The Impact of Strategy Diffusion on Organisational Performance of Project-Based Organisations

تأثير نشر الاستراتيجية على الأداء المؤسسي للمنظمات القائمة على المشاريع

by

JAMILA JUMA OMAR OTHMAN ALMAAZMI

A thesis submitted in fulfilment

of the requirements for the degree of

DOCTOR OF PHILOSOPHY IN PROJECT MANAGEMENT

at

The British University in Dubai

June 2020

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ABSTRACT

Many studies have investigated topics related to strategy management, portfolio management, program management, and project management relationships. However, traditional one-way cascading of the strategy is still preferable by many organisations, with few studies investigating the use of top-down and bottom-up techniques to spread an organisation's strategy and getting back the performance, or the possibility of employing one of diffusion theories (e.g., Rogers' Theory of Innovation Diffusion) within strategy or project contexts in project-based organisations. Consequently, the need to understand and apply a strategy diffusion (top-down) and report its performance (bottom-up) was urgent and necessary within project-based organisations, to fulfil the complete drive of the strategy and raise the competitive advantage of businesses.

In this study, there was a comprehensive literature review of strategic management, diffusion theory, and project management facets, where the strategy spreading practices were based on the five well-known skills of Rogers' diffusion theory; to diffuse the strategy (top-down) and reveal performance results (bottom-up) to feed each level of the project-based organisation hierarchy structure, taking the advantage of the interrelationships that exist amongst the strategy, the portfolio, the program, and the project levels. This was done to facilitate the deployment process.

Moreover, mediation effects were taken into consideration for the organisational culture and the performance (bottom-up) related to the four organisational levels during the relationships investigation between all the research variables; since it is known that organisational culture and bottom-up performance have huge influence on business outcomes. Accordingly, the research framework was adopted and designed. This study used a quantitative method to investigate the influence of strategy diffusion on organisational performance within project-based organisations, where significant positive influences on the relationships were found between the required research variables.

This thesis shifts strategy diffusion practices within the project context from a traditional one-way method to strategy diffusion top-down and performance bottom-up methods. Since, the study was limited to government agencies in the Emirate of Dubai located in United Arab Emirates (UAE), the generalisation of outcomes to other sectors is challenged.

تأثير نشر الاستراتيجية على الأداء المؤسسي للمنظمات القائمة على المشاريع

الملخص

غطت العديد من الدراسات الموضوعات المتعلقة بالعلاقات بين إدارة الإستراتيجية، إدارة المحافظ، إدارة البرامج، وإدارة المشاريع. وبالرغم من أن الطريقة التقليدية لتمرير الإستراتيجية هي أحادية المسلك، فأنها لاتزال الطريقة المفضلة لدى العديد من المنظمات. هناك ندرة في الدراسات التي تتحقق من الاستفادة من التقنية التي تمرر من القمة إلى القاعدة لنشر إستراتيجية المنظمات ثم تمرر تقاريرها رجوعا إلى القمة، أوإمكانية توظيف إحدى نظريات النشر - مثل نظرية روجرز لنشر الابتكار- ضمن نطاقات الاستراتيجية أوالمشروع في المنظمات القائمة على المشاريع. وبالتالي فإن الحاجة كانت ضرورية وملحة إلى فهم أعمق ولتطبيق الآلية (من القمة إلى القاعدة) لنشر إستراتيجية المنظمات القائمة على المشاريع ورفع تقاريرأدائها رجوعا إلى قمة الهرم الوظيفي، وذلك من أجل تحقيق القيادة الكاملة للإستراتيجية ورفع الميزة التنافسية للأعمال.

في هذه الدراسة، كانت هناك مراجعة شاملة لأدبيات الإدارة الاستراتيجية، نظرية الانتشار، وجوانب إدارة المشروع، حيث تستند ممارسات نشر الإستراتيجية على المهارات الخمس المعروفة لنظرية روجرز، وذلك لإستخدامها لنشر الإستراتيجية المطلوبة بتمريرها من القمة إلى القاعدة لتعود مجددا إلى القمة بكشف نتائج الأداء لتغذية كل مستوى من مستويات التسلسل الهرمي للمنظمات القائمة على المشاريع، والإستفادة من العلاقات المتبادلة الموجودة بين مستويات الإستراتيجية والمحافظ والبرنامج والمشاريع في هذه المنظمات لتسهيل عملية النشر. علاوة على ذلك، فقد تم الأخذ في الإعتبار أثناء التحقيق في العلاقات بين جميع متغيرات هذا البحث تأثير التداخل لكل من الثقافة التنظيمية والأداء من القاعدة إلى القمة التابعة للمستويات الأربعة، نظرًا لأنه من المعروف أن الثقافة التنظيمية والأداء من القاعدة إلى قمة الهرم الوظيفي لها تأثيرات كبير على نتائج الأعمال، ووفقاً لذلك تم تبني وتصميم فكرة إطار البحث. استخدمت هذه الدراسة طريقة البحث الكمي للتحقيق في تأثير انتشار الإستراتيجية على الأداء التنظيمي للمنظمات القائمة على المشاريع، حيث تبينت التأثيرات الإيجابية الكبيرة على كل العلاقات بين متغيرات البحث المطلوبة.

إن هذه الأطروحة تتبنى التحول في ممارسات نشر الإستراتيجية ضمن سياق المشروع من الطريقة التقليدية أحادية الاتجاه إلى طريقة ذات اتجاه مزدوج. وبما أن الدراسة اقتصرت على الجهات الحكومية في إمارة دبي في دولة الإمارات العربية المتحدة، فإن هنالك تحدٍ صعب في تعميم النتائج على القطاعات الأخرى.

DEDICATION

I would like to dedicate my PhD Thesis

to my beloved Mom and Dad,

Husband and Kids,

Sisters and Brothers,

who have been there for me.

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In the name of Allah, Most Gracious, Most Merciful.

Praise be to Allah, the most Merciful of the worlds for giving me the strength and ability to complete my PhD thesis in a timely manner while being a full-time employee and a part-time student.

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At the end, special thanks go to my family whose support and prayers empowered me to complete this research: parents, husband, and children. They are the most precious people in my life and words cannot express how thankful I am to them. I thank my father and mother for teaching me how to never quit and be persistent in pursuing my goals. Last, but not the least, all thanks and appreciation to my beloved husband who always stood by, supported and encouraged me through all the difficult times during my study, and to my four candles of my life (my kids): Shamsa, Hamdan, Hamad and Maryam.

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List of Abbreviations

AMCES	Association Management, Consulting and Evaluation Services
AMOS	Analysis of A Moment Structures
APM	Association for Project Management
BSC	Balance Score Card
DE	Decision and Evaluation
EY	Ernst and Youg
IA	Implementation and Adaptation
KP	Knowledge and Persuasion
MSP	Managing Successful Programmes
OC	Organizational Culture
OP	Organizational Performance
P	Project
Perf	Performance
PESTEL	Political, Economic, Social, Technological, Environmental and Legal
PgPM	Program Management
PMI	Project Management Institute
PMBOK	Project Management Body of Knowledge
Po	Portfolio
Pr	Program
Prac	Practice
P2M	Project and Program Management
PWC	Pricewaterhous
R and D	Research and development
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Sciences
Sr	Strategy

SRS	Simple Random Sampling
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UAE	United Arab Emirates

1. CHAPTER ONE: Introduction

1.1. Introduction

This chapter introduces the research general background and research problem. Then, it identifies the research aim, and key objectives. After that, it shows the proposed research questions and hypothesis. Finally, it concludes with the research significance and presents the thesis outline.

1.2. Research background to the research problem

Despite the important role of the strategy diffusion process in strategic management, empirical research focusing on project-based organisations in the area of strategy diffusion has been limited. This study seeks to delve deeper to understand the impact of strategy diffusion on organisational performance within project-based organisations. It initiates from the ambition to contribute to what is recognised about the science of strategy management in strategic diffusion practices to improve the ultimate outcomes of project-based organisations in this competitive business world.

Competition in today's world has developed due to various concepts, such as rapid technological changes, changing customer expectancies, new markets and globalization. Therefore, current businesses are enforced to think strategically more often and make faster decisions by applying more strategy management (Durmaz & Düşün 2016). This is to say that strategic management has become one of the most significant current discussions within businesses (Durmaz & Düşün 2016) especially the strategic distribution part, where the value of the strategic distribution has grabbed more and more attention in society and corporations (Falkheimer *et al.* 2017).

The organisational strategy needs to be understood by all staff at all levels of governance within the organisations very well, in order to implement their daily business in a way that contributes to the success of that strategy (Kaplan & Norton 2001). In project management literature, an organisational strategy is increasingly delivered through the portfolio to program and project levels, as portfolios focus on the oversight and holistic management of projects, where it also has often been conceptualised as simply being implementation sites on organisational strategy (Clegg *et al.* 2018; Lowstedt, Raisanen & Leiringer 2018). Therefore, despite the importance of strategy for all levels of a project-based organisation, it has been recognised. Yet, strategy remains a theoretical and operationally challenged concept (Lowstedt, Raisanen & Leiringer 2018).

Strategy management classically uses top-down perception to make sense of the collaborations amongst portfolios, programs, and projects (Clegg *et al.* 2018). But several scholars have criticized the common top-down, one-dimensional standpoints of strategy in the project-management literature (Lowstedt, Raisanen & Leiringer 2018), as the traditional (top-down) approach in project management focuses on rational structural aspects of strategizing, which leads to losing the focus on the fundamental practices and processes that are initiated by the strategy and how these practices and processes frame strategy implementation (Clegg *et al.* 2018). Thus, any bad management systems or usage of unworthy exercises can destroy the organisation, for example, through unrelated explanations or reports about what actually is happening with these companies, or because of the absence of a robust platform on which administration or top manager action must be based on (Blomquist *et al.* 2010). Moreover, several corporations suffer from a lack of an efficient method to align the business strategy with project management, which leads to misaligned projects (Sirvannaboon 2006). In addition, unfortunately, most studies in diffusion theories have only been carried out in a small number of areas in relation to strategic management, which leads to calling for enhancing the

field's understanding about the interface between strategy and diffusion (Kuester, Gatignon & Robertson 1999). Some scholars start constructing knowledge about the position of strategic diffusion for the success and survival of organisations (Kuester, Gatignon & Robertson 1999; Falkheimer *et al.* 2017). In addition, today's economical scholars who are interested in project-based organising have increased the calls for more investigation of strategic management research and its theoretical implications (Cattani *et al.* 2011). Several scholars have called for research into the interrelationships between projects and their parent organisation (strategy) rather than a site of 'strategy execution separately (Artto *et al.* 2008; Söderlund & Maylor, 2012, Lowstedt, Raisanen & Leiringer 2018).

Subsequently, the emergence of using a diffusion strategy (top-down) and (bottom-up) is imperative, so that the diffusion process can be significantly accelerated, and the organisational strategy will be translated, improvised and made sensible. This will also fulfil the complete drive of strategy (Clegg *et al.* 2018; Lowstedt, Raisanen & Leiringer, 2018), especially as the professional strategy diffusion is the right method to help practitioners to enhance their tasks and activities, contribute more to their organisational strategic objectives, and enhance their organisational outcomes (Köhler & Zerfass 2019). Similarly, project management levels should know about their corporate aspect of their projects to know how to deal with it, in order to support their top strategy, understand the corporate needs; ultimately, this will lead to customer satisfaction and achieving business success (Meskendahl 2010; Patanakul & Shenhar 2012). Thus, a bi-directional link between strategy, projects, and project portfolio management is suggested in the literature on the practicing of strategy over projects, and the ability of project portfolio and project actions and processes to update the strategy (Killen *et al.* 2012). Furthermore, it will build on continuous mixes of bottom-up learning from projects-to-organisation and top-down strategic decision-making from organisation-to-projects (Lowstedt, Raisanen & Leiringer 2018).

Thus, a strategy concept with diffusion may help in bridging the gap related to the above argument about the utilisation of the strategy diffusion practice as a top-down approach. This can spread the organisational strategy and support reporting performance bottom-up, to learn the lessons and to make decisions accordingly, which will lead confidently to increase all organisational performance indicators. This research seeks to better model the relationships among strategy diffusion top-down, performance reporting bottom-up, and firm performance.

1.3. Research aim

The aim research aimed to examine the effects of strategy diffusion on organisational performance in projects-based organisations. The research proposed a model for implementing organisational diffusion at strategic, portfolio, program and project levels.

1.4. Research objectives

The research objectives of the study were to:

- Review existing strategic management theories and align them with business strategy and organisational project management levels.
- Appraise diffusion theories and assess the suitability of the selected theory for strategy diffusion in project-based organisations.
- Examine existing project management theories from top-down and bottom-up viewpoints and propose a conceptual framework.
- Evaluate the influence of strategy diffusion drivers in strategy, portfolio, program and project levels on organisational performance development in project-based organisations.

- Identify the mediating roles of performance drivers in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations.
- Assess the mediating role of the organisational culture driver in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations.
- Propose a model for implementing the organisational strategy diffusion at each level of strategy, portfolio, program and project within project-based organisations.

1.5. Research questions

The study seeks to address the following questions linked to the research problem statement:

1.5.1. Initiative diffusion practices questions

Q1: How does strategy initiatives diffusion practice influence the emergence of organisational performance in project-based organisations?

Q2: How does portfolio initiatives diffusion practice influence the emergence of organisational performance in project-based organisations?

Q3: How does program initiatives diffusion practice influence the emergence of organisational performance in project-based organisations?

Q4: How does project initiatives diffusion practice influence the emergence of organisational performance in project-based organisations?

1.5.2. Performance mediations questions

Q5: How does strategy performance impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q6: How does portfolio performance impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q7: How does program performance impact the program initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q8: How does project performance impact the project initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

1.5.3. Organisational culture mediation questions

Q9: How does organisational culture impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q10: How does organisational culture impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q11: How does organisational culture impact the program initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

Q12: How does organisational culture impact the project initiatives diffusion practice to influence the emergence of organisational performance in project-based organisations?

1.5.4. Strategy diffusion (top-down) questions

Q13: How does strategy initiatives diffusion practice influence the appearance of portfolio initiatives diffusion practice in project-based organisations?

Q14: How does portfolio initiatives diffusion practice influence the appearance of program initiatives diffusion practice in project-based organisations?

Q15: How does program initiatives diffusion practice influence the appearance of project initiatives diffusion practice in project-based organisations?

1.5.5. Performance (bottom-up) questions

Q16: How does project performance influence the appearance of program performance in project-based organisations?

Q17: How does program performance influence the appearance of portfolio performance in project-based organisations?

Q18: How does portfolio influence the appearance of strategy performance in project-based organisations?

1.6. Significance of the research

The current study contributes, to our knowledge, addressing several important issues and gaps in the literature and areas that can be found in the future research suggestions agenda.

First, adding new methods for the firm's strategy spreading process, which is a Rogers' diffusion theory, in which strategy management of the David strategic management model is combined with the innovation diffusion method (Rogers theory) to facilitate an organisation's strategy translation smoothly and easily underneath levels of based project-based organisations in Dubai (UAE) at strategy, portfolio, program and project levels. Hence, this model has added to the existing knowledge, especially with a lack of usage of the Roger diffusion theory for

strategy diffusing purposes at all levels within project-based organisations as indicated by Kuester, Gatignon and Robertson (1999).

Second, the top-down and bottom-up approaches for strategy diffusion (top-down) and its outputs/outcomes reporting (bottom-up) within a project-based organisation based in Dubai are used for better embedding the strategy to everyday work, then getting back the results and lessons-learned from the real ground. This is used for better decision-making at top management levels. Hence, this study will be a further contribution to the strategy management knowledge, as there are rare researches that investigated the strategy diffusion impacts on organisational outcomes at each level of project-based organisations based in Dubai (Artto *et al.* 2008; Blomquist *et al.* 2010; Söderlund & Maylor 2012; Killen *et al.* 2012; Nicasion *et al.* 2016; Lowstedt, Raisanen & Leiringer 2018; Clegg *et al.* 2018).

Third, the organisation hierarchal alignment among strategy, portfolio, program, and project levels is used, where the study can demonstrate it by using the strategy diffusion (top-down) and performance (bottom-up) practices at each level of project-based organisations based in Dubai, at the strategy, portfolio, program and project levels. As indicated by Clegg *et al.* (2018) and Srivannaboon and Milosevic (2006), some studies have showed the focus of the strategy on the organisational top level only.

Fourth, there will be assessment of the mediation role of the organisational culture driver in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations based in Dubai; since there are few studies like PMI (2017), that explained the mediation role of the organisational culture within a comprehensive study utilising all the four levels of project-based organisations.

Finally, this study will develop a new practical robust platform (model) that can diffuse successfully the organisational strategy using the theory of Rogers innovation diffusion theory via practicing all the diffusion decision process stages through utilising the top-down method

to each project-based organisational levels at strategy, portfolio, program and project levels and report back all the needed performance via applying the bottom-up approach from each of these levels. This is done in order to establish a proper decision-making bases and for competitive advances as indicated by Clegg *et al.* (2018).

All these topics will open new domains for strategic management practice within "the organisational project management" aspects, and will significantly influence the project's business world.

1.7. Research outline

Figure 1.1 describes the research outline, where each chapter is shown in order.

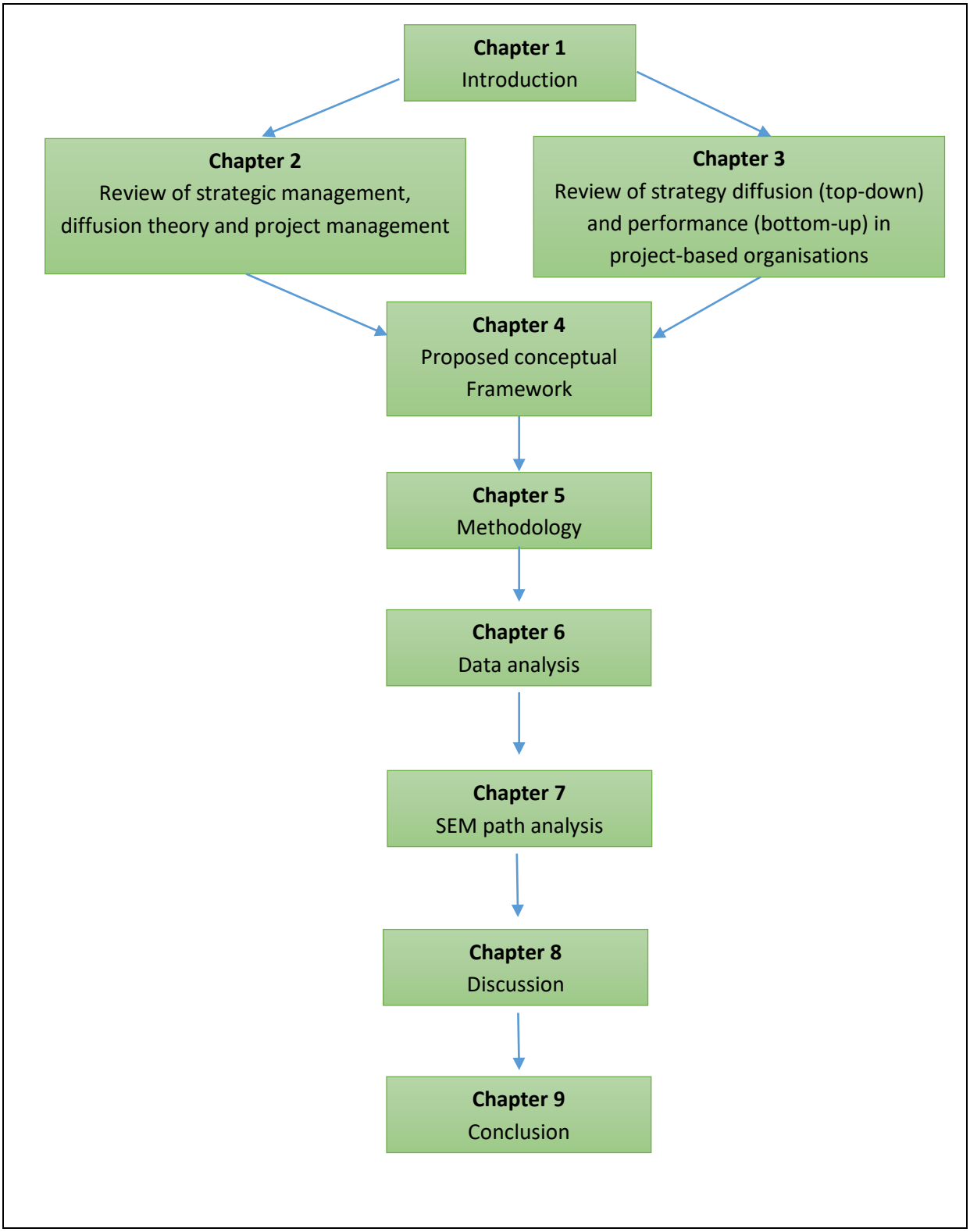


Figure 1.1: Thesis outline

- **Chapter 1** introduces the research background and problem statements, research objectives and aims, research questions and hypotheses, research significance and thesis outline.
- **Chapter 2** includes an extensive literature review on strategy and strategic management, the diffusion theory, project management, organisational performance, and organisational culture concepts, to select the suitable models or theories for this study.
- **Chapter 3** includes a thorough review of literature on the strategy diffusion concept within project contexts along with an elaboration on top-down and bottom-up methods and the relationships between all the research aspects. Furthermore, it confirms that innovation diffusion theory can be used for strategy diffusion within project-based organisations.
- **Chapter 4** includes a proposed research conceptual framework and proposed hypotheses. Furthermore, it contains suggested organisational culture and performance (bottom-up) reporting as mediators and drivers that can influence the strategy diffusion (top-down) impact on organisational performance in project-based organisations at all the four levels.
- **Chapter 5** explains the research methodology including philosophies, approaches, and strategies. Furthermore, it validates the implemented research philosophy, research approach, research methods, planned data collection techniques and data analysis procedures.
- **Chapter 6** includes a demonstration of collected data and descriptive statistics. Furthermore, it includes an assessment of data normality and the research questionnaire reliability tests' results for independent and dependent variables. It also covers the correlation results details.
- **Chapter 7** includes the results of SEM path analysis of variables. In addition, it includes the models used for analysing the predictor variables to check their associations amongst each other and their influences on outcome variables.

- **Chapter 8** includes discussions of the key research findings and the related research questions achievements. This chapter also presents a debate of the key findings from the questionnaire results. Furthermore, it includes discussions of all statistical tests' results and links them with research hypotheses testing. Finally, it consists of a correlation test and SEM path analysis test results discussions. It also includes a detailed investigation of the relationships between strategy diffusion (top-down), performance (bottom-up), organisational culture, and organisational performance.
- **Chapter 9** includes demonstration of conclusions drawn out from the research investigation and results discussions. Implications of findings are discussed as well. It contains an appearance of the robustness of the adopted research methodology. Furthermore, it links the study objectives to the research findings and it includes the study contribution to knowledge, recommendations for future research in the field.

