in coordination and communication than functional teams. On the other hand, other researchers assert that there is always a knowledge boundary for cross-functional teams due to their different backgrounds, and this could affect their ability to communicate well (Kotlarsky, van den Hooff & Houtman, 2015). The effectiveness of cross-functional teams will always be a debatable subject among scholars, but the essence of resilience in the public sector is coordination and collaboration, as will be discussed in principle two hereafter.

Nonetheless, study findings show that for better communication of an emergent event, the level of transparency required to communicate an emergent event is based on the event itself as there are some sensitive events that need special ways of handling and communication. The most important thing about communicating with the public is to communicate the information without causing chaos. This can be achieved by using proper communication methodologies. Another important factor that was highlighted by the interviewees is fast communication; people should not wait until they hear something from the public sector officials. The information can be gradually transmitted while ensuring a balance between full transparency and restricting only sensitive information. Coombs (2015) introduced a guideline for strategic communication during a crisis. The guideline describes communication choices to deal with an emergent event while maintaining the organization's reputation. Meanwhile, Reynolds & Quinn (2008) emphasized the importance of having a communication framework to highlight all communication parameters for a specific emergent event.

To summarize the above discussion, formulating a decision to face an emergent event is not an easy process as many factors need to be taken into consideration. The public sector should engage various parties in the decision formulation process and should assure public interests and well-being while formulating decisions during the crisis. However, since public interests may vary as there are no unified public interests, decision-makers may have to make their decisions based on the situation itself. When it comes to assigning responsibility for decision-making when faced with an emergent event, study findings show that cross-functional team structure is the preferred option. However, this choice is based on the emergent event type and culture. Finally, communication management of an emergent event should be associated with certain communication protocols specified for the event itself to ensure timely provision of the right information to specified stakeholders.

6.3.3.2 Recoverability Strategy

Interviewees think that the recoverability strategy is based on the level of preplanning that was done prior to an emergent event. The public sector should do a prioritization of critical functions to be retrieved, and there should be a quick-wins component to the recovery strategy to demonstrate ability to manage emergent events. Furthermore, the interviewees highlighted that any recoverability strategy should maintain a balance between the following variables: efficiency, recovery period, image, and sustainability. Study findings show that interviewees prefer to have a recoverability strategy that is based on quick recovery regardless of the associated cost and resources. However, there is no straight-forward answer to this question as recovery does not always mean maintaining the old positioning as highlighted by INT01.

One of the key highlights for the recoverability strategy is implementing the eighty-twenty (80/20) rule or Pareto principle as recommended by INT29. This rule implies that any recoverability strategy should have as its first aim the recovery of eighty percent of operations, and this may be done by utilizing twenty percent of resources. Similarly, during communication, the public sector could approach eighty percent of the target audience by using twenty percent of communication channels. Additionally, the public sector could base eighty percent of its decisions on twenty percent of available information. Research literature is replete with evidence of the 80/20 rule (Nisonger, 2008).

The other important component that the recoverability strategy should incorporate is having quick wins as highlighted by some of the interviewees. Quick wins will demonstrate the ability of the public sector to show success stories and demonstrate its ability to manage the emergent event in front of society (Simangunsong & Hutasoit, 2018).

To summarize the above discussions, a recoverability strategy should include prioritization, quick-wins and should ensure fulfilling people expectations. Any recovery strategy should

maintain a balance between the many relevant variables that represent aspects of public sector operations, as well as consider implementing the 80/20 role to be more focused.

6.3.4   Discussions of the fourth attribute (A4: Resilience capabilities)

Figure 6-8 illustrates the summary of the findings related to resilience capabilities as presented in the previous chapter.
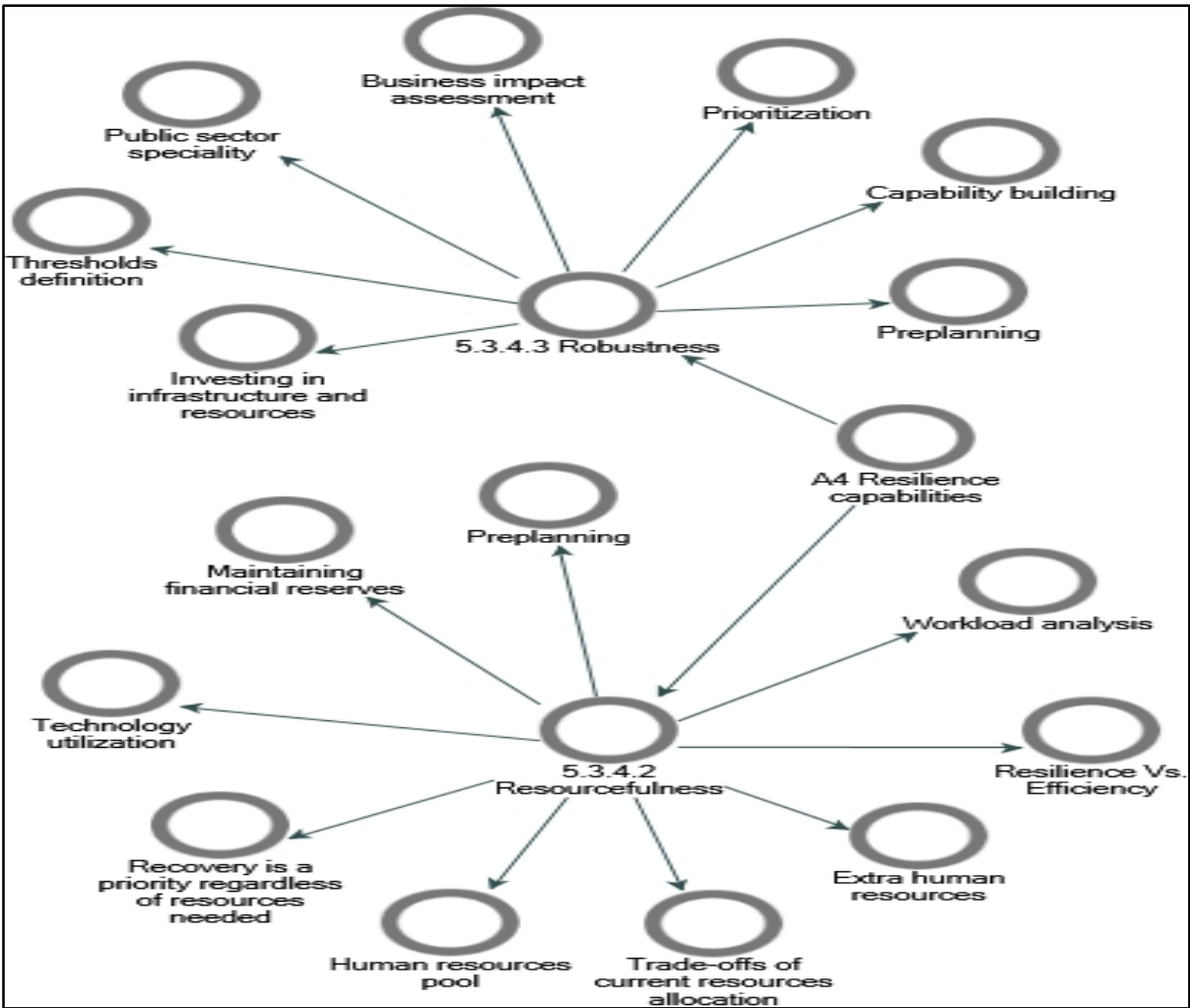
Figure 6-8: Summary of the findings related to resilience capabilities

Study findings show that there should be proper resources planning prior an emergent event to identify the best utilization of resources in case of an emergent event occurs. Maintaining a

446

financial reserve is an important aspect of resource planning that the public sector should give adequate consideration. Another point of consideration is for the public sector to build resilience capabilities that transcend simply being efficient. The rising trend of the resilience paradigm versus the efficiency paradigm is one of the evolving subjects in the literature. Roger (2019) argued that the efficiency paradigm has a high price in the long run, and organizations should embrace the resilience paradigm for sustainability. This will require the public sector to start balancing efficiency measures and resilience measures to achieve sustainability and to fulfil the wellbeing requirements of society. Ganin et al. (2017) described another example of the need to consider resilience and not only efficiency to justify the investment opportunity in designing roadways. Study findings support the idea of allocating resources in a balanced way between building resilience and maintain efficiency as part of preparedness for emergent events.

Furthermore, study findings show that robustness is associated with having preplans and building readiness. The process of building robustness in the public sector is different from the private sector. In a mature public sector, this process will not affect the key operations and services provided to customers as the public sector finds alternatives to do that. The resilience engineering association looked at robustness as a required parameter that is needed when designing processes and systems, and they associate it with flexibility in order not to focus only on rigidity (Resilience Engineering Association, 2019).

To summarize the above discussion, resourcefulness and robustness represent desired capabilities of the public sector to build resilience. Resourcefulness in the public sector requires keeping financial reserves and maintaining the skill set of employees who may be needed in case of an emergent event. On the other hand, robustness requires incorporating parameters in designing processes and systems to be stronger while facing an emergent event. The results

highlighted one key argument about the need to balance between resilience and efficiency when addressing key challenges for the public sector in future.

6.3.5 Discussions of the fifth attribute (A5: Resilience capacities)

Figure 6-9 illustrates the summary of the findings related to resilience capacities as presented in the previous chapter.
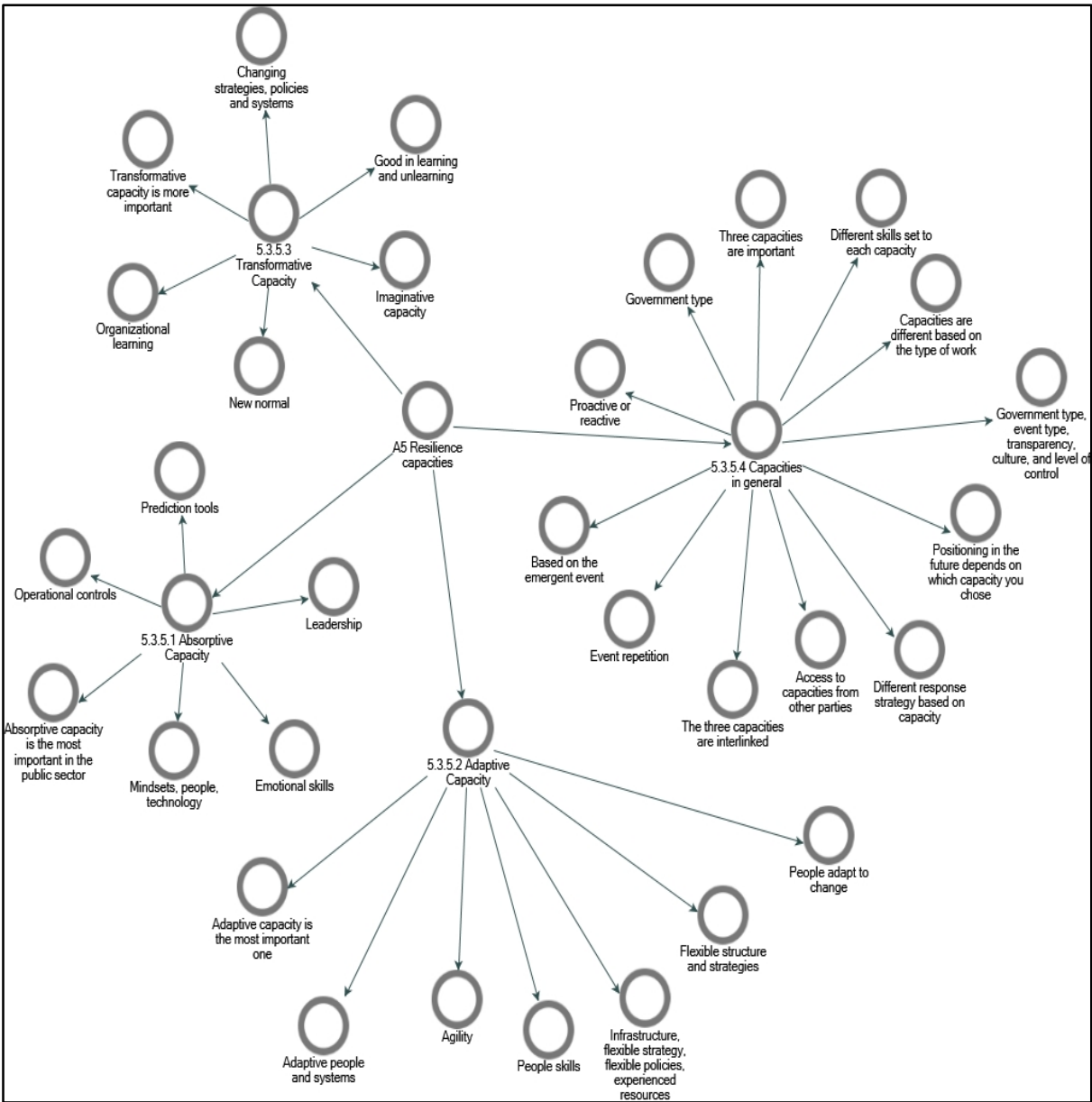
Figure 6-9: Summary of the findings related to resilience capacities

Study findings show that absorptive capacity requires high emotional and leadership skills. It is also linked to mindset of people and technology as it is the first capacity to be utilized after triggering an emergent event. It is also associated with prediction tools. Adaptive capacity is associated with agility and people skills. The public sector needs flexible people, systems, structures, strategies, policies, and infrastructure to be adaptive. To be transformative, the public sector implies the need to change strategies, policies, and systems. Transformation requires innovation, imagination, and a recognition that the new normal will not be the same as the old normal. In terms of which capacity is most important, study results show that nine of the interviewees think that the absorptive capacity is the most important capacity to have; three interviewees think it is the adaptive capacity, while four think that it is the transformative capacity. Seven of the interviewees think that the three capacities are of the same importance.

Study findings also show that the three capacities differ based on the type of work each public sector organization does. There should be a different skill set for each capacity and an identification of the links highlighting the relationship between these capacities.

The above results enriched the highlights from the literature review, which considers whether the three capacities are a set of static dimensions or dynamic dimensions; the static dimension looks at the three capacities as sequential. In their 2012 study, Bene et al. argued that the sequential need of these capacities is based on the intensity of the shock or change. If the intensity of the shock is small, only the absorptive capacity is needed to resist the change without further consequences on the system's structure and status. When the absorptive capacity is not capable of managing the shock, the organization then deploys its adaptive capacity to make adjustments for the system to continue functioning without significant change in the system's structure and status. Lastly, if neither of the two capacities (absorptive and adaptive)

449

can sufficiently manage the shock, the transformative capacity is needed to make alterations in the function, structure, or status of the system for it to cope with the enormous magnitude of change required. The dynamic point of view is represented by the work of Frankenberger et al. (2014). They looked to resilience as a dynamic concept in which the capacities and other determinates are constantly changing. Although most of the interviewees considered the three capacities as static, the three capacities are more dynamic and have considerable overlap between them. This concept is derived from the complexity theory that is considered as one of the four concepts for this research. To conclude the main point, it will be very difficult to segregate the three capacities: absorptive, adaptive, and transformative capacities from each other or try to give them weightages when trying to define special leadership skills or based on the type of the emergent event or even based on the type of operations. The public sector needs all three capacities working together to successful navigate the complex interactions between the emergent event, the systems, and people embedded within the public sector.

To summarize the above discussions, the results showed that the interviewees preferred that the public sector focus more on absorptive capacity as it is the first line of defence, and the public sector needs it to demonstrate its resilience to society by absorbing the first shock. However, there is a dynamic relationship between these three capacities and the emergent event, making the absorptive, adaptive, and transformative capacities of equal importance to address all variables related to effectiveness, efficiency, and sustainability.

6.3.6   Discussions of the sixth attribute (A6: Learn and adjust)

Figure 6-10 illustrates the summary of the findings related to learn and adjust as presented in the previous chapter.
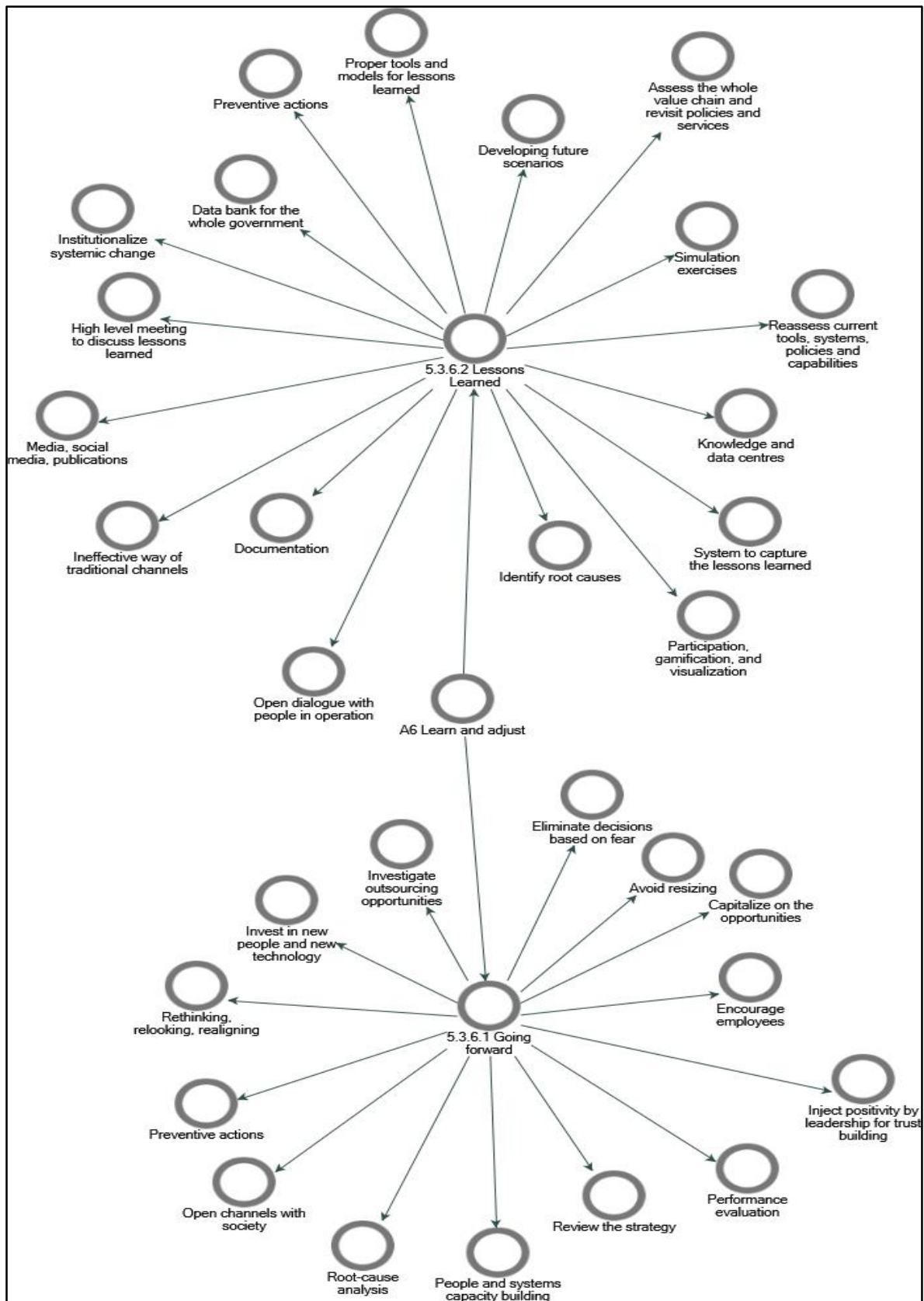
Figure 6-10: Summary of the findings related to learn and adjust

Summary of findings show that to ensure that lessons learned are properly captured, they should first be documented. Lessons learned can be an input to developing simulation exercises that will help the public sector employees to learn from emergent events. Lessons learned can also be a learning tool across government organizations and even across countries. Root-cause analysis should be done as part of lessons learned to identify preventive actions to be taken. The aim of the lessons learned exercise is to open dialogue to ensure everyone is engaged in future improvements. However, some interviewees questioned the traditional channels of sharing lessons learned as they think they are not effective. Meanwhile, INT37 suggested some more attractive channels through participation, gamification, and impressive visualization of these lessons. In addition, the interviewees highlighted the importance of having a data bank of knowledge and data centres across the government to institutionalize the learning process across the whole of the public sector.

Furthermore, study findings show that the first thing the public sector should do post an emergent event is performance evaluation. There should also be a strategy review exercise to capitalize on the opportunities that may emerge after the event. A root-cause analysis should also be done, and identification of the proper preventive actions should take place.

The interviewees also emphasize the importance of not being influenced by the emergent event outcome to eliminate decisions based on fear. Meanwhile, post an emergent event, dialogue should be initiated with employees and the society to rethink the response strategy and look for ways to improve and take proper preventive actions in the future. The interviewees also emphasized the importance of investigating outsourcing opportunities and investing in people and new technologies post an emergent event.

To summarize, this attribute "learn and adjust" brings us back to organizational learning theory (Basten & Haamann, 2018). Meanwhile, organizational adjustments highly depend on the

ability to learn (Fiol & Lyles, 1985). The main issue of concern is how to make the public sector more interested in this process as the traditional ways of sharing lessons learned seem to be outdated. The public sector should also think about proper mechanisms of sharing knowledge across the whole government and remove barriers preventing this learning.