1.8. Chapter summary

This chapter provides an overview of the study. First, it presents notions about the research background and research problem. Then, it shows the research aims and objectives. After that, it discusses the research questions and hypotheses drawn from the research objectives. Finally, the thesis significance and outline are presented.

2. CHAPTER TWO: Review of strategic management, diffusion theory and project management concepts

2.1. Introduction

In this chapter, there will be a comprehensive literature review exploring existing strategic management models, diffusion theories, and project management aspects required for this study, where the chapter will display a set of different definitions, descriptions, theories and models for each of the three terms. Then, it will compare and appraise each of the three aspects of strategic management, diffusion theories, and project management separately, in order to select the proper theories and models that are suitable for accomplishing the aim of this study.

Furthermore, it will evaluate the fitness of the selected theories of strategic management, diffusion theories, and project management aspects together and will show the theoretical underpinning of applying the innovation diffusion for strategy diffusion as indicated in sub-sections 2.3.2, 2.3.3 and 2.3.4. Then, it explains the performance role in project-based organisations. Finally, it will show the importance of the organisational culture as an influencer role in project-based organisations. At the end, the research planned outline in section 2.10 will explain the clear roadmap for the research direction for developing the best research theoretical framework in project-based organisations, which will support examining the research's associations. It will also support the accomplishment of the research aim, which is to investigate the effects of strategy diffusion on organisational performance in projects-based organisations.

2.2. Strategy and strategic management

The concept of strategy has been in society for thousands of years; thus, it is not a new idea. Its origin came from the early days of human civilization, mainly for survival thinking and success achieving, through leadership in wars like the Napoleonic Wars, as written by Von

Clausewitz (1983) and ever since the 400 B.C. wars, as mentioned by Sun Tzu (1988). Hence, from the beginning, the strategy concept was a rich perception and was dedicated only to one idea which is how to win the battle! To this day, military thinking has not changed, and it perhaps will not change (Shenhare *et al.* 2007).

In the modern era, specifically in the 1950s, the term strategic planning originated. Then, later on between the mid-1960s and the mid-1970s the concept became more popular and was broadly understood to be the solution of all difficulties. During the 1980s, strategic planning was kept away as many strategic models did not provide the expected returns for companies. However, in the 1990s, the renewal of strategic planning and processes was extensively accepted in the business world (David 2011). Moreover, as indicated by Shenhare *et al.* (2007), today the strategy concept has been practiced in various situations. For example, individuals understand it as a path, a direction to their future, or even a track to get from one position to another as defined by Mintzberg (1994). In the coming sections there will be several studies that explore strategy in terms of its definitions, typologies, phases, and processes. This is done in order to check which one amongst these typologies could be applicable for this study.

2.2.1. Strategy and strategic management definitions

Over more than 60 years, thousands of publications related to business and corporate strategy were published. For example, the famous works in strategy with the concepts of "distinctive competence" which describes the correlation among structure and strategy had been introduced by Selznich (1957) and Chandler (1962). Starbuck (1965, p. 468) defined strategy as "one could legitimately discuss everything that has been written about organisations." Wright, Pringle and Kroll (1992, p. 3) defined strategy as a "top management's plan to attend outcomes consistent with the organisation's missions and goals", (Shenhare *et al.* 2007). Ackoff (1974, p. 523), also stressed that ''an organisation's strategy consists of those decisions that are made by its highest level of management and that affect the organisation as a whole''. Mintzberg

(1979, p. 25) submitted an alternative definition, stating that ‘‘strategy may be viewed as a mediating force between the organisation and its environment” (Laurett & Ferreira 2018). Therefore, from previous definitions about strategy, authors either limited it to top management and their plans, or they referred it to organisational environments. Later on, Mintzberg (1973, 1987, 1988, 1994) had developed a strategy, as a comprehensive model called “the five P” framework. It is defined as below:

Strategy is a plan – a direction of how to get from here to there; it is also a pattern of consistent behaviour over time; a position, created by a different set of activities and typically results in a unique set of products in particular markets; a perspective, the fundamental way of doing things; and finally a poly, a deception, a specific manoeuvre intended to outwit an opponent or competitor”.

Then, Mintzberg *et al.* (1998) posted what characterises strategy. For instance, strategy sets direction, centres effort, describes the institute, and offers consistency (Shenhar *et al.* 2007). However, Bryson (1995) articulated that strategy can be defined as “a pattern of purposes, policies, programs, actions, decisions, or resource allocations that defines what an organisation is, what it does, and why it does it.” However, Ferreira *et al*. (2014) questioned if the concepts of strategy and strategic management are clear by business managers, especially the new joiner to the business field. Accordingly, they implemented phenomenography type research and investigated all the strategy definitions since 1938 till 2001 to identify the nearest definition to the modern business life. Thus, they came up with twelve understandings of strategy conveyed by new business managers, as displayed in figure 2.1.

From various definitions of the strategy shown above, there is a slight degree of similarities, but still, there are also several important differences that reflect the different beliefs and sights

presented by different authors based on their working agendas and experiences. Thus, this study agenda is to focus on the strategy in the context of project management-based firms.

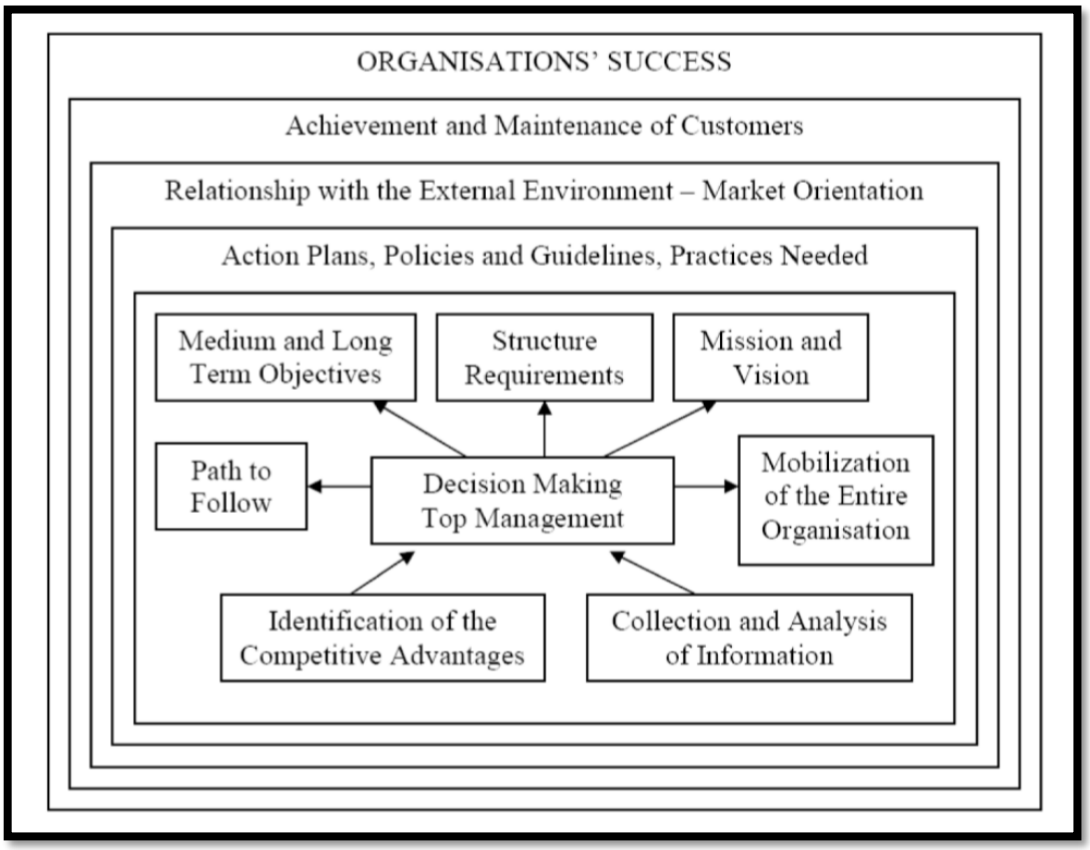


Figure 2.1: Set of visions of the definition of strategy

Source: (Ferreira *et al.* 2014)

2.2.2. Levels of strategy within organisation

In the business world, at least, there are three levels of strategy and planning that are commonly recognised: enterprise level, business unit level, and functional level. Strategies can present and must present at different levels of the organisation, and it is totally appropriate and essential that organisations have a strategic plan at the corporate level, the business unit level, and, the functional level. Moreover, strategic plans at all levels are projected to report challenges of great status (Nickols 2016).

The same were pointed out by other authors (Monday *et al.* 2015; Pearce & Robinson 2013), noting that a classic business firm normally has three types of strategy. The top hierarchy is the corporate strategy, which normally defines a company's overall vision and direction in links to its general attitude toward growth and the management of its product and service lines. The second level is the business unit strategy, which uses the corporate strategy to define specific plans for each business unit, as well as how to deliver these plans, and handles the development of the competitive position in the marketplace. The bottommost level in the hierarchy is the functional strategy level, which takes care of development and improvement of day-to-day actions, and builds an individual capability to offer an enterprise or business unit with a competitive advantage. Therefore, to enhance performance, entities must utilise all three types of strategy concurrently.

Figure 2.2: Strategy levels in organisations

2.2.3. Strategy and strategic management typologies and theories

As specified by Milosevic and Sirvannaboon (2006) that multiple business-strategy typologies are explored in the academic world. Table 2.1 covers a list of strategy definitions and some numbers of typologies, as proposed by different authors according to their agenda of work. Mintzberg, Ahlstrand and Lampel (1998) provided an exceptional roadmap to discover the strategy landscape, through an extraordinary survey and reviewing nearly 2,000 references.

They set the field of strategy into ten different schools, as indicated in table 2.2. The first three schools are related to how the strategy should be formulated, the next six schools describe how strategy is made, and the last school combines all schools (Shenhar at al. 2007).

Table 2.1: Strategy definitions and typologies

What is Strategy?	Typologies of Strategy
Wright, Pringle and Kroll (1992) Strategy is top management's plans to attend outcomes consistent with the organization's missions and goals. **Mintzberg, Ahlstrand and Lampel (1998)** • Plan, a course of action • Pattern of behavior • Position (product, markets) • Perspective • Ploy **Porter (1980, 1985, 1996)** • Search for favorable competitive position—for profitable and sustainable position • Strategy is doing different things or doing the same things differently • Organizational effectiveness is not strategy **Cleland and King (1983)** Strategy is a series of prescriptions that provide the means and set the general direction for accomplishing organizational goals, objectives, and mission.	**Porter (1980, 1985, 1996)** Generic strategies: • Differentiation • Cost leadership • Focus **Miles and Snow (1984)** • Reactors • Defenders • Analyzers • Prospectors **Maidique and Patch (1988) Typology** • First to Market • Fast Second • Cost volume • Differentiation (Niche) **Venkatramen (1994, 1999)** • Aggressiveness • Analysis • Defensiveness • Futurity • Proactiveness • Riskiness **Mintzberg, Ahlstrand and Lampel (1998)** • Niche players • Pioneers • Local producers • Dominant firms • Me-too firms • Worldwide replicators • Professionals • Thin producers • Rationalizers • Crystalline deliverers or network firms • Conglomerates

Source: (Shenhar 2007)

Table 2.2: Mintzberg's ten schools of strategy formation

School	Strategy Formation
Design	Process of conception
Planning	Formal process
Positioning	Analytical process
Entrepreneurial	Visionary process
Cognitive	Mental process
Learning	Emergent process
Power	Process of negotiation
Cultural	Collective process
Environmental	Reactive process
Configuration	Process of transformation

Source: (Shenhar 2007)

One of the most influential works in strategy is Porter's generic strategies, introduced by Michael Porter in the 1980s, where he developed a platform for the notions of the value chain and competitive analysis. Porter's generic strategies model comprises the following scopes: focus, cost leadership, and differentiation (Shenhar *et al.* 2007). Milosevic and Sirvannaboon's (2006) study described in detail Porter's generic strategies, starting from cost and leadership scope, which means to be as an organisation, the lowest-cost producers in the business, to increase market share and to gain competitive advantage. Meanwhile, the differentiation scope is where organisations follow a different strategy to position themselves in the marketplace with a distinguished reputation that pleases the requirements of their clients. Finally, the focus scope which is through targeting a specific segment of the market, such as focusing on the service line, select customer group, geographical area, or product kind (Porter 1996).

Monday *et al.* (2015) stated that according to Wheelen and Hunger (2011), strategic management in any organisation is involved in four main stages, to cope with the surrounding changes. The stages are:

- Stage one: basic financial planning, where the managers start simple one-year plans for budgets.
- Stage two: forecast planning, where the managers plan for projects that may take more than a year, normally between three to five years.
- Stage three: strategic planning, where the top management develops strategic planning, and the execution part undertaken by lower-level staff.
- Stage four: strategic management, by creating a team from all levels in the organisation that involves planning.

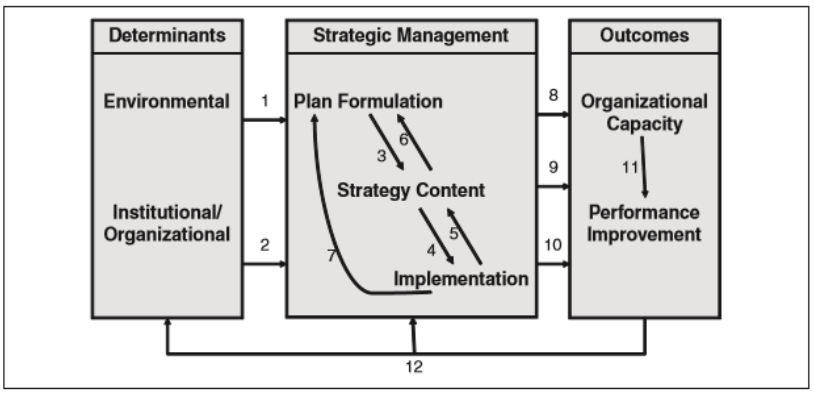


Figure 2.3: Strategic management conceptual framework in public sector

Source: (Poister *et al.* 2010)

Poister *et al.* (2010) followed Stone *et al.* (1999), and used a conceptual model shown in figure 2.3 to describe the Strategic management in the public sector. The left side of the model consists of the influencer of the strategic management in the public sector, including institutional / organisational and environmental factors. The centre of the model is the strategic management processes, including the strategy formulation, contents, and strategy implementation. The right side of the model are outcomes generated by strategic management activities. This model is

intended to represent the logic behind it with the main principle elements of strategic management and their impact on an organisation's performance.

Kaplan and Norton published a paper in 2008 describing how their Closed-Loop Management System Links Strategy and Operation. The loop contains a five-stage system, as shown in figure 2.4, starting with strategy development, which participates in applying processes, tools, and thoughts, such as mission, vision, and value statements, shareholder value management, SWOT analysis, PESTEL Analysis, competitive placing, and core capabilities to formulate a strategy statement. After that, the strategy statement is translated into defined objectives and initiatives of a strategic plan, using other processes and tools, such as strategy maps and BSC balanced scorecards.

The third stage is strategy implementation, which maps strategy plans to operations plans, using another set of processes and tools, like process and quality management, dashboards, reengineering processes, activity-based costing, rolling forecasts, dynamic budgeting, and resource capacity planning. The fourth stage will be monitoring and learning, where the implementation progresses continually to be monitored and reviewed, to learn from internal operational data results, from external data results on competitors, as well as, from the overall business environment to check the assurance of the strategy. Finally, executives periodically evaluate the strategy, modifying it when they learn that the expectations underlying it are superseded or defective, which means to start another loop in the system.

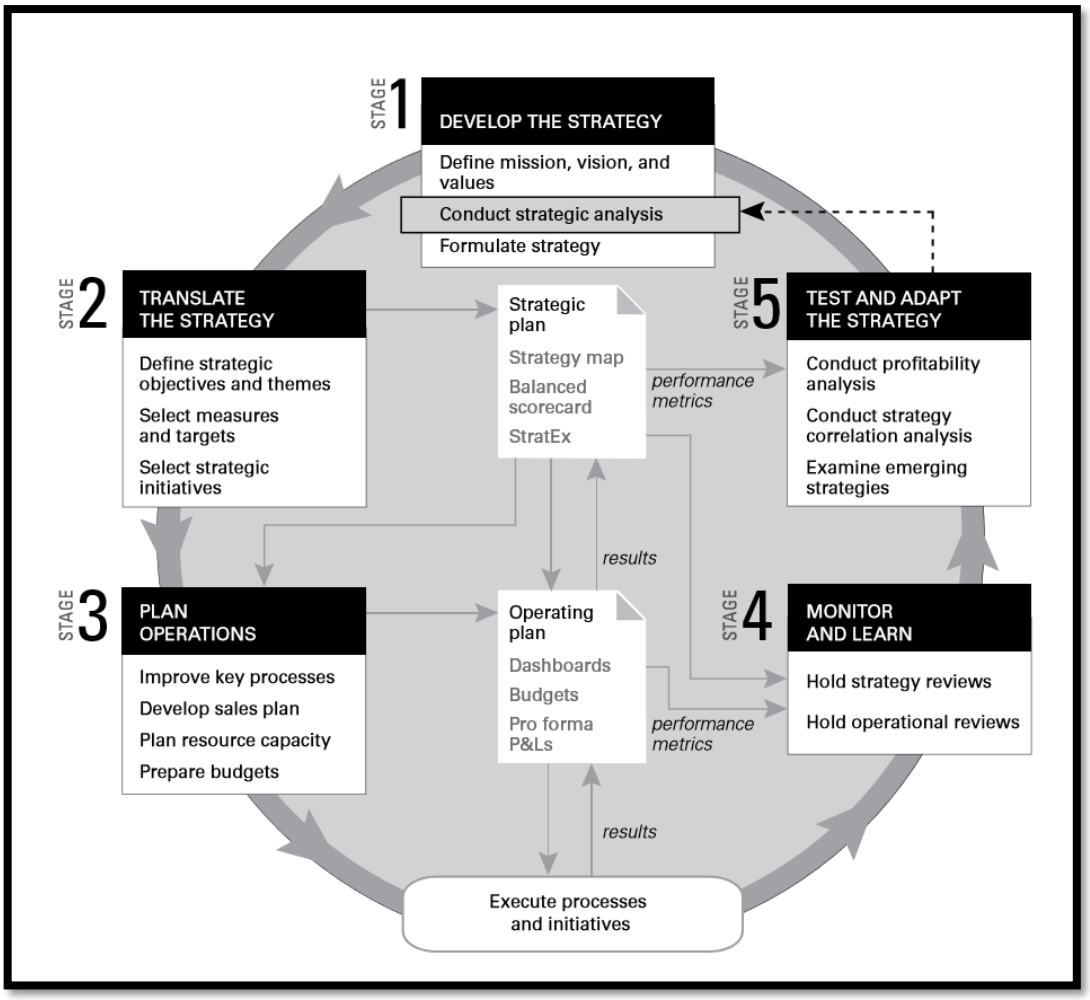


Figure 2.4: The closed-loop management system

Source: (Kaplan & Norton 2008)

Likewise, Fred David's model called the strategic management comprehensive models since 1999 is one of the famous models in strategic management. Based on Fred David's strategic management model, the process contains three phases, precisely, strategy formulation, strategy implementation, and strategy evaluation, as shown in figure 2.5.

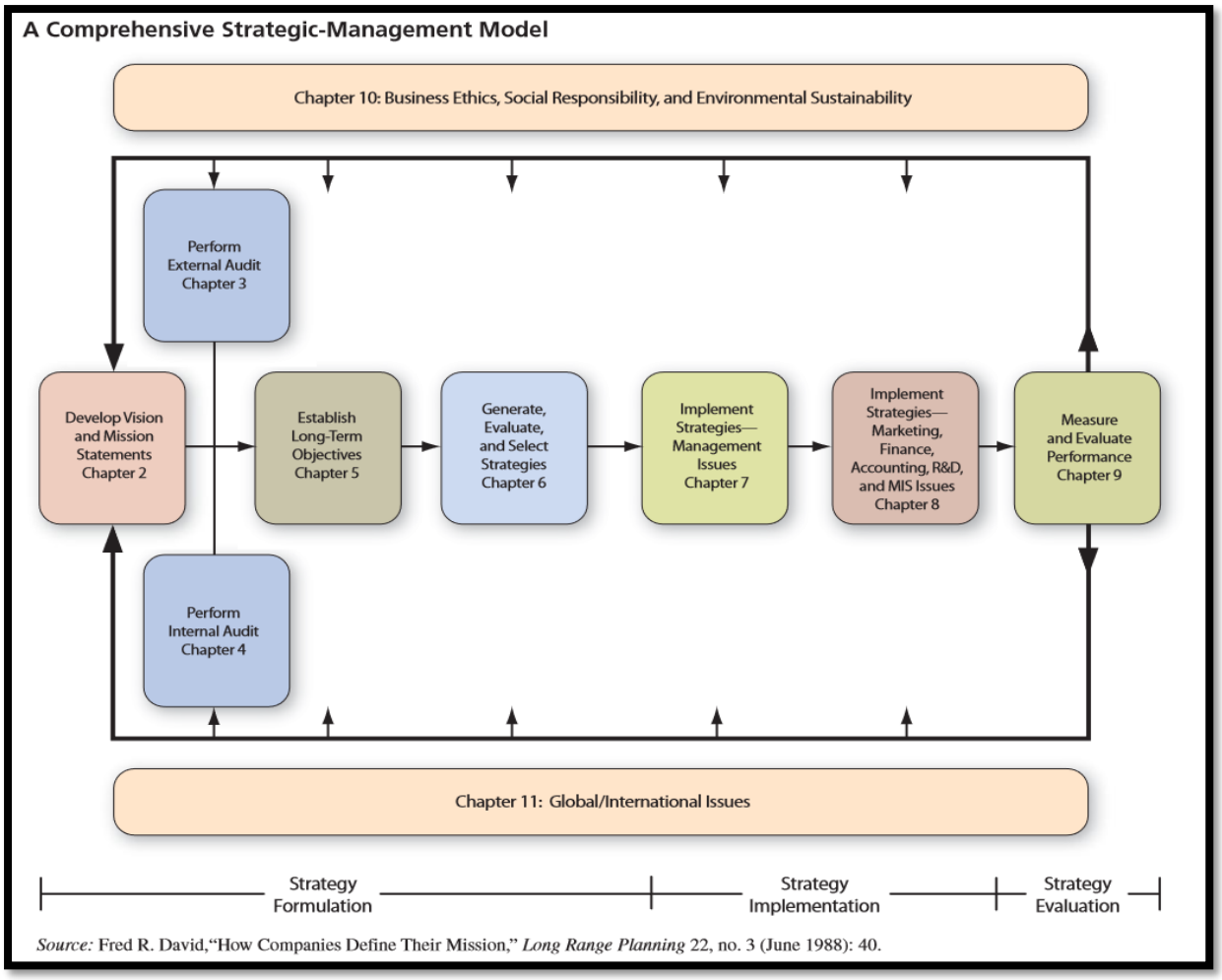


Figure 2.5: A comprehensive strategic-management model

Source: (David 2011)

Strategy formulation, which known also as strategic planning, is the first stage of the strategic management process in David's Model. It participates in the number of sub-phases: development of vision and mission statements of the entity, execute internal and external audit, the creation of long-term objectives, and finally generation, evaluation, and selection of company strategies. The next stage, is commonly known as strategy implementation, comprises activities like launching yearly objectives, allocating resources, and developing policies for every business role, and so on. Actually, in this stage, the company's objectives are being implemented, to achieve the organisational objectives. Strategy evaluation is the last stage of

the strategic management process, where it involves company performance measuring and evaluation, accordingly, any changes or corrective actions can be taken for the strategy (David 2011; Shujahat *et al.* 2017).

From all of the above, it is found that the strategy typologies and models were varied, from author to author, and the strategy models were displayed by various authors according to how they address issues, their field of work, experiences, and perspectives. Moreover, project-based organisations should only consider those that could provide fitting between their business strategy and their project management elements and characteristics; for example, Miles and Snow's (1984) typology, Porter's generic strategies (1980, 1985, 1996), as well as Maidigue and Patch's (1988) typology as indicated by Milosevic and Sirvannaboon (2006). Furthermore, Muogbo (2013) utilised David's strategy model to investigate the impact of strategic management on a firm's development and growth and found that there is a significant effect on employee performance and boost in organisational performance and competitiveness. This is because David's model of strategy is one of the more famous strategic models due to its appropriateness with a number of other theories that facilitate project management; such as, contingency theory (Ford 2002), resource-based theories, and profit-maximising and competition-based theory, in which, profit-maximising and competition-based theory are referred to the concept that business organisation's key goal is to achieve long-term profit and emerging sustainable competitive advantage in the marketplace. On the other hand, the resource-based theory refers to the internal resources, their capabilities, and they have the potential to establish competitive advantage and eventually improve organisational performance. Furthermore, the contingency theory refers to how firms should develop managerial strategy based on the situation they are facing; as there is no single idea or way to manage the organisation.

2.2.4. Importance of strategy and strategic management

In general, all the business strategy definitions are linked to competitive advantages, advantages that benefit entities to sustain attracting customers, and protecting themselves from competitive forces (Milosevic & Sirvannaboon 2006).

Allen and Helm's (2006) findings included a list of key strategic practices significantly related to organisational performance for each of Porter's generic strategies, and specified that most if not all researchers, support the extensive benefits of strategy for the effective performance of an organisation.

The maximum number of entities' underperformance is due to breakdowns between strategy and operations (Kaplan & Norton 2008). Moreover, everyone agrees that achieving a good result cannot happen without having good execution. Similarly, everyone understands that having a good strategy alone is not enough to guarantee success. As is known, execution is about making results in the context of strategy choices. This means that the strategy is related to a series of choices one decides on regarding where and how to execute to win and maximise the long-term value of the company. Thus, a good strategy must have a good execution (Favaro *et al.* 2012).

Monday *et al.'s* (2015) empirical study was conducted in Nigeria, and shows the significant relationship between strategic management and firm performance. Moreover, it proves that strategic management implementation leads to the competitive advantage of the organisation.

An effective strategy planner recognises that strategy must be dynamic, flexible, and compliant. This is because the strategy is about a future observation and every single day brings new information and learning about how your future will be. For instance, changes in technological innovations, customer expectations involvement, organisational income, regulatory changes, political activities, competitive interruptions, and other forces that may affect the strategy must

always considered and monitored. Thus, the strategy must cope with these changes (Favaro 2013).

In turn, Laurett and Ferreira (2018) mentioned in their systematic literature review study about the importance of strategic planning at non-profit organisations that in order to meet all the needs of their stakeholders, it is required to attain their vision, missions, and develop future plans.

Seminal contributions had been made by Mintzberg, Ahlstrand and Lampel (2005) in a "strategy safari" book, where the authors illustrated the advantages of the strategy as follows: 1) strategy sets direction, as the key part of the strategy is to draw the path of an organisation to sail consistently; 2) the strategy focuses all efforts, by coordinating the activities because without strategy disorder can occur as people will follow alternative and different paths; 3) the strategy describes the organisation, as it provides a meaningful way to understand what the association does; 4) the strategy offers consistency, through facilitating actions, a reduction in ambiguity by explaining the words, and providing orders.

This has also been explored in prior studies by David (2011) about the financial and nonfinancial benefits that can be determined by practicing strategic-management concepts in organisations. Financial benefit reflections can include substantial enhancements in sales, profitability, and productivity.

Whereas, for nonfinancial benefits part scholars like Greenley (1986), Oyedijo (2013) and Monday *et al.* (2015) illustrated them as following: It offers a visionary objective for problem management, permits for identification, ranking, and utilisation of chances, builds a framework for in-house communication between staff, characterises a framework for improved coordination and governor of actions, offers an integrated, supportive, and excited approach to undertake opportunities and difficulties, allows extra effective distribution of time and resources

to known opportunities, reduces the impacts of negative changes and conditions, minimises the usage of time and resources that are used to correct incorrect decisions, unites the individual's effort to total effort, encourages forward-thinking, encourages a positive attitude toward change, offers a platform for advisory separate responsibilities, provides a sense of formality and discipline to the business management. Finally, it permits key choices to better support conventional objectives.

David (2011) mentioned that much top management in profit and non-profit companies realised the benefits of strategic management. For example, strategic management lets firms be more proactive in visualising their future, and that allows them to control their companies more adequately, where, the strategy communication is one of the key success factors within strategic management. Figure 2.6 illustrates these essential benefits, when a firm engages in strategic planning. Note that all firms need all employees on a mission to help the firm succeed.

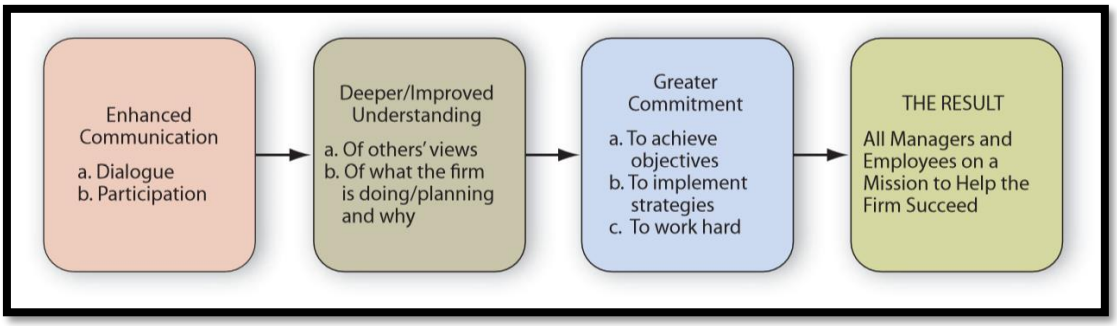


Figure 2.6: Benefits to a firm that implements strategic management

Source: (David 2011)

The fundamental importance to managers in the public sector is a shared sense of organisational strategy because it is vital to the position of organisations to face an uncertain and complex future. Moreover, these managers can utilise strategy to concentrate and put more effort into

real significances, to offer a consistent model to guide actions and decisions and provide a new or renewed sense of drive to organisations (Poister *et al.* 2010).

Studies have shown that achieving a competitive advantage position and enhancing firm performance relative to competitors are the main objectives that business organisations should strive to attain. Furthermore, the idea that strategy content influences organisational performance is a central element of generic management theory. To remain competitively advantaged, studies had equally suggested the use of strategic management. This is because strategic management identifies the purpose of the organisation, as well as the plans and actions to achieve the main purpose (Muogbo 2013).

In summary, after a comprehensive review of existing strategy and strategic management definitions, topologies and models, David's strategic management model were selected as it is aligned with project management business. As indicated by Muogbo (2013) this model impacts positively on the organisational employees' performance, which in turn boosts the organisational performance. Moreover, this model is very much matching with project management business as it deals with the same theories utilised in project management, such as resource-based theories, profit-maximising theories, contingency theory and competition-theories according to Ford (2002). In the next sections, there will be more illustration about the diffusion theory and the possibility of merging the strategic management model with the diffusion theory concepts.

2.3. The diffusion theory

Kaminski (2011) and Strang and Soule (1998) noted in their studies that the idea of diffusion theories is not new, as the idea was first debated archeologically in 1903 by the French

sociologist Gabriel Tarde, who designed the original S-shaped diffusion curve. After that, it was followed by Gross and Ryan (1943), who announced the adopter groups. Later on, the diffusion model developed by Bass (1969) established an experimental overview about new products and services (Mahajan, Muller & Bass 1995). Then another classic study existed about diffusion by Hagerstrand (1967), who studied the diffusion of the telephone and tests for tuberculosis innovations in Sweden; and finally Coleman *et al.'s* (1966) investigation of a medicine drug diffusion in four Midwestern cities. The current theory had been popularised by Everett Rogers in 1995, amongst other scholars (O'Neill, Pouder & Buchholtz 1998; Strang & Soule 1998). These studies were dedicated to the communication procedures and channels, interrelation network between individuals within the adopting community, monitoring the job of the mass media, and professional change managers (Strang & Soule 1998).

2.3.1. Rogers' diffusion theory process

As indicated by Rogers (2003), Kaminski (2011), and Doyle, Garrett and Currie (2014), the diffusion of innovation process was built up via certain communication channels over time by members of a community structure.

Beal and Bohlen (1956), Rogers (1995), and Doyle, Garrett and Currie (2014) identified and described the five stages of diffusion or the communication channels at the individual level occurring as shown in figure 2.7. These include: 1) Knowledge or Awareness Stage, where an individual is open to innovation, but without full information; 2) Persuasion or Interest Stage, where an individual shows more and more interest about the new idea and wants more data about it; 3) Decision or Evaluation Stage, where an individual uses innovation spiritually and expects the upcoming condition, and then selects whether or not to go for it; 4) Implementation

or Trial Stage, where an individual fully uses the invention; and 5) Confirmation or Adoption Stage, where an individual chooses to fully use innovation.

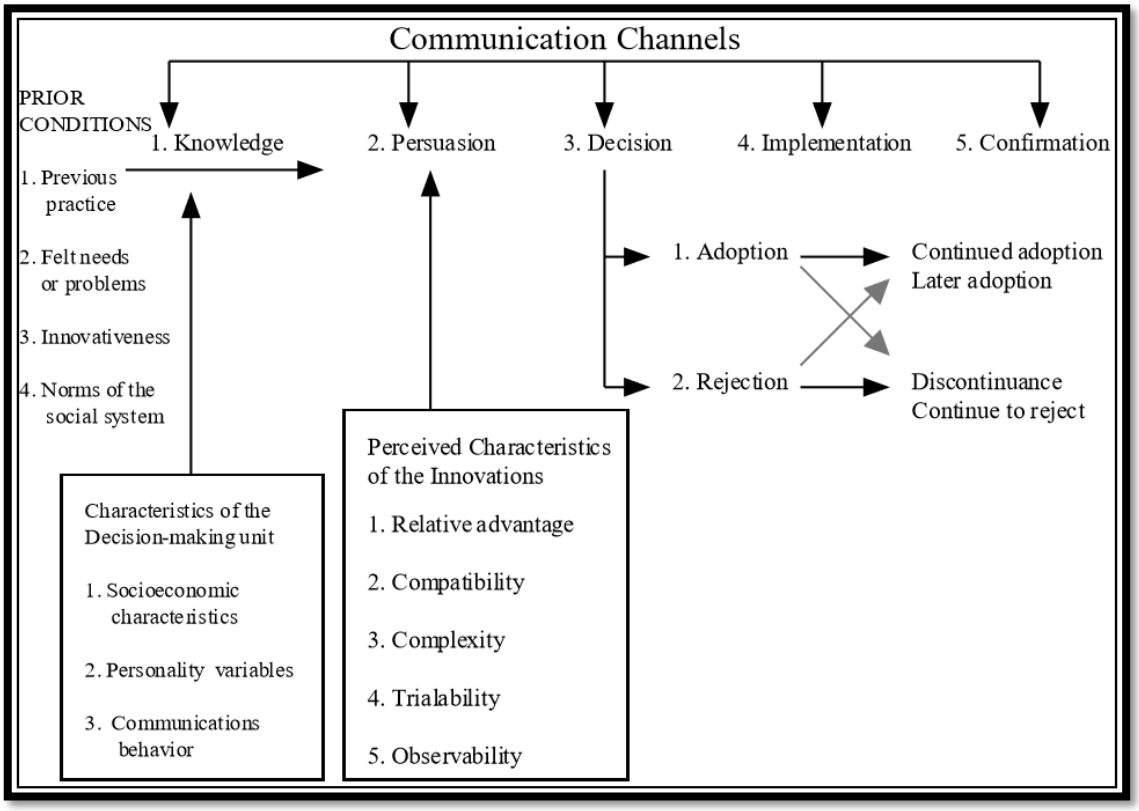


Figure 2.7: Decision process stages of diffusion theory

Source: (Rogers 1995)

Elements that could influence diffusion amounts contain the features of the adopter, the features of the promoters, the communication process, the social network, and the innovation aspects that influence an individual's decision, when persuading to adopt an innovation. These may include observability, complexity, relative advantage, compatibility, trial ability (Lyytinen & Damsgaard 2001; Doyle, Garrett & Currie 2014). Furthermore, Rogers (1995) identified four elements for the diffusion, as following: innovation, communication system, time, and social system. Table 2.3 defines all the Rogers diffusion model components.

Table 2.3: Components of the classical diffusion model

Component	Definitions/Generalizations
Definition of Diffusion	The process by which an innovation is communicated through certain channels over time among the members of a social system.
Typical Diffusion Pattern	Process starts out slowly among pioneering adopters, reaches "take-off" as a growing community of adopters is established and the effects of peer influence arise, and levels-off as the population of potential adopters becomes exhausted, thus leading to an "S-shaped" cumulative adoption curve.
Innovation Characteristics	Innovations possess certain characteristics (relative advantage, compatibility, complexity, trialability, observability) which, as perceived by adopters, determine the ultimate rate and pattern of adoption.
Adopter Characteristics	Some potential adopters are more prone to innovate than others, and can be identified as such by their personal characteristics (education, age, job tenure etc.). Adopters can be usefully classified according to where they adopt relative to others (innovators, early majority, etc.).
Adoption Decision Stages	The adoption decision unfolds as a series of stages, flowing from knowledge of the innovation through persuasion, decision, implementation and confirmation. Adopters are predisposed towards different kinds of influence (e.g., mass market communication versus word-of-mouth) at different stages.
Opinion Leaders and Change Agents	The actions of certain individuals (opinion leaders and change agents) can accelerate diffusion, especially when potential adopters view such individuals as being similar to themselves.

Source: (Fichman 2000)

2.3.2. Diffusion in the context of managerial practice

Diffusion theory was utilised in many fields and domains, including the medicine and health fields, education sector, agriculture domain, or in industries for new products like mobiles (Kuester, Gatignon & Robertson 1999). For example, Doyle, Garrett and Currie (2014) employed a literature review and thematic categorisation methodology, which prescribe the use of Rogers' diffusion of innovation for merging mobile devices into nursing education. Furthermore, Kempe, Kleinberg and Tardos (2015) concluded the earliest systematic investigations on social network diffusion processes within the social sciences studies, where some studies focused on data relating to the adoption of medical and agricultural innovations.

While Greenhalgh *et al.* (2004) attempted in their systematic literature review to integrate a huge and various literature through combining a framework of the diffusion of innovations in healthcare organisations. However, they indicated in their study some points that not explored in detail, related to organisation and management literature in organisational perspectives, where innovativeness relies upon logical decision making, excellent leadership, and competent human resource management.

Strang and Soule (1998) discussed the diffusion in social movements and organisations, where they focused on how practices spread and argued that researchers should put more attention to structural and cultural bases of diffusion, as the impact of the diffusion method on the business and political part had barely started to be practiced.

Nonetheless, several studies (Fichman 1999; Lyytinen & Damsgaard 2001) have found that the diffusion of innovation research has had a significant positive effect on IS research. However, it is suggested, as a step forward, to consider issues like market making and organisational structures for future studies related to diffusion theory, to understand the critical role of market making and organisational structures in shaping the diffusion arena. Asked to develop multi-layered theories of diffusion that influence the mappings between different levels and settings. For doing so, good candidates consist of institutional models, political models and theories of team behaviour in conflict associations. Moreover, Kaminski (2011) indicated that the diffusion theory is a vital theory, which can support managers, change agents, informatics professionals, and information technicians well. The diffusion theory also benefits the purposes of change, since all involved stakeholders are consistent with robust strategies for executing innovative change. The theory provides a support for planning informatics inventions.

Kee (2017) published a paper in which he described organisational adaption and noted that many diffusion studies focus on individuals as a unit of adoption more than organisation as a

unit of adoption. Kee discussed in his study that organisation normally adopts an innovation by utilising a number of stages, such as setting, matching, redefining, structuring and interconnecting. For example, when a new idea or new regulation is proposed it must go through these stages of adaptation. This model suggests that the organisation must go through multiple stages and focus on planning until it adopts the new concept. At the end of his paper he recommended for future application of the diffusion theory in new and emerging contexts and developing advanced solid methods. Moreover, most diffusion studies treat each innovation tested as a new idea, practice, or technology. However, nowadays innovations are more complicated, as they can be involved in adoption of new actions and beliefs associated with the new notion. Furthermore, the researchers can investigate the role of organisational capacity as a factor for adaptation, and capacity building as a diffusion practice. These studies could have the potential to enhance the adaption capability of both organisations and individuals.

Therefore, in management fields, the diffusion term as stated by Strang and Soule (1998, p. 266) refers "to the spread of something within a social system". The main word here is "spread," and in a deeper explanation it is to start movement from a source to an adopter, for instance via communication and influence. For Strang and Soule (1998, p. 267) the word "practice" refers to the things that are being diffused in societies or organisations, which "might be a behaviour, strategy, belief, idea, practice, product, service, technology, or structure". Normally, diffusion studies often highlight the spreading process as trendy between "users" and "adopters" (Bass 1969; Rogers 1995), which is very much similar to the definition of the innovation, where it consists of a product, service, idea, or practice as per Rogers (1995).

In the management field, those practices have seemed and reflected in more efficient and effective ways to attain specific outcomes. Precisely, those management "practices" which will reason in strategies or structure modifications often happen in the context of organisational re-

engineering (for example, Business Process Improvement). It can also provide positive improvements on manageable parts, such as management guidelines and strategies (Sun 2009). For example, it could refer to the acceptance process for a new product appears in the market (Bass 1969); and in the society, it could refer to a process that a novel notion, fashion, technology etc. is practiced by the society participants (Rogers 1995).

However, regardless of what the "something" is, "spread" is the main expression, as it suggests an understanding and leaning that further individuals are undertaking and accepting it or rejecting. In place of practice diffusions, it is mainly about the communication of how a practice is presented and understood (Sun 2009). Thus, diffusion always comprises together teaching and learning practices (Strang & Soule 1998). Moreover, good communication gives people a chance to argue and share their point of view and considerations about a practice, and later to influence a mutual decision about whether a practice should be rejected or believed (Sun 2009).

Consequently, the distinct model for diffusion is an establishment's nonstop movement of looking for "uniformity" and adapting to its "established environment" as indicated by DiMaggio and Powell (1991). Moreover, a practice diffusion in relation to a changing process meant to put in place a practice which is unknown, to become known, accepted, supposed, and practiced (Sun 2009).

Similarly, the diffusion of invention indicates to the process that happens as people accept a novel notion, practice, viewpoint, product, and so on. It also highlights the significance of communication and peers interacting within the implementation process (Kaminski 2011). Rogers (1995) highlighted that normally, an early few are agreeing the new notion and accept its implementation and use. As these primary innovators 'spread the word', further individuals come to be open to it which results to the expansion to a serious quantity. By the time, the new idea or invention becomes diffused among the people till a fullness point is realised.

Beal and Bohlen (1956), and Rogers (1995) described a practice for the spreading process and mapped out this process via five groups of adopters according to their probability of attempting and/or adopting new things containing: innovators, early adopters, early majority, later majority and laggards, refer to figure 2.8. This curve shows the gap between early adopters and the late majority as serious measure, and reduces the gap reflecting on understanding social and emotional factors, which motivates an invention's spread, as well as the method by which these factors merge to make a gap among early adopters and others in a society or an organisation (Rogers 1995).

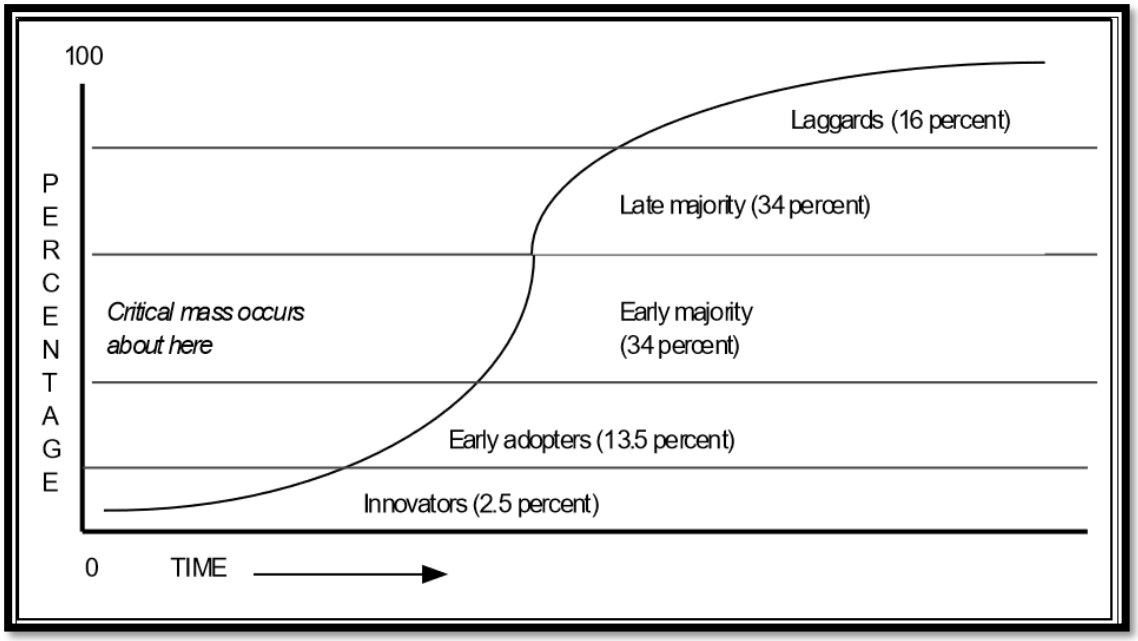


Figure 2.8: The diffusion curve

Source: (Rogers 1995)

As indicated by Kaminski (2011) and Rogers (2003) the diffusion of innovation process was built up via certain communication channels over time by members of a community system.

According to the above several studies related to diffusion theory utilisation various fields, this indicates that the diffusion theory can be used for different types of practices and is not limited to innovation only, especially those that are related to managerial practices. Moreover, it can use both an individual as well as in organisation as a unit of adaption (Kee 2017).