6.3.7 Discussions of the seventh attribute (A7: Resilience measurement)

Figure 6-11 illustrates the summary of the findings related to resilience measurement as presented in the previous chapter.
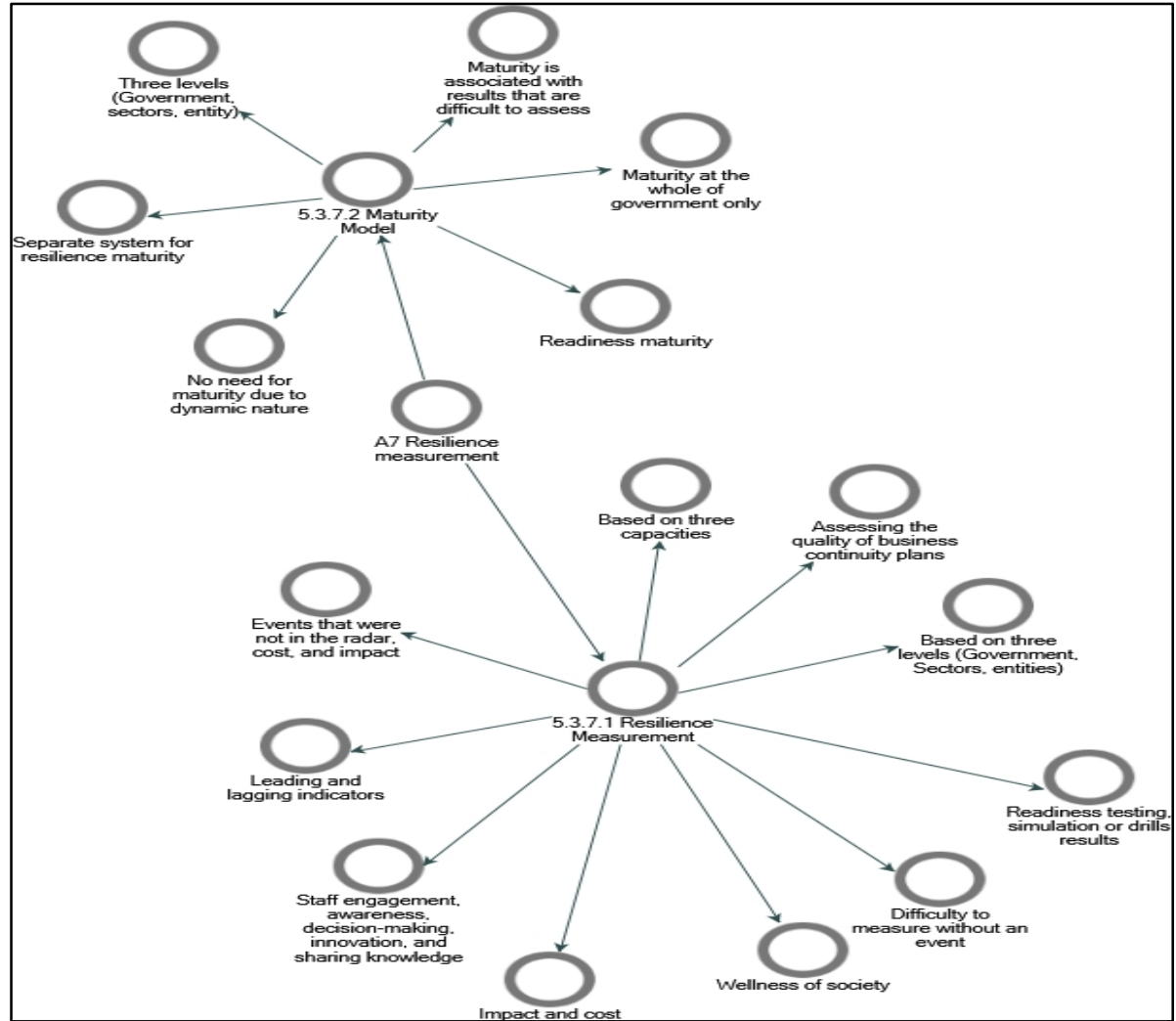

Figure 6-11: Summary of the findings related to resilience measurement.

Study findings show that resilience could be measured based on assessing the quality of business continuity plans, the three capacities (absorptive adaptive and transformative), and the readiness testing through simulations or test results. The interviewees also identified three levels to test resilience in the public sector (whole of government, sectors, and organizational level). The interviewees highlighted the importance of first defining what resilience in the public sector means before trying to introduce measures. They also suggested having leading and lagging indicators to measure resilience, including a list of various measures such as impact, cost, and recovery time. However, some interviewees think it may be difficult to measure resilience without assessing performance in a real emergent event. The summary of resilience measurement that was presented in the literature review chapter highlighted the importance of the public sector focusing on integrating indicators of the various types of impacts into more useful metric (Acosta, Chandra & Madrigano, 2017; Schipper & Langston, 2015). Furthermore, Zhao, Liu & Zhuo, (2017) identified four main factors affecting setting up a proper system for resilience measurement. These factors are: 1) the dependency and interdependency of system capacities and time-varying, 2) the severity of consequences and potential losses caused by disruptions and their association with uncertainties 3) the dependency of system performances depending on resources dispatch/input strategies and design attribute, and 4) the incompleteness of historical information of major disaster prevention. Also, The Rockefeller Foundations identified four main categories to measure city resilience: leadership and strategy, health and wellbeing, economy and society, and infrastructure and ecosystems (The Rockefeller Foundation, 2015).

Based on findings from the interviews, key points discussed in the literature review chapter, and the adjusted resilience theoretical framework, we can have three key levels to measure resilience and one cross levels resilience measure as illustrated in figure 6-12.

454
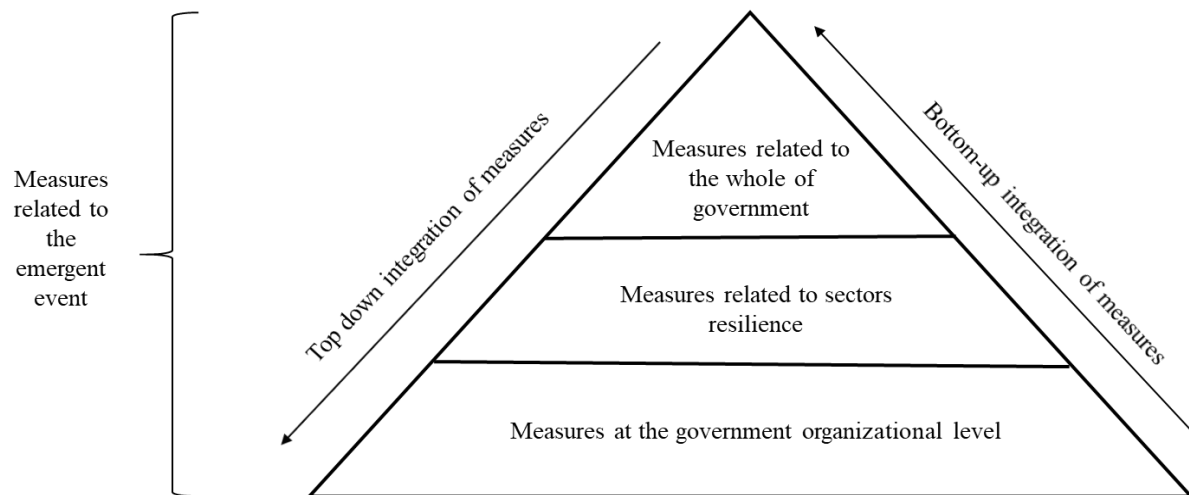
Figure 6-12: Measuring resilience for the public sector.

The measures related to the emergent event can be assessed through cost, time, and impact. Resilience in the public sector can be measured through levels. For instance, if the public sector needs to measure readiness through assessing the quality of business continuity plans, this should be measured first at the government organizational level, followed by the sectors level, and finally at the whole government level. Measures across the three levels should be integrated bottom-up and top-down. To ensure the integration of indicators of the various types of impacts into more useful metric, the public sector should look at indicators that are linked with building capabilities (robustness, resourcefulness, and recoverability) and should also look to indicators related to the three capacities (absorptive, adaptive, and transformative) (Acosta, Chandra & Madrigano, 2017; Schipper & Langston, 2015). There should also be indicators related to positive recoverability., These are the opportunity recognition and exploitation measures (Kuckertz et al., 2017).

Furthermore, results of resilience maturity show that interviewees think that the public sector should have a separate maturity model for resilience different from other maturity models that exist for other systems. Some interviewees think that the maturity model should be restricted to

the whole of government only, and it is not advisable to have it at the organizational level. Other interviewees believe that the maturity should be restricted to assess readiness only as there is no sense of having a maturity of results that are difficult to assess. Another point of view held by interviewees is to embed the maturity of resilience within the existing management systems that are implemented in the public sector. However, some interviewees believe that it is difficult to have a maturity model for resilience due to its dynamic nature. Meanwhile, as highlighted in the literature review chapter, two models for assessing resilience maturity were discussed. The first one is based on the work of Kerr (2015) in which four levels of resilience maturity were suggested: 1) effective short term of business as usual capability where the organization still lacks the resilience medium and long term horizons planning, 2) the medium-term ability to change and adapt where the organization still lacks the advanced ability for long term resilience planning, 3) the long term ability to shape the environment of the organization through long horizon resilience planning, and 4) where resilience become part of the organization's DNA and manifests as an advanced ability to shape the external environment of the organization positively.

The second maturity model is based on the work of Denyer (2017). He recommended five levels an organization can go through towards enhancing resilience thinking and adaptation; 1) preventative control or defensive consistency, 2) mindful action or defensive flexibility, 3) performance optimization or progressive compatibility, 4) adaptive innovation or continuous flexibility, and 5) paradoxical thinking or balancing and managing tensions. Both models for resilience maturity did not have robust boundaries to differentiate between different maturity levels, and they seem to be more theoretical approaches rather than practical approaches. The question here is, do we need a maturity model for resilience in the public sector? We may need this to assess the level of readiness or to assess performance after an emergent event, which is

usually not accurate as every public sector wants to show only the positive aspects while dealing with an emergent event. Assessing maturity is a complicated exercise given the complex nature of emergent events and the associated response parameters in the public sector.

To summarize the above discussions, measuring resilience in the public sector can be done by measuring the cost, impact, and recovery time for an emergent event. There should be integrated measures for resilience at the public sector organizational level, at the sectors level, and at the whole of the government level. Measuring resilience in the public sector can be based on resilience capabilities and resilience capacities, and it is important to have resilience measures related to the ability to grasp opportunities that may present with an emergent event. However, using a maturity model for resilience in the public sector seems to be a complicated task and a non-feasible exercise, except if maturity is related to assess readiness level only.

6.3.8   Discussions of the eighth attribute (A8: Enabling traits)

Figure 6-13 illustrates the summary of the findings related to enabling traits as presented in the previous chapter.
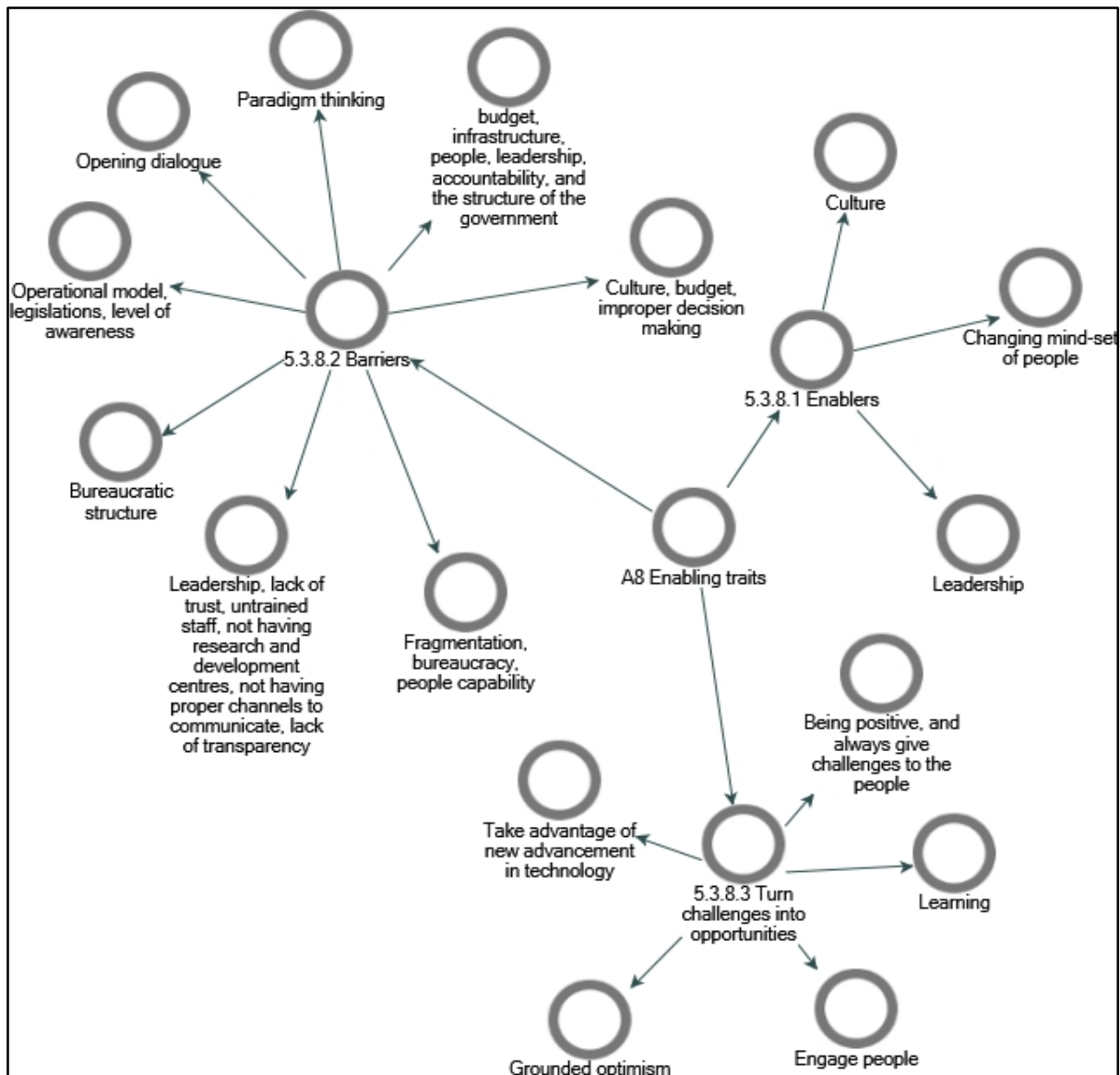
Figure 6-13: Summary of the findings related to enabling traits.

Summary of findings shows that that the most important enabler of resilience in the public sector is leadership. This was expected as leaders are the drivers to build resilience in the face of emergent events. Leaders should ensure that there is a unity of purpose and motivate everyone to achieve set goals. Also, leaders should show responsibility by being at the forefront of the response to an emergent event maintaining a proper communication with stakeholders. Also, leaders should inspire the people in a time of crisis and should look for opportunities in

the crisis. The role of leadership in building resilience was emphasized extensively in the literature (Southwick et al., 2017; Teo, Lee & Lim, 2017; Wang, Li & Li, 2017).

Interviewees also think that culture is an important factor in building resilience. Culture represents norms and beliefs. In the public sector, culture can be reflected by the ability of people to work together to face an emergent event and work positively to try to maximize opportunities embedded within the events. The culture factor for building resilience was emphasized in the literature (Arrington & Wilson, 2000; Ungar, 2008; Ungar, 2018).

Furthermore, interviewees think that trust plays a vital role in building resilience. There are many dimensions to trust; trust between leaders and employees, trust between employees themselves, trust between the public sector and different stakeholder, trust with the private sector, trust with the society, trust across sectors, trust between planners and executors, etc. The importance of the trust factor was discussed comprehensively in the literature (Koronis & Ponis, 2018; Longstaff & Yang, 2008). Finally, having an open mind-set for people is a key factor to enable resilience, as emphasized by the interviewees.

When it comes to barriers, interviewees think that bureaucracy is the most important barrier that prevents the public sector from becoming resilient. According to Van de Walle (2014), the ability to react to emerging events speedily and constructively by the public sector is usually tied up within its bureaucratic structures. Overcoming this barrier will require vast transformations across the public sector, which will take a long time to complete in addition to the many complications that will arise. Accordingly, the public sector should explore other alternatives of enhancing teamwork and utilizing technology to come up with fast solutions.

In addition to bureaucracy, study findings show that having a non-supportive culture and budget limitations are barriers to building a resilient public sector. Some interviewee highlighted non-supportive leadership and people's behaviours as barriers. Furthermore, interviewees also

highlighted lack of responsibility, lack of trust, and paradigm thinking as barriers to resilience. To overcome these barriers, the public sector should explore more practical solutions and new quick-wins that do not have a lengthy and costly process of implementation. Also, interviewees think that learning from the experience is the most important factor that will enable the public sector to turn challenges into opportunities. In addition, engaging people, being positive and keeping the bar high will assist in finding new opportunities out of an emergent event.

To summarize the above discussions, the most important enablers of resilience in the public sector are leadership, culture, teamwork, trust, and an open mindset. Bureaucracy seems to be a major barrier to building resilience in the public sector. To overcome barriers, the public sector should explore practical solutions and quick-wins rather than trying to implement complicated processes of transformation, which may make things worse.

6.3.9   Discussions of the first principle (P1: Integration with other management concepts)

Figure 6-14 illustrates the summary of the findings related to integration with other management concepts as presented in the previous chapter.
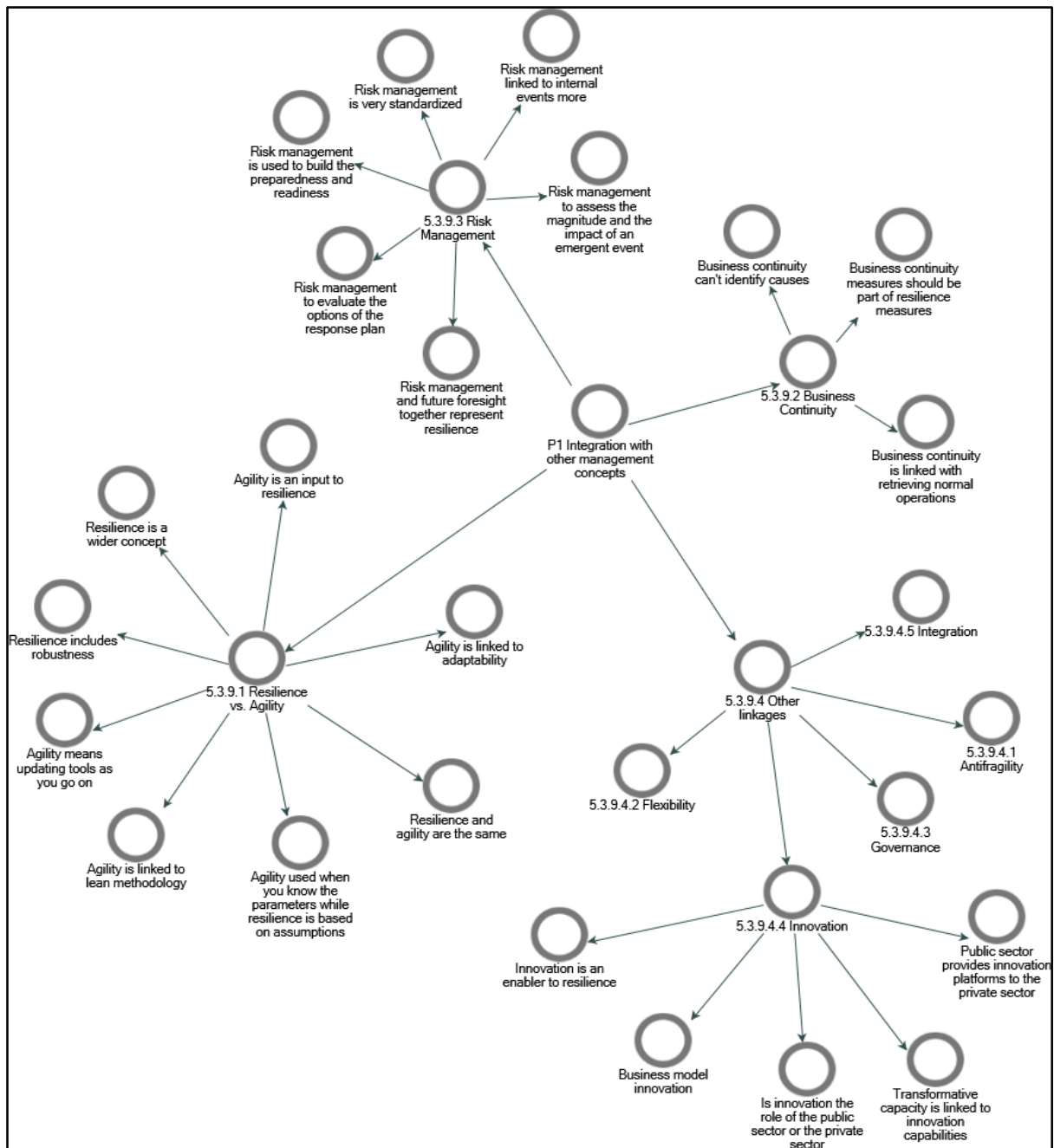
Figure 6-14: Summary of the findings related to integration with other management concepts.