2.3.3. Diffusion in the context of strategic management

Only a few works in the literature demonstrate strategy and diffusion (Kuester, Gatignon & Robertson 1999) where it is reported that the role is done by technology and access strategy in the diffusion theory to enhance the field's knowledge about the idea of integrating the strategy with diffusion theory. They concluded that the actions of business firms can have a significant impact on the speed of diffusion of new products, ideas, or practices marketed by an organisation. This calls for combining strategic decisions into diffusion models. This study discussed about the strategy aspects as market segmentation and target choice, order of access, pre-broadcasting, market entry obligation, and the role of spreading. Additionally, Hallahan *et al.* (2007) in their article examined the nature of strategic communication, mentioning that a well-known theory (diffusion theory) views communication as an effort by a sender to create a pre-defined attitudinal modification in the receiver, which requires that mass media notify specific people, who, in turn, influence the senses supposed by others.

From the above literature, innovation diffusion study suggests understanding of why strategies might continue to spread through people and if most strategic initiatives will plan to have a better financial impact on an organisation than organisational innovations. This great impact arises because strategies generally are implemented quickly and have major up-front prices. Over the huge growth or drop created by these variations and changes, the organisation is subject to a potentially swift and evident turn in performance (O'Neill, Pouder & Buchholtz 1998).

Furthermore, O'Neill, Pouder and Buchholtz (1998) carried out a study of patterns in the diffusion of strategies across organisations to enhance performance. As they described, strategy is an organisational change that significantly increases or tightens the business field in a new

way. Furthermore, they designated three key factors that together influence the properties of the diffusion design:

1. Organisation environmental influences: as in order to identify the diffusion patterns of strategy, it is essential to know the conditions that put an organisation in a stable position or to search for change. For example, environmental uncertainty that could be rapid and broaden a strategy's spread, as well as the acceptance of diffusion, will be quicker within micro-cultures than across macro-cultures. Specifically, when there are more linkages and homogeneity between micro-cultures there will be greater and quicker adoptions within that macro-culture.
2. Organisational factors: like an organisation's past success, failures, organisational performance, and organisational memory and their important relations to the determination of adoption of a strategy.
3. Features of the strategy itself: as the visibility and portability of the strategy as well as the reputation of the strategy's source.

Therefore, several studies have shown the possibility of working on diffusion theory within the contents of strategy management, which indicates the theoretical opportunity of using the diffusion theory within the strategic management environment.

2.3.4. Strategic management diffusion in the context of project management

Kenny (2003) presented a comprehensive model of managing innovation projects and strategic educational change, where he linked the strategic management and project management with Rogers' diffusion theory. Strategic planning as per Mintzberg (1989), is a course to set priorities and directions to fulfil the required desires or challenges for an institution. The

execution phase of the strategy normally leads to identifying change and innovative projects. The main success key of strategic planning is the building of a “shared vision” through the organisation.

O'Neill, Pouder and Buchholtz (1998), mentioned the linkage between strategy diffusion and the organisational uncertainty environment. Rogers (1995) also illustrated that innovation comes with its uncertainty. Furthermore, the projects that emerge in the implementation stage of an essential strategic direction in an organisation would contribute in innovation and change, but surely would have high levels of uncertainty. Obviously, then strategic change will take place only if a ‘shared vision’ is approved over a mixture of top-down and bottom-up practices.

There must be a circle or a loop that links the strategy to the activities and actions happening in an organisation and a continuous response to update and notify strategic planning for any updates. The project management therefore has to reflect the accomplishment of the strategic objectives of the organisation, and not only focuses on a narrow project aspect (Kenny 2003).

Similarly, Mahmoud-Jouini, Midler and Silberzahn (2016) declared that project management meets innovative conditions through exploration (defining and solving the problem for better ideas inspiration), firm strategizing (contributes to value creation) and stakeholder involvement (in innovation processes for easing their interconnections). Likewise, Kock, Heising and Gemunden (2016) studied the linkage between innovation management and project portfolio through investigating the impact of front-end success on project portfolio performance success. The findings of the study showed a positive significant association between front-end success and portfolio success with the existence of strategic ordinations through riskiness and with the presence of portfolio degree of contingencies (project interdependency and portfolio size). In the end, the study recommends extra research into the interface of project management and innovation.

Based on that, there is connection found between the innovation concepts and project management field that can be employed for this study to move toward its main aim that will be used to investigate the strategy diffusion impact on the project-based organisations' final performance.

In the coming section, the need to comprehend the project-based organisation is essential to understanding the organisation type under this study, and to check the suitability of this environment for this study; as this study needs to practice the top-down and bottom-up points of view.

2.4. Project management concept

A series of recent studies indicated that there are three directions of study in the literature of project management to reformulate project management in such settings. The first direction has highlighted the importance of an exploration phase in projects to allow requirements and specifications to emerge through learning, trial and error (Dodgson, Gann & Phillips 2014; Lenfle 2008); the second direction has highlighted the need to link project management to firm strategizing by, for example, project portfolio selection and decision making methods (Ghasemzadeh & Archer 2000; Cooper, Edgett & Kleinschmidt 2002; Meskendahl 2010; Martinsuo 2013; Pajares & López 2014); and the third direction has highlighted the critical role of stakeholders and the need to mobilise them to build the political context in which the project will develop (Jonas 2010; Unger *et al.* 2012).

Project-based organisation points to a diversity of organisational forms that contribute to the system related to project activities and performance. Lately, more attention has focused on project-based organisations as a contracture, where project-based organisations need to utilise

approaches that enable structures, deliver strategy, and unify the knowledge, in order to develop a common language that fosters the exchange of ideas. Many project-based organisations have moved from managing single projects to multiple project management, and from a "contained" project management prototypical to more strategic perception. Furthermore, now it is well-known that the establishment of project, program, and portfolio management within project-based organisations, see figure 2.9, for the typical project-based organisational structure is explained in recent project management literature. In summary, project-based organisations still need more exploration on the associations between the field of project and general management and more investigation regarding the two-way relationships between them to check the influence of organisational practices (Soderlund 2004; Thiry & Deguire 2007).

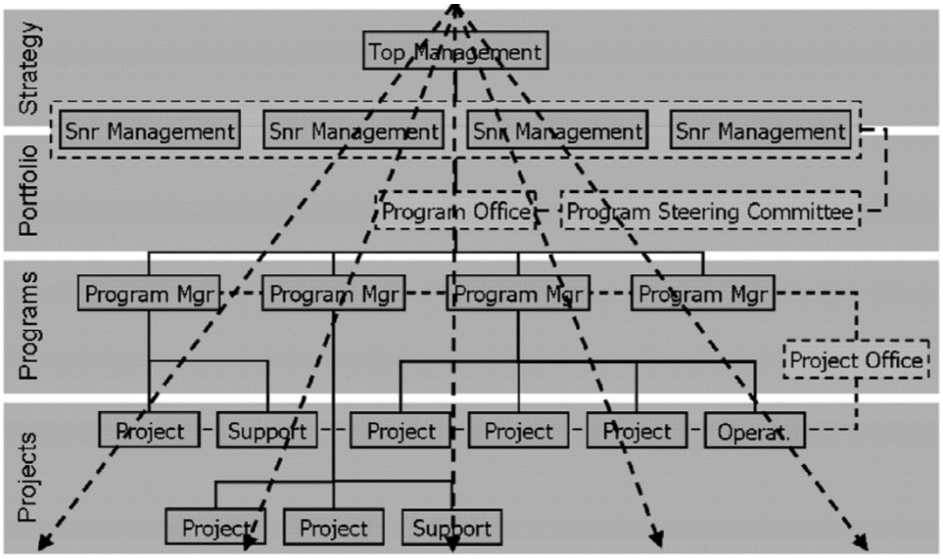


Figure 2.9: Project-based organisation model

Source: (Thiry & Deguire 2007)

As the management of multiple projects, such as project management and portfolio management, is now the leading structure in many companies for strategy implementation, business renovation, new product expansion and constant enhancement (Winter *et al.* 2006; Too & Weaver 2014). In the coming section, there will be a demonstration of project

management including the levels of portfolio management, program management, and project management in project-based organisations.

2.4.1. Project portfolio management

The field of portfolio management started from a seminal paper written in 1952 by an author known as Harry Markowitz, where he laid down the base for the Modern Portfolio Theory (MPT). A framework was developed by Wheelwright and Clark (1992) for classifying projects called "the Aggregate Project Plan". Later, the "Information Paradox" was developed by Thorp (1998), where PPM was placed in a broader framework called "Benefits Realization" (De Reyck *et al.* 2005). Moreover, the medicinal industry has used project portfolio management for a long time (Kodukula 2014).

A Portfolio is defined as "a collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives" PMI (2017, p. 15). Portfolio management is defined as "the centralized management of one or more portfolios to achieve strategic objectives" PMI (2017, p. 15). Patanakul (2015, p. 335) defined Portfolio management as "a dynamic decision process, whereby a business list of active new product and R and D projects is constantly up-dated and revised. In this process, new projects are evaluated, selected and prioritized. Existing projects may be accelerated, killed or de-prioritized. And resources are allocated and reallocated to the active projects." Levine (2005, p. 22) stated that "the management of the project portfolio so as to maximize the contribution of projects to the overall welfare and success of the enterprise".

Likewise, several authors like Muller *et al.* (2008, p. 28) defined in their studies that project portfolio as "a group of projects that shares and competes for the same resources and is carried out under the sponsorship or management of an organisation". Therefore, portfolio of projects

management can be recognised as a dynamic decision course, where a list of dynamic projects is constantly being revised and updated (Muller *et al.* 2008). Similarly, as it has been previously reported in the literature, as portfolio management involves collections of multiple projects and programs it is also a channel to implement organisational strategic objectives (Unger, Gemunden & Aubry 2012).

A number of authors have recognised a list of goals and objectives for project portfolio management, as per the following: setting expected objectives and goals clearly, launching confidence in accomplishing an anticipated objective, understanding, accepting and negotiation, risk management via identifying, eliminating, minimising and diversifying projects' risk, and finally, monitoring and controlling portfolio performance; in order to achieve the needed objectives and goals (De Reyck *et al.* 2005). Furthermore, Cooper, Edgett and Kleinschmidt (2002) placed similar objectives for portfolio, such as value maximisation, strategic direction, right number of projects, and balancing.

Cooper, Edgett and Kleinschmidt (2002) identified, according to best practices, the importance of portfolio management as follows: 1) financially, to maximise return and increase R and D productivity; to achieve financial goals; 2) to preserve the business competitive position, to upsurge market share and sales; 3) to allocate right resources; 4) to build a linkage between business strategy and project selection process, as the portfolio must facilitate strategy through translation of the firm's strategy; 5) to achieve the right balance between high risk and low risk, and between long-term and short-term projects, that are aligned with the business's goals; 6) to achieve focus by doing the right number of the project as per the organisation resources and budget; and 7) to better interconnect priorities with the firm, both horizontally and vertically. This is to provide better wisdom in project selection, then to delete the bad projects accordingly.

Moreover, Killen *et al.* (2012) published a paper focused on the strategic management concepts, like dynamic capabilities, absorptive capacity, and the resource-based view, to project portfolio management and project management research, and the potential of fruitful outputs for these kind of studies in the world of business. Furthermore, the paper highlighted that there will be benefits that can be gained if the researchers establish theories from the strategic management field, portfolio management and project management research areas, and validate their positions as interlinked subsections among strategic management and management research rather than as isolated fields. Likewise, Kunisch *et al.* (2019) explained the importance of shifting from managing single strategic initiatives to managing an integrated portfolio of strategic initiatives and how this led to performance improvement and strategic renewal. Moreover, the article emphasised focusing on the performance of multiple strategic initiatives, not only on the performance of an individual strategic initiative, in order to gain more effective strategic initiative management and to enhance value creation through initiative portfolio management. Moreover, this was because of the fact that the organisational performance reflects the combined effect of multiple strategic initiatives results rather than the results of a single strategic initiative. The five main proposed management practices are shown in figure 2.10 for both cases of single and multiple strategic initiatives.

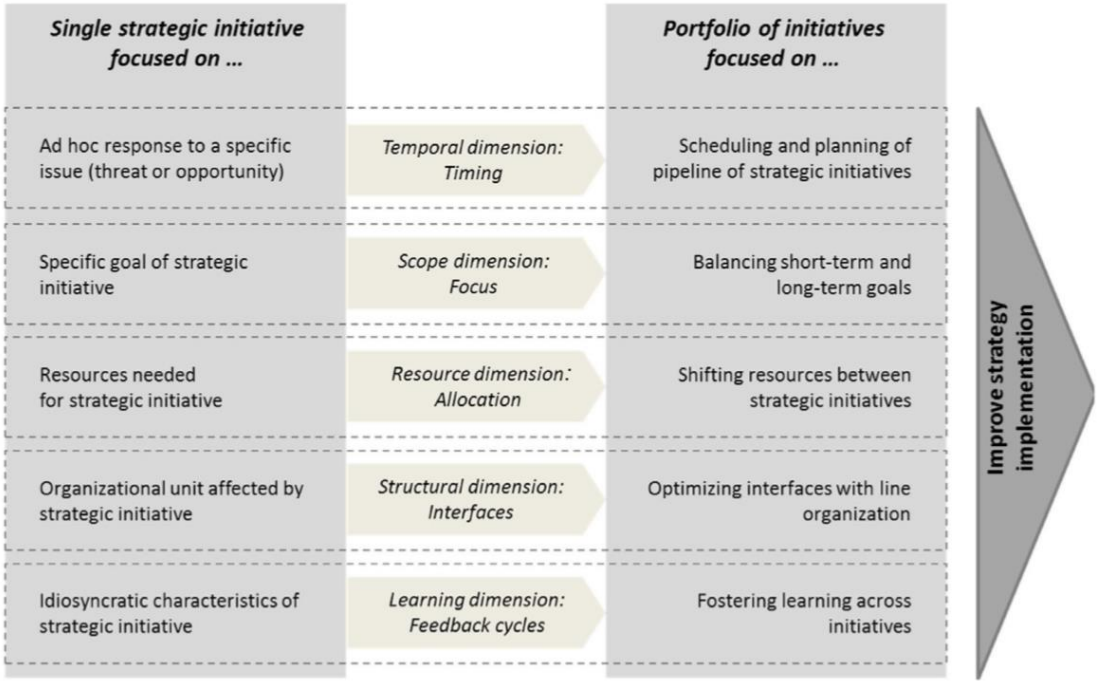


Figure 2.10: Shifting the focus from strategic initiatives to the portfolio

Source: (Kunisch *et al.* 2019)

Over time, an extensive body of literature has been developed on bridging the idea of strategy management with project management through project portfolio management, how the implementation stage of the strategy can be achieved successfully by portfolio practices, and how that can impact significantly a firm's success (Jonas 2010; Unger *et al.* 2012; Killen *et al.* 2012; Martinsuo 2013; Clegg *et al.* 2018) Some scholars mentioned that the portfolio is a central coordination unit that supports the organisations (Jonas 2010). Others stated that the project portfolio is the vehicle for strategy execution (Unger *et al.* 2012). Furthermore, Martinsuo (2013) noted that project portfolio management has taken a central and stable position both in firm management and project management practices throughout the past years. In addition, past studies on portfolio management stressed that portfolio management practices largely depend on the practice and context and demands for further studies on possible factors that could influence the portfolio management field (Martinsuo 2013; Kock, Heising & Gemunden 2016; Kock & Gemünden 2016).

In response, studies have investigated important contingency factors like the complexity and interdependency of the portfolio (Teller *et al.* 2012; Kopmann *et al.* 2015), the type of projects (Müller *et al.* 2008), environmental turbulence (Müller *et al.* 2008; Kopmann *et al.* 2015), or the size of the portfolio (Kopmann *et al.* 2015). Furthermore, several studies (Kopmann *et al.* 2017) explored how strategic control instruments executed at the portfolio level can influence organisational performance by not only measuring performance, but also providing guidance and motivation for improvement and change strategic processes.

Therefore, both the top-down driven process and the bottom-up driven process have been discussed, adding to that the beneficial outcomes for organisations. Additionally, the project portfolio success factors were as follows: strategic implementation success, portfolio balance, future readiness, and synergy. The strategy factors were strategic control, emerging strategy recognition, deliberate strategy implementation, and environment turbulence.

Though the most important role of the portfolio management is the strategy execution part, yet, there are an insufficient study investigated the linkage between business success, strategy, and portfolio management as one block (Muller *et al.* 2008; Kock & Gemünden 2016: Clegg *et al.* 2018). Therefore, this study aims to contribute to a better understanding about the effective strategy implementation by project portfolio practices, to check the strategy impact on organisation performance.

2.4.2. Program management

This section presents a review of related literature on program management, where Shehu and Akintoye (2009) demonstrated that there is a need for implementation of program management via aligning, coordinating and controlling a group of projects to deliver benefits, which cannot be accomplished by projects independently. Although the benefits are achievable

in the exercise of program management, still understanding this practice is vague in many firms. Thus, the program management needs to be clearer as a context or a practice. Furthermore, the differences, similarities, and relationships between program and project management need to be addressed and to be explored further, to highlight the implications and the gaps. Understanding this can affect the execution process of program management.

There are many definitions of program management acknowledged by numerous authors, see below table 2.4 for some of the definitions of program and program management.

Table 2.4: Definitions of program(me) and program(me) management (Hillson 2008)

SOURCE	PROGRAM(ME)	PROGRAM(ME) MANAGEMENT
PMI Standard for Program Management (2006)	A group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually. Programs may include elements of related work outside of the scope of the discrete projects in the program.	The centralized coordinated management of a program to achieve the program's strategic objectives and benefits.
OGC Managing Successful Programmes (2007)	A temporary flexible organisation structure created to coordinate, direct and oversee the implementation of a set of related projects and activities in order to deliver outcomes and benefits related to an organisation's strategic objectives.	The coordinated organisation, direction and implementation of a dossier of projects and transformation activities (i.e. the programme) to achieve outcomes and realise benefits of strategic importance.
APM Body of Knowledge (2006)	A group of related projects, which may include related business-as-usual activities, that together achieve a beneficial change of a strategic nature for an organisation.	The coordinated management of related projects, which may include related business-as-usual activities, that together achieve a beneficial change of a strategic nature for an organisation.

Source: (Hillson 2008)

Furthermore, (Shehu & Akintoye 2009) paper of the program management is defined as multi-project, mega-projects, new business approach, and portfolio of projects. However, it is believed that the term "program" is in common practice, and its exact meanings would be not matching with the in which the word is utilised.

Project Management Institute (2017, p. 11) defined a program as "a group of related projects, subsidiary programs, and program activities managed in a coordinated manner to obtain benefits

not available from managing them individually. From PMI (2017, p. 14) a program management is defined as "the application of knowledge, skills, and principles to a program to achieve the program objectives and to obtain benefits and control not available by managing program components individually."

Pellegrinelli (1997) asserts its importance lies within three features including:

- create benefits through better organisation of projects and their activities; in themselves they do not deliver the project's objectives;
- evolve in response to the business needs in an uncertain competitive, political and technological environment, in a way straddling the vague and changing, and the fixed and tangible;
- take a wider view to ensure that the overall business benefits from projects' activities, not just the project client or sponsor.

It was reported in the literature that the rationale of program management lies behind strategic management, where the focus is on the organisation, rather than the technical level, and instead of focusing on deliverables, it focuses on benefits (Thiry 2004a, 2004b). Hence, the related scopes and roles of program management are to align with the organisational strategic direction that impact project and program objectives and goals, assign the scope of the program into program elements, manage interdependencies of the program components, manage program risks, resolve conflicts and difficulties within the program, manage change requests, allocate budgets, and finally to guarantee benefits realisation (PMI 2017).

Many scholars suggested similar phases for the program management lifecycle (Pellegrinelli 1997, Thiry 2002, 2004a, 2004b, Lycett *et al.* 2004), see figure 2.11, including the following:

1. Initiation and formulation (business requirements, seeking of alternatives, evaluation of options, and selection)

2. Planning and organisation (strategy planning and selection of projects' actions)

3. Deployment and delivery (projects' performance cycle, execution of actions, projects and program interrelationship management, support operational activities, resource efficiency, and monitor and control)

4. Appraisal and renewal (new business requirements, decisions, assessment of benefits, benefits realization, review of purpose and capability, changes to the business model and realignment of projects, if required)

5. Dissolution and closure (interdependencies, learning cycle, reallocation of people and funds, knowledge management and feedback)

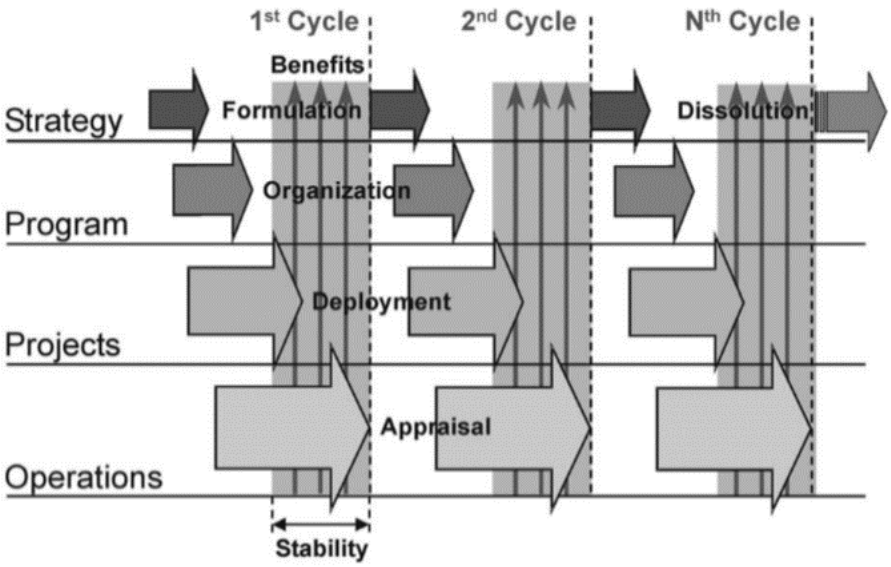


Figure 2.11: The program lifecycle

Source: (Thiry 2004a)

The literature also explores the essential suggestions for program management, which are at present poorly reflected in practice as well as in research. The main suggestion is linked to the rational basis of program management (for example, the stages and activities) and to understand the influence of the relationships. The main relationships that need to be maintained are individual projects and the goals and drivers of the wider business, and individual project

managers within a program and between program management and project management, see figure 2.12, that bonds these associations to the important goals of program management. In particular, it is summarised that the main role of program management is to support effective relations between the different project managers inside the program; to confirm that these projects are working together very effectively and keep on jointly focusing on the success of inclusive business benefit (Lycett *et al.* 2004; Shehu & Akintoye 2009).

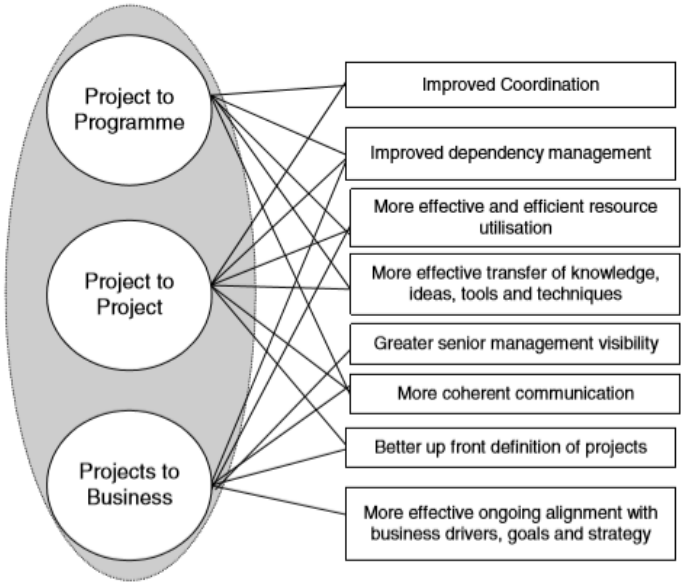


Figure 2.12: Main program management relationships and goals

Source: (Lycett *et al.* 2004)

In summary, a recent study by Hillson (2008) concluded that there is extensive agreement that programmes are at a higher structural level of the organisation than projects, and their scope is to accomplish strategic benefits (Thiry 2000, 2004a, 2004b; Lycett *et al.* 2004). It is also clear that the scope of programmes is bigger than just the number of projects. More expressively, the objectives of a program are strongly related to the overall firm's strategic objectives. Accordingly, the project goals are operational and more related to outputs and deliverables, while program goals are strategical and related to benefits Hillson (2008**)**. Furthermore, Hillson (2008) called to address the issues related to program management practice and research, in

which stresses on the management of associations, to enable the enhancement of the program over time.

2.4.3. Projects management

Previous evidence has shown that firms cannot respond correctly and swiftly to the continual changes of the business world. Firms should change significantly their way of implementation of new practices, for instance to use project management approaches, project benefits, and a better apply and control of current resources and available capabilities. As project management has become critical for the expansion of organisational strategies, by strengthening specialised competences and skills, it is of interest to carry out studies exploring project success, which is subsequentially considered as a business success (Gomesa & Romãoa 2016). Hence, projects are important ways for organisations to achieve their value creation or to create benefits. In today's business world, top managers are supposed to have the ability to manage the challenges of tinier timelines, tighter budgets, lack of resources, and swiftly varying technology. The business environment is dynamic and in order to continue being competitive in the world economy, enterprises are adopting the project management method to dependably bring success to business (PMI 2017).

The Project Management Institute (2017, p. 4), has defined a project "as a temporary endeavor undertaken to create a unique product, service or result". In the same publication (p. 10), project management is defined as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirement." A project management can be considered completed successfully, whenever a correct implementation of the project management courses is done that defined specially for the project.

The project management model allows firms to implement their projects in a very effective and efficient way. Normally, project management efficiency and effectiveness reflect a strategic

competency inside organisation. In additional to that, it empowers organisations rigidity amongst project results and business goals, and it also reacts to the business variations that impact projects, through proper adjustments of project management plans (PMI 2017).

Müller *et al.* (2008) pointed out that many research studies have provided evidence for the project management field; for example, projects are linked to wider company vision, strategy of the firm, and the business benefits (Artto & Dietrich 2004; Morris & Jamieson 2005); projects are managed as part of strategic programs (Lycett, Rassau & Danson 2004; Vereecke, Pandelaere, Deschoolmeester & Stevens 2003); projects relate to programs and portfolios (Turner & Müller 2003); projects are managed as part of organisational portfolio of projects (Elonen & Artto 2003; Engwall & Jerbrant 2003; Payne & Turner 1999; Söderlund 2004); and projects are apparent in different industries (Blomquist & Wilson 2007).

Most early studies, as well as current work focus on the alinement between projects and strategy of the firm; to gain more business success and to gain competitive advantages (e.g., Too and Weaver 2014).

2.5. Performance management

Performance management was defined by Armstrong (1999) as "a systematic approach to improving and developing individuals and teams' performances and capacities in order to increase efficiency throughout the organisation". Until lately, performance management has been linked with the concept of human resources appraisal. However, over time, it has been more related to the organisational aspect. Performance management is found at three organisational levels: strategic, operational, and individual, which consist of metrics, methodologies, metrics, systems, processes, tools and software that are utilised to manage

organisational performance. At the strategic level, performance management is based on strategic organisational goals, where it is the maximum comprehensive execution phase. Actions are focused on organisational strategy preparation and execution. At this level, the most applied instruments for measurement are the performance prism and balanced scorecard (BSC) by Kaplan and Norton (1992) and it covers strategies, missions, objectives, policies, procedures, and organisational culture. Then, the operational level is based on the departmental or groups objectives within the organisation, and the critical tools used for it are dashboards and scorecards. In the past, financial aspects were the key indicators for performance management, but by the time and with the organisational complexity atmosphere been amplified non-financial aspects were also added, consequently performance management extended to other practical ranges inside the firms (e.g., humane resources, marketing, sales, portfolio, program, and project management and so on). For instance, now, the accomplishment of a project is shown not only by the triple constraint (budget, time and cost), but it also covers other essential business factors like company reputation, stakeholder's satisfaction, strategy alignment, teamwork, and so on. Therefore, the business factor is very much linked with the value of a project that can add to the company, and this has become a key factor for a project's success. Finally, at an individual level performance management is focused on simply to the day-to-day execution activities and the performance evaluation that was evaluated by the direct line-manager of the employee. After the 1990s, the two concepts were integrated in a way that an individual's performance contributes to the overall organisational strategic performance. Facets like performance objectives for each employee, experience, knowledge, skills, coaching, and feedback given to individuals are evaluated (Bonghez & Grigoroiu 2013).

According to Bonghez and Grigoroiu (2013) performance management in project-based organisations can be defined as an organisation whose business is directed mainly over projects or (operational) activities, where the projects are the important part of its business. The mission

of this kind of organisation is to produce results based on precise stakeholder needs by building projects and to do business within a targeted period of time. These projects are initiated, planned, executed, and finished concurrently, creating a balance and dynamic flow that confirms the growth and existence of the association. According to Thiry (2008), project-based organisations are required to be organised in such a way as to establish collaboration amongst strategy and project, program, and portfolio management, where, projects' processes need to deliver value for stakeholders, and it must be sustainable. Thus, performance management within project-based organisations must cover the alignment of the objectives of the portfolio, programs, and projects to organisational strategic objectives, when setting the individual and departmental objectives.

Futhermore, several studies mentioned that the performance measures come from top organisation goals and objectives and developed into project business case. These measurements provide a proper guidance to project teams and offer a useful roadmap for results-focused planning. Thus, project performance measurement needs to put attention on the project management method and the project results (Comninos & Frigenti 2002).

According to many authors, unfortunately it has been informed that more than fifty percent of the performance management executions did not succeed due to the low rate of operational success. This is because of the fact of ignoring the interactive elements of performance management, while these factors are critical for the effective execution and use of a performance management. Therefore, it is the time to focus on the implementation process which integrates both the instrumental, like setting performance indicators and behavioural sides of performance management; this is in order to provide firms a better opportunity of gaining the complete benefits of performance management. Such an approach is the strategic performance management development (de Waal 2007).

Some supporting evidence has been found by Müller, Martinsuo and Blomquist (2008) regarding the connection among portfolio-level outcomes and organisational-level performance, and operational-level performance indicators. Likewise, a study of middle management managers in project, program and project portfolio management recognised that project performance, program performance, and portfolio performance should be studied at the same time.

Recently, it has been found that less effort has been made to analyse the similarities and differences in project performance assessment approaches under different circumstances. Thus, the need for future investigation is essential to understand the role of flow of various projects' input on project output or performance, and if the project performance is influenced by the degree of culture of a firm and its adaptiveness (Gupta *et al.* 2019).

While, performance process measures are normally dedicated for output like product creation to practical measurement, planned budget against actual costs, and timeliness of the outputs. On the other hand, project business performance measures comprise outcome measures like the outcomes that contribute to organisational strategic objectives and goals, stakeholder satisfaction, and project deliverables that accomplished and incorporated with business needs (Comninos & Frigenti 2002).

Most early studies as well as current works focus on the alignment between project management and strategy of the firm, in order to achieve effective project outcomes and at the same time to gain more business success and a competitive advantage (e.g., Too & Weaver 2014). Equally, the oft-promoted wisdom that says, "if you can't measure it, you can't manage it" (Peter Drucker). Consequently, this study addresses the essential need for strategic performance management, portfolio performance management, program performance

management, and project performance management, in order to measure the organisational performance in much effective method, which is one of scopes for this study.

Thus, after knowing the project-based organisational environment and its hieratical structure, where it consists of portfolio, program and project levels. Understanding each level of critical practices, activities, roles, results, outputs and outcomes with benefits and importance, this allows for further confirmation about the top-down and bottom-up approaches appropriateness that will be utilised in this study.

In the coming section, we need to know about the different models that may support the idea of top-down and bottom-up within project-based organisations. In addition, the collaboration between strategy management and project management in project-based organisations is explored.

2.6. Collaboration between strategic management and project management

Study by Kaiser, Arbi and Ahlemann (2015) demonstrated that there is a need to understand the role of structural alignment, to ensure successful alignment between strategy and portfolio using proper project selection techniques. This will lead to project portfolio success and effective strategy implementation through organisational structural alignment, during the project selection process. Thus, the authors stressed that the criteria can be developed for firms' project evaluation and selection processes, by the information requirements facilitated from the firm's alignment structure.

Managing multiple projects concurrently is a huge challenge companies must conduct today in order to execute their strategies (Artto & Dietrich 2007; Unger, Gemünden & Aubry 2012).

Young *et al.* (2012) asked for further research to explore developing portfolio management, program management, and project management to increase the possibility of the idea that

strategy will be implemented successfully. In addition, participants in this active and rich area of literature connecting strategy to projects are developing (Killen *et al.* 2012).

In response, several studies worked toward understanding the linkage between corporate strategy and project fields like study on project success factors based on a multidimensional strategic concept (Shenhar *et al.* 2001), linking corporate and project strategy (Morris & Jamieson 2005), the concepts of project-based management, programs, and portfolios (Artto & Dietrich 2007; Milosevic & Srivannaboon 2006), the factors that affect the linkage between the strategy and the projects (Biørn & Saeed 2014), the value chain and the project governance (Too & Weaver 2014), strategy cascading to projects and the role of people, processes, standards (Muhammad 2015), and key patterns of strategizing actions within project-based organisations (Löwstedt, Räisänen & Leiringer 2018)

Table 2.5: Project success criteria as per strategic concept

Success dimension	Measures
1. Project efficiency	Meeting schedule goal
	Meeting budget goal
2. Impact on the customer	Meeting functional performance
	Meeting technical specifications
	Fulfilling customer needs
	Solving a customer's problem
	The customer is using the product
	Customer satisfaction
3. Business success	Commercial success
	Creating a large market share
4. Preparing for the future	Creating a new market
	Creating a new product line
	Developing a new technology

Source: (Shenhar *et al.* 2001)

Another study was made by Petro and Gardiner (2015) about the investigation of project-based organisational design that influences project portfolio effectiveness, success and business efficiency. The independent factors included the involvement level of a steering committee, project manager's authority, responsibility. The findings specified that the influence degree of project manager in the organisation has a significant positive effect on the success of the

portfolio, strategic alignment, client satisfaction, preparedness and project portfolio effectiveness.

Pajares and López (2014) stated that project portfolio management main concern is the alignment between projects with their business strategy, where they focus on project assessment, ranking and selection. On the other hand, multi-project management is concentrated on operational matters, like risk management, resource allocation, and scheduling. They argued that project portfolio management and multi-project management decisions are very similar, as the decision to take in a new project within the portfolio not only because of its influence to financial value or strategy, but also on how the nominated project interacts with the current portfolio in terms of schedule, risk, or cash-flow; so there is an interrelation between project and portfolio. Additionally, project portfolio management is a continuous process and very dynamic, see figure 2.13 for further clarification, where a portfolio plan is launched with the corporate strategy, project identification can be achieved top-down (as the strategy process) and bottom-up (as a result of proposals). When new projects are entered, they must be assessed, and the main assessment criteria is the strategy alignment, and if these projects contribute to the organisational goals. It is found that the interactions impacted the capital cost, risk, scheduling, cash flows, and resource allocation. Furthermore, the model fulfilled the gap among the operational day-to-day opinion of project managers and the strategic perspective of project portfolio managers.

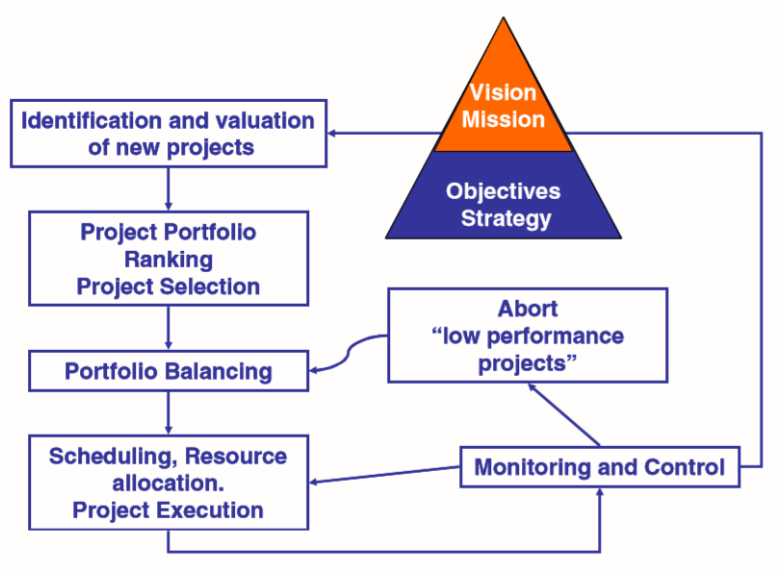


Figure 2.13: Project portfolio management as a dynamic process

Source: (Pajares and López 2014)

A Wrappers model offers a framework that integrates the organisations strategic, business, and project management stages, shown in figure 2.14.

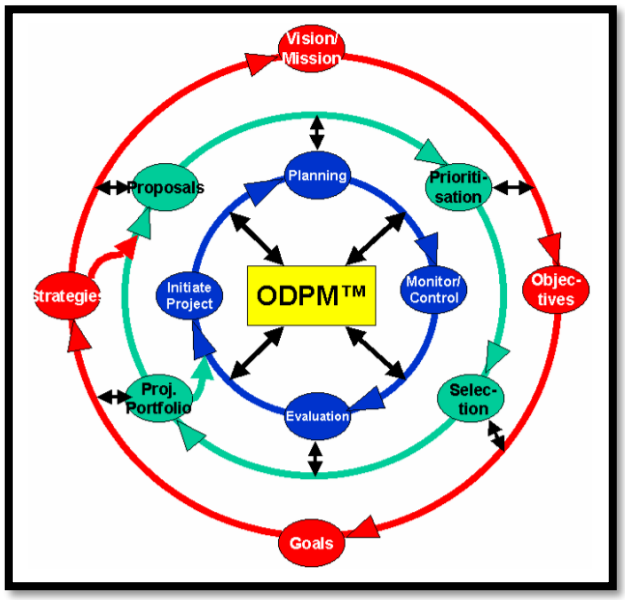


Figure 2.14: The wrapper model

Source: (Comninos & Frigenti 2002)

The management in a project-based organisation focuses on managing complete groups of projects and toward effective linking of these projects to the final business goals. Portfolios or collections of multiples projects are naturally placed under the control of organisational units or within charge areas, see figure 2.15. Management practices overhead projects must tie projects to business objectives and support in accomplishment or beyond the anticipations or goals fixed by business strategy (Artto & Dietrich 2007).

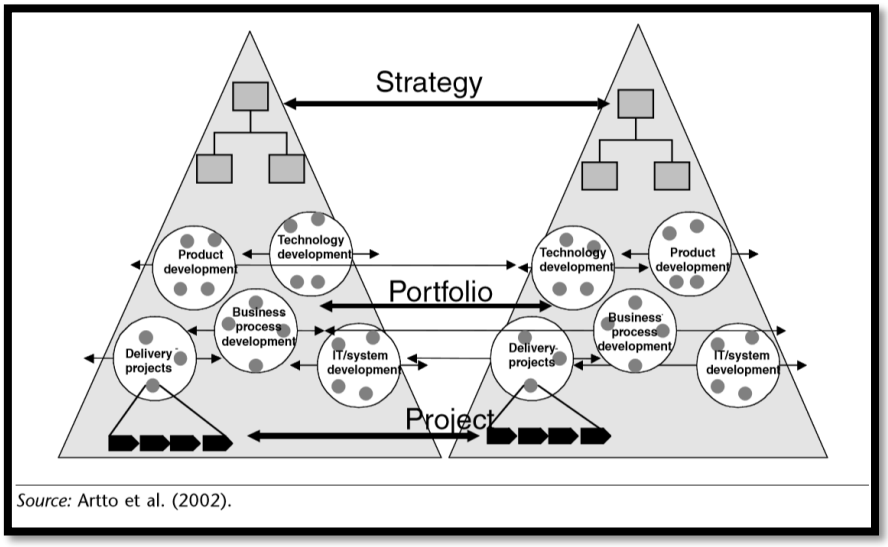


Figure 2.15: The pyramid structure of a project-based organisation

Source: (Artto and Dietrich 2007)

As shown in figure 2.16, a well-integrated project-based organisation would be anticipated to show robust interrelationships amongst its business and corporate strategies and its projects; in a way that a top-management would be expected to see project management as an integrative method. Then, a bottom-line operative must reveal an attention on solitary project, and multi-project management should concentrate on data collecting and resource allocation, where an accountability and transparency are expected behaviours needed for the project managers (Thiry & Deguire 2007).

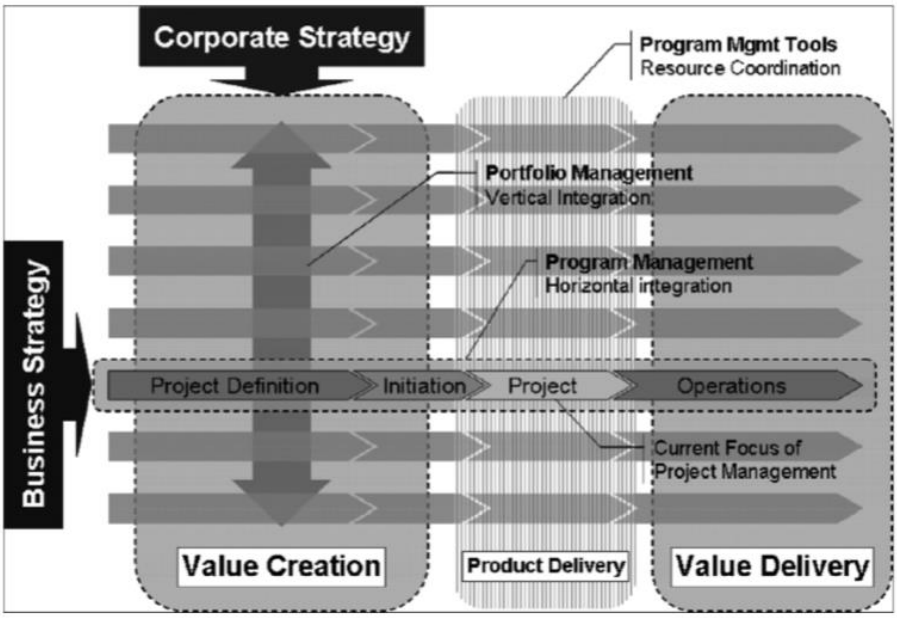


Figure 2.16: Vertical and horizontal integration in PBOs

Source: (Thiry and Deguire 2007)

Then Too and Weaver (2014) explained that all the three levels of project, program and portfolio management can be measured and considered to be instruments for strategic changes implementing; in order to achieve the firm's strategic objectives and realise value, in which, the value itself is a less tangible perception as visible in figure 2.17 and takes a broader clarification. Value can be realised when the project's output (results, product or service) is utilised by the firm to create the planned outcomes, whereas the outcomes allow the predicted realisation and further benefits. At that point, if the intangible and tangible benefits surpass, the input expenses that connected to the organisational change initiative and the project. Furthermore, the ultimate firm's outcomes support the complete strategy, through delivering organisational strategic benefit or by supporting the bottom line, 'value' has been created.

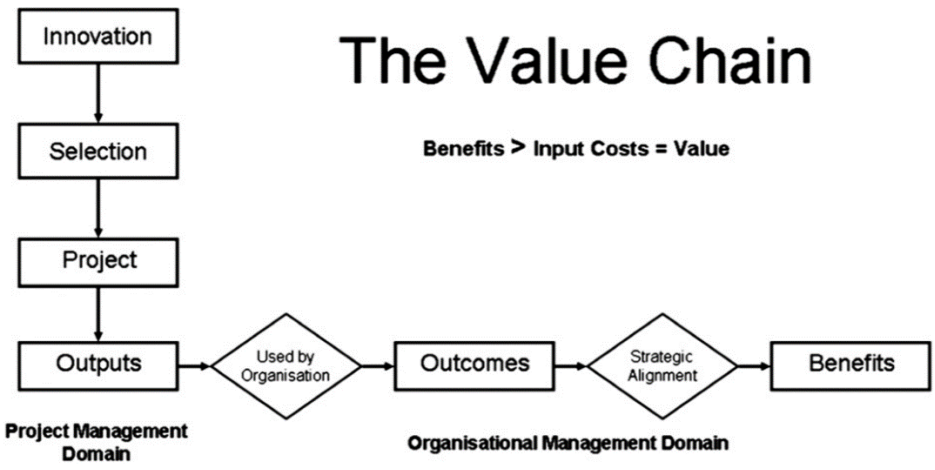


Figure 2.17: The value chain

Source: (Too & Weaver 2014)

According to PMI (2017) projects can be controlled or managed in three ways: as a single project, contained by a program or contained by a portfolio. Although, project management is different from program management and portfolio management, in its lifecycle, focus, activities, objectives, and benefits, projects, programs and portfolios regularly involve using the same stakeholders and perhaps use the same resources that could create a clash within the firm. Thus, in this situation the need of synchronisation inside the firm over the use of portfolio, program, and project management is essential, in order to realise a practical stability in the organisation. Figure 2.18 provides an example of a specific hierarchy and the condition of the relationship amongst portfolios, programs, and projects. In summary, portfolios or programs, projects ultimate aim is toward achieving corporate level objectives and goals. This normally can be done via strategic plan perspective, which is the dominant element that can guide a project's investments. To work on such alignment, an efficient controlling of portfolios, programs, and projects via organisational project management practice is required PMI (2017).