Summary of findings shows that some interviewees think that resilience is a wider concept and agility is input to resilience, while others think that they are the same. Other interviewees linked agility to adaptability and lean methodology. The interviewees think that agility in the private sector is more evident than in the public sector. Meanwhile, one interviewee highlighted that

resilience means robustness in addition to agility. Finally, another interviewee highlighted that agility is more linked to known parameters while resilience is linked to unknown parameters. To understand the difference between the two concepts, studies on both concepts in literature were examined. In a systematic review of literature by Tallon et al. (2019) on agility, they concluded that while organizational agility can have both offensive or defensive connotations or both, the most important points is its association with dynamism. Some researchers described agility as a formative element of resilience (Ponomarov & Holcomb, 2009), while others highlighted areas of overlap, as well as dimensions that are common and uncommon to agility and resilience (Gligor et al., 2019; Lotfi & Saghiri, 2018). Figure 6-15 illustrates common and uncommon dimensions of agility and resilience described by Gligor et al. (2019).
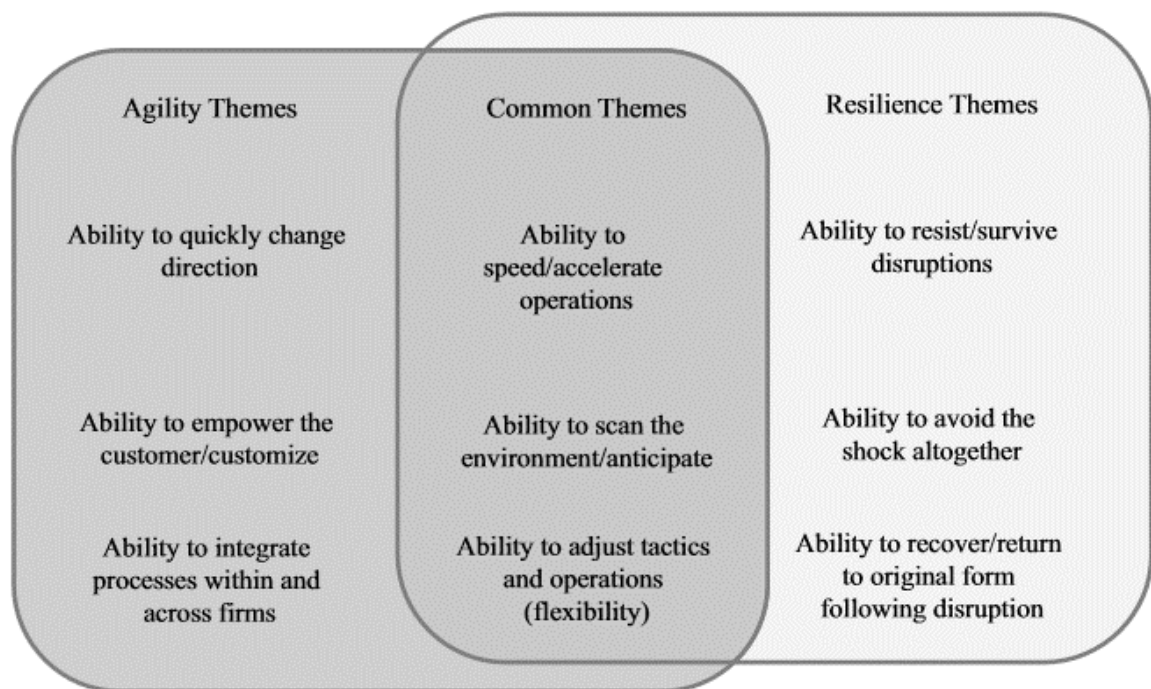
Figure 6-15: Common and non-common dimensions of resilience and agility (Gligor et al., 2019).

The above figure illustrates that resilience is always associated with disruption or shock. Meanwhile, agility is associated with the ability to change direction quickly. The debate between the two concepts continues as each concept evolves to include more parameters over time. Nevertheless, based on the results emphasized by interviewees, resilience could be a wider concept, and agility is a key parameter to have a resilient public sector.

For business continuity, interviewees think that business continuity measures should be part of resilience measures. Business continuity is linked with retrieving normal operations, while resilience is focused on the new normal after an emergent event. Furthermore, some of the interviewees highlighted the importance of reviewing business continuity plans based on the outcome of the lessons learned after an emerging event. Trying to figure out the difference between resilience and business continuity in literature seems to be very difficult as proponents of business continuity think that resilience is part of business continuity. This point of view is supported by the newly released business continuity standard ISO 22301:2019 (International Standard For Organization, 2019). On the other hand, proponents of resilience think that business continuity is part of the overall umbrella of resilience (Florin & Linkov, 2016).

However, this study highlights some drawbacks of business continuity in order to ensure their inclusion in the resilience framework of the public sector. The following drawbacks were identified by Abdullah, Noor & Ibrahim (2013): business continuity seems to be not well suited in the complex socio-techno environment; business continuity focuses on restoration of operations while resilience focuses on building capabilities and looking for new opportunities; resilience address how people should cope with complexity while business continuity does not address this, resilience look at capacities while business continuity does not address this issue. All these drawbacks of business continuity are addressed very clearly by the recommended resilience framework in the public sector.

For risk management, interviewees think that risk management can help in identifying the magnitude and the impact of an emergent event. Additionally, risk management can help in building preparedness and readiness before an emergent event occurs. Some interviewees think that risk management and foresight together can represent resilience, and risk management is more related to the absorptive capacity. Also, some interviewees think that risk management is more linked to internal events, and it is a very standardized process that makes the public sector focus on steps rather than value. There is some limitation associated with traditional risk management systems when compared to resilience systems (Taleb, 2010). These limitations are: 1) risks cannot always be anticipated, 2) risks may be hard to quantify, and 3) risk management usually misses the adaptation part, which is covered by resilience. In the literature review chapter, it was highlighted that resilience plays a crucial role in uncertain environments when standard risk management techniques fail to provide solutions (Kovalenko & Sornette, 2016). Similarly, Van Der Vegt et al. (2015) argued that traditional risk management techniques have major pitfalls which are related to the unfeasibility to list all the risks that may face an organization. On the other hand, for certain events, the failure of risk management to provide a solution is due to the complex nature of the events, which are unforeseeable in the traditional risk management frameworks.

For antifragility, one interviewee thinks that resilience and antifragility are the same concepts, while another interviewee thinks that antifragility is an advanced phase above resilience. Antifragility is associated with the famous book of Nassim Taleb, "The Black Swan" where a surprising, extreme event may occur, and we need to think beyond traditional risk management boundaries to try to build our antifragility (Taleb, 2010). Furthermore, the areas of overlap between resilience, agility, and fragility frameworks and their associated definitions based on the work of Bosetti, Ivanovic & Menaal (2016) are illustrated in Figure 6-16 below.

464

Fragility: Willingness of a state to carry out its basic or core functions to meet the needs and expectations of its citizens.

Risk: The combination of the probability of an event and its negative consequences.

Resilience: the ability and capacity of individuals, organizations, and structures (including cities) to cope, adapt, and recover from shocks and stresses, in a way that reduces the overall vulnerability to similar shocks and stresses in the long term.

Figure 6-16: Mapping risk, resilience, and fragility frameworks (Bosetti, Ivanovic & Menaal, 2016).

For flexibility, interviewees focused on the word "flexibility" when it is associated with strategies, policies, structures, and budgets. However, reviewing the literature indicates that flexibility could be one of the resilience principles (Dinh et al., 2012).

For governance, the interviewees focused on the word "governance" when it is related to tools, models, corporate, sectors, structures, and levels. The most important point in governance is the need to have an overall system to govern all the implemented systems related to excellence, resilience, business continuity, risk management, organizational agility, or any other related management system under one governance system as highlighted by INT06.

For innovation, interviewees think that innovation is an enabler of resilience. Meanwhile, some interviewees highlighted that the public sector has a role in this regard of being an enabler through the provision of platforms for innovation to the private sector. Furthermore, they suggested that each sector have its own innovation initiatives. Interviewees also think that

innovation is linked to transformative capacity where the public sector should think of business model innovation to fulfil the new requirements. As was discussed in the literature review chapter, some researchers consider innovation to be the main pillar for organizational resilience, and they demonstrate this thinking in their definition of organizational resilience. For example, Hamel & Välikangas (2003) define organizational resilience as "the capacity for continuous reconstruction. It requires innovation concerning the organizational values, processes, and behaviours that systematically favour perpetuation over innovation". Others see resilience from the perspective of adaptive and transformative capacities. In their study, Folke et al. (2010) argued that the transformative capacity is needed to make use of crisis as a window of opportunity by transforming at a smaller scale that is then amplified to build resilience at a broader level. This transformation requires the recombination of sources of knowledge and experience in ways that will enable innovations to cross thresholds into newly developed trajectories. Therefore, the suggested framework in the public sector is to link innovation to both adaptive capacity and transformative capacities, with more weight assigned to transformative capacity.

For integration, interviewees think that there should be some sort of integration between government organizations. This integration in government should be reflected in having integrated communication and having integrated plans and solutions. There should also be some sort of integration between sectors. Integration in the public sector, in general, is driven by leadership. The key takeaway here is that the public sector should consider integrating its systems, including processes, platforms, and solutions, to be more resilient.

To summarize the above points, resilience as a concept overlaps in many ways with many other concepts such as agility, business continuity, risk management, fragility, and flexibility. This overlap is expected to persist due to the lack of a standard definition for resilience or its

466

boundaries. The same is applicable to other management concepts. The key learning point here is the need to have an overall governance system in the public sector for all these concepts in order to integrate the efforts and avoid any conflicts or duplications.

6.3.10 Discussions of the second principle (P2: Collaboration and building partnerships)

Figure 6-17 illustrates the summary of the findings related to collaboration and building partnerships as presented in the previous chapter.

Figure 6-17: Summary of the findings related to collaboration and building partnerships.

Organizations cannot always effectively respond to emergent events by themselves unless they collaborate with other stakeholders. The collaboration dimension is required when an organization by itself does not have sufficient capacity to handle emergent events except it networks with other organizations or agencies (Allen, 2011). Without this principle, managing networks with partners will not succeed in the face of the disruption event. This principle was also emphasized by Allenby & Fink (2005), who argued that network-centric organizations are more resilient compared to other organizations that do not build strong networks with other stakeholders.

Interview findings show that there should be an alignment between the public sector and universities in order to better build resilience. Academia has an important role in building capabilities, developing cases studies, piloting solutions, and adopting lessons learned as part of building resilience in the public sector. In addition, to build resilience in the public sector, there should be better collaboration between public sector organizations, sectors, teams, stakeholders, with the private sector, with international organizations, and between countries. Within these collaborative working relationships, the public sector should coordinate communication in case of an emergent event. There should also be a central body to coordinate decision making and implementation of response strategies to an emergent event as it is better to have one person responsible for the ultimate coordination of decision-making between different parties.

Another point of observation is that public-private partnership is important to building resilience in the public sector. In addition, the public sector should encourage partnerships with big companies and international organizations, and most importantly, to deal with society as partners when it comes to building resilience in the face of emergent events. Finally, research centres can provide good input for the prediction of an emergent event and assist the public

sector in coming up with disruptive solutions as part of responding to an emergent event. They can also help to identify opportunities that may arise from a disruptive event.

To summarize the above discussions, to be resilient, the public sector needs to build collaboration and partnerships with academic institutions, research centres, international organizations, the public sector in other countries, the private sector, and other stakeholders. Collaboration between the public sector and other sectors should be developed and maintained to facilitate resilience building.

6.3.11 Discussions of the third principle (P3: Engaging the society and the public sector employees)

Figure 6-18 illustrates the summary of the findings related to engaging the society and the public sector employees as presented in the previous chapter.
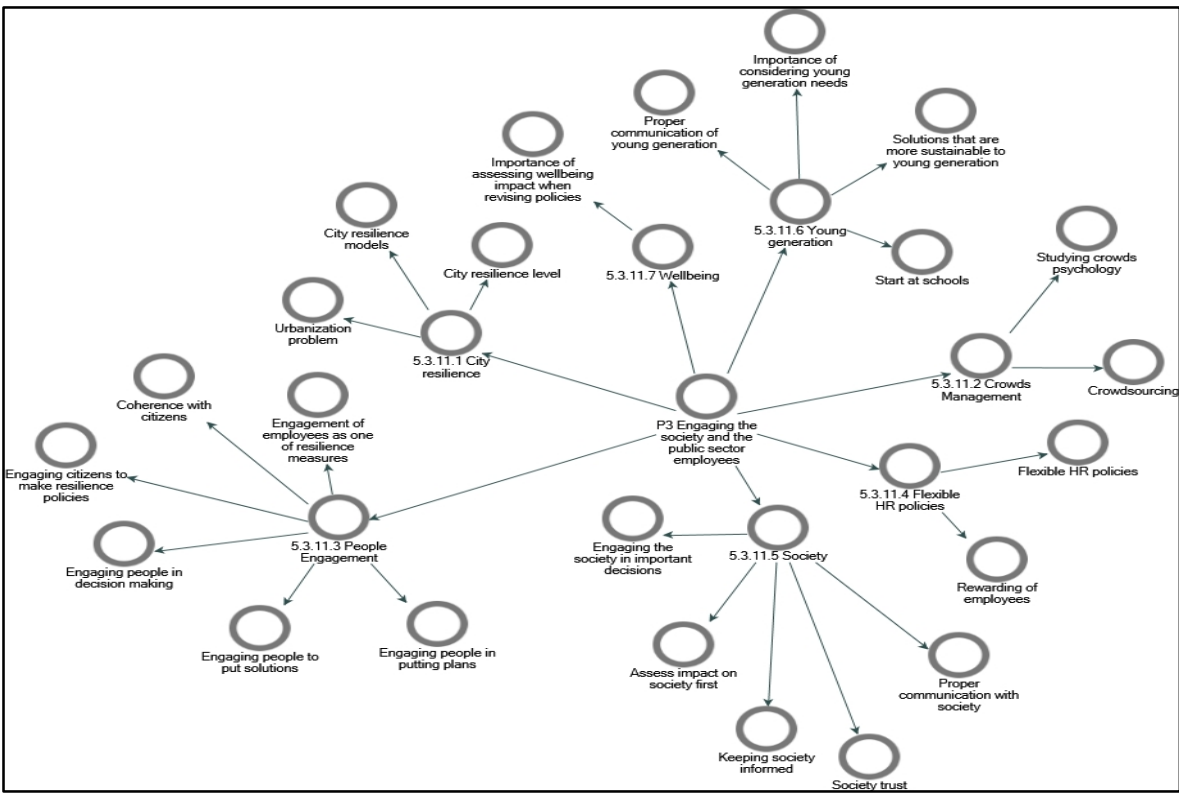
Figure 6-18: Summary of the findings related to engaging the society and the public sector employees.

ISO 37123:2019 identified certain requirements and indicators to ensure the engagement of different segments of society in building resilience at a city level (International Organization for Standardization, 2019). Furthermore, cohesion among employees is a significant dimension in the developed resilience model affecting organizational resilience (Kantur & Say, 2015). Meng et al. (2019) studied mechanisms of resilience at the workplace through the social exchange perspective to develop a resilience model between a Team-Member Exchange and a Leader-Member Exchange. Also, Liu, Reed & Girard (2017) developed a resilience model that consists of three factors; intra-individual, interpersonal factors and socio-ecological factors based on the psychological field.

Study findings show that city resilience models could be an input to developing a resilience framework for the public sector. Meanwhile, crowdsourcing and studying crowd psychology are important factors to build resilience in the public sector in the face of emergent events. Furthermore, the level of engaging people while managing an emergent event is one of the resilience measures. This can take the form of engaging them in developing resilience policies, in decision making, in designing plans, and in implementing solutions. Whenever the public sector faces an emergent event, it should first assess the impact on society, and proper communication with society should be actively maintained to obtain society's trust while handling an emergent event. The public sector should also take the needs of the younger generation into consideration in order to be resilient. This implies opening communication channels with the younger generation and providing solutions that address their needs when facing an emergent event. Finally, since the essence of the public sector is ensuring the welfare of the public, the public sector should continuously assess the wellbeing of society while revising policies due to an emergent event to ensure that society's trust is retained.

To summarize the above discussions, people engagement is required to fulfil requirements for having a resilient city along the lines of crowd management, evaluating crowdsourcing options, and keeping the people and the socially engaged, especially the younger generation.

6.3.12 Discussions of the fourth principle (P4: Understanding the evolving role of the public sector and define determinants of future transformability

Figure 6-19 illustrates the summary of the findings related to understanding the evolving role of the public sector and define determinants of future transformability as presented in the previous chapter.
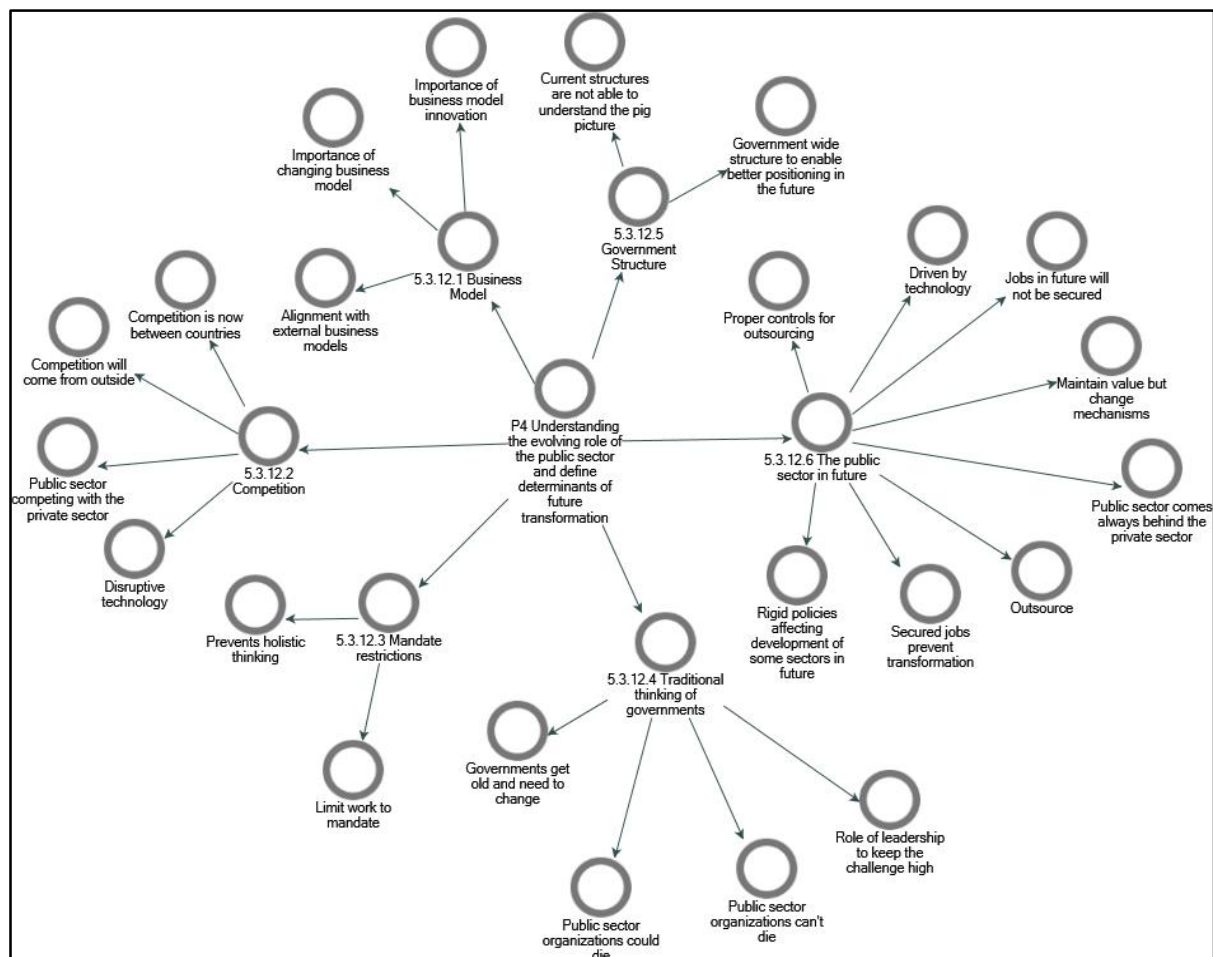
Figure 6-19: Summary of the findings related to understanding the evolving role of the public sector and define determinants of future transformability.

The ISS 2020 Vision White book highlights twelve trends of the public sector in future. These trends are: managing demographics and society segments, growing customers' expectations, harnessing technology and innovation, consolidation towards larger and integrated contracts, task providers, from providers to commissioners, outsourcing across public sector levels, profits contingent upon outcomes, increase the involvement of other parties, affordable government, and more empowered shadow governments (International Service System (ISS), 2014).

In addition, a summary of interviews results shows that the public sector should align its business model with external business models to be more resilient. The public sector should always look at business model innovation and upgrade its business model to fulfil the new-normal requirements. The public sector should also take cognizance of increasing competition between countries and competition from international companies. Also, for the public sector to be more resilient, it should enable the private sector to do its work without competing with them in their core businesses. The public sector should also move away from the traditional thinking that assumes the government can control everything. This assumption is no longer valid due to too many reasons, and one of them is the increased exposure of citizens to other experiences in other countries, which make them tend to question governments control. Public sector organizations are also restricted by their mandates, which limits the scope of their work and prevent holistic thinking. As governments get old, they need to change. The role of leadership is highly important in this regard in order to keep the bar as high as always. Meanwhile, there should always be an option of restructuring across the whole public sector to introduce new government organizations or to end the operations of some of them. Furthermore, the government should be structured in a way that is facilitating the understanding of the big picture and enabling a better positioning in future. Finally, the trend of outsourcing in the public sector services is expected to continue to grow in future. The public sector should learn from the

experiences of the private sector to better position itself for the future. Accordingly, it should maintain value but change mechanisms. Another point of consideration is that the current employment model where the jobs of public sector employees are secured and guaranteed for a long time should not the norm in future.

To summarize the above discussions, to build resilience in the public sector, there should be a proper understanding of the expected role of the public sector currently and how it will evolve in future. This requires challenging the structures, tools, and approaches the public sector currently uses and looking for more advanced techniques like what successful private sector companies are doing.