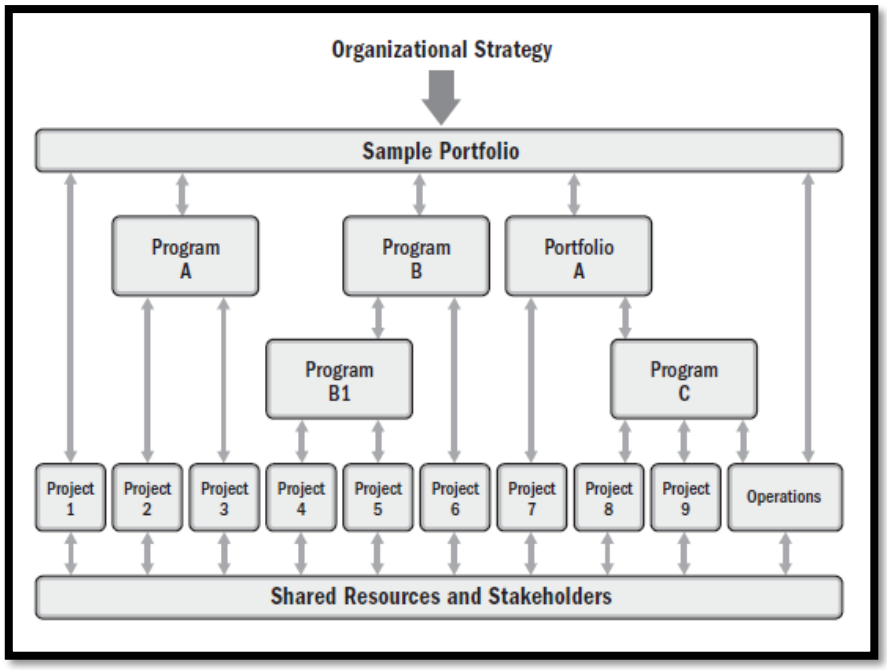


Figure 2.18: Portfolio, programs, and projects relationships

Source: (PMI 2017)

Thus, the definition of the organisational project management as per PMI (2017, p. 17), is "a framework in which portfolio, program, and project management are integrated with organisational enablers in order to achieve strategic objectives". From this definition it can be understood, the main aims of organisational project management are to ensure the correct project consideration, the sufficient resource allocation, and the assistances in ensuring the clear understandings of the strategic vision, the objectives, the initiatives, and the outcomes, for all the levels in an organisation (see figure 2.19). Although, portfolios, programs, and projects are associated and governed by corporation strategies, the mode of involvement from each area is varied in order to realise the strategic goals. For instance, portfolio management is meant to align portfolios with company strategies via choosing the correct projects/programs prioritising the work and allocating the required resources, while program management is meant to match its components and to manage interdependencies, in order to obtain definite values. However, then, project management is intended to facilitate the accomplishment of organisational objectives and goals (PMI 2017).

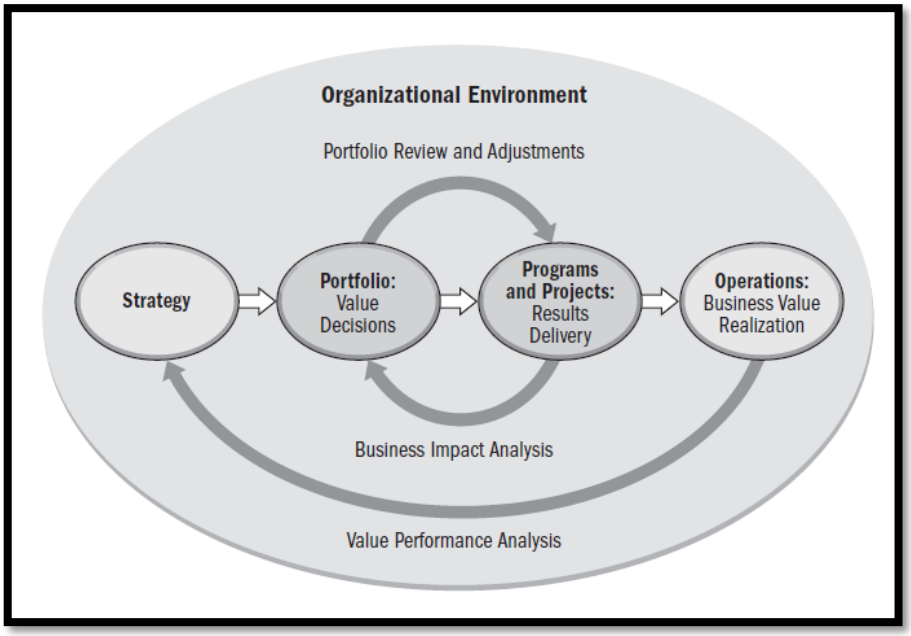


Figure 2.19: Strategy, portfolios, programs, and projects alignment

Source: (PMI 2017)

A consultant company (PWC) proposed in 2017 a useful framework that illustrated the relationships between strategy, portfolio, program, and project within a company, in which to support their clients in execution of their strategy. It showed the role of the macro influencers by changing the external factors which could impact the business either positive or negatively. It embedded strategy through alignment and prioritisation practices. It measured performance, and also embedded changes into the business (see figure 2.10 for the framework) (PWC 2017).

The roles of portfolio are aligning strategy to project, selection, benefits optimisation and investment, while the roles of program are implementation of a set of related projects or workstreams to deliver business outcomes and benefits. In addition, the roles of projects are a short-term set of activities to deliver one or more outputs in accordance with a specific business case (PWC 2017).

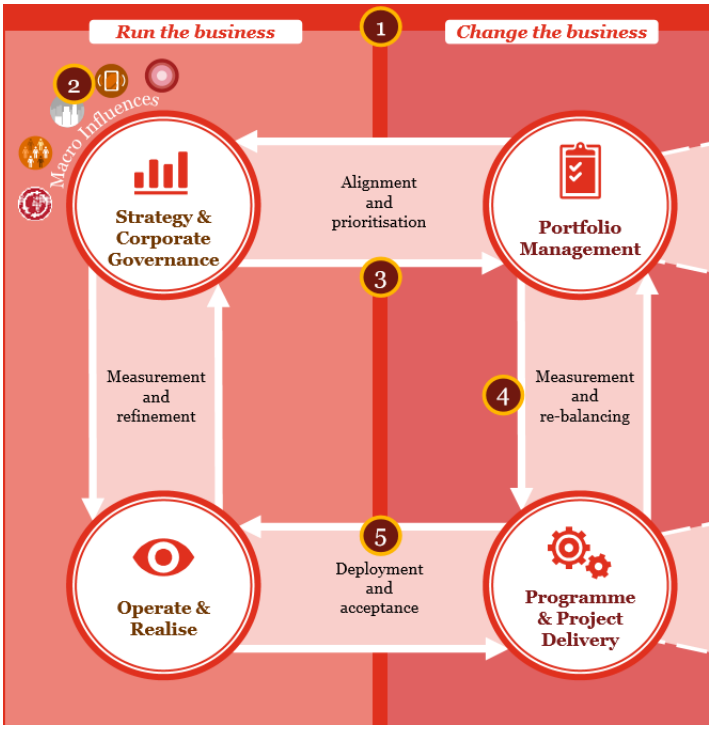


Figure 2.20: The proposed framework

Source: (PWC 2017)

From the comprehensive literature review, the concept of the synergy between strategy level, business level, and operational level within organisations is now clearer. In summary, the established strategic diffusion practice into project context can be done, through top-down and bottom-up methods. Many studies have shown, collaboration between strategy, portfolio, program and project perfectly.

2.7. Organisational performance

This study needs to analyse the impact of strategy diffusion on organisational performance, thus, the need to understand the organisational performance is important.

According to Aubry and Hobbs (2011), organisational performance originated from the old French parfournir and today it is defined as “something accomplished”. Therefore, the idea of organisational performance is not new. At the end of the 1950s and in the early of the 1960s,

efforts were made to recognise the achievement of firms. This work was established from the 1960s till the 1980s, then after the 1980s was narrowed down to perceptions like quality. There were number of words used just as substitutes to organisational performance; for instance, effectiveness, success, output, outcomes, productivity, health, achievement, and organisational excellence. The perception of organisational performance has been applied for this study since it is more suitable in the situation of project-based organisations. Moreover, Cameron (1981) proposed that organisational performance can be defined as a subjective concept attached with the values and likings of the stakeholders. The direction of this research allows the implementation of the structure measurement (paradox between control and flexibility) and the focus measurement (paradox between external and internal) in order to use them for the organisational performance norms (see figure 2.21).

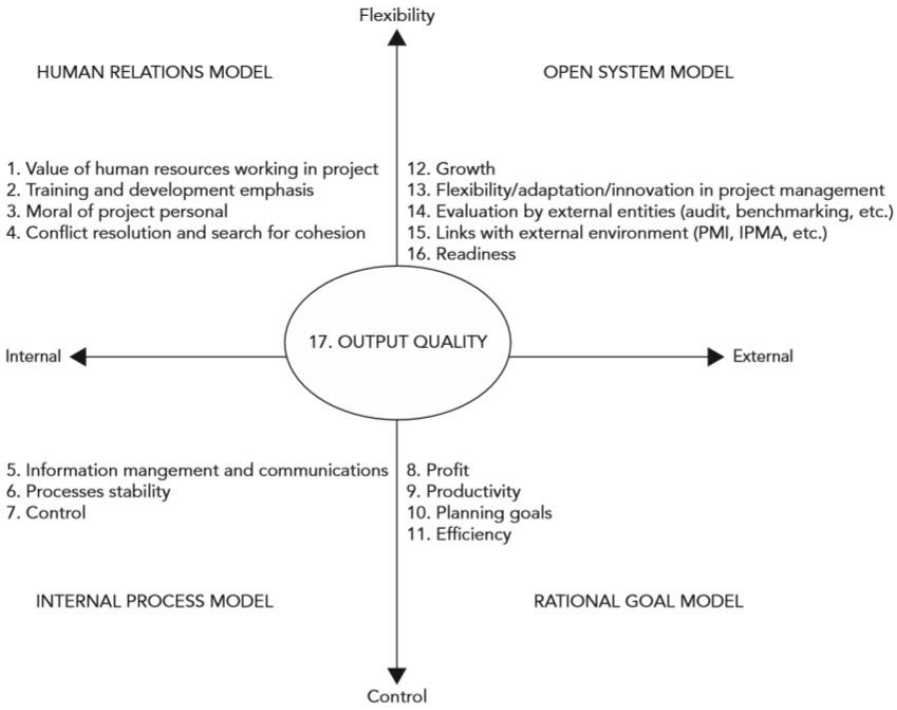


Figure 2.21: Organisational performance and the associated criteria

Source: (Aubry & Hobbs 2011)

Organisational performance is well thought-out as one of the fundamental concepts in management world and all the organisational activities are designed according to it. For sure,

companies' achievements can be mirrored in their performance. Organisational performance is intended to be the summation of achievements accomplished by all departments. These successes are contributed to a company goal for targeted period. The idea of organisational performance is associated with the business's survival and organisation's success (Nikpour 2017).

Moreover, Zheng, Yang and McLean (2010) posit a definition of organisational performance, which is taken from Daft (1995, p. 98). The definition reads as follows "the degree to which an organisation realizes its goals". Furthermore, performance is often identified as the ultimate dependent variable in the literature on organisations (Aubry & Hobbs 2011). In general, performance is the final outcome of actions. Mainly, it contains the real endings of the strategic management process. In precise words, the organisational performance is represented by completing its goals successfully (Alrubaiee *et al.* 2015). Then, Aydiner *et al.* (2019) indicated that companies can accomplish significant performance achievements whenever they align with the firm's objectives. Therefore, there must be a clear coherent between business performance indicators and its objectives.

Therefore, organisational performance is an important subject in management research, especially for strategy, operations, human resource management, accounting, and marketing scholars, those who are seeking to understand, influence, measure and improve organisational performance (Richard *et al.* 2009). Richard *et al.* (2009, p. 722) mentioned "Organisational performance encompasses three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, and so on); (b) product market performance (sales, market share, and so on); and (c) shareholder return (total shareholder return, economic value added, and so on)".

In the light of what has been described, it is likely that although organisational performance covers numerous definite areas of firm results (i.e., dimensions), this study will focus on the

main dimensions to measure organisational performance, such as quality improvements, new product development, profitability, market share, return on assets (ROA), return on investment (ROI), sales growth, employee satisfaction, and customer satisfaction.

2.8. Organisational culture

Since one of the objectives of this study is to assess the meditating role of the organisational culture driver in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations. Thus, it is important to understand more about the organisational culture.

Nowadays firms are intending to accomplish success globally in profitability, fast growth, preparation for future, continuous improvement, and to be in a top position in their business. Thus, to gain those achievements with high performance, it is very important to distinguish the factors that affect organisational performance (Nikpour 2017). One of these important factors of success in any organisation is to understand its internal characteristics, and how they apply these characteristics' influence in organisational results. These characteristics focus on widespread and constant such as culture, structure, political and power features, where the firm's activities take place (Zheng, Yang & McLean 2010). In this regard, many researchers have exposed that one factor among these characteristics, which helps in achieving the organisational outcomes is the company's organisational culture (Nikpour 2017).

Organisational culture literature has its origins from the early 1980s and has dedicated consideration of the strategic significance of organisational culture (Denison, Haaland & Goelzer 2004; Ahmady, Nikooravesh & Mehrpour 2016).

Organisational culture is very important aspect of a firm's success as it enhances the support and cooperation culture within the firms. Furthermore, it is an essential instrument for organisational knowledge sharing and learning. In order to accomplish a high-quality performance, organisational culture can offer a countless support to the organisation. Moreover, there are many practices linked to organisational culture like team and individual performance, change management, quality management system, and project management (Biørn & Saeed 2014).

Another study has shown that due to globalisation many project managers had different cultural background, thus, the relationship among national and organisational culture and their impact on the organisational performance has been debated (Biørn & Saeed, 2014); in other words, the fitting amongst a business and its environment (Denison, Haaland & Goelzer 2004; Kotter & Heskett 2011).

Moreover, some previous research (Narikae *et al.* 2017) showed that goals can be aligned when the organisational culture strives to emphasise getting the organisational initial mission achieved. This encourages culture to align with strategy implementation at the primary level. This level, where goal sitting needs to be aligned, is beneficial to be realised, and be supported by existing organisational process, procedures, policies and systems, thereby helping to achieve strategy execution and keep the organisational cultural reliability. The above literature shows that organisational culture links the organisational strategy with the projects (Biørn & Saeed 2014).

Some authors have driven the further development of the identification of feasible means of ensuring that knowledge as a solution, an experience, or as socially created is formed and diffused throughout the organisational hierarchy till project borders are an essential matter for project-based businesses. This needs an in-depth understanding of the organisational

complications and profession organisational culture that encourages and directs the people involved within projects (Ajmal & Koskinen 2008). Likewise, Carmeli and Tishler (2004) indicated in their study that organisational performance can be well described by six intangible organisational elements where one of them is the organisational culture.

The organisational culture term was defined in many ways. One of the most comprehensive meanings was for Brown (1998), Hokzinsky and Buchanan (2001) who defined organisational culture as a set of beliefs, values, traditions, customs and constant approaches communicated by the participants (Ahmady, Nikooravesh & Mehrpour 2016). In addition, it refers to norms, values, and shared assumptions as defined by Schein (1985). Furthermore, it is a factor of sustained competitive advantage as indicated by Barney (1991). As other scholars like Denison (1990) noted, it is a key factor in organisational effectiveness (Zheng, Yang & McLean 2010). Needle (2004) put a definition of the organisational culture as a creation of aspects containing technology and strategy, market, product, history, type of employees, national culture and management style (Nikpour 2017). Culture can be used for flexible guidelines and for mutual identity determination. For instance, it has significant effects on individuals' feelings, behaviours, perceptions and attitudes, which can be investigated through its dimensions, and then it can explore, expect, guide to desired changes. Therefore, the organisational culture aspect simply enables the modifications and encourages new directions in an organisation (Ahmady, Nikooravesh & Mehrpour 2016).

Studies of Denison and his colleagues are well documented, in which it is also well acknowledged that organisational culture includes mission, adaptability, involvement, and consistency (Nikpour 2017; Zheng, Yang & McLean 2010; Yilmaz & Ergun 2008; Denison, Haaland & Goelzer 2004; Ahmady, Nikooravesh & Mehrpour 2016). See figure 2.22 for the Denison model of organisational culture, where mission dimension is defined as a clear sense of organisation about its purpose and vision that identify organisational strategic objectives and

goals. The adaptability dimension occurs when organisation has ability to adapt changes, organisational learning, and customer focus for organisational improvements purposes. Consistency dimension is about the strong culture of well-integrated, well-coordinated, with high degree of agreement among the organisation people. And, involvement dimension is about people empowerment, capability building and teams (Denison, Haaland & Goelzer 2004).

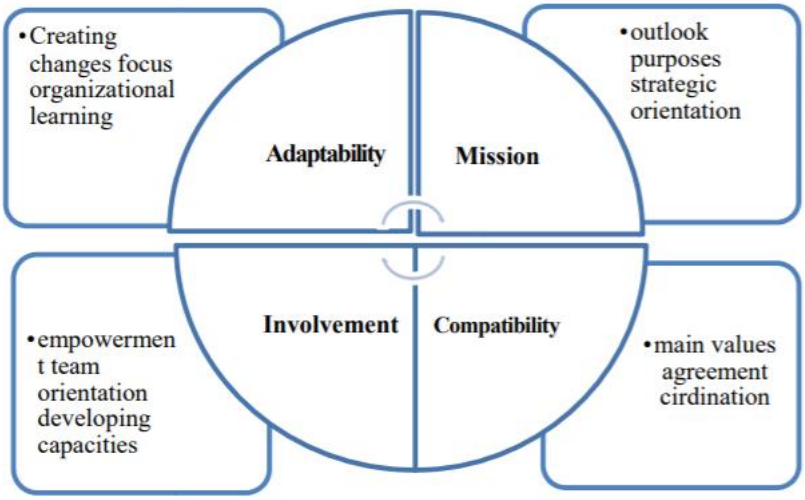


Figure 2.22: Organisational culture of Denison

Source: (Ahmady, Nikooravesh & Mehrpour 2016)

For this study, Denison's model will be used to measure the cultural aspect of the organisation, as the core of the model is the underlying assumptions and beliefs, where the deepest levels of organisational culture are represented. Moreover, according to Denison's model the four identified cultural characters jointly enable an organisation's abilities for coordinating and participating internal resources, along with the external environment adaptation, in order to achieve a substantial level of the organisational performance (Yilmaz & Ergun 2008).

Compared with other organisational culture models, Denison's organisational culture model has the following features; it has been applied to all organisational levels, it assessed team behaviour instead of assessing individuals, and it completed the dimension to the bottom levels of the organisation (Ahmady, Nikooravesh & Mehrpour 2016). Furthermore, the fourth identified

cultural traits were positively related to organisational performance (Xenikou & Simosi 2006). In addition, a recent study by Molina *et al.* (2019) concluded that there is a high association among hierarchal levels (strategic, executive, and operational) and the four Denison's (1990) instruments (Adaptability, Involvement, Mission and Consistency) of organisational culture. Molina had called for further investigation to explore the relationship between organisational culture and hierarchal levels.

Of all the four cultural dimensions, the involvement dimension has been selected for this study instrument, as this dimension is under internal and flexible category within Denison's model. Moreover, the involvement (participation) scope is to empower the organisation's people, shape their organisations around teams, and build capability for their people at all levels. All employees from top levels to bottom levels are dedicated to their job and very loyal to their organisation. Furthermore, individuals at all levels feel that they must contribute at least some participation into decisions that will affect their work, and that their work is directly connected to the goals of the organisation (Denison, Haaland & Goelzer 2004). Furthermore, a study conducted on competitive intelligence was an example of a marketing strategy by Dishman and Calof (2008), where he provided extra insight as to important factors related to intelligence process and structure. One of them was the level of employee involvement in the communication phase. Therefore, the researcher of this current study is focused on involvement as it is under an internal and flexible dimension, which is very much appropriate for this study. See table 2.6 for the sub-dimensions' definitions for the involvement dimension.

Table 2.6: Indices of organisational involvement

Empowerment	People had authority and ability to control their work. This issue created possession and responsibility feeling in an organization
Group orientation	In an organization, group work was important to common purposes so that employees like managers felt that they had to respond. an organization laid on group to perform
Capability development	To provide needs and remain in competition arena, an organization developed skills of employees. In an organization, innovator gathered and distributed information related to performance, competitive quality and costumer in an organization.

2.9. Top-down and bottom-up

Recent systematic reviews exploring the strategic renewal topic conducted by Schmitt, Raisch and Volberda (2018). They had reported a gap in the method that helps organisations to know their vision requirement through transforming their strategic initiative and capabilities, where they found barriers between top-down and bottom-up renewal initiatives, which lead them to call for enabling more effective mechanisms. These research studies about strategic renewal can support practitioners and researchers to clarify the processes ensuring organisations' long-term survival and success.

Löwstedt, Räisänen and Leiringer (2018), as well as Clegg *et al*. (2018) presented the important role of strategy in all the levels of a project-based organisations, where strategy remains a theoretically and methodologically contested construct. They mentioned that many authors criticised the common top-down approach (one-dimensional) of strategy in the project management context, demanding for interrelationships between them.

Milosevic and Sirvannaboon (2006) addressed lack of information in two parts related to the concept of business strategy and project management alignment: a top-down and bottom up influence between business strategy and project management, and a process applied for the alignment.

Artto and Dietrich (2007) talked about the challenges of tightening the connection between creative innovations/initiatives and expectable goal achievement in the context of strategic management, which can occur by developing an innovation culture or environment, unifying unlimited opportunities with leaders' sufficient attention, applying top-down approaches while harmonising bottom-up approaches for development, and adjusting actions while concurrently allowing the organisation to learn new activities.

Although there are many studies, the research in top-down and bottom up approaches remains limited. However, few studies employed the top-down and bottom up approaches in change management (Smeds, Haho & Alvesalo 2003), knowledge management (Mom, Van Den Bosch & Volberda 2007) and project portfolio management (Ligetvári 2013). Based on Ligetvári (2013) the relationships between strategy management, portfolio management and project management were explained, as shown in figure 2.23. These types of studies considered how to work on similar ideas for strategy spreading within project-based organisations.