6.3.13 Discussions of the fifth principle (P5: Promote systems thinking)

Figure 6-20 illustrates the summary of the findings related to promote systems thinking as presented in the previous chapter.
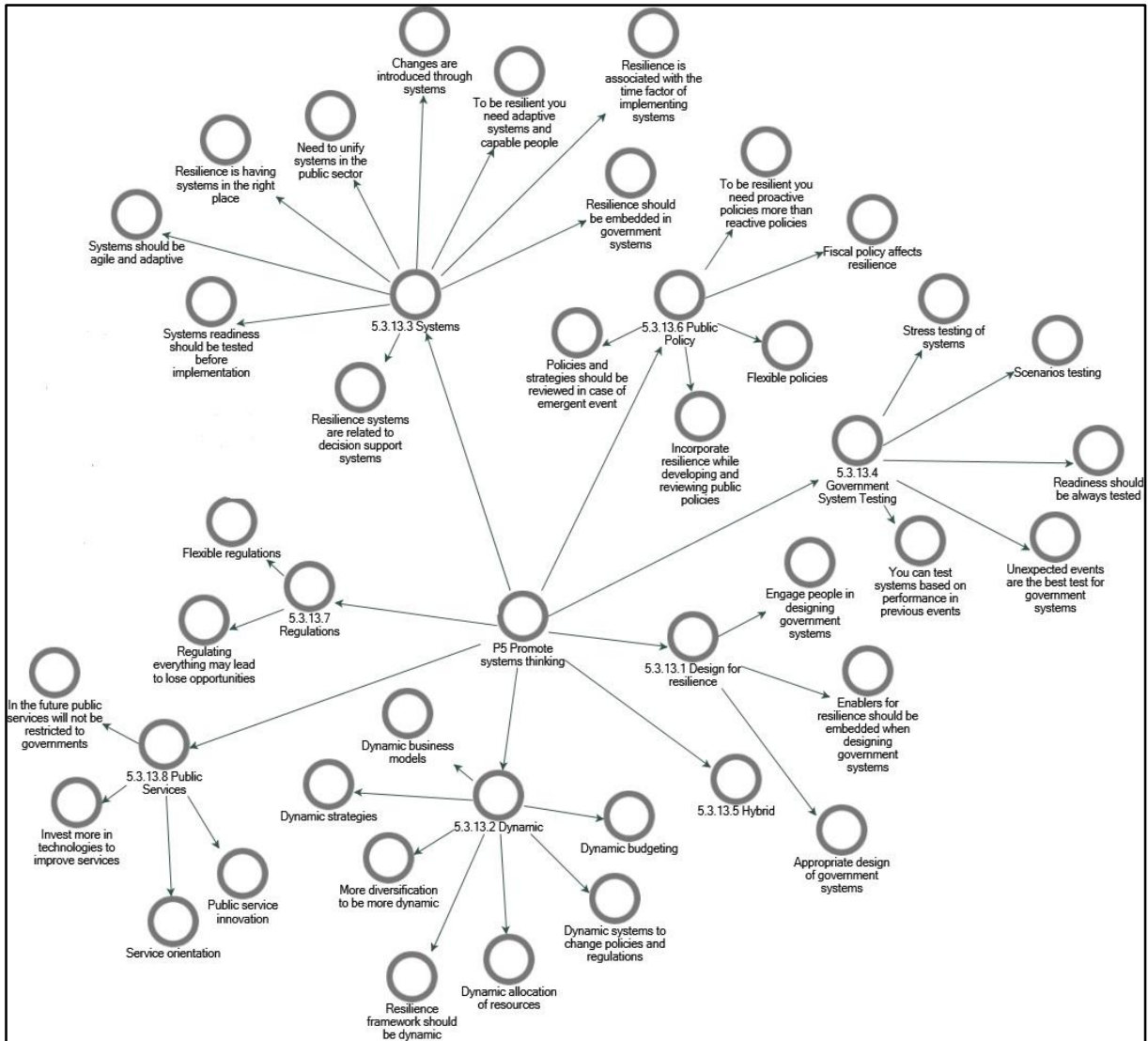
Figure 6-20: Summary of the findings related to promote systems thinking.

Embracing a systems point of view in the public sector will enable identification of the added value of, and the relationships between the various aspects and components of the public sector. Systems thinking in resilience is highly related to the resilience-engineering concept, which was thoroughly discussed in the literature review chapter. Resilience engineering is a system property that enables the system to remain integral and to continue operating despite the presence of a threat (Patriarca et al., 2017). Resilience engineering is also the deliberate design and construction of resilient systems (Fairbanks et al., 2014).

474

Summary of study findings shows that enablers for resilience should be embedded when designing any government system. In addition, people should be engaged in the process of developing these systems, and there should be self-reflection checks within these systems. Interviewees also highlighted the importance of having a dynamic framework for resilience in the public sector, which is described as having a dynamic allocation of resources, dynamic budgeting, dynamic business models, dynamic strategies, and dynamic systems. Dynamism means having a proper understanding of uncertainties around us that keep changing, and it is highly linked with agility (Tallon et al., 2019). Furthermore, resilience in the public sector implies having adaptive systems and capable people combined with routine testing of these systems to ensure their readiness to face emergent events before implementing them when an event occurs. Another point of observation made by interviewees is the importance of continuous testing of public sector readiness. They recommended having stress testing of systems and using various technological tools and management tools for testing. They also suggested having hybrid structures and systems between the central government entities and the other public sector organizations to enable predictions and response to emergent events.

Study findings also identified the importance of incorporating resilience components while developing or reviewing any public or fiscal policies. The public sector should have flexible policies, and the related policies and strategies should be revised post an emergent event to ensure they are aligned with the new normal.

The results also show that the tendency of the public sector to try to regulate everything may lead to the loss of some opportunities embedded within an emergent event. A better approach is for the public sector to engage different parties when developing regulations and should always look to develop flexible regulations. Furthermore, in future, the public services will not

be restricted to governments, and the public sector should make more investments in technology to make it more service-oriented and to enable it to innovate the way it provides services.

To summarize the above discussions, resilience means having the proper systems in place when facing an emergent event. This implies that the public sector should properly design its systems to be more resilient. Furthermore, the public sector should build dynamic systems, continue to improve its understanding of the dynamic nature of systems, conduct routine testing of these systems, understand the need for having hybrid systems, and define the relationships between different outcomes of the public sector (public policies, regulations, and public services).

6.3.14 Discussions of the sixth principle (P6: Sectors approach for better management of the public sector)

Figure 6-21 illustrates the summary of the findings related to sectors approach for better management of the public sector as presented in the previous chapter.
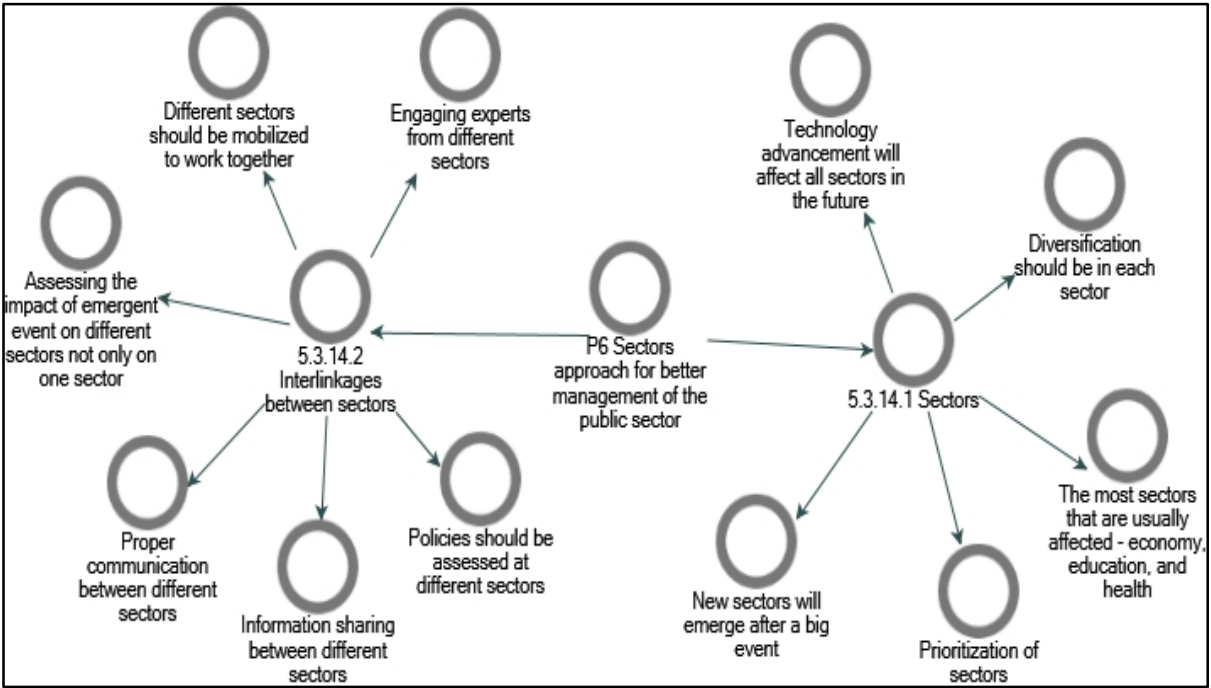
Figure 6-21: Summary of the findings related to sectors approach for better management of the public sector.

The sectors focused on in some studies addressing the topic of resilience were discussed in the literature review chapter. Table 6-8 below gives examples of some of these studies.

Table 6-8: Examples of resilience research in various sectors.

Discipline	Publication Title	Research focus
Economy	Regional economic resilience, hysteresis, and recessionary shocks (Martin, 2012).	Resilience usefulness in understanding regional economies reaction to major recession shocks.
Finance	Governmental financial resilience under austerity in Austria, England, and Italy: How do local governments cope with financial shocks? (Barbera et al., 2017).	To highlight and operationalize different patterns of financial resilience, namely, self-regulation, constrained or reactive adaptation, contented or powerless fatalism that is the result of the interaction and development over time of different internal and external dimensions.
Political	Political Resilience and EU Responses to Aviation Terrorism (Argomaniz & Lehr, 2016).	Examines how European authorities have responded to reported threats to aviation resulting from individual terrorist tactics by applying the notion of political resilience.
Healthcare	Vulnerability and Resilience in Patients with Chronic Pain in Occupational Healthcare: A Pilot Study with a Patient-Centered Approach (Peilot et al., 2018).	To describe vulnerability and resilience and possible subgroups in patients with chronic work-related musculoskeletal pain in occupational healthcare.
Education	Building resilience in teacher education: An evidenced informed Framework (Mansfield et al., 2016)	To determine factors that may impact teacher education to support teacher

		resilience and ways in which this may occur.
Social	What is social resilience? Perspective of disaster researchers emergency management practitioners and policy-making in New Zealand (Alan H Kwok et al., 2016).	To better understand what is social resilience at the community level.
Security	Defining a Cyber Resilience Investment Strategy in an Industrial Internet of Things Context (Carías et al., 2019).	To identify and model an effective cyber resilience strategy.

Summary of interview findings suggest though the prioritization of sectors may differ from one country to another, the economy, education, and health sectors should always be top on the priority list. Some interviewees recommended having resilience at the sectors level, while others highlighted the emergence of new sectors as a result of big emergent events. Furthermore, the public sector should have the ability to utilize various resources and expertise from different sectors while facing an emergent event. It should also seek the input of various sectors when introducing or revising public policies as a result of an emergent event.

To summarize the above discussions, for the public sector to be more resilient, there should be diversification in addition to the exchange of information and expertise across sectors to ensure a well-coordinated response when an emergent event occurs.

6.3.15 Discussions of the seventh principle (P7: Collective understanding of the big picture)

Figure 6-22 illustrates the summary of the findings related to the collective understanding of the big picture as presented in the previous chapter.
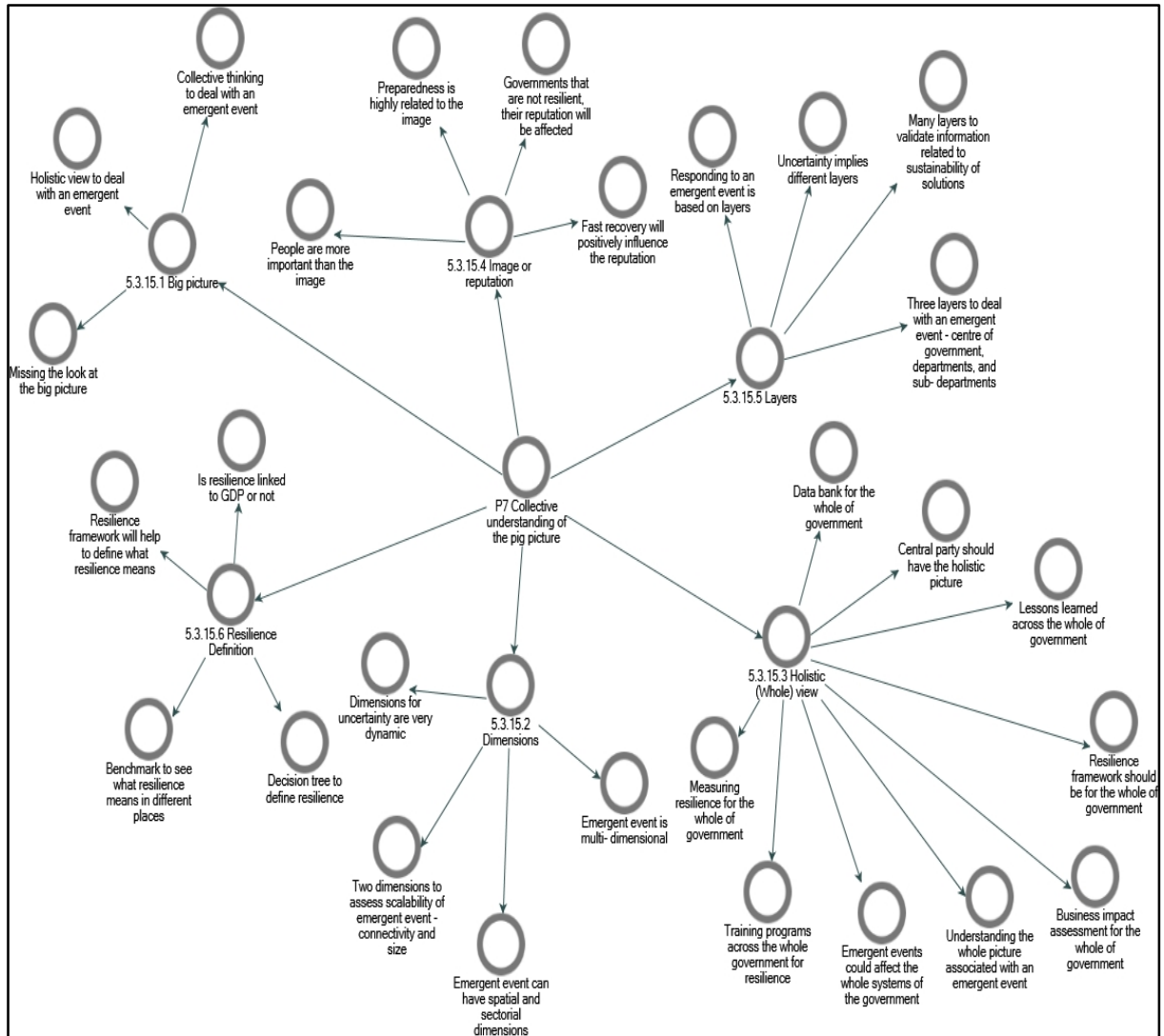
Figure 6-22: Summary of the findings related to collective understanding of the big picture

Collective understanding of the big picture will lead us to complexity theory that was thoroughly discussed in the literature review chapter. Allen, Strathern & Baldwin (2007) argued that while the knowledge captured by each agent in a complex system is important, what is more important is the ability of the complex system to use that knowledge to develop a successful response strategy, and to adapt and learn from different experiences over time. Also, enhancing the understanding of the holistic context will give the public sector a big picture perspective of what resilience really means within the context of the public sector. This big

479

picture perspective will enable the public sector to understand the different components, dimensions, and layers of resilience that may be affected by an emergent event and the complex relationship between them. Furthermore, understanding the big picture will help the public sector in defining what positively or negatively affects its image while responding to an emergent event.

Study findings show that there are different levels of uncertainties, and the public sector also responds to emergent events from different levels. Also, the public sector should have the ability to utilize various resources and expertise from different parties while facing an emergent event. Furthermore, when introducing or revising public policies because of an emergent event, the input of various sectors should be sought and incorporated. As an emergent event is multi-dimensional, the response to it should also be multi-dimensional, taking into consideration the multiple dimensions to measuring and building resilience.

Study findings also show that any resilience framework for the public sector should include the whole of the government as any emergent event could affect the whole system of the government. Regarding lessons learned, the public sector should have proper mechanisms to capture and communicate lessons learned from emergent events across the whole of government. Being resilient also positively affects the reputation or image of the public sector, but the preservation of reputation should not take precedence over serving the people. Furthermore, interviewees emphasized the need to build a resilience framework in the public sector that is based on a proper definition of what is meant by a resilient public sector. To recall the definition of organizational resilience that was initially drafted in the literature review chapter (Chapter 2) after doing a systematic literature review of resilience definitions, it was concluded that organizational resilience is the capacity of an organization to anticipate, absorb and adapt to changing conditions or disruptions in the internal and external environment, to

learn from the experiences and <u>bounce forward</u>, that is, survive and thrive through improved performance.

Based on the amended theoretical framework and the discussions incorporated within this chapter, and the earlier definition of organizational resilience. The following definition of resilience in the public sector is proposed; the ability of the public sector to collectively work together to build its capabilities and capacities at all levels to understand, anticipate, absorb, and adapt to changing conditions in a complex environment, to collaborate and learn from the experience and bounce forward, that is, survive and thrive through improved performance.

To summarize the above discussions, the public sector should understand the big picture to build resilience properly. This will require a proper understanding of the mission of the public sector and its ability to understand complex dimensions and layers associated with facing an emergent event.

6.4 Aspects of the developed framework that are aligned with the public sector definition

The general definition of the public sector was presented in Chapter 2. It was concluded that the public sector is the part of a country's that is owned or controlled by the government (Friedrichsen et al., 1985). Meanwhile, and as was discussed in Chapter 1, defining what is meant by a public sector seems to be a complicated task and differs from one country to another (Mansour, 2008). Within this context, he tried to reach a definition for the public sector in UAE by trying to define its boundaries and concluded that the public sector in UAE could operationally include all organizations that are funded by the government public budget and are involved directly in providing some sort of goods or services to the public. Boyne (2002) compared public sector organizations and private sector organization by highlighting the debate in the literature about the similarities and differences between both of them, and the main

difference is the ownership, where private firms are owned by shareholders or entrepreneurs and public sector agencies are owned collectively by governments or members of political communities.

To function effectively in its role as private sector enabler, the public sector has its own mandates and structures to develop the required infrastructure, public strategies, public policies, legislations, business models, and public services to create value for both the public and the private sectors. Further, more investigation is required to better understand how the attributes and principles of the resilience framework (shown in Table 6-9) apply to both the public and the private sector.

Table 6-9: Key aspects of the principles and attributes in the developed framework that are consistent with the definition of the public sector

Component in the developed framework	Key aspects that are consistent with the definition of the public sector
P1: Integration with other management concepts	The business continuity and risk management requirements in the public sector are usually enforced by a central public sector authority and there is usually a body to ensure fulfilling these requirements. Enforcing resilience in the public sector should follow the same path.
P2: Collaboration and building partnerships	External partnerships in the public sector are usually controlled by political decisions. However, for internal partnership, the public sector is expected to have various partnerships with local academic institutes and local research centers as part of social responsibility to enable proper research agenda at the national level.
P3: Engaging the society and the public sector employees	The public sector is concerned with engaging the whole of society. Meanwhile, private sector organization focus on segments of society where majority of their target customers came from. Furthermore, the public sector should focus on the wellbeing and the sustainability of the society while building resilience.
P4: Understanding the evolving role of the public sector and define determinants of future transformability	Understanding the evolving role of the public sector may be a big challenge as it currently operates as a monopolized sector where competition is controlled by politicians and central authorities. Meanwhile, the private sector operates in an environment governed by high competition where survival is only guaranteed for companies that better understand the operating environment.
P5: Promote systems thinking	The public sector may have more influence on the ecosystem more that the private sector. The interactions and relationships of policies, regulations, and legislations requires a lot of complexity thinking in the public sector to serve the interests of both the public and the private sectors.

P6: Sectors approach for better management of the public sector	The public sector helps to maintain balance between the interests of different sectors such as economy, education, and health while building resilience. Private sector companies are more interested in the sector they are operating in and may have little interests in other sectors.
P7: Collective understanding of the big picture	The public sector organizations should build collective thinking to understand the essence of the public services and the future of it. For the private sector, each company is interested in the field it is working in and they are more focused to their specialities.
A1: Understanding external and internal context and the relationships	The public sector should have a collective understanding of uncertainties and build mechanisms to deal with them. This is usually not the case in the private sector as each company develops its own tools to understand uncertainties. Nevertheless, the private sector is affected more by uncertainties and emergent events than the public sector; the impact on the private sector is immediately felt.
A2: Ability to anticipate	The public sector usually has developed standardized tools to integrate information and build capacity to anticipate emergent events. This anticipation ability is usually missed in private sector small to medium scale companies though big private sector companies have their own special anticipation tools.
A3: Define response strategy	The response strategy is usually more complex in the public sector as it affects people lives or national security issues. A lot of communication through different channels with various society is needed in the public sector to manage emergent events. On the other hand, the scope of response strategy in private sector companies is narrower as the impact of decision will only affect the stakeholders.
A4: Building resilience capabilities	The public sector is responsible for building the wide range of infrastructures, systems, policies, human element strategies, legislations, and structures to have a more resilient public and private sectors.
A5: Building resilience capacities	Utilization of transformative capacity is usually minimum in the public sector when compared to the private sector and this is due to its bureaucratic structure and the lengthy process required to change policies and legislations.
A6: Learn and adjust	The public sector is facing a big challenge when it comes to sharing knowledge between public sector organizations or across different sectors.
A7: Resilience measurement	There is a need in the public sector to introduce resilience measures when facing an emergent event other than the normal efficiency and effectiveness measures. Measuring resilience in the private sector is more straight forward as it is related to how much an emergent event is affecting the profit of private sector organizations.
A8: Enabling traits (Leadership, culture, cross-functional teams, trust, and mind-set)	Both the private and the public sector depend on having strong leadership to ensure resilience. Building the culture, cross functional teams, trust, and positive mind-set require more efforts in the public sector as it depends on centralized human resource policies issued by central authorities.

6.5 Verification of the developed framework

Due to the difficulty of verifying and validating the developed framework through a case study, the other option that exists is to verify the framework against the ISO 22316:2017 standard (International Organization for Standardization, 2017). The purpose of this comparison is to ensure that the main components of the resilience framework building resilience in the public sector align with the best practice components embedded in the ISO 22316 standard. Table 6-10 below describes the mapping.

Table 6-10: Mapping of the components embedded within the developed framework with ISO 22316:2017 standard.

Component in the developed framework	Related component in ISO 22316:2017 Standard	Comments
P1: Integration with other management concepts P1.1 Agility P1.2 Business continuity P1.3 Risk management P1.4 Other linkages	P4: Effective management and governance P6: Coordination across management disciplines and contributions from technical and scientific areas of expertise P7: Relies upon effectively managing risk 5.8 Development and coordination of management disciplines	The ISO standard focuses on the relationship with risk management, but there is no identification of relationship with other concepts such as business continuity or innovation
P2: Collaboration and building partnerships P2.1 Academic involvement P2.2 Collaboration P2.3 Coordination between different government parties P2.4 Partnership P2.5 Research centres	5.3 Understanding the influencing context	In ISO, collaboration is associated with achieving the organization's purpose and vision through understanding, collaborating, and strengthening of relationships with relevant interested parties
P3: Engaging the society and the public sector employees P3.1 City resilience P3.2 Crowd management P3.3 People engagement P3.4 Society P3.5 Young generation P3.6 Wellbeing	5.5 A Culture supportive of organizational resilience	Engagement in ISO is part of building the culture of supporting organizational resilience and there are limited details except a general statement: "engage people at all levels to promote the organization's values"
P4: Understanding the evolving role of the public	5.3 Understanding and influencing context	There is a general statement in ISO about "the ability to think

484

sector and define determinants of future transformability P4.1 Business model P4.2 Competition P4.3 Traditional thinking of governments P4.4 Government Structure P4.5 The public sector in future	P2: Understanding of an organization's context P1: Shared purpose and vision	beyond current activities, strategy, and organizational boundaries"
P5: Promote systems thinking P5.1 Design for resilience P5.2 Dynamic P5.3 Systems P5.4 Government system testing P5.5 Hybrid P5.6 Public policy P5.7 Regulations P5.8 Public services	5.6 Shared information and knowledge	There is a general statement in ISO to ensure that knowledge is created, retained, and applied through established systems and processes.
P6: Sectors approach for better management of the public sector P6.1 Sectors P6.2 Interlinkages between sectors		There is a general statement in ISO organizational requirements to select performance measures on the basis of the sector in which the organization operates
P7: Collective understanding of the big picture P7.1 Big picture P7.2 Dimensions P7.3 Holistic view P7.4 Image or reputation P7.5 Layers P7.6 Resilience definition	5.2 Shared vision and clarity of purpose 5.3 Understanding the influencing context P1: Shared purpose and vision P2: Understanding of an organization's context	In ISO, this is covered through identifying strategic direction and a comprehensive understanding of internal and external environments
A1: Understanding external and internal context and the relationships A1.1 Uncertainties in general A1.2 Public sector uncertainties A1.3 Understanding uncertainties A1.4 Emergent events categories A1.5 Emergent event magnitude	5.3 Understanding the influencing context P2: Understanding of an organization's context	In ISO there is no concentration on emergent events and its relationship with building resilience
A2: Ability to anticipate A2.1 Monitoring A2.2 Anticipation tools A2.3 Anticipation capabilities	5.10 Ability to anticipate and managing change	Monitoring and assessment in ISO are embedded within a different clause under evaluating the factors that contribute to resilience
A3: Define response strategy A3.1 Response governance A3.1.1 Decision making formulation	P3: Absorb, adapt, and effectively respond to change	Define response strategy in terms of decision making, responsibility, communication, and responding are scattered in

A3.1.2 Responsibility to take action A3.1.3 Emergent event communication A3.2 Recoverability strategy	P4: Effective management and governance	different clauses in ISO and are not associated with a specific emergent event
A4: Building resilience capabilities A4.1 Resourcefulness A4.2 Robustness	5.7 Availability of resources P5: Diversity of skills, leadership Knowledge and experience	Although the ISO standard extensively cover resources, but does not focus on how to build robustness
A5: Building resilience capacities A5.1 Absorptive capacity A5.2 Adaptive capacity A5.3 Transformative capacity A5.4 Capacities in general	P3: Absorb, adapt, and effectively respond to change 5.7 Availability of resources	The ISO standard did not focus on capacity building except in one place under availability of resources "take appropriate decisions on resourcing and capacity, diversification, replication and redundancy to avoid single points of failure and respond to incidents and change, so that core services are maintained at an acceptable, pre-determined level". In addition, transformation in ISO is incorporated in effectively responding to change
A6: Learn and adjust A6.1 Going forward A6.2 Lessons Learned	5.6 Shared information and knowledge 5.9 Supporting continual improvement	Learning in ISO is defined in general, and it is not associated with a specified emergent event
A7: Resilience measurement A7.1 Resilience measurement A7.2 Maturity model	5.9 Supporting continual improvement	ISO requires having to monitor resilience performance against predetermined criteria in 5.9. Meanwhile, measurement in ISO is thoroughly discussed in clause number 6 which is evaluating the factors that contribute to resilience
A8: Enabling traits (Leadership, culture, cross-functional teams, trust, and mind-set) A8.1 Enablers A8.2 Barriers A8.3 Turn challenges into opportunities	5.4 Effective and empowered leadership 5.5 A Culture supportive of organizational resilience	ISO thoroughly discussed requirements for leadership and culture that support resilience building. The trust factor in ISO is having one dimension through having a trusted and respected leader and there is no mentioning of the mind-set.

The above table illustrates that mapping can be done between the developed framework and the

ISO 22316:2017 standard, and there are no key components that are missing. Accordingly, the

developed framework for resilience in the public sector is verified against one of the best

practices, and it can form a good reference for developing resilience in the public sector in the face of emergent events.

Chapter Seven: Conclusion

7.1 Introduction

This chapter illustrates the conclusions drawn out of this thesis. The first section of this chapter presents the objectives of this study and demonstrates how these objectives were fulfilled. Then the limitations of the study are summarized. Followed by the contribution of this thesis to the body of knowledge. Finally, further areas of research will be recommended for future studies.

7.2 Fulfilment of the research objectives

The following sections go through the objectives of the study and draw conclusions based on the previous chapters.

> ### *Objective 1: Systematic review of the literature to extract resilience characteristics and strategies applicable to the public sector.*

Based on the literature review, the following key conclusions were identified for resilience in general, and they were found to be applicable to the public sector:

Uncertainties sources: these sources are due to techno-socio-economic changing conditions (Hamel & Välikangas, 2003; Marston & Marston, 2018), and they are either external concerns such as innovative new technologies and new regulations (Kerr, 2015), or internal concerns due to turbulence coming from the existing infrastructure (Collier et al., 2016).

Anticipation ability: to be able to develop understanding of when a certain event aggregates to become an emergent event. The anticipation of potential disruptive events is critical to managing the disruption effectively or identifying new opportunities. Anticipation will require building future foresight capabilities (Aguirre-Bastos & Weber, 2018; Dufva & Ahlqvist, 2015;

Durst et al., 2015; Heiko et al., 2015; Ilmola & Rovenskaya, 2016) and scenario planning enhancement.(Hills, 2015; Ilmola & Rovenskaya, 2016; Sircar et al., 2013; Stewart & O'Donnell, 2007). The four resilience capabilities are robustness, resourcefulness, recoverability, and rapid recovery; Robustness represents the ability to maintain critical operations and functions in the face of crisis. Resourcefulness represents the ability to skillfully prepare for, respond to and manage a crisis or disruption as it unfolds. Recoverability represents the ability of the system to recover quickly and at a low cost from potentially disruptive events. Rapid recovery represents the ability to return to and/or reconstitute normal operations as quickly and efficiently as possible after a disruption (Kantur & Say, 2015).

The three resilience capacities are absorptive, adaptive, and transformative capacities. Absorptive capacity is the ability of a system structure or organization to absorb the impacts and maintain its function during disruptive scenarios (Zhao, Liu & Zhuo, 2017). Adaptive capacity is the capacity of actors in the system or organization to influence and manage resilience (Engle, 2011). Transformative capacity is required to do alterations in the function, structure or status of the system or organizations to cope with the enormous magnitude of change required (Béné et al., 2012). Furthermore, some scholars looked at the transformative capacity to make the crisis a window for opportunity through transforming at a smaller scale that is amplified to build resilience at a broader level to recombine sources of knowledge and experience and enable innovation to cross thresholds into newly developed trajectories (Folke et al., 2010).

Response strategy: responding to an emerging event is knowing what to do to respond to an internal and external disruptive event. Having a resilient response will require activating the 4Rs of resilience capabilities and the three resilience capacities within the response strategy (Hollnagel, 2015). While the knowledge captured within a complex system is important, what

489

is more important is the ability of the complex system to use that knowledge to develop a successful response strategy, and to adapt and learn from different experiences over time (Allen, Strathern & Baldwin, 2007).

Collaboration: sometimes, organizations cannot effectively respond to emergent events by themselves unless they collaborate with other stakeholders. The collaboration dimension is required when an organization does not have sufficient capacity to effectively respond to an emergent event unless it networks with other organizations or agencies (Allen, 2011).

Learning: represents the ability to learn from what has happened or being able to benefit from learning by experience. Monitoring represents the ability of organizations to effectively monitor the cycle of disruptive events to gain an understanding of how their performance is affected (Hollnagel, 2015; Patriarca et al., 2017).

Objective 2: Identify emerging events that are stressors for public sector organizations and map these events unto resilience strategies.

To accomplish this objective, the following conclusions were reached based on study findings:

Identifying emerging events facing the public sector

Although researchers usually link resilience with the occurrence of unexpected incidents like the global financial crisis of 2008, the outbreak of the Ebola virus between 2014 and 2016 (Barasa, Mbau & Gilson, 2018), and more recently, the COVID-19 pandemic (Liu, Lee & Lee, 2020); current trends shaping the future of nations, cities, and organizations include big data, internet of things, four industrial revolution, global tensions between key players' countries, artificial intelligence, etc. These trends are forcing organizations, cities, and nations to build better readiness in the face of fast-evolving new uncertainties associated with these trajectories.

Within the same context, the findings of this study showed that the public sector is surrounded by uncertainties related to political, economic, social, technological, environmental, and legal areas. Furthermore, study findings highlight advancements in technology, including cybersecurity threats, as the main source of uncertainty in the public sector.

Emergent events in the public sector can be generally categorized based on their likelihood or the magnitude of their effect and impact on the public sector. In all cases, the public sector should use impact assessment tools to estimate the magnitude. The magnitude can also be assessed based on the people affected and based on the financial and technological implications. When addressing the people affected, the public sector is guided by the Maslow pyramid of needs which suggests that emergent events that affect the basic needs of the people should are more critical and should receive priority attention.

Study results also show soft parts of the internal context like the silos mentality, using the same tools, and the mindset of people may affect effectively addressing uncertainties in the internal context. For the physical parts, uncertainties in the public sector could come from the infrastructure or the existing systems.

Mapping the emergent events into resilience strategies

The resilience strategies are based on the three resilience capacities, which means that the public sector's resilience strategy can either be more absorptive in nature, more adaptive in nature or more transformative in nature. The absorptive strategy requires using the absorptive capacity more than the adaptive and transformative capacity, the adaptive strategy requires using the adaptive capacity more than the absorptive and the transformative, and the transformative capacity requires using the transformative capacity more than the absorptive and the adaptive. Figure 7-1 illustrates the difference between the three strategies.

491
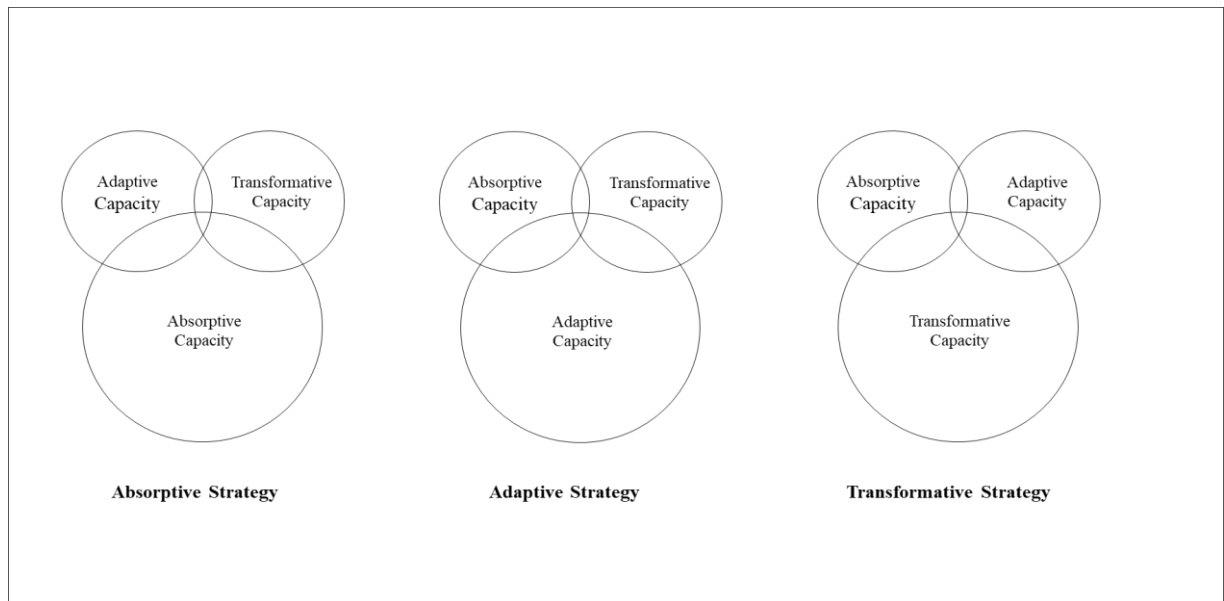
Figure 7-1: An illustration of the difference between absorptive, adaptive, and transformative strategies.

Selecting which strategy to follow depends on many factors and the complicated relationships that exists between them. These factors include the emergent event, current systems, capabilities, culture, leadership, people, preparedness, vulnerability level, sensitivity level, bureaucratic structure, networking ability, time to recover, mind-set, and resilience capabilities of the public sector. Selecting a resilience strategy also depends on the level of overlap and interactions between the three resilience capacities. The following are recommendations of when to use each of the three strategies based on findings from the interviews:

1- Absorptive strategy: the public sector should focus on this strategy when facing an emergent event that was not expected or an emergent event that is multi-dimensional. In addition, this strategy is more suitable when the public sector has a bureaucratic structure, and the level of readiness or preparedness is low. It is also the preferred strategy when sensitivity is high and there is limited diversification of resources and skills and networks.

2- Adaptive strategy: the public sector should focus on this strategy when a long time to recovery is expected. This strategy can be used when facing an expected or non-expected emergent event with a high magnitude. This strategy is also applicable if the public sector is looking only to bounce back or recover normal operations. Furthermore, the public sector can use this strategy if it needs to make adjustments to ensure flexibility to live with an emergent event.

3- Transformative strategy: the transformative strategy is associated with inspired leaders who can transform challenges into opportunities and is intended to yield positive recoverability or bouncing forward. Furthermore, selecting a transformative strategy will depend on having the same emergent event that continues to reoccur, which require the public sector to think of new ways for transformation to a new normal. The transformative strategy is associated with network-centric organizations that build strong networks with other stakeholders (Allenby & Fink, 2005). The transformative strategy will require a high level of diversification in resources and sectors diversity. It is also associated with a public sector that has a high level of engagement with society and the employees, has a high ability to crowdsource or develop innovation platforms that can translate individual ideas into action. The transformative strategy is also associated with a public sector that has high technological readiness and can revise policies and legislations or introduce new ones in a short time.

Objective 3: Develop and validate an adaptive framework to imbue resilience into the decision- making process of public sector organizations when faced with disruptive events.

To accomplish this objective, the following conclusions were reached based on study findings and the proposed framework. The framework in the previous chapter is developed based on four resilience concepts, three levels, seven principles and eight attributes. The framework also includes the outcome of three resilience strategies, as concluded in the previous section. Figure 7-2 below illustrates the resilience framework for the public sector, including all components.
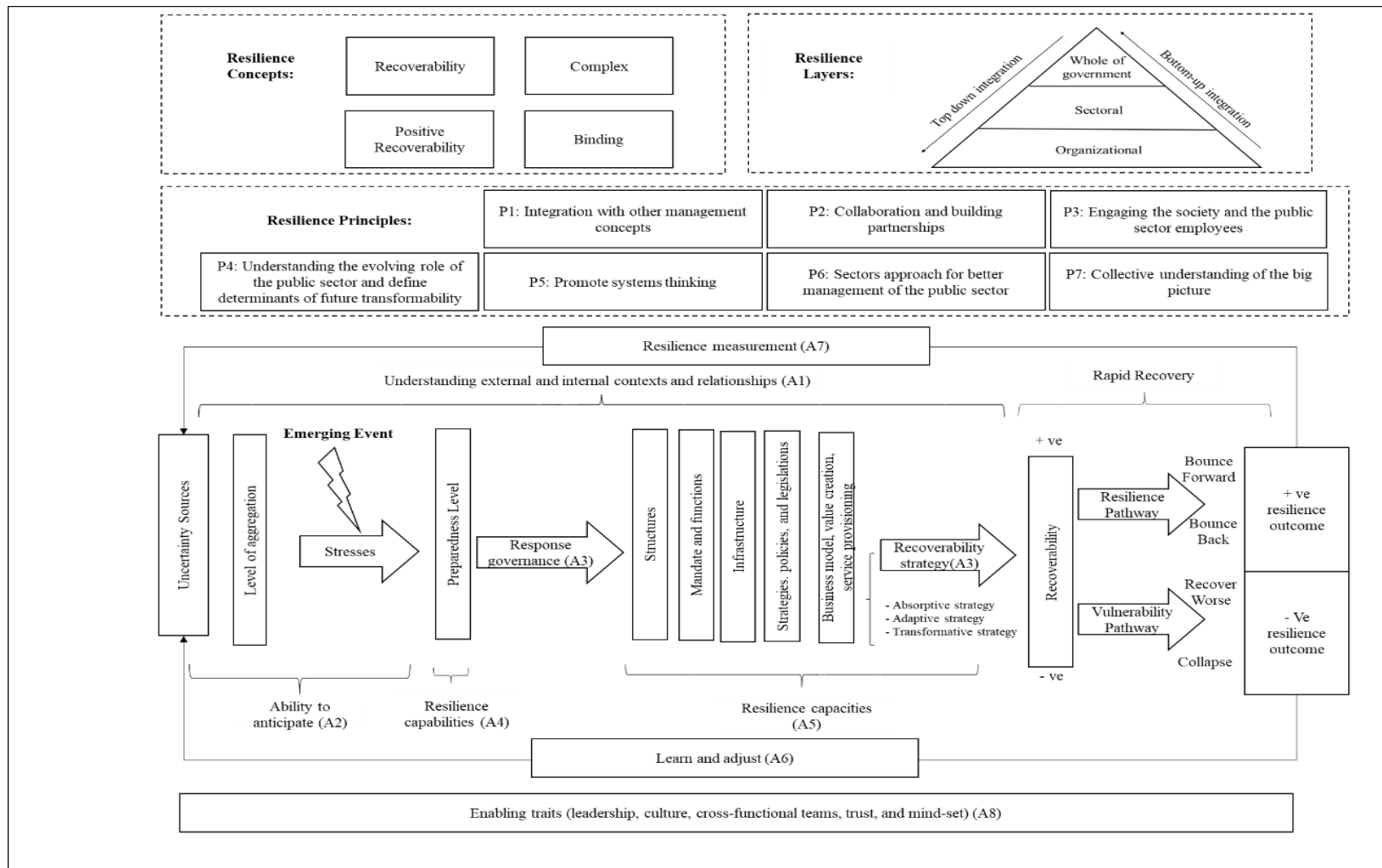
Figure 7-2: The developed resilience framework for the public sector including all components

The proposed framework starts with uncertainties sources. These sources are due to techno-socio-economic changing conditions, and they are either external concerns such as innovative new technologies and new regulations or internal concerns due to turbulence coming from the existing infrastructure. Building resilience in the public sector requires developing the ability to anticipate and monitor and events to recognize when certain emerging events evolve and become disruptive. The ability to anticipate potentially disruptive events is critical to managing the disruption effectively or identifying new opportunities. This anticipation will require building foresight capabilities or enhancing the ability to predict and respond to future scenarios.