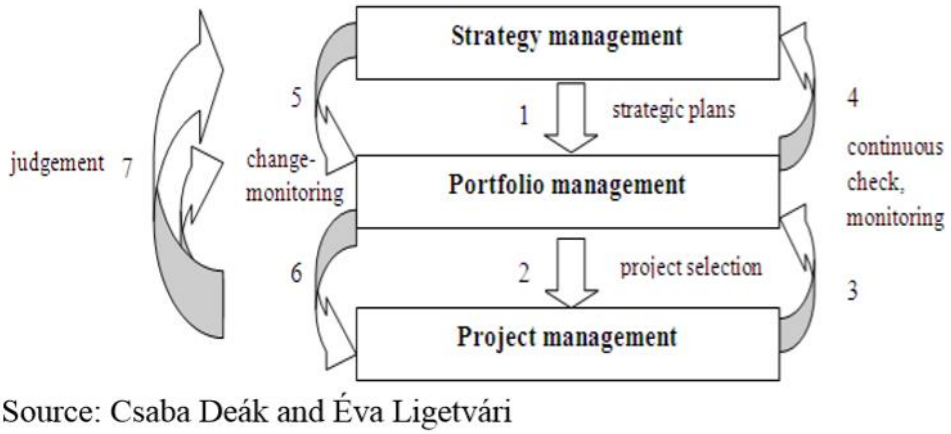


Figure 2.23: Relations of strategy, portfolio and project management

Source: (Ligetvári 2013)

Consequently, while emphasising on top-down and bottom-up approaches, Blomquist *et al.* (2010) underlined that the concept of the project-practice approach is established to make project management research well-intentioned. Table 2.7 discusses in summary different approaches for each one of the three approaches, namely, the traditional system approach, process approach, and practice approach.

Table 2.7: Three approaches for project management research

	Focus	Empirical Approach	Ontological Status of Human Action	Epistemology	Dominating Methodological Commitment	Examples of Research Question
Traditional System	Focuses on rational structures and how they can be best managed	Top-down	Determined	Objectivist	Above all quantitative methods, to enable *Erklaren* (explaining)	What are the success factors of planning?
Andersen (2006); Dvir and Lechler (2004); Pinto and Slevin (1989)						
Process	Focuses on describing the process and how the process relates to the structure	Past, Present, Future	Intersubjective	Objectivist/ subjectivist	Above all qualitative methods such as interviews, documents, etc., to enable *Verstehen* (understanding)	How could the process of planning be understood?
Legris and Collerette (2006); Lindkvist et al. (1998); Lundin and Söderholm (1995); Sutterfield et al. (2006)						
Practice	Focuses on describing the process through the identification of local situated actions	Bottom-up	Intersubjectively situated	Subjectivist	Above all qualitative methods such as ethnography, to enable *Konstruieren* (construction)	What are the actions that are building the activity of planning?
Hällgren and Wilson (2007); Hodgson (2004); Simon (2006)						

Source: (Blomquist *et al.* 2010)

While top-down approaches are meant to mirror the top management's strategic goals, taking into consideration the corporate's main concern, bottom-up approaches are intended to arise in the regions of operative activities and practices - the field of the lower-level bosses' proficiency. Thus, it is suggested that both approaches, top-down and bottom-up, serve harmonising roles of operations strategy establishment (Kim, Sting & Loch 2014).

2.10. Research outline

The research objective required a review of existing strategic management theories and aligning them with business strategy and organisational project management levels. Thus, this section was intended to select a proper and effective strategic management style that can work for this research. Based on Muogbo (2013), David's strategic management model was a proper framework to utilise for this research as it is a mixture of strategy formulation, implementation and evaluation, which is effective for all types of organisations specially for project management.

Likewise, since Rogers' diffusion theory is the most popular theory in diffusing and spreading practiced and shows its effectiveness within a quite good number of different fields. Furthermore, Rogers' diffusion theory offers a useful theoretical model to support the planning and implementation of any new improvement (Doyle, Garrett & Currie 2014). It is aligned with the research objective to appraise diffusion theories and assess the suitability of the selected theory for strategy diffusion in project-based organisations. Therefore, Rogers' diffusion model has been used to be imbedded in the suggested system for this study.

Finally, in regard to project management, several literature reviews have been studied in order to define portfolio, program, and project management, to understand more about their main roles, and to explore more about their linkages amongst the portfolio, program, and project terms and the corporate direction. Accordingly, another objective for this study was settled through checking existing project management theories for the appropriate viewpoints of diffusing or spreading the strategy, which is the utilisation of the (top-down and bottom-up) approaches.

In summary, there will be an effort for this research to plan a relative structure of business layers (strategic level, business unit level including portfolio level, then program and project level), and all the intended levels are intersected with the three strategic phases from formulation, implementation, to evaluation. Moreover, for all top-down strategy phases, Rogers' diffusion theory will be utilised to diffuse the strategy from a top-down approach. To be more specific, it is suggested that for the (top-down) approach, the strategic "initiatives" will be spread by adopting Rogers' diffusion theory within each strategy phase, starting from the enterprise level to business unit project portfolio management, reaching to program and project levels. Then, for the bottom-up part, "performance" will be reported to higher levels, as the data will be going upward to the next level above it and so on until it reaches the organisational top level. See figure 2.24 for more explanation about the proposed research outline, where the strategy initiatives have been diffused from top levels to down levels, so that each level knows their links

to the organisational strategy and to know their precise roles and activities. It is then required to identify the outputs and outcomes (performance) at each level, which are to be reported to the levels above. Finally, and as an ultimate goal for doing so, is to improve the organisational performance for the project-based firms, considering the culture of the organisation and how this influences the overall system.

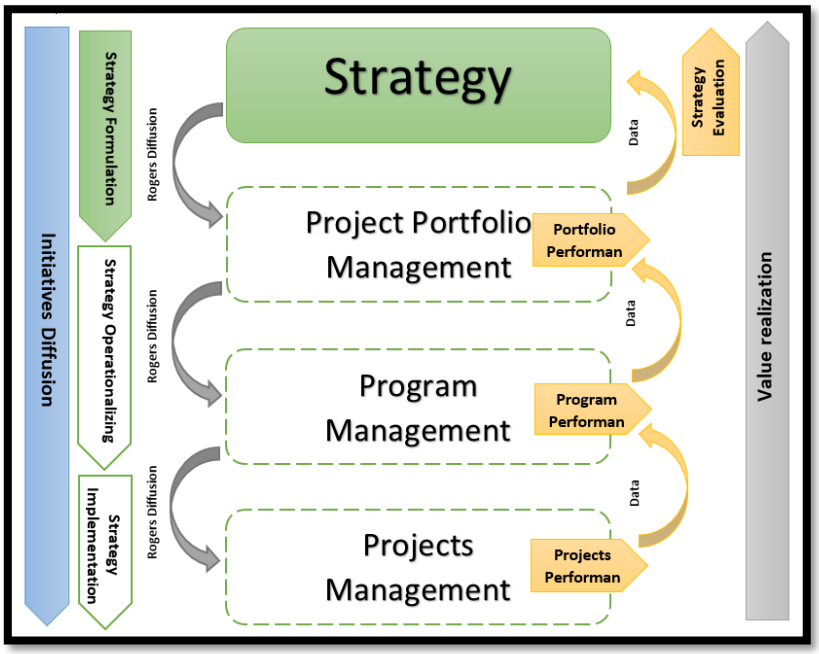


Figure 2.24: Research proposed outline

2.11. Key problems identified from the reviewed literature

An inclusive literature review was conducted for many different studies related to the main concepts required for this study that consist of strategy and strategic management models, diffusion theories, project management. This review resulted in the appearance of several problems and challenges, which are resolved as per the following:

- Challenge related to the selection of a proper strategic management model that can fit in project management aspect, has been solved via selecting David's model for strategic management amongst other models; since David's model is a perfect facilitator of strategy

practices within project management environment as both models (strategy and project management) practices theories like resource management, profit-maximising theory, contingency theory and competitive-based theories.

- Challenge related to the selection of a suitable diffusion theory model that can be used for strategy diffusing practice in project management settings, has been resolved via selecting Rogers' innovation diffusion model; as Rogers' diffusion model is a best implementer of strategy diffusing practices within project management environment as many examples and studies approved the fitting of strategy diffusion via using Rogers' innovation diffusion model. Furthermore, many studies approved the suitability of using Rogers' innovation diffusion theory for strategy diffusion refer to section 2.4.2; for the theoretical approval and the suitability of the Rogers' diffusion in the context of managerial practices, refer to section 2.4.3; for the theoretical support and the appropriateness of the Rogers' diffusion in the context of strategic management; and refer to section 2.4.4 for the theoretical agreement and the relevance of the Rogers' diffusion in the context of strategic management and project management.

- Challenge related to the selection of the correct project management model (project-based organisation structural pyramid) that can be suitable for strategy diffusion concept to utilise the top-down method, and performance management to utilise the bottom-up method, has been solved via selecting a project-based organisational model that was structured as a strategy, portfolio, program and project pyramid. This model was selected as it is the right model to very smoothly practice top-down and bottom-up approaches.

- Challenge related to the selection of the correct organisational culture (Denison) model that can be suitable for a project-based organisation environment. It is noteworthy that this model considered the four dimensions of adaptability, mission, involvement and compatibility, which are jointly enable an organisation's abilities for coordination and participating internal

resources, along with the external environment adaptation, in order to achieve a substantial level of the organisational performance.

From all of the above challenges and with resolving of those challenges, opportunities are shown of contributing effectively in solving the research problem, which is having the right framework for strategy diffusing at each project-based organisation level; this is done in order to understand the strategy by all the organisational staff at all the levels that can allow for more involvement and contribution to the organisational strategy through their daily works, then to report each level outputs and outcomes in order to contribute to enhancing the final organisational performance.

2.12. Chapter summary

This chapter included a comprehensive literature review of existing strategic management, diffusion theory, and project management aspects. It displayed a set of different theories, definitions and descriptions for each of the three terms. Then, it appraised each of the three aspects of strategic management, diffusion theories, and project management and assessed the suitability of aligning the selected theories from strategic management, diffusion theories, and project management aspects. Finally, it proposed the planned research outline that can be used in project-based organisations and to support in examining the research's associations and to accomplish the research aim, which is to investigate the effects of the strategy diffusion on organisational performance in projects-based organisations. In the coming chapter there will be a mapping process between the diffusion theory process and the strategic management phases at each of the project-based organisational pyramid levels. This is undertaken to ensure that there is a perfect integration of Rogers' diffusion theory in the strategy management implementation phase within project-based organisation, and this supports the possibility of using the Rogers' diffusion model in strategy management fields.

3. CHAPTER THREE: Review of strategy diffusion (top-down) and performance (bottom-up) in project-based organisations

3.1. Introduction

The previous chapter provided a theoretical underpinning about the suitability of Rogers' innovation diffusion theory for strategy diffusing within project-based organisations. However, to confirm additional validation about the concepts similarity of innovation diffusion and strategy diffusion, thus, this chapter is mainly employed to explain the thorough mapping of the five diffusion decision process that consists of knowledge, persuasion, decision, implementation, and adaptation stages, which are adopted from Rogers' diffusion theory, with the strategic management three phases that consist of formulation, implementation, and evaluation that taken from David's strategic management model at each of the project-based organisation hieratical levels for strategy, portfolio, program and project levels as a top-down perspective. These will be explored in a series of sub-sections (3.3.1, 3.3.2, 3.3.3, and 3.3.4).

Then, it will show the similarity of the meaning for the four innovation diffusion elements (innovation, communication channels, time and social system) in Rogers' diffusion theory and in David's strategy management model, as will be show in sub-section 3.2.1. After that, this chapter will provide the characteristics' meanings of compatibility, relative advantage, complexity, observability and trialability in Rogers' innovation diffusion theory and the parallel characteristics' meanings (consistency, advantage, clarity, visibility consonance and feasibility) in David's strategic management model. These have different terminologies but the same meanings, as will be shown in sub-section 3.2.2. This is to support and confirm the possibility of the study proposed concept of utilising Rogers' diffusion theory for strategy diffusion within project context as top-down method in a project-based organisation. Finally, this chapter explains the detailed bottom-up arrangement from project to program to portfolio

and up to the strategy level, which shows the possibility of the bottom-up approach in project-based organisations; this is done in order to fulfil the necessity of improving organisational performance.

3.2. Integrated structure of a project-based organisation

Many researchers argue that to function effectively, a project-based organisation needs enthusiasm and flexibility in the way programs and projects link upwards with business strategy. Hence, there needs to be cooperation among project and organisational top-level management. Again, there should be horizontal and vertical integration processes in order to connect business strategy and project activities. Horizontal integration can be ensured via successfully completion of the project life cycle, however vertical integration will bond project processes and activities to business strategy (Milosevic & Srivannaboon 2006; Thiry & Deguire 2007; Ligetvári 2013), as demonstrated in figure 3.1.

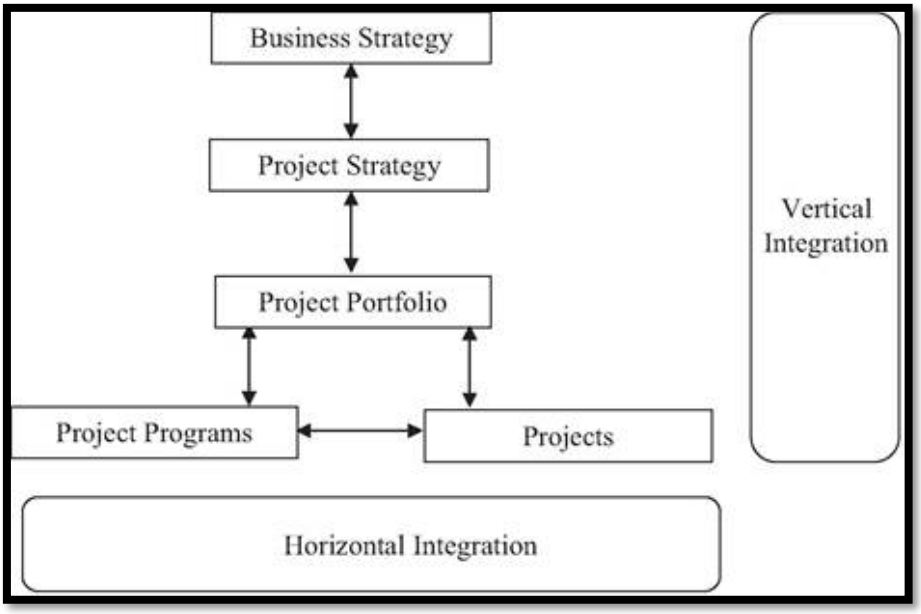


Figure 3.1: Integrated structure of a project-based organisation

Source: (Thiry & Deguire 2007)

Likewise, Artto and Dietrich (2004) advised that one of the managerial challenges in fitting project management with corporate strategy is to encourage individuals to participate in strategy development practice via creating new ideas and in order to renew current strategies.

Moreover, the literature review shows that firms implement their transformation practices on three levels: portfolio, program and project. Clearly, these levels have dissimilar purposes but must work consistently to deliver transformations successfully (Deloitte 2015; EY 2015). Furthermore, to indicate the importance of utilising the top-down and bottom-up approaches, a risk-intelligent approach was highlighted by Deloitte (2015), where they encouraged organisations to utilise a top-down approach by top level management. This was encouraged to identify risks at a strategic level, whereas risk owners in business units practice a bottom-up approach; to identify and monitor exact risk, escalate fears and create the risk-related statistics to leaderships strategic view.

Strategy diffusion (top-down) and performance (bottom-up) approaches at each project-based organisation level at strategy, portfolio, program and project, practices for both methods will be the main focus of this chapter. Therefore, there will be a detailed description about the strategy diffusion (top-down) method, where the diffusion theory will be integrated with the strategy management stages and then the combined model will be mapped to each level of the organisation's practices. Specifically, there will be a mapping of the five communication channels steps of Rogers' diffusion theory and the three David strategy management phases with each management level of the intended organisational hierarchy from strategic management level, to portfolio management level, then program management level, reaching to the project management level. In the same way, there will a comprehensive detail about the performance (bottom-up) approach, in which the important data and results will feed the level above it according to the project-based organisational hieratical structure till it reaches the top level of the organisation. In this study the focus is on the strategic initiatives which will be the

element of the diffusion from the top level of the organisation to the execution level (portfolio), as the strategic initiatives are the core of strategic management. Furthermore, strategic initiatives can be represented by various forms like product development, new processes, major reorganisations, or projects. Therefore, these initiatives in this study have turned into projects for further diffusion purpose at the execution levels, while the performance data will be the feedback element from down level to top level of the organisation (Walter, Lechner & Kellermanns 2016).

In summary, a top-down diffusion and bottom-up performance link between strategy, projects, and project portfolio management is suggested in the literature for the practicing of strategy over projects and the ability of project portfolio and project actions and processes to update strategy (Killen *et al.* 2012).

3.3. Rogers' diffusion theory and David's strategic management model integration

In this section, there will be further elaborations regarding the possibility of matching Rogers' diffusion theory key terms, elements, characteristics, and decision process stages with the strategy management facets.

There was evidence by Kenny (2003) for the utilisation of Rogers' diffusion theory in the context of strategy and project management for educational innovation projects, where the strategy implementation often results in the change of identification and innovative projects, and the certainty is also involved in this formula.

3.3.1. Strategic management and the four main elements of Rogers' diffusion theory

Rogers (2003, p. 5) defined diffusion as "the process in which an innovation is communicated thorough certain channels over time among the members of a social system". Therefore, as mentioned in this statement the four key elements of the diffusion are innovation, communication channels, time, and social system.

- **Innovation**: for Rogers (2003), innovation definition is "an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (Rogers 2003, p. 12). The idea, practice, or project terms in strategic management are synonym to objectives, products, goals, and initiatives terms (David 2011). Thus, it is clear that strategic decision to "adopt an innovation" happens only when a "shared vision" is approved over a mixture of top-down and bottom-up courses (Kenny 2003).
- **Communication channels**: Rogers (2003, p. 5) defined communication as "a process in which participants create and share information with one another in order to reach a mutual understanding," with two ways of communication; mass communication and interpersonal communication (Sahin 2006). Likewise, in the setting of strategic management, in order to support a firm main role as a competitive team, communication and interaction adaptation between managers and employees across hierarchical levels are a must. This is because boosted communication provides deeper understanding of the strategies, which leads to higher commitment as a consequence, offering effective outcomes. Therefore, communication is crucial to successful strategic management. Moreover, top-down flow of communication is important to encourage and develop bottom-up support (Foreman & Argenti 2005; Hallahan *et al.* 2007; David 2011; Hume & Leonard 2014).
- **Time**: The innovation-diffusion process, rate of adoptions, and adopter categorization all contain a time aspect (Sahin 2006). Furthermore, in strategic management there is a long-term objective, where the time frame should be reliable, usually from two to five years. In addition, there are short-term objectives, and the time frame for those objectives are less.

Equally, in the strategy implementation stage the time aspect is crucial for deploying the strategic initiatives or projects. Moreover, the time dimension also must be considered for the monitoring, controlling, and measuring performance in the strategy evaluation stage (David 2011).

- **Social system**: Rogers (2003, p.23) defined the social system as "a set of interrelated units engaged in joint problem solving to accomplish a common goal." Similarly, in the strategic management field, strategy formulation, implementation, and evaluation events happen at three hierarchical levels in a large organisation: enterprise, divisional or strategic business unit, and functional, sharing the same challenges to be solved and same objective to be achieved within targeted time (David 2011).

3.3.2. Strategic management and the five characteristics of Rogers' diffusion theory

As per Rogers (2003, p. 232), the process of innovation-diffusion is "an uncertainty reduction process", and he recommended number of attributes of innovations that could support in reducing the innovation uncertainty. Attributes of innovations consist of five characteristics of innovations: compatibility, relative advantage, complexity, observability, and trialability. Moreover, Rogers (2003, p. 219) indicated that "individuals' perceptions of these characteristics predict the rate of adoption of innovations".

In Rogers' (2003, p. 229) diffusion theory relative advantage is defined as "the degree to which an innovation is perceived as being better than the idea it supersedes." Compatibility is defined as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (p. 15). Complexity is defined as "the degree to which an innovation is perceived as relatively difficult to understand and use" (p. 15). Trialability is defined as "the degree to which an innovation may be experimented with on a

limited basis" (p. 16). Moreover, observability is defined as "the degree to which the results of an innovation are visible to others" (p. 16).

On the other hand, the same characteristics can be found in strategic management features as indicated by Rumelt (1998), which are: advantage, consistency, consonance, clarity, feasibility, and visibility. Advantage means that strategy must deliver for the foundation and up keeping of a competitive advantage in the chosen area of activity. Consistency in strategy means to provide consistent goals and policies. In consonance, the strategy must show an adaptive reaction to the exterior environment and to the serious modifications happening inside it. Moreover, strategy mission, vision and objectives should be clear to have the right foundation for all strategic planning, implantation and evaluation undertakings, as well as to have same direction, achieve support, synergy, clarity, and gain higher performance among all levels of company. Additionally, feasibility of the strategy must provide the right resources availability and avoid forming unsolvable sub complications. Therefore, over-all, strategic objectives should be challenging, consistent measurable, clear and realistic (David 2011).

3.3.3. Strategy formulation phase

Many researchers have argued that the smart strategic planner in strategic-focused companies let their firms' strategies to adapt the changes as per the organisational dynamic environment needs. Clearly, to do so, there is a need for a strong platform that knows about how organisations improve their business value consistently, where leadership makes superior choices about the best shape of their portfolios, and lastly understands more about their firm's distinguished capabilities (Favaro 2013).

The process of founding shared meaning is far from the "cascade of plans". However, it is very much linked with the learning process; thus, the strategic decision about the current or new initiatives requires buy-in from the organisation's individuals (Kenny 2003). Hence, Rogers

(2003, p. 172) explained the process of innovation-decision as "an information-seeking and information-processing activity, where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation".

The innovation-decision process in Rogers' diffusion theory of five stages, which naturally follow each other in a time-ordered method are involved knowledge, persuasion, decision, implementation, and confirmation (Sahin 2006). Consequently, in order to attempt to diffuse the strategy in this study, the mapping has been conducted between Rogers' theory adoption decision process stages with David's strategy formulation phase, as per the following:

- **The knowledge stage (Awareness):** knowing the business's general direction (vision and mission). Developing a vision (what do we want to become? What is our business?) Additionally, setting a mission is required (what we need? How? Why?) (David 2011).
- **The persuasion stage (Interest):** Future external and internal details assessments; offering the fundamental information, facts, trends, and events for creating objectives and strategies. The main purpose of it is to set a defined number of opportunities that could benefits an organisation with the list of threats that should be avoided. Plus, it provides a list of weaknesses that could be translated into a number of objectives via using the defined strengths in this stage. Furthermore, it can let participants establish a clear idea about their jobs and how they fit into the whole organisation (David 2011).
- **The decision stage (Evaluation):** Generate evaluation and select strategies in this stage via using a three-stage decision making model. Stage 1 (Input Stage) is the fundamental input data required to express strategies. Stage 2 (the Matching Stage) focuses on generating practicable different strategies by aligning important internal and external factors. Stage 3 (Decision Stage) involves tools and techniques, like the Quantitative Strategic Planning Matrix, in order to offer a rational basis for choosing precise strategies

(David 2011). This is followed by deciding to create Long-Term Objectives (Financial or Strategic objectives) via using different strategies approaches that might benefit the firm (David 2011).

- **The implementation stage (Trail):** Strategic planning is typically established on expectations and theories that are repeatedly verified and polished by research, knowledge, learning and experience (David 2011).
- **The adoption stage (Confirmation):** Confirm the Long-Term Objectives (Financial or Strategic objectives) (David 2011).