As an emergent event becomes a reality, it will challenge all the existing systems and preparedness that the public sector has acquired. This will challenge the robustness and resourcefulness of the public sector's resilience system, including its structures, mandates, functions, infrastructures, strategies, policies, legislations, business models, value creation, and the provision of public services. When facing an emergent event, the public sector should start with building response governance to define the decision-making process, assign responsibilities to deal with the emergent event, and define the communication plan. This can then be followed by a recoverability strategy that may include one or all of the following three options: absorptive strategy, adaptive strategy, and transformative strategy. Deciding which strategy to choose depends on the emergent event itself, the perceived level of vulnerability, the systems in place, the developed capabilities, the developed capacities, and the leadership intentions- either to bounce back or bounce forward. Based on the response strategy, the public sector either follows the resilience pathway or follows the vulnerability pathway. The resilience pathway may lead to bouncing forward (positive recoverability) or bouncing back (recoverability), while the vulnerability pathway represents a scenario in which though the

public sector recovers from the event, but it ends up in a position that is worse than before the event. During and post an emergent event the public sector should monitor performance and measure resilience and it should go through the proper learning process to adjust and continually improve.

Resilience concepts

The framework comprised four resilience concepts: recoverability, positive recoverability, complex, and binding. The two concepts for recoverability and positive recoverability are represents the resilience pathway in the figure above as the other pathway, which is the vulnerability pathway, will not be considered as it is not a desirable outcome. The recoverability concept is associated with bouncing back, representing recovery to the previous status before having the emergent event, while the positive recoverability concept is associated with bouncing forward to a status that is better than the previous status before the emergent event. The third concept, which is the complex concept, illustrates that resilience is associated with the complexity theory. It indicates that emerging events are of a complex nature and the response strategy is also of a complex nature as is often has to take a lot of complicated interactions into consideration. The fourth concept is the binding concept which illustrates the relationship between resilience and management concepts like risk management, business continuity, disaster recovery, agility, antifragility, foresight, and many others.

Resilience layers

Resilience in the public sector comprised of three levels: the whole of government, sectoral, and organizational. The first level -the whole of government level- represents the central entity responsible for strategic planning, developing policies and regulations, and systems governance. The second level -the sectoral level- represents specific aspects of the public sector

such as the economy, education, and health. The third level -the organizational level- represents the public sector organizations that are responsible for providing public sector services based on their mandates. In addition, to develop a resilience framework for the public sector both top-down and bottom-up integration should be activated to ensure effectiveness and efficiency, and to minimize duplications. This will also help to ensure proper governance when faced with an emergent event.

Resilience attributes

There are eight attributes for resilience in the public sector. These are A1: Understanding external and internal contexts and relationships, A2: Ability to anticipate, A3: Response strategy, A4 Resilience capabilities, A5: Resilience capacities, A6: Learn and adjust, A7: Resilience measurement, and A8: Enabling traits.

A1: Understanding internal and external contexts and relationships

The public sector needs to collectively understand the internal and external contexts not only to survive but also to excel and thrive in a very complex world. The public sector should strive for tools to deal with uncertainties and should not be comfortable with the status quo. This is to ensure the future welfare of the society considering that the rules of competition are changing as there is increasing competition between public sectors of different countries to attract talents and investors. When it comes to emergent events, the public sector should carefully choose tools to identify emerging events and should have a consensus on the proper impact assessment tools with which to evaluate the magnitude of the impact of emergent events. There should also be a collective understanding of how to deal with emergent events and how to utilize the opportunities that may emerge out of them.

A2: Ability to anticipate

Ability to anticipate is based on people, tools, and decision-makers who should utilize the anticipation information in making the proper decisions. The public sector should ensure integration of anticipation information across all three levels of the public sector by having a centralized hub where all the information is integrated and is well visualized.

A3: Response strategy

The response strategy comprises of two stages: response governance and recoverability strategy.

1. Response governance

Formulating a decision to face an emergent event is not an easy process as it involves the consideration of many factors. The public sector should engage various parties in the decision formation process. Meanwhile, decision making should take into consideration the interests and well-being of the public. However, since public interests may vary as there are no unified public interests, decision-makers will need to base their decisions on the situation itself. Furthermore, regarding the assigning of decision-making responsibility, study findings show that the cross-functional team structure is the best alternative to face an emergent event. However, this choice is based on the type of emergent event, and the organizational culture. Finally, communication management during an emergent event should be associated with certain communication protocols specified for the event itself to ensure timely provision of the right information to relevant stakeholders.

2. Recoverability strategy

A recoverability strategy should include prioritization and quick-wins and should be designed to fulfil people's expectations. Any recovery strategy should maintain balance between the

various parameters that represent aspects of the organization's operation and should consider implementing the 80-20 role to be more focused. The research identified three key strategies to be used based on multiple situation assessment (Absorptive, adaptive, and transformative).

A4: Resilience capabilities

Resourcefulness and robustness represent the capabilities of the public sector to build resilience. Resourcefulness in the public sector requires keeping financial reserves and maintaining the skill set of employees who may be needed in case of an emergent event. On the other hand, robustness requires incorporating parameters in designing processes and systems to strengthen them as part of readiness to face an emergent event. The results highlight one key argument about the need to balance resilience and efficiency while addressing key challenges of the public sector in future.

A5: Resilience capacities

The public sector should focus more on absorptive capacity as it is the first line of defense against the impact of emergent events. Demonstrating this capacity to absorb the initial shock from a disruptive event will help the public sector retain the trust of society. However, there is a dynamic relationship between the absorptive, adaptive, and transformative capacities and the emergent event. This will require choosing between absorptive, adaptive, and transformative strategies as the proper response strategy based on the emergent event and based on the current situation in the public sector when the emergent event occurs.

A6: Learn and adjust

Making adjustments is highly dependent on the ability to learn. The traditional ways of sharing lessons learned seem to be outdated. The public sector should develop proper mechanisms of

effective sharing of knowledge across the whole of the government and to remove barriers to the learning process.

A7: Resilience measurement

Measuring resilience in the public sector can be done through measuring the cost, impact, and recovery time of an emergent event. There should be integrated measures for resilience at the public sector organizational level, at the sectors level, and at the whole of the government level. Furthermore, measuring resilience in the public sector can be based on resilience capabilities and resilience capacities. In addition, it is important to have resilience measures related to the ability to grasp opportunities that may emerge out of an emergent event. Finally, having resilience maturity model in the public sector seems to be feasible only to assess readiness maturity.

A8: Enabling traits

The most important enablers of resilience in the public sector are leadership, culture, teamwork, trust, and an open mind-set. However, bureaucracy seems to be the most significant barrier preventing the public sector from becoming more resilient. Whenever the public sector needs to overcome barriers, it should give more consideration to practical solutions and quick wins rather than trying to go into complicated processes of transformation, which may lead to further complications on the path towards achieving resilience.

Resilience principles

There are seven principles for resilience in the public sector. These are P1: Integration with other management concepts, P2: Collaboration and building partnerships, P3: Engaging the society and the public sector employees, P4: Understanding the evolving role of the public

sector and define determinants of future transformability, P5: Promote systems thinking, P6: Sectors approach for better management of the public sector, and P7: Collective understanding of the big picture.

P1: Integration with other management concepts

Resilience overlaps with many other concepts such as agility, business continuity, risk management, fragility, and flexibility. This overlap is expected to persist due to the lack of a standard definition for resilience or its boundaries. The same is applicable to other management concepts. The public sector should have an overall governance system for all these concepts in order to integrate its efforts and avoid any conflicts or duplications.

P2: Collaboration and building partnerships

To be resilient, the public sector needs to build collaboration and partnerships with academic institutions, research centers, international organizations, the public sector in other countries, the private sector, and other stakeholders. Meanwhile, collaboration among the public sector organizations and between sectors should be maintained to ensure better resilience outcomes.

P3: Engaging the society and the public sector employees

People engagement should be designed to fulfil requirements for having a resilient city. Aspects of people engagement include crowd management, evaluating crowdsourcing options, engagement with public sector employees, and engagement with all segments of society, especially the younger generation.

P4: Understanding the evolving role of the public sector and define determinants of future transformability

To build resilience in the public sector, there should be a proper understanding of the current role of the public sector and how it will evolve in future. This requires challenging the current structures, tools and approaches the public sector currently uses, and developing advanced techniques like what successful private sector companies are currently using.

P5: Promote systems thinking

Resilience means having the proper systems in the right place when facing an emergent event. This implies that the public sector should properly design its systems to be more resilient. Furthermore, the public sector should pursue a better understanding of the dynamic nature of systems and conduct proper testing of these systems before implementing them. Furthermore, the public sector needs to understand hybrid systems and defining the relationships between different outcomes of the public sector (Public policies, regulations, and public services).

P6: Sectors approach for better management of the public sector

For the public sector to be more resilient, there should be a focus on understanding the needs and requirements of different sectors and having diversification across sectors in addition to sharing information and expertise. This will ensure effective coordination of the response strategy when an emergent event occurs.

P7: Collective understanding of the big picture

The public sector should embrace a big picture perspective to building resilience. This will require a proper understanding of the mission of the public sector and its ability to understand complex dimensions and layers associated with facing an emergent event.

7.3 Framework validation

The developed framework for resilience in the public sector was verified against the ISO 22316:2017 (Security and resilience – Organizational resilience – principles and attributes) to ensure that the key components of the developed framework align sufficiently with best practices contained in the ISO 22316:2017 standard. The results of mapping showed full coverage of the key components as represented in the following Figure (Figure 7-3).
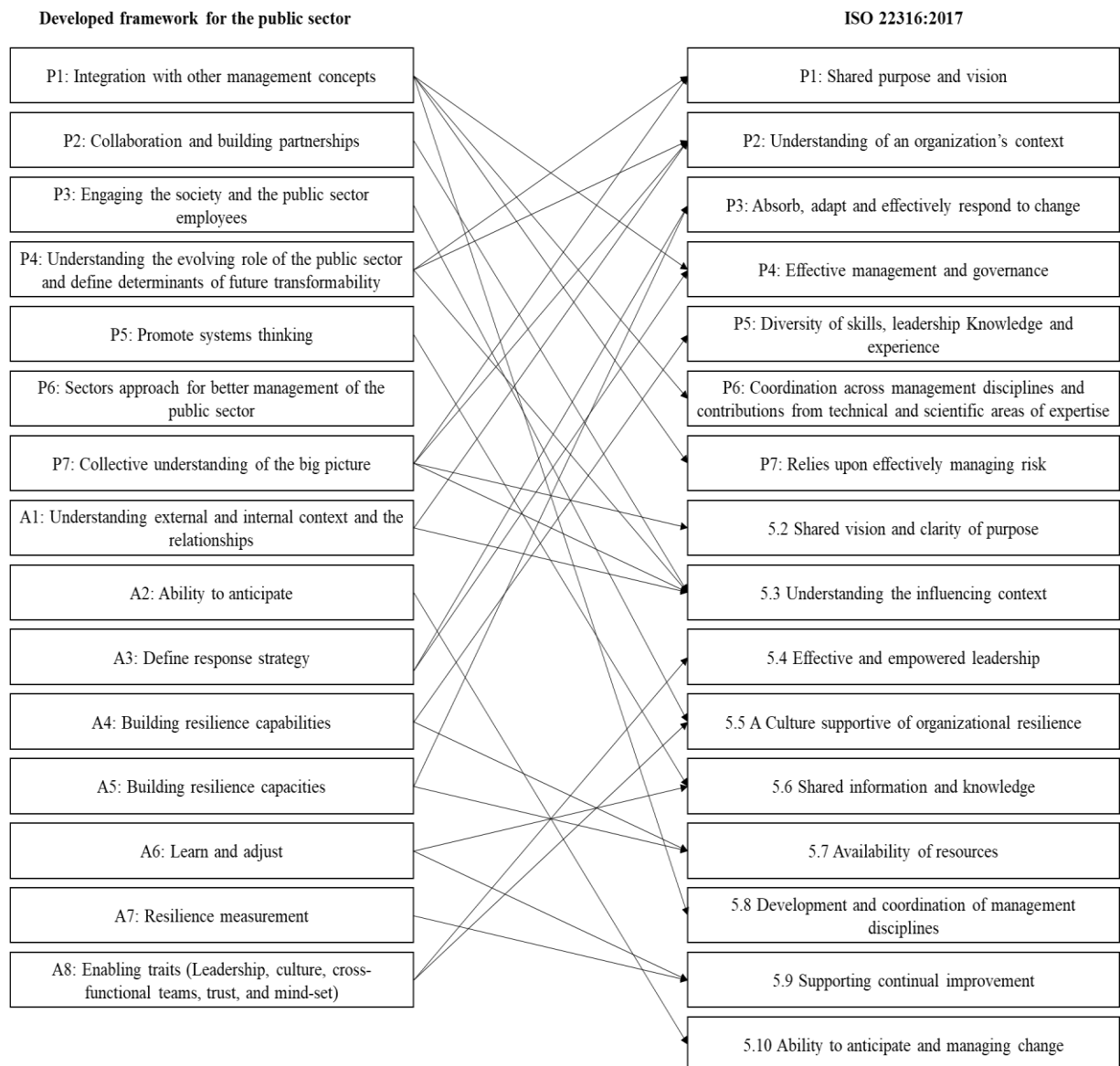
Figure 7-3: Mapping of the developed framework for resilience in the public sector against ISO 22316:2017 standard

504

7.3 Framework applicability to UAE public sector

The successful application of research outcomes in practice requires three core elements: 1) the level and nature of the evidence, 2) the context or environment into which the research is to be placed, and 3) the method or way in which the process is facilitated. Evidence encompasses codified and non-codified sources of knowledge, and this is reflected through the method of the study, where an exploratory qualitative study design is used to examine currently available data on the concept of resilience from the perspective of multiple researchers and disciplines Kitson, Harvey & McCormack, 1998). These data are aggregated into a conceptual model used to guide participant selection, data collection, and data analysis. Purposeful sampling was used to select study participants where a total of 37 participants with professional experience working in public sector organizations within the UAE are recruited into the study. Semi-structured interviews were used for data collection. Interviews are conducted using an interview guide developed based on the currently available evidence in the literature about organizational resilience. The interview guide and interview procedure were pilot-tested and validated before use in the actual data collection process for the study. Interview audio recordings are transcribed using proper techniques and transcripts are checked against the audio files by the researcher to ensure that the transcription is accurate. Data Coding and analysis were done using NVivo software (Version 13). Thematic analysis was conducted to draw discussion and drive conclusions. Validity checks like member-checking and researcher reflexivity were conducted to improve the quality of the overall research. A conceptual framework incorporating four resilience concepts, seven principles, and eight attributes of building resilience in the public sector emerged from the data. Also included in the framework are outcomes of three core resilience strategies that can be used by public sector organizations.

The context or the environment within which research findings are to be implemented is the UAE public sector. It can be generalized and customized to fulfil the requirements of public sectors in other countries taking into consideration the specific typology of the public sector that is changing from a country to another. In UAE, and as discussed in Chapter 1, the public sector consists of Federal authorities, Local authorities, and other owned governmental organizations. It is of a complicated nature that requires a lot of coordination, communication, and proper responsibility definition while facing an emergent event, especially at a national level. This is due to some overlap between the responsibilities of the Federal and Local levels and the large number of ministries at the national level and the public sector organizations at the local level. Accordingly, this requires strong national-level leadership and coordination that is evidenced through the implementation of the national UAE agenda and The UAE Centennial 2071 (UAE Government, 2021; UAE Vision 2021, 2020). Maintaining this strategic momentum will require UAE to have an advanced role of the National Emergency, Crisis and Disasters Management Authority (NCEMA) at the national level or the Supreme Committee of Crisis and Disaster Management at Dubai level as there should be some advancement in providing solutions to existing challenges such as COVID-19 or future challenges such as cybersecurity challenges for the future IT infrastructure, besides the current overlapping structures and multi responsibilities mandates and systems.

Facilitating the implementation process of the developed framework will require first conducting a gap analysis report to identify the existing tools and practices the public sector in UAE is using to understand the evolving role of the public sector and to anticipate the emergent events and how anticipation information is communicated among different public sector entities and levels. The gap analysis should also include identifying and analyzing the existing systems such as business continuity, disaster recovery, and risk management in the public sector used

506

to manage an emergent event and the relationship between them. The second step is to develop case studies based on the developed framework key components to illustrate how the public sector in UAE previously managed previous emergent events; this should include how the public sector previously collaborated with external stakeholders such as research centres and academic institutes and how the public sector previously engaged society and public sector employees. Finally, before putting the framework into implementation, it can be piloted to two or three public sector organizations to examine the framework applicability and the lessons learned to generalize the framework.

Implementing the framework will require the UAE public sector to integrate and standardize information related to anticipating an emergent event across the public sector. The other important factor is to develop mechanisms for responsible governance and recoverability strategy by mapping resilience strategies unto emergent events as discussed previously in this Chapter in section 7.2.2.1. The public sector should build resilience capabilities and capacities to build readiness to face an emergent event and should think of integrated platforms to share lessons learned after an emergent event. There should also be a definition of resilience KPIs other than the normal efficiency and effectiveness measures the public sector uses to ensure proper measurement of resilience capabilities and capacities proper management of an emergent event. Furthermore, the public sector in UAE should define the type of leadership and culture that will enable resilience and should look at the proper mechanisms to build trust and an open mindset for different stakeholders.

The most important benefit of implementing the developed resilience framework is to have a collective understanding of the public sector of what is required to work together to manage an emergent event. The framework encourages a new paradigm of thinking in the public sector on how to move from competition between organizations to an integrated collaborative mode of

thinking to develop a centralized hub of information generation and exchange. The framework encourages building an initiative culture as it is not necessary to wait for instructions to contribute to solutions but to think about being initiative in contributing to resolving the situation.

Implementing the framework will upgrade current KPIs used in the public sector, which currently focuses on the efficiency and effectiveness of individual public sector organizations to include resilience KPIs that reflect how each entity participates in managing emergent events that are of a national or cross-sectional nature. This framework will also enable integration of different management systems under a resilience umbrella and will encourage building partnerships and engaging society to participate in putting solutions. It is also introducing the concept of how the public sector can turn challenges into opportunities, promote systems thinking and collective understanding of the big picture. Other benefits will include uplifting the normal thinking of responding to an emergent event from normal disaster recovery and business continuity point of view that are focusing on retrieving the previous performance into an advanced stage where the public sector is also thinking about the new normal that may emerge after facing an emergent event.

7.4 Limitation of the study

This study has two limitations which are listed below:

The first limitation is associated with the applicability of the developed framework on other UAE emirates rather than Dubai, and countries other than the UAE. Most of the selected interviewees have most of the public sector experience in Dubai. Some of the interviewees have earlier experiences in other Emirates, such as Abu-Dhabi and Ajman. While others have earlier public sector experiences in Saudi Arabia, Jordan, and Egypt. This limits the applicability of

the developed framework to other Emirates and other countries. It may be necessary to revise the framework to make it better customized to the structure and nature of the public sector in other countries (Fusch & Ness, 2015).

The second limitation is associated with the validation of the resilience framework for the public sector. The framework was verified by mapping it against the ISO 22316:2017 standard to ensure the incorporation of main components of resilience. However, the ISO 22316:2017 is a general document for organizational resilience that can apply to any organization. Meanwhile, validation of the public sector resilience framework could have been better achieved using case studies or focus groups (Bryman, 2016; Eisenhardt, 1989). Meanwhile, due to the limited time of this study and the limited resources, the verification against ISO 22316:2017 is considered to fulfil the study requirements. Further research is needed to validate the framework should be conducted in future studies.

7.5 Contribution to the knowledge

The following are key contributions of this study to the body of knowledge.

- A theoretical framework for resilience was developed based on the literature review. This framework identified the relationships between uncertainty sources, emergent events, resilience capabilities, resilience, capacities, resilience measurement, collaboration, and resilience engineering principles (monitor, anticipate, respond, and learn). This theoretical framework provides a concise summary of the many theories, models and definitions that undergird resilience research. It also captures perspectives from multiple fields like psychology, ecology, engineering, and management science which makes it a robust tool to guide efforts by public sector organizations to build resilience. This is because the operations of public sector organizations have aspects

that are based on these foundational disciplines. For example, developing the human component of these organizations often require training that is based on psychology. Also, decision making and strategy development use principles in management science and designing the work environment of these organizations for effective performance use principles of ergonomics that are rooted in ecology and systems engineering. Therefore, it makes sense that any theoretical framework that will be used to build resilience in the organization should capture and reflect all these aspects.

- Guided by this theoretical framework, the study obtained insights from professional experts in the public sector through semi-structured interviews to propose a framework for public sector resilience. This framework was validated by mapping it against ISO 22316:2017. Validating the framework against an established quality standard implies that the theoretical framework can be used to drive the development and implementation of best practices in the public sector. This increases confidence in the suitability of the framework for use in the public sector as there is currently no theoretical framework for building resilience in public sector organizations, especially the UAE public sector.

- This study specifies resilience concepts, principles and attributes related to the public sector, and it covers the three layers embedded within the whole structure of the public sector. However, bringing all these components together into one comprehensive framework provides a holistic understanding of resilience in the public sector. Again, this is an important development considering the lack of consensus on a definition of resilience among researchers even though the concept has been studied extensively in many domains. Furthermore, by mapping existing knowledge from other domains into the framework, this study created a new domain for resilience research, which is the domain of resilience in the public sector.

- The developed framework opens new perspectives to use the three capacities (absorptive, adaptive, and transformative) as core elements to build resilience in the public sector and to define associated response strategies to deal with any emergent event. According to the amended theoretical model, these three capacities mediate the link between response governance and recoverability. How well an organization will recover, either bounce back or bounce forward, from an emergent event depends on the response governance. Response governance is about effective leadership in the face of disruptions, but an effective leadership response that will transition the organization out of the chaos requires skilful application of the three resilience capacities. In the context of public sector organizations, this study established that the three capacities have equal importance, and a dynamic approach to the application should be adopted. New perspectives regarding the use of these three capacities include thinking at the system level, where all three capacities are deployed by leadership to achieve necessary changes in structure, functions, policies, and business model to drive recovery. For example, good emotional skills (absorptive capacity) are needed to remain calm when faced with an emergent event. This is a crucial first response that leaders must demonstrate as poor emotional skills can lead to rash reactions, which can dampen the staff and team's morale. Having secured the confidence of the staff, the organization can quickly shift gears to making changes to structures and functions through strategy development and policies. However, good people skills (adaptive capacity) are needed to mobilize the staff to implement these changes. A motivated staff makes for an agile response to the emergent event, which implies that people are alert to recognize opportunities even amid chaos (transformative capacity). These new insights are fed back to leadership and are used to inform policy changes to enhance the overall response strategy. The significant

511

contribution of the theoretical framework here is that these capacities are not used sequentially or in a stand-alone fashion like is done in other domains; rather, they are to be used concurrently when it comes to building resilience in the public sector.

- The study highlighted the need to reconsider using new key performance indicators related to resilience in the public sector besides the efficiency focus indicators and other indicators that the public sector is currently using.

- This study showed that resilience is not a passive, reactionary attribute of organizations that enable them to survive a disruptive event. Rather, building resilience includes taking proactive steps to monitor, anticipate, and possibly predict emergent events. This is in line with developing trends in research that has provided evidence that organizations can play an active role in shaping their future by acquiring the capacity to learn from their own experience or the experience of other organizations that have had to deal with disruptive events. By actively curating this body of knowledge, public sector organizations can better manage uncertainties, especially those that are epistemological in nature (known unknowns). The organizational memory acquired can be leveraged to respond effectively when faced with ontological uncertainties (unknown unknowns). This capacity for monitoring and anticipating emergent events to ensure that public sector organizations thrive positions building resilience as an advancement to disaster recovery, crisis management, risk management, and business continuity practices (Florin & Linkov, 2016; Hillman, 2013). This unique contribution is reflected in the theoretical model by the construct learn-and-adjust, which spans the entire spectrum of resilience development from sources of uncertainties to resilience outcomes (Figure 6-4)

7.6 Suggested areas for future research

The proposed resilience framework provides a basis for addressing resilience in the public sector. However, there are a lot of areas for future research that should be investigated further. Some of the already addressed areas that were highlighted in this study are listed below:

- There is a need to investigate more about the relationships and differences between specific concepts used to explain building readiness to face emergent events. These concepts include resilience, agility, and antifragility. Furthermore, there are a lot of interactions between resilience management, risk management, and business continuity systems that need further research to investigate how these systems integrate with each other.

- Building resilience in the public sector requires building resilient strategies, policies and legislations. However, there is a need to elaborate more on how we can have a resilient strategy, or policy, or legislation in the public sector. This may include further studying of the same for a specific sector such as health or economy.

- Further research should be done to demonstrate government structure characteristics, including the hybrid structure of public sector organizations and its relationship with building resilience. The same is applicable when investigating how the mandate of public sector organizations could affect building resilience.

- Society engagement through crowdsourcing seems to have a good potential in better building resilience in the public sector. More research should be conducted to define this relationship and the different crowdsourcing mechanisms in the face of various emergent events.

- Turning challenges into opportunities seems to be a difficult task to be proved in the public sector. More investigation through case studies for public sector organizations is required to show tangible results of how this concept can be validated.

- The need to investigate the validity of the efficiency measures in the public sector while facing an emergent event. Efficiency measures form the yardstick for judging the success of any public sector organization, and this is not necessarily true in the time of crisis.

- There is a need to study the relationship between an emergent event and the current systems embedded within the public sector in a more dynamic way as current research is focused on the static relationship. Meanwhile, studying static relations may not fully capture the import of accelerating changes in the surrounding environment.

- Customization of anticipation tools to fulfil the needs of the public sector needs more study as a lack of consistency in the tools used will yield poor outcomes.

- The proposed framework for resilience in the public sector needs further validation, as explained in section 7.3. This implies opening doors for researchers to test and validate the framework and study how it can be improved further.

- There is a need to validate the proposed relationships between the different attributes in the model and resilience in the public sector by conducting quantitative hypothesis testing.

- Studying the attributes associated with the absorptive, adaptive, and transformative capacities in the public sector need further investigation.

- Investigating how new technologies can be used to build resilience in the public sector is also an area of future research.

- Technology and connectedness were identified by interviewees as significant to building resilience in the public sector. However, the researcher recognizes that these can mean different things to different people depending on factors like their worldview, their professional background, etc. As such, there was no agreed upon definition for these terms between the researcher and the interviewees. This lack of a definition limits how precisely these concepts can be applied and incorporated into building resilience by public sector organizations. Further research is needed to define technology and connectedness, more specifically within the context of resilience.

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517

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APPENDIX I

Authors	Definition or main focus of organizational resilience.
(Eisenhardt & Brown, 1998)	A balancing factor between organizational stiffness and unstructured ambiguity.
(Sutcliffe & Vogus 2003, Vogus & Sutcliffe, 2007)	The maintenance of positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful.
(Hamel &Välikangas 2003)	A capacity for continuous reconstruction. It requires innovation with respect to those organizational values, processes and behaviors that systematically favor perpetuation over innovation.
(Fikse, 2006)	The capacity of an enterprise to survive, adapt and grow in the face of turbulent change.
(Lengnick-Hall, Beck & Lengnick-Hall, 2011)	The firm's ability to effectively absorb, develop situation-specific responses to and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten organization survival.
(International Organization for Standardization, 2017)	an organization could be considered resilient if it is able to continue its critical functions at least in the Minimum Business Continuity Objective (MBCO) level within the Maximum Tolerable Period of Disruption (MTPD) after any disruption.
(d'Errico & Di Giuseppe, 2018)	the capacity to bounce back after a shock; the capacity to adapt to a changing environment; and the transformative capacity of an enabling institutional environment
(Lee, Vargo & Seville, 2013)	It is a function of two factors: adaptive capacity and planning.
(UK Department for International Development, 2016)	Having the following capabilities: absorptive, adaptive and transformative.
(Ilmola & Rovenskaya, 2016)	Awareness, adaptation, agility and active learning. It is not only bouncing back, but also bouncing actively forward.
(Kolay, 2017)	McManus (2008) defines organizational resilience as a function of an organization's overall situation awareness, management of keystone vulnerabilities and adaptive capacity in a complex, dynamic and interconnected environment.
(Kolay, 2017)	Is characterized using notions of bouncing back robustness, absorption, and surviving and thriving.
(Kolay, 2017)	The ability to respond to various disturbances and to regular and irregular threats, the ability to flexibly monitor what is going on, the ability to anticipate disruptions, and the ability to learn from experience.
(Kolay, 2017)	The capacity to withstand sudden change in the environment, and continue to survive and grow.
(Kantur & Say, 2015)	The resistance capacity of the organizations to withstand against unfavorable and stressful conditions, as the capacity of the organizations to preserve their position and as the capacity to benefit from unfavorable conditions and to benefit from them.

(Kantur & Say, 2015)	Not only have reactive and proactive innovations but also anticipatory innovations where buyer preferences are anticipated and innovations are developed accordingly.
(Kantur & Say, 2015)	A positive state that every organizational aims to achieve.
(Kantur & Say, 2015)	rigidity, transience, adaptability and vulnerability.
(Kantur & Say, 2015)	Robustness, redundancy, resourcefulness and rapidity.
(Xiao & Cao, 2017)	The capacity of a company to over time become a selected variation in the marketplace
(Xiao & Cao, 2017)	The abilities to monitor, to anticipate, to respond and to learn.
(Xiao & Cao, 2017)	Reliability, efficiency and change capacity.
(Kerr, 2015)	The ability of the organization to prosper year on year in a dynamic interconnected world.
(Kerr, 2015)	Adaptive, agile, robust and competitive – harnessing the experience and embracing the opportunity to pass the test on time.
(Kerr, 2015)	It is intrinsic to an organization's ethos and provide a common platform and shared an understanding for adapting to a dynamic business environment.
(Kerr, 2015)	A resilient organization is one that not merely survives over the long term but flourishing – passing the test of time.
(Kerr, 2015)	Reaches beyond risk management towards a more holistic view of business health and success.
(Kerr, 2015)	An effective short-term business as usual capability, the medium-term ability to change and adapt; and the long-term ability to actively shape the environment of the organization. Arguably, there is also a fourth level which is the ability to shape the environment positively outside one's own organization.
(Kerr, 2015)	Continually achieved over time through a number of elements, including ongoing relationships and interactions with all stakeholders. It is not a one-off exercise.
(Nussbaum, 2016)	Robustness, resourcefulness, rapid recovery, absorption.
(Alrob & Jaaron, 2018)	A function of the overall situation awareness, keystone vulnerabilities and adaptive capacity of an organization in a complex, dynamic and interrelated environment.
(Alrob & Jaaron, 2018)	Adaptive capacity, planning.
(Olivos, 2014)	To absorb disturbance and reorganize while undergoing change.
(Olivos, 2014)	a critical step towards developing an organization able to ride the waves of change.
(Olivos, 2014)	Managing the Unexpected.
(Olivos, 2014)	The capacity for resisting, absorbing, and responding, even reinventing if required, in response to fast and/or disruptive change that cannot be avoided.
(Tracey, 2015)	The capability and the ability of an organization to return to a stable state after experiencing displacement.
(Rudrajeet, 2013)	to engage and utilize effectively the key resources and assets (financial, material, social, networks) by developing dynamic capabilities (strategic and operational flexibilities, redundancy,

	robustness) and organizational learning (culture, employee wellbeing, attentive leadership and decision-making).
(Meng et al., 2019)	The positive psychological capacity to rebound, to bounce back from adversity, uncertainty, conflict, failure or even positive change, progress and increased responsibility'.
(Patriarca et al., 2017)	Can be described as a combination of four cornerstones: monitoring, responding, learning, and anticipating.
(Carayannis et al., 2017)	Innovation is a documented enabler of resilience and robustness.
(Koronis & Ponis, 2018)	The cultural capacity of an organization to make sense of risks and negative events, to absorb the pressure and ultimately protect the organization's social capital and reputation.
(Koronis & Ponis, 2018)	Preparedness, responsiveness, adaptability and learning.
(Duit, 2015)	A more holistic, robust, inclusive, and responsive.
(Duit, 2015)	Able to maintain its function during a crisis, maintained structure and integrity of the organization throughout the crisis, the function and structure is maintained during the crisis and when successful recovery to a state of normalcy follows after the crisis, as well as direct and purposeful learning, lesson-drawing, and institutional and organizational reforms aimed at increasing future resilience.
(Stewart & O'Donnell, 2007)	Capacity to respond positively, or at least, adaptively to disruptive change.
(Stewart & O'Donnell, 2007)	Withstand external shocks, plus a capacity for adaptation and learning.
(Stewart & O'Donnell, 2007)	How to plan for the unexpected.
(Mafabi, Munene & Ntayi, 2012)	Organizational innovations as a gateway for knowledge management to build organizational resilience.
(Sawalha, 2015)	The ability to absorb shocks and external pressures and restore prior order.
(Sawalha, 2015)	Ability to take advantage of shocks and pressures to become stronger.
(Sawalha, 2015)	How quickly an organization returns to normal without incurring a major loss, damage or discontinuity.
(Sawalha, 2015)	The ability to *"bounce back"* following a crisis or disaster.
(Sawalha, 2015)	It is a deliberate effort to become better able to cope with future adversity
(Sawalha, 2015)	Identifying potential risks, developing early warning systems and taking proactive measures.
(Sawalha, 2015)	The decline, survive, bounce back and bounce forward.
(Sawalha, 2015)	Developing and maintaining a culture of resilience.
(Denyer, 2017)	The ability of an organization to anticipate, prepare for, respond and adapt to incremental change and sudden disruptions in order to survive and prosper.

(Denyer, 2017)	Defensive (stopping bad things happen) and progressive (making good things happen), as well as a division between approaches that call for consistency and those that are based on flexibility.
(Denyer, 2017)	Preventative control (defensive consistency), mindful action (defensive flexibility), performance optimization (progressive consistency) and adaptive innovation (progressive flexibility).
(Denyer, 2017)	Foresight, insight, oversight and hindsight.
(Denyer, 2017)	To respond to disruptions as well as positively adapt in the face of challenging conditions, leveraging opportunities and delivering sustainable performance improvement.
(Denyer, 2017)	Learning to bounce back and the ability to 'bounce forward'.
(Denyer, 2017)	Changing before the cost of not changing becomes too great.
(Xiao & Cao, 2017)	The power of organizational units to resume, rebound, bounce back or positively adjust untoward events.
(Xiao & Cao, 2017)	Ability to effectively absorb, develop situation-specific responses to, and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten organization survival.
(Xiao & Cao, 2017)	Capability to face disruptions and unexpected events in advance thanks to the strategic awareness and a linked operational management of internal and external shocks.
(Xiao & Cao, 2017)	The ability of recover and develops in a state of uncertainty, discontinuity, and emergency.
(Xiao & Cao, 2017)	Ability to restore to the original state even develops a new skill in disruptive conditions.
(Hollnagel, 2015)	The ability to respond, monitor, learn and anticipate.
(Megele, 2014)	The capacity to bounce back from unexpected and adverse situations and to restore the previous course of action.
(Megele, 2014)	Requires flexibility and agility.
(Annarelli & Nonino, 2016)	The organization's capability to face disruptions and unexpected events in advance thanks to the Strategic awareness and a linked operational management of internal and external shocks.
(Rodríguez-Sánchez & Vera Perea, 2015)	To respond productively to significant change that disrupts the expected pattern of events without engaging in an extended period of regressive behaviour.
(Teoh, Yeoh & Zadeh, 2017)	It is a feature of an organization that enables it to withstand discontinuities and to adapt to risky environments.
(Teoh, Yeoh & Zadeh, 2017)	To keep pace with and create new opportunities.
(Teoh, Yeoh & Zadeh, 2017)	A firm's ability to recover from misfortune or change, and to adjust easily to misfortune or change.
(Teoh, Yeoh & Zadeh, 2017)	The ability to rebound from an unexpected, stressful, adverse situation and to pick up where it left off.
(Teoh, Yeoh & Zadeh, 2017)	A firm's capacity for developing resilience is derived from a set of specific organizational capabilities, routines, practices, and the processes by which a firm conceptually orientates itself, acts to

	move forward, and creates a setting of diversity and adjustable integration.
(Teoh, Yeoh & Zadeh, 2017)	A function of an organization's situational awareness, management of key vulnerabilities, and its capacity to adapt to a complex, dynamic, and interconnected environment.
(Teoh, Yeoh & Zadeh, 2017)	Maintenance of positive adjustment under challenging conditions, such that the organization emerges from those conditions strengthened and more resourceful.
(Teoh, Yeoh & Zadeh, 2017)	The ability of an organization's business operations to adapt rapidly and respond to internal or external dynamic changes – opportunities, demands, disruptions or threats – and continue its operations with a limited impact on the business.
(Teoh, Yeoh & Zadeh, 2017)	The ability to maintain positive adjustments under challenging conditions.
(Menéndez Blanco & Montes Botella, 2016)	is not merely survival in response to adversity but rather an anticipatory strategy for progress, recognizing the need to take both proactive and reactive measures
(International Organization for Standardization, 2017)	The ability of an organization to absorb and adapt to a changing environment.

INTERVIEW

PARTICIPANT INFORMATION SHEET

We are living in a world of uncertainties as future challenges such as fourth industrial revolution, change in economic structures, security challenges and other social cohesion challenges are forcing public sector to build its resilience in the face of emerging events that may occur. The resilience concept is emphasized by the eight principles of Dubai to strengthen its growth and tolerance issued by His Highness Sheikh Mohammed Bin Rashed Al Maktoum early 2019 and one of these principles is considering having a credible, resilient, and excellent government as one of the three factors that are driving the global growth of Dubai.

Research Project:

Exploring Public Sector Resilience to Emerging Events.

Name of Researcher/Faculty/University

Fadi Nabulsi, PhD student, Faculty of Business and Law, The British University in Dubai.

I would be grateful if you could be able to take part in a research study. The purpose of the study is to develop an adaptive resilience framework for the public sector that will be used to enhance decision making against various emerging events. The framework will assist the public sector to have the ability to absorb, adapt to, transform, and rapidly recover from a potentially disruptive event.

The Research Questions are:

1. How emerging events facing the public sector can be recognized?

2. How resilience strategies in the public sector can deal with emerging events?

3. How adaptive capabilities & capacities in the public sector can be elevated to effectively absorb and respond to emerging events?

There are no risks involved in participating in the study. All data points will be coded and anonymized so that no individuals or organizations can be identified in the analysis and publications of the findings. The information taken through the interview will be kept confidential, your participation is voluntary and you have the right to withdraw at any time without giving a reason.

The interview will be audio recorded unless you give instructions to the researcher to take notes only.

Contact Details of Researcher

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Contact Details of Director of Study (DOS)

Prof. Halim Boussabaine, Dean of Faculty of Business and Law, The British University in Dubai.

Email: halim@buid.ac.ae

Name of Participant	Date	Signature

Can you please tell me more about yourself?

Title:

Education:

Total work experience:

Total work experience in the public sector:

Do you currently hold a management position or an advisory/consultancy position:

(1)

- As you know we are living in a world that is surrounded by uncertainties due to accelerated and emergent technological, economical, social and other factors. Can you tell me your insights within this regard?
- How do you think these uncertainties are affecting the way the public sector is operating?
- Do you think that some of these uncertainties affect the public sector more than others?
- In your opinion, what are the main causes of these uncertainties? (Why we are not certain about various things in the public sector)

(2)

- You spoke about some of the uncertainties that surround us and obviously some of these uncertainties will scale up to transform into an emergent event that needs us to give more attention to it:
- How will we know uncertainty may transform to an event?
- What tools the public sector can use to predict this transformation?
- How can we ensure that we are using the appropriate tools?
- What the public sector should do, in terms of building capabilities, to properly use these tools?

(3)

- Earlier we spoke about emergent events that may face the public sector due to the uncertainties surrounding us……………
- Can you tell me more about the most common types / categories of emergent events facing the public sector?
- How do we assess the magnitude of this event (Scale Up)?
- What are the scenarios possible for you, do you wait for more data, do act in a similar way for all events, do you wait until the situation resolve itself?
- If decided to take an action, how define responsibilities to take action (Do you form teams, do you put an initiative, do you change your structure, policies, define certain unit, etc.) (Small scale Vs. big scale events)
- How you ensure proper diffusion of the knowledge of the emergent event (spreading the knowledge in multi dimensions)

(4)

How we develop our strategies to ensure the following:

- During an event, what do we do in order to ensure that we are able to maintain our key operations or do the critical things we used to do?
- How can we ensure within our strategies that our resources have the appropriate skills to manage the disruption event?
- How can we build our strategies to ensure the quick and efficient recovery after an event?

(5)

- How can we ensure that our system in the public sector is having the proper first line of defense to react to an emergent event? (Absorb)
- How can we ensure that our systems in the public sector can do adjustments to ensure we are flexible enough to live with an emergent event?
- How we learn from this event to change from the status que to be different (positive and negative) to change our structures and the way we are doing work to change to something else?

(6)

- Post a disruption event, what is the most likely scenario the public sector can do to go forward? (Retrench, expand, invest in new technologies, etc.)
- How can we ensure that we have properly captured the lessons learned from our experience in managing the emergent event?

(7)

- How do you think we can measure resilience at the public sector?
- Can you tell me more if a scale for measuring resilience or its maturity will be appropriate to be implemented more at the government level or at the organizational entity level?

(8)

If we can now explore more about how to turn disruptive events into opportunities in the public sector:

- What are your insights about emerging events, Do you think that they only have negative influences or we may look at them as a window for new opportunity?
- What enablers should we have at the government level to turn disruptive event into an opportunity?
- What are the barriers at the government level that prevent this?
- What enablers should we have at organizational level to turn disruptive event into an opportunity?
- What are the barriers at the organizational level that prevent turning disruptive events into opportunities?

Script after the interview

I really appreciate your time and dedication to conduct this interview. I have had a new insights that will sure add a lot of value in my research. As earlier stated, all the information captured will be anonymized and there will be no mentioning of any name in the thesis or in the publications. If you are interested I can share with you key findings of my study after gathering and analyzing data. Meanwhile, I will be very grateful if you can provide me with your feedback of how I can further enhance this interview and for recommendation for and subject matter expert you can refer me to in order conduct a similar interview.

Thanks again and best of luck.

APPENDIX III

Initial Codebook

Name	Description
Theme 01 - Uncertainty Sources	To start an introductory overview of the uncertainties surrounding us in general and uncertainties affecting the public sector in particular. In addition to having an initial insight about the understanding of these uncertainties
1.1 Uncertainties in general	general insights about uncertainties due to accelerated and emergent technological, economic, social and other factors
Complex	Represents the complicated interlinks between variables to reach into conclusion and not the easy path to understand things through simple one to one relationship
Uncertainty	General term representing doubts of something and not being sure about it
VUCCA	We are living in a Volatile, Uncertain, Complex, Chaotic and Ambiguous World
1.2 Public sector uncertainties	How uncertainties are affecting the way the public sector is operating
Competitive Governments	Insights about competitiveness among different parties and requirements for the public sector to change the mentality to be as the private sector
Economy	A sector in the public sector representing the performance of productivity and efficiency
Oil	The direct impact of a certain commodity on the performance of the public sector
Financial	Monetary requirements or implications of a certain emergent event
Health	A sector in the public sector representing the ability to realize aspirations and public well-being
Political	General term represents the government or public affairs of a country
Social	A category of one scope in the public sector that is focusing on providing basic needs for the people for social development
Technologies	Technical means to produce an outcome or service
Artificial Intelligence	New technology trend related to uncertainty and ambiguity in ability to predict an emergent event or to manage and emergent event
Big data	Technology used to manage the huge amount of data to predict an emergent event or to manage and emergent event
Block Chain	A technology that can be used to anticipate an emergent event or manage an emergent event

1.3 Understanding uncertainties	Why we are not certain about various things in the public sector
Assumptions	Things that are judged based on experience or based on other factors
Connectedness	Represents connection at all levels, globally, locally, between sectors between public and private, between departments, between teams and connections with the public
Recognition of uncertainty	The ability to take an action after identifying an emerging event appearing out of an uncertainty
Vulnerable	Exposure to an emergent event (s) and being affected
Theme 02 - Triggering an emergent event	To understand what tools the public sector can use for anticipating an emergent event and if monitoring systems and tools within the public are capable of identifying the transformation of uncertainties into an emergent event. The other part of questions will investigate the potential tools the public sector can use in order to predict emerging events, validation of these tools and building capabilities to ensure proper usage of these tools
2.1 Monitoring	How will we know that uncertainty may transform into an emergent event
Black Swan	Event of very low probability but with a very high impact
Early Warning systems	Systems that have the capability to identify any trend or sequence of happenings that may lead into an emergent event. This may imply the ability to have proper channels to communicate what is going on to the decision maker in the proper communication channels
Emergent	Sudden event that came out due to uncertainty that was either anticipated or not anticipated
International rankings	Ranks about your level of performance against other countries or cities in a specific field
Knowledge	General term represents awareness of a certain situation based on the provided information. Also it may represents requirements for providing knowledge for employees or decision makers in the public sector
Measure	A general code to investigate how can we measure resilience in the public sector
Own formula for prediction	This code refers to the importance of not depending merely on external sources in order to get the right information and the need to have a specialized body within the public sector to do the proper data analysis and interpretation
Predict	Ability to anticipate an emerging event or anticipating the proper action to be taken
Smart KPIs	This code represents the need of the public sector to focus on a certain KPIs that may tell the decision maker the important parts of the story or performance without the need of having a complicated KPIs to try to evaluate government performance

2.2 Anticipation Tools	What tools the public sector can use to predict this transformation and how we will ensure that we are using the proper tools
Foresight	Ability to anticipate what will happen or what needs to be done in the future using certain mechanisms and tools
Scenario planning	Making assumptions for a certain situation that may happen and conducting analysis to evaluate which is the most suitable scenario that may happen
Subject matter experts	People how have the specialization and deep knowledge and experience of a certain topic in the public sector
Think Tank	A highly skillful experts or bodies who can provide advice and new spectrum of a specific topic
Tools	General term representing instruments used to manage the work prior, during and after an emerging event
2.3 Anticipation capabilities	What the public sector should do, in terms of building capabilities, to properly use the anticipation tools
Research	Systematic investigation the public sector should do in order to establish facts and develop conclusions to properly building resilience in the face of emerging events
Training	General term used to represent the action taken to build capabilities of employees
Theme 03 - Emergent Events	The purpose of these set of questions is to get understanding of how we can categorize emerging events facing the public sector, how to assess the magnitude and the escalation of an emergent event, the first response strategy, defining responsibility to take action, and diffusion of knowledge about the emergent event to various stakeholders
3.1 Emergent Events categories	The most common types / categories of emergent events facing the public sector
Internal emergent events	A code to distinguish the emergent events that may scale up internally due to some circumstances or uncertainties in the public sector itself
Multi events	A code representing if the public sector is impacted by more than one emergent event
Positive event	An event that may result in a positive performance of the public sector and we need to capitalize into opportunity to maximize benefits
Previous experience	Making judgement or recommendation based on earlier experiences
To build resilience you may build a small controlled event	This is a self test of the system when a certain controlled event is planned by the top management without informing the employees to evaluate the current responding actions
Type of event	To identify the different types of emergent event that may face the public sector
Unpredictable events	Unknown Unknowns (Things that you can't predict and you don't know any thing about them)

3.2 Magnitude of an emergent event	Assessing the magnitude of an emergent event and how it will scale up
3.3 Decision- Making Formulation	Scenarios possible to take decision upon identifying an emergent event, do you wait for more data, do act in a similar way for all events, do you wait until the situation resolve itself
Alpha risk and beta risk	Alpha risk; If you do not expect an event and you don't take an action and it happened. Beta risk that you expect something and it doesn't happen
Decision	General term representing when an action needs to be taken
Decision Making	The process of formulating a decision prior, during and after an emerging event
Decision tree	Decision support diagram structured as a tree of possible decisions and their consequences
Maslow	The famous Maslow pyramid of hierarchy of needs
Scenarios	General term representing different possibilities
Situation	General term representing an experience or opinion under a certain circumstances
Sustainability	The ability of the public sector to meet the needs of the existing society segments without compromising the ability of future generations to meet their needs
Visualization	Representation of information in a smart way that will enable the decision making process
3.4 Responsibility to take action	Defining responsibilities to take action (Do you form teams, do you put an initiative, do you change your structure, policies, define certain unit, etc.)
Escalation	To involve someone or a group in a higher management level (s) in order to take an action prior, during and after an emergent event
Theory X & Theory Y	Theories of motivation (Douglas McGregor) as management can group employees based on their motivation to work, where 'X' represents that employees need always instructions and continuous follow-up to do the work (Negative), while 'Y' assumes that employees are self motivated to do the work (Positive)
Training to deal with the situation	The need to have specialized training in the case of emergent event to deal with the situation and not having general training that may scatter the efforts of the employees
3.5 Communication of an emergent event	Ensuring proper diffusion of the knowledge of the emergent event (spreading the knowledge in multi dimensions)
Communication	General term representing the need for communication to be established at different levels vertically and horizontally to ensure making responsibilities and expectation and awareness clear to everyone to build resilience in the face of emergent event
Emotional Intelligence	

Information	Data after being processed to show a meaning or to take a decision
People update	How to make the public aware and active in putting solutions in the face of emerging event
Soft Communication	Not to stick to traditional way of communication when facing and emergent event but try to use other channels such as using the influencers or using the social media in an indirect way
Theme 04 - Resilience capabilities	To identify the strategy for building capabilities to face emergent events including robustness, resourcefulness and recoverability. In addition to the relationship between strategies to face emergent events and the link between the taking action strategy and the overall strategy of the government or the government organization. This theme will also address how to balance between different factors of efficiency and effectiveness when facing an emergent event
4.1 Recoverability strategy	How can we build our strategies to ensure the quick and efficient recovery after an emergent event
80 - 20 rule	Pareto principle stating that, for many events, roughly 80% of the effect come from 20% of the causes
Action in relation to the strategy	Defining relationship with the strategy to put action to face an emergent event and the existing the strategy the public sector is having as bigger umbrella
Bounce back	Ability to recover the previous performance
Piloting	Testing the solution on a small scale before deployment on a large scale
Prove You can do it	To put confidence of the society that the public sector is able to manage the whole situation. We can focus on one success story to be accomplished properly to show the audience that the public sector is capable of managing the situation
Quick Win	Actions that can be done fast and easily while showing impact
4.2 Resourcefulness	How can we ensure within our strategies that we have enough resources and reserves and our resources have the appropriate skills to manage the disruption event
Cost	General term to evaluate the financial requirements in different aspects to build resilience
Resources	Money, material, manpower, infrastructure, tools, , mechanisms, and technologies that are required to build resilience in the public sector in the face of emerging events
4.3 Robustness	During an event, what do we do in order to ensure that we are able to maintain our key operations or do the critical things we used to do
Build	An action to be taken
Capabilities	Different requirements the public sector should have in order to face an emergent event
Able	Represents ability to: recognize an event, deal with an event, and to learn from an event

Central vs. entities	This code represents too many alternatives for centralizing the efforts to anticipate an emergent event, or deal with an emergent event or learn from an emergent event against the being decentralized and giving more flexibility to government organizations. Also, it covers centralization or decentralization of strategies as well as research efforts
Infrastructure	Facilities and systems that are necessary to provide services to the public
Plan	Making arrangements on advance of what intended to be done
Prioritize	Identify what is most important based on certain criteria
Readiness	The precautions and actions to be taken to build robustness to be ready for a specific emerging event or for a specific emerging event
Drills	Tests to evaluate your preparedness and simulates a real life scenario representing a real life emergent event
Respond	Taking action as a response to an emergent event
Strategies	General term representing where we need to have strategies and what type of strategies, components of these strategies, and the relationship with other strategies vertically and horizontally
TOWS	A strategic tool used for strategic analysis similar as SWOT but with a different orders were you start with Threats, then opportunities, then weaknesses and finally strength
Theme 05 - Resilience Capacities	To address which capacity is more appropriate to be used in the public sector in the face of emergent events. In addition to investigating if one of these capacities are more appropriate based on the type of government organization (service provisioning or policy making)
5.1 Absorptive Capacity	How can we ensure that our system in the public sector is having the proper first line of defense to react to an emergent event
5.2 Adaptive Capacity	How can we ensure that our systems in the public sector can do adjustments to ensure we are flexible enough to live with an emergent event
Adapt to change	Ability of the public sector to identify there are changes and work to adhere to these changes
5.3 Transformative Capacity	How we learn from this event to change from the status quo to be different (positive and negative) to change our structures and the way we are doing work to change to something else
Capacities in general	Understanding of the three capacities the public sector should have in order to face an emergent event. Also, it involve we should have a balance between the three capacities or one is important than the other and what characteristics we should have for each capacity
Capacity	Referring to the three capacities (absorptive, adaptive, and transformative) in addition to any other capacity that the interviewee may suggest to consider

Theme 06 - Post event scenario	To investigate the scenarios the public sector can go after a disruption event, in addition to the learning mechanisms to improve the government system in the future
6.1 Going forward	Post a disruption event, what is the most likely scenario the public sector can do to go forward? (Retrench, expand, invest in new technologies, etc.)
6.2 Lessons learned	How can we ensure that we have properly captured the lessons learned from our experience in managing the emergent event
Benchmark	Comparison and leaning from other organizations or sectors and implement lessons internally
Best practice	Set of guidelines or ideas that represent the most efficient and effective way of doing something and from which the public sector can learn
Case studies	Refers to two parts; either the public sector should benefit from case studies to learn on how to build resilience or it should document the lessons learned through case studies that other organizations, employees or the public can benefit from
Gamification	The application of games to enhance understanding of certain scenarios that may happen during an emergent event
Learning	Ability to understand and deploy lessons from previous experience or from other practices in order to be more resilient
Sharing lessons with other governmental organizations	This code is identifying the need to share the lessons learned with other government parties in order to learn better and overcome the competition tendency among government entities
Theme 07 - Resilience Measurement	To identify the components of resilience measurement in the public sector and if a maturity model is a suitable tool to assess the resilience of the government in general and for the public organizations in particular
7.1 Measuring Resilience	How to measure resilience in the public sector
7.2 Maturity Model	Insights about having a maturity model or a scale to evaluate where we are standing in terms of being resilient
Theme 08 - Turning challenges into opportunities	Getting insights about how the government sector can encourage the positive thinking of turning challenges into opportunities and what are the enablers to enable this transformation and the barriers that are preventing this transformation at the government level and at the government organizational level
8.1 Enablers	What enablers the public sector should have to turn disruptive event into an opportunity or to be resilient
Awareness	knowledge or perception of situation or fact usually in public sector is linked to society awareness and some time it is reflecting the awareness of employees

Culture	Norms, traditions, or beliefs of certain group that is leading to a certain behavior or performance
Celebration of success and failure	Post an event we should have motivation of people to learn, either by celebrating our success or celebrating failures to ensure that people are learning from their mistakes
Imaginative capacity	Ability to show creativity
Participation	Joining efforts to achieve a common goal
Leadership	A code representing a decision to be taken by leaders or a need to define requirements of leaders in order to be resilient
Trust	General term representing the confidence of the good will of the other party (360 degrees trust) and what needs to be done to build the trust as an important pillar to build resilience
Positive	General term representing a favorable outcome
8.2 Barriers	What are the barriers in the public sector that prevent it from being resilient
Bureaucracy	Inherited systems or procedures in the public sector that make it hard to take an action
Challenges	General code to investigate what challenges that are facing the public sector in general, challenges to build resilience in the public sector and challenges that we may face to turn a challenge into opportunity
Negative	General term implying non favorable outcome
Practicality of training courses	This code is try to link between the training provided to the public sector employees and the ability to implement what they learn as some of the trainings are done for the purpose of delivery without identifying its possibility of implementation in the real life by the participants
Silo Mentality	Reluctance to share information and focusing on building 'empires' by a certain government entity or teams or even government leaders
Turn challenges into opportunities	This code is trying to get examples of how we can turn challenges into opportunities as part of building a positive resilience in the face of disruptive events
Opportunities	Positive outcome that represents a new possibility to do something else in the public sector
Possibilities	The term is used to challenge the traditional way of doing work in the public sector and recommending up-normal new way of thinking
Theme 09 - Resilience relationship with other managerial concepts	This theme will investigate the relationship between resilience and other managerial concepts and systems, such as; agility, antifragility, business continuity, flexibility, governance, innovation, policy making and risk management and what is the integration platform between these concepts and management systems

Agility vs. resilience	Getting insights from participants about the difference between agility and resilience as different concepts or integrated concepts or similar concepts
Agile	Ability to move quickly and easily
Antifragility	Term used to describe being resilient in the face of emergent events which represents the ability of withstanding the stress without breaking
Business continuity	Creating systems of prevention and recovery for a potential threat (s) in the public sector
Crisis	A time or intense facing a negative emergent event
Flexibility	The extent to which the public sector or a sector or a government entity adapt to changes. The term has some overlaps with agility and resilience and we need to distinguish the relationship between them
Governance	Responsibility and authority structure to take an action prior, during and after an emergent event
Innovation	General term representing creativity and bringing out of the box solutions to face an emergent event or to turn challenges into opportunities
Integration	bring things together under one unity
Relation to policy making	A code to identify the relationship and the interactions between building resilience and the policy making
Risk Management	The purpose of this code is to identify the relationship between risk management and resilience management in the public sector
Appetite	Term usually used in risk management representing the level an organization can withstand without taking an action to reduce the risk (there is a link with robustness and absorptive capacity in resilience)
Risks	Situation involving exposure to negative or positive event in the public sector
Theme 10 - Collaboration and partnerships	The focus of this theme is the need to collaborate with other parties, such as, academic institutes, other countries, international organizations, different government parties, private sector and research centers to effectively manage a disruptive event
Academic involvement	Engaging the academia to seek their opinion on how to deal with an event or partner with academic institutes to do researches and engage them in finding a solution
Collaboration	Represents collaboration between teams, departments, government entities, sectors, governments and countries
Collaboration with other countries	Specific code to determine how collaboration between countries will enhance building resilience of the public sector
Countries	Comparing countries practices in terms of public sector structure or economical and government performance comparison

International organizations	International bodies which have the expertise and best practices and controls in a specific sector such as WHO
Coordination between different government parties	Coordination efforts either in communication or in taking action or between central and non-central entities to properly build readiness or face an emergent event
Partnership	Aligning with other parties to do a certain mandate or manage a certain emerging event
Research Centre	Specialized bodies that may be formed by the public sector in coordination with universities and the private sector to provide factual information to build resilience
Theme 11 - People engagement	To investigate the possible ways of engaging the society and the public sector employees to face an emergent event and how to assess their requirements and manage them if an emergent event occur
City	A code to investigate if certain requirements for resilience are needed at the city level
Crowds Management	How to manage crowds and direct them positively to face an emergent event
crowdsourcing	Seeking insights from the public and engage them to build resilience and face an emergent event
Engagement	Level of involvement in a certain activity or task in the public sector. It also represent how different stakeholders care to be part of putting solutions or recommending innovative ideas
Experience	General term that highlight some practical point of view about a certain topic
HR systems to encourage resilience	HR requirements to be resilient
People	Representing either the society or the human resources in the public sector
Resilient Society	The need of the public sector to build resilience of the society first in order to be able to properly face an emergent event and find ways of engaging them in putting solutions and make them always aware of what's going on
New generation	Youth people who may have different new requirements and new ways of doing things
Start at schools	To build resilience and positive thinking we need to start with the young generation at school to teach them yes they can do it
Sentiment analysis	Interpretation and classifications of public or society segments emotions using proper tools
Society segments don't have the same interests	This code is for identifying different interests of different segments in the society and the need of the public sector to address these different needs and not having a one solution for all segments
Wellbeing or welfare	A state for the society for being healthy, comfortable, or happy

Theme 12 - Public sector current and future mandate	This theme focuses on the evolving role of the government and what is the expected role in the future. Also, it will address the perspectives how the business model of the public sector and the value provision is changing upon facing an emergent event
Business model	Represents how the public sector deliver value to the society
Model	Blueprint of how to do work in the public sector entity or at a public sector level
Competition	Represents mainly the competition is now at a national level and at the public sector level and this may require the public sector to change mentality of how to provide services in the era of globalization
Evolving role of governments	Represents how governments are changing over time to adhere to changes or to be ready to face different emerging events
Governments no longer controlling the narrative	A term representing that the governments are no longer controlling the services provided to the public as the public expectations are becoming higher due to their experience with other governments
Mandate restriction	In the public sector the mandate represents a restriction for each government entity as it defines a specific scope to work on and also it prevents the private sector from doing business related to government entities mandates
Ministry of finance	Controllers of budgets and financial resources in the public sector
Organizations die	A code to investigate the possibility of a break down of a government entity
Public sector varies from a country to another	The shape of how the public sector is structured is not the same and it is changing from a country to another
Tensions	Forces that are pulling in different directions
The role of the government	This code represents the basic role of government across eras which is to abide basically education and health care and to provide for the economic well-being of the citizens so to recall well, these are the three basic functions of any government. The way the role is being performed is changing, but the role itself hasn't changed.
User Cases	List of steps identifying what needs to be followed by a user to do a certain task in an IT system
Value	Sustaining and improving desirable balance between wants and needs of stakeholders and providing something that is appreciated by them
Future	General term representing a status or an action in future
New government structure	A government structure that is modernized and different than the current government structure

New value or new business model	Represents looking for new opportunities in the government that requires a new way of thinking which will result in a new value to the public or change the thinking by a revised business model
Public sector reshaping	Due to emerging technologies the public sector should accommodate to rapid changes to do the work in a new innovative ways
Job security in the public sector	To represent the type of career in the public sector that is secured by the government and it is very difficult to get rid of an employee even if he/she had a bad performance
Secured	General term to identify if something is protected or not
Metaphor	A symbolic example to express a certain idea
Outsource	To delegate the some of the public sector operations to another party or supplier
Private sector	Part of economy represented by companies that are privately owned by the public and not having government ownership
Private sector leads	This code represents the opinion that the private sector is always ahead of the public sector and the practices for improving the work of the public sector comes mainly from the private sector
Public sector competing with private sector	Unfavorable event where the public sector tried to take part of the market share of the private sector by doing some of their business
Theme 13 - Holistic View	This theme is collecting all the general terms that were found as a frequently used words by the interviewees to try to build the big picture and not to miss anything important that may not have been highlighted by the other themes
Big picture	Used to figure out the understanding of different levels and different factors affecting the public sector operation
Collective	A code representing either a collective thinking governments should have to focus on one big goal or a joint efforts that should be taken to build resilience
Change	General term that is used to get insights about what needs to be done in a different was in the public sector in order to be resilient also it represents what changes needed in the public sector in general to be in a better position
Factors	Circumstances, facts, or influences that contribute to a certain result
Dimension (s)	An aspect or feature of a situation that needs to be considered
Holistic	Comprehensive overview taking into consideration a lot of information and variables
Whole	General term representing totality of something
Image or reputation	Reputation
Layers	levels
Level	The amount or degree of something
Multiple	General term representing various factors or dimensions

Management	General term representing ability to manage resources and information to be able to improve performance or take a proper decision
Resilience framework	Identifying the participants opinion if a resilience framework is needed or it should be embedded within other frameworks in the public sector
Resilient definition varies	It is important to define what resilience means in the public sector and having consensus on that before developing the resilience framework as resilience could be interpreted in a different way by different parties
Theme 14 - Government Systems	To define various components of government systems and how these systems can be tested to assess their readiness before an emergent event occur
Design for resilience	It means that you don't design to solve the problem or to get a service, but the design details has all the requirements for if something happened, that it can change easily, and this is what is built about the Lean Sigma Six Sigma and lean manufacturing
Dynamic	Constantly changing, and in resilience it may imply ability to adapt to changes constantly
Government System Testing	Experimenting a government system to see it's practicality and ability to adapt with the changes
Government Systems	Representing structures, policies, procedures, legislations, tools, and employees to provide value and services to the public
Hybrid	a mix of two different elements or systems
Policy	Principles or actions or steps that govern a certain scope of work in the public sector
Regulations	A rule or a directive made by a public sector authority that needs to be followed
Services	Set of activities or outputs carried out by the public sector to the society aiming to fulfil their requirements or provide a certain value to them
Structure of the government	Represents a new way of public sector thinking to enhance the government mind and awareness about the changes and about the trends and about the potential events, not only to predict the future, but also to enable positioning for the future.
Systems	Set of policies, procedures, processes, and actions in the public sector working together to ensure fulfilling a certain requirement by the society
Theme 15 - Government Sectors	The public sector consists of various specialized focus areas that are addressing different specialties such as economy, health, and education. The focus of this theme is to identify linkages between these sectors when building resilience at the public sector

Interlinkages between sectors	Influence of public sector on each other. This code means that the impact of an emergent event may not be specified to a certain public sector as other sectors may be impacted
Sectors	Certain areas in the public sector representing a specific scope of functioning