Table 3.1: Comparison between Rogers' theory and strategic formulation stage

Rogers diffusion theory (The adoption - Decision Process)	Rogers diffusion theory definitions (Rogers 2003)	David's Strategy Formulation Phase (David 2011)
The Knowledge Stage (Awareness)	During this stage, the individual tries to define the innovation and how and why it works.	Knowing business general directions, vision and mission.
The Persuasion Stage **(Interest)**	Develops interest; gathers more information and facts about it.	External and Internal details Assessments.
The Decision Stage (Evaluation)	Mental trial; after getting all the information from previous stage. Individual selects to accepts or reject it. Or to active rejection or passive rejection.	Generate, evaluate, and select strategies in this stage. Use a three-stage decision making framework. Stage 1 (Input Stage), Stage 2 (the Matching Stage), and Stage 3 (Decision Stage).
The Implementation Stage (Trail)	Innovation put into practice; uncertainty and reinvention can occur in this stage; to change or modify the new idea.	Establish Long-Term Objectives (Financial or Strategic objectives).

The Adoption Stage (Confirmation)	Large-scale, continued use; satisfaction.	Confirm the Long-Term Objectives (Financial or Strategic objectives).

Furthermore, as indicated by Killen *et al.* (2012) that the relationships between strategy management, project management, program management and project portfolio management are well-known and have been discovered in the lots of literature for more than 20 years by many scholars.

Hence, after aligning the diffusion with strategy formulation phase, it is now very much useful to use the same technique in fitting the strategy diffusion at the levels of strategy level, portfolio level, program level, and project level, through diffusing the strategic initiative formed from the strategy planning stage to all organisational levels. The coming sections are the important parts that involve diffusion purposes of the organisational strategic initiatives at each level of the organisation for this research.

3.4. Strategy diffusion (top-down) alignment

More studies have confirmed that it is very important that the firms know correctly their business management framework and the location of their portfolio, program and projects management within it (Morris & Jamieson 2005). A number of scholars (Artto & Dietrich 2004; Morris & Jamieson 2005; Thiry & Deguire 2007; Deloitte 2015; EY 2015; Walter, Lechner & Kellermanns 2016) outlined many practices and processes for governing the strategic, portfolio, program, and project connections in multi-project settings.

Traditionally, a pyramidal structure has been seen in project-based organisations, where management debating converted to project discussion. By the time, the practical implementation

was renewed in such a way that supported in appearance of the top-down style within project management organisations, where, the style suggested a cascading arrangement from the top management down to a single project, going through the portfolios and programs. In addition, the board of directors in the company can control the portfolio environment, classify programs, and accept projects for improvement. In figure 3.2, there is an individual portfolio, a minor quantity of programs inside the portfolio, and some projects contained by each program, where a synergy is formed amongst the projects (Thiry & Deguire 2007).

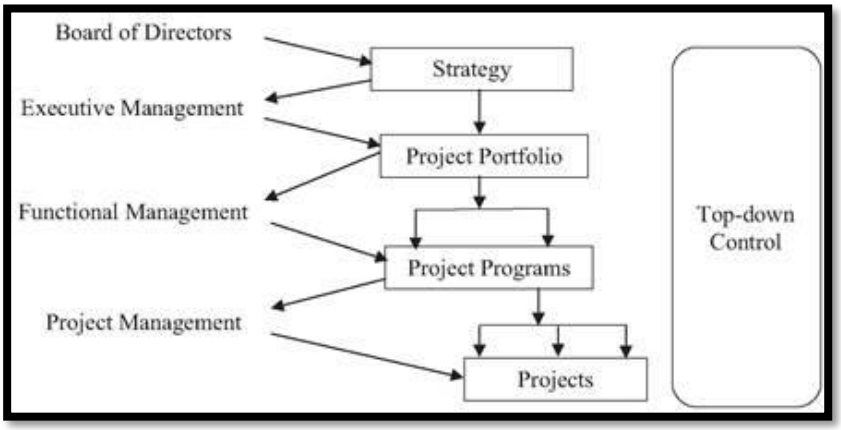


Figure 3.2: The pyramid structure of a project-based organisation

Source: (Thiry & Deguire 2007)

Additionally, according to Morris and Jamieson (2005) a hierarchy of objectives, strategies and strategic initiatives can usually be created as an output of a planning strategy phase; which can strongly affect the means of configuring, strategy managing and communicating it to the association. As shown in figure 3.3, the cascading process is proposed to show how organisations locate business strategy, portfolios, programs, and projects to accomplish their objectives and goals. As a result of these literatures suggestions, the equivalent top-down model has been adapted in this research.

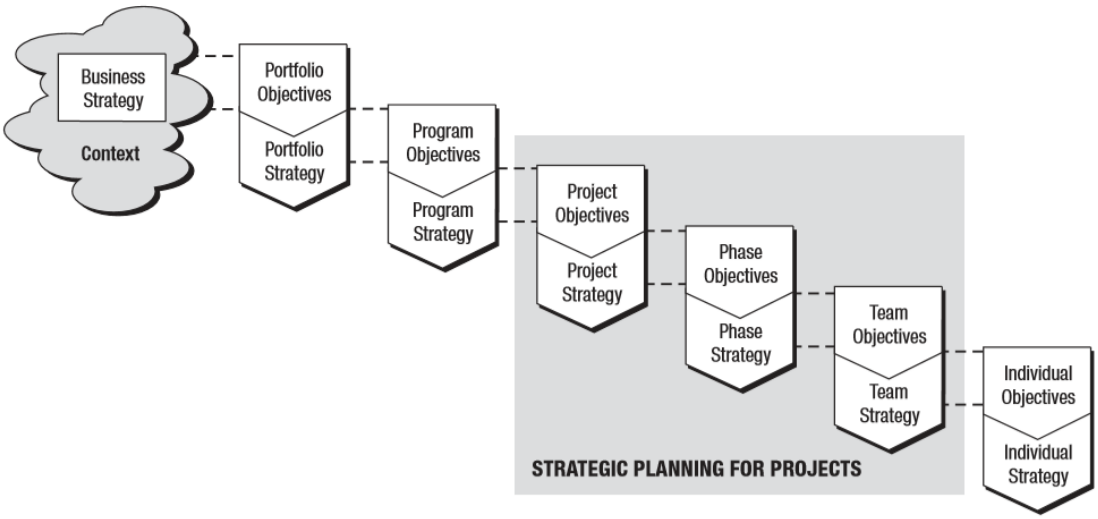


Figure 3.3: Linking corporate and project strategy

Source: (Morris & Jamieson 2005)

3.4.1. Strategy diffusion at strategy level (strategy formulation phase)

Comninos and Frigenti (2002) stated that strategic effectiveness can be achieved through establishing the correct objectives, goals or initiatives and then implement them in a proper method. Thus, the strategic planning naturally needs to be practiced at all levels of the organisation. To be more specific, strategic planning at the corporate level results in a set of organisational needs and goals, where these needs and goals are transformed into business strategic initiatives, which later on these business strategic initiatives are carried out over projects, whose strategy is the project approach.

Moreover, the strategic fitting concept describes the degree to which all projects jointly reflect the strategies of the business corporate. Based on that, the alignment of project portfolio objectives and resources reflects the overall business strategy (Heising 2012). This means that when top management identifies and agrees on its long-term goals, objectives, targets, means, and initiatives, then they put them in action plans and explain the plans in detail to convert them into shared actions (Kim *et al.* 2014)

In general, organisational leadership defines and agrees on the organisation mission, goals, and strategies. The key next step will be the identification of precise initiatives or projects or programs (Thiry 2002) that will handle the strategies. These programs and/or projects become parts of an organisation's project portfolio, which should result in achieving the mission and goals of the organisation. Each project in the portfolio is defined in broader part as delivering outcomes, resource requirements, and potential timelines and responsibilities. In other words, the management selects those projects that deliver the most valuable results and ensure the strategy implementation in the greatest efficient and effective mode. The clearer the plan, the higher the chances will be of achieving the goals. This is illustrated in figure 3.4, the link between strategy and project portfolio (Levine 2005; Serra & Kunc 2015).

To facilitate the task of this research, it was decided to change the five steps of Rogers' diffusion into three steps. This will be through joining the first (knowledge) step and the second (persuasion) step together, then the fourth (implementation) step and the fifth (adaptation) step, and finally leave the decision step as is.

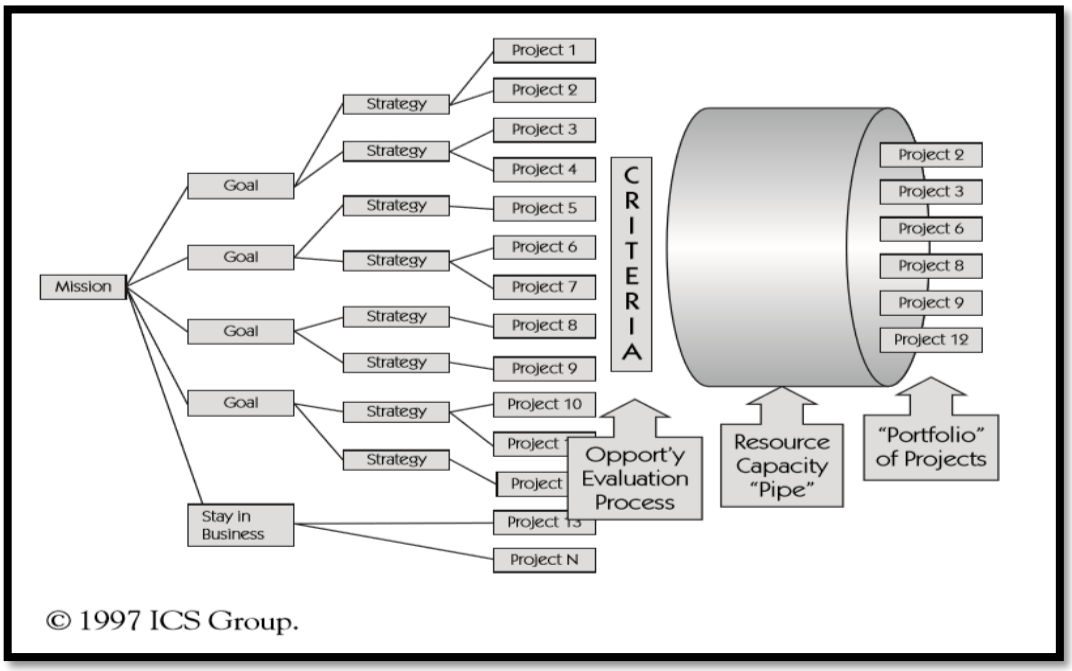


Figure 3.4: Strategies competing to enter the portfolio

Source: (Levine 2005)

Thus, this level needs knowledge and persuasion diffusion phase through shared understanding of the business drivers behind the strategic initiatives (Saunders, Mann & Smith, 2008); the capabilities needed for the strategic initiatives (Kunisch *et al.* 2019; PWC 2018; Favaro 2013; Saunders, Mann & Smith 2008); the values and benefits of the organisational strategic initiatives (Lechner & Floyd 2012; APM 2019); and about the strategic initiatives alignment with the organisational risk management (Saunders, Mann & Smith 2008). Then, for the decision and evaluation diffusion phase the organisation needs the strategic initiatives decisions to be based on analysed data (Walter, Lechner & Kellermanns 2016); policies, boundaries and guidance; and against organisational values (Saunders, Mann & Smith 2008). Finally, for the parts of implementation and adaptation diffusion phase, they can be done through suitable allocation of the capabilities (Saunders, Mann & Smith 2008; AMCES); strategic initiatives risk communications; and key performance indicators, which must be set for the strategic initiatives for better deployment purposes (Saunders, Mann & Smith 2008). See table 3.2 for further explanation.

Table 3.2: Comparison between Rogers' theory and strategic formulation stage after forming strategic initiatives within strategy level

Rogers diffusion theory (The adoption - Decision Process)	Rogers diffusion theory definitions (Rogers 2003)	David's Strategy Formulation Phase / Strategic initiatives formed
The Knowledge Stage (Awareness)	During this stage, the individual tries to define the innovation and how and why it works.	Knowing business general directions, vision and mission. Long-term objectives formed like strategic initiatives.
The Persuasion Stage (Interest)	Develops interest; gathers more information and facts about it.	Share understanding of all details of capabilities, risks, values, benefits of the strategic initiatives.

The Decision Stage (Evaluation)	Mental trial; after getting all the information from previous stage. Individual Selects to accept or reject it. Or to active rejection or passive rejection.	Strategic initiatives decision making is based on data analysing, organisational policies, boundaries, and guidance, and they must be aligned with the organisational values.
The Implementation Stage (Trail)	It put into practice; uncertainty and reinvention can occur in this stage; to change or modify the new idea.	Capabilities are allocated for the strategic initiatives, risks are communicated, and key performance indicators are settled for the strategic initiatives.
The Adoption Stage (Confirmation)	Large-scale, continued use; satisfaction.	Strategic initiatives are translated to portfolio of projects.

3.4.2. Strategy diffusion at portfolio level (strategy operationalising phase)

A study by Morris and Jamieson (2005) mentioned that corporate strategy is about thinking and expressing how a utility's higher-level objectives and goals will be accomplished. This strategy later on is normally "operationalized" as a business unit level strategy; where strategic initiatives are then grouped into portfolios of projects, programs, and projects for execution. Likewise, Shenhar *et al*. (2001) stressed that project portfolios are "powerful strategic weapons" in projects business, because one can consider it as an essential hub in executing the planned strategy. Then, firms utilize project portfolio management methods, for instance non-financial and financial assessment and valuation are practiced to prioritise and select the finest collection of projects (Serra & Kunc 2015).

At a top level, portfolio management processes contains a number of elements: 1) classification applicant projects, 2) emerging selection criteria that will facilitate projects ranking, and 3) endorsing or balancing the portfolio via visual assessments that let forming of several choices

and modification of the portfolio. In general, organisations recruit portfolio management for the following aims: 1) maximising the value of projects according to the company objective (for example, profitability), 2) achieving a balance of projects (for example, as per risk wise, or time line wise), or 3) ensuring the business strategic objectives alignment with projects (Levine 2005, Kodukula 2014; Pajares & López 2014).

Moreover, portfolio management facilitates strategic goals, via offering the benefits of empowering decision making based on strategic objectives and data not as ad hoc judgments determined through the needs of the moment. Additionally, portfolio management does the proper resource allocation to reduce the wastages spending came from inefficient resource allocation or due to duplication of the projects. Furthermore, it can benefit from the source of project information to audit and assess projects' progress and enable organisational learning from earlier strategy choices and decisions (PMI 2017; Levine 2005).

Thus, the lifecycle of project portfolio management has five stages, including portfolio inventory, analysis, planning, tracking, and review and re-planning. These stages are iterative, dynamic, and ongoing, see figure 3.5. Therefore, this process must be controlled and managed cleverly, while relying on project lifecycles as well as organisational matters, similarly to financial plan cycles.

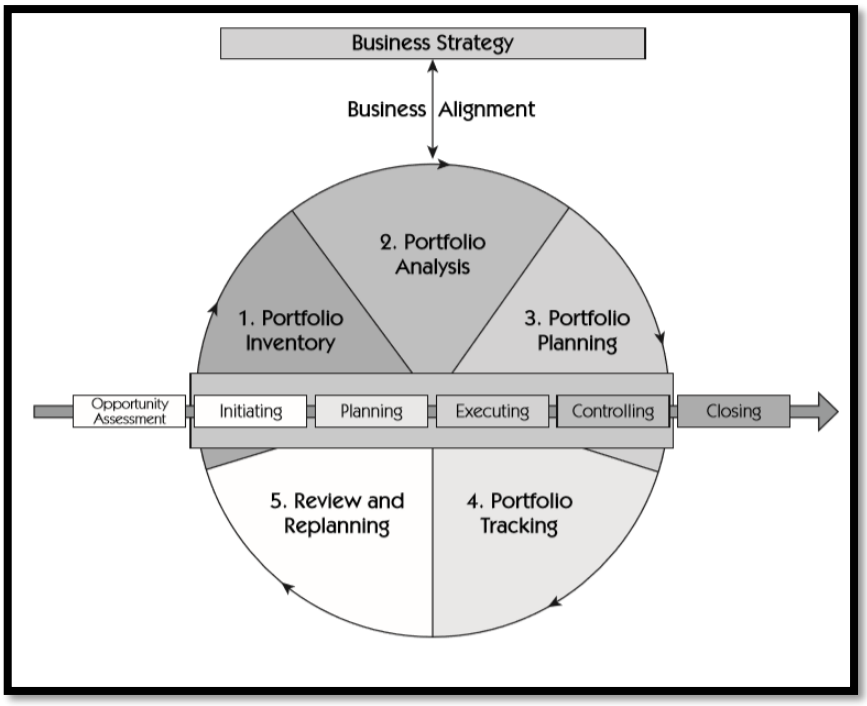


Figure 3.5: Project portfolio management and project management lifecycle

Source: (Levine 2005)

Therefore, while comparing project portfolio execution processes to Rogers' diffusion theory in the setting of strategic implementation stage, the linkages will be as follows:

- The Knowledge Stage (Awareness): The strategy foundation of objectives and strategies should be clearly understood and openly communicated all the way through an organisation, which means moving a firm to its main direction (David 2011). To be more detailed, top management provides a broad direction to cascade it in every operational level of the organisational hierarchy. In this context, middle managers can separately accept strategic initiatives to define precise activities that will function their objectives in link with the organisation's comprehensive direction and/or to explore a new opportunity (Kim *et al.* 2014). In this stage project portfolio selection involved in picking a portfolio of projects that in relations to the organisation's goals and objectives, considers resources availability and does not add unsolvable constraints (Ghasemzadeh

& Archer 2000). Agreeing with the current strategic plan and how the projects/programs approved within that strategy contributes to the organisation strategic objectives. According to PWC (2017) provides two steps to serve this stage as: 1) Portfolio Mobilization, which translates the strategy into action, where it builds vision and approves strategy and objectives, as well as to found project scope and delivery design. 2) Management design where it sets up success via defining portfolio controller and establishing portfolio office.

- The Persuasion Stage (Interest): as per David (2011) all bosses and employee's roles in strategy implementation should be created upon prior participation in strategy planning courses and all major external threats and opportunities should be very obvious and clear, and all enquiries of managers and employees to be addressed and answered. In project portfolio there must be a clear understanding of what 'right' project means for organisation; and have the information needed for all the methods to allow proper decisions for projects selection and the efficient and effective use of resources. This can be done via communicating company oversight and assurances with external stakeholders, the organisation's owners, and the wider stakeholder community (Too & Weaver 2014). PWC (2017) defined this stage in project portfolio as data preparation stage, where they get data to know better, by assessing current landscape, personnel interviewing, and collecting relevant portfolio and business information. Therefore, portfolio management roles involve in collecting and confirmation of ability and resource availability figures; using the methods, policies, procedures, and criteria to make and implement effective decisions (Too & Weaver 2014).

- The Decision Stage (Evaluation): for this stage managers and employees from all levels of the organisation should participate directly and early in strategy implementation assessments (David 2011). The main role of portfolio management is to involve in

accepting or rejecting the “right” programs/projects that meet the requirements of the organisation's strategic objectives and plans (Too and Weaver 2014). Portfolio assessment stage which proposed by PWC (2017) is to test and refine the portfolio, vial portfolio optimization, data modelling and analysis, and categorising activities. Ensuring that information needed to allow a proper decision to be made is developed and that the degree of uncertainty (risk) involved in the assessments is understood and is acceptable to the organisation when balanced against the anticipated benefits.

- The Implementation Stage (Trail): the main functions here for the strategic management are creating annual goals and objectives, putting policies, assigning resources, aligning managers with strategy, creating a culture that support the strategy, developing human resources productivity, modifying a present organisational construction, reviewing reward and encouraging plans, reducing resistance to change, reengineering and restructuring, adapting operations processes, and downsizing whenever needed (David 2011). This is very much matching with the main functions of the project portfolio implementation, as portfolio management is developing process to ensure decisions are aligned with corporate strategy; determining the methods and criteria that could be used for the oversight, selection, or termination of programs/projects; evaluating of the programs/projects; fostering and supporting projects to assist their crews for bringing benefits to the organisation as well as to other stakeholders; and reducing total cost (Too & Weaver 2014). For this stage PWC (2017) proposed portfolio recommendations phase, to make the right decision, where they can draft portfolio blueprint, baseline plans and provide recommendations.

- The Confirmation Stage (Adoption): in the strategic management all main competitors’ achievements, plans, actions, processes, products, and performance have to be obvious to entire organisational community as well as when practicing a training for all

employees. It will certainly facilitate the strategy implementation and adoption phase (David 2011). From the project portfolio perspective, there will be confirmation of the right projects/program in order to start and maintain it, and which to cancel or defer, taking in to account the resource availability and the correct prioritising of the programs/projects (Too & Weaver 2014). This is totally agreed by PWC (2017) when proposing portfolio's operational phase for this stage, where it is for the delivering and maintaining stage, through reporting performance and inserting assurance and learning.

Table 3.3: Comparison between Rogers' theory and the strategic operationalising stage in the portfolio context

Rogers diffusion theory process **(Rogers 2003)**	**David's Strategy Implementation Phase** **(David 2011, Kim *et al.* 2014)**	**Project portfolio management level** **(Ghasemzadeh and Archer 2000, Too and Weaver 2014)**	**Project portfolio management level (PWC 2017)**	**Portfolio Managemen t Process** **(Levine 2005)**
The Knowledge Stage **(Awareness)**	The foundation information for objectives and strategies is available, like strategic initiatives for precise activities.	A portfolio selection of projects that meets an organisation's objectives.	Data preparation For better understanding.	Initial projects arrive the portfolio and knowing that projects has translated from strategic initiatives.
The Persuasion Stage **(Interest)**	Managers and employee's involvement start from strategy formulation stage and all their questions to be answered for buy-in purposes.	Full and clear understanding of what 'right' projects means for organisation, and full information and methods, procedures needed for the decisions.	Portfolio Deployment is to translate strategy into actions and management design.	Inventory phase: all projects data is gathered (including cost estimates, schedule, budgets, strategic initiatives,

				dependencies, ranking, relative expected benefits, risk, priority, and value).
The Decision Stage (Evaluation)	Managers and employees should participate from beginning and directly in strategy-implementation decisions.	The function of portfolio management is a decision about the "right" programs/projects the organisation should accept, fund and support.	Portfolio assessment is to assess and polish the 'to-be' portfolio.	Portfolio analysis phase: where projects are checking for their fitting, balancing, and utilizing.
The Implementation Stage (Trail)	The strategic management roles are creating annual goals and objectives, putting policies, assigning resources, aligning managers with strategy, creating a culture that support the strategy, developing human resources productivity, modifying a present organisational construction, reviewing reward and encouraging plans, reducing resistance to change, reengineering and	Portfolio management roles are strategy fitting, selecting projects, balancing, resource allocating, and cost reduction.	Portfolio recommendations implementation.	Project is selected and enters to project portfolio planning phase, where the resources are allocated for it.

	restructuring, adapting operations processes, and, , downsizing whenever needed.			
The Confirmation Stage (Adoption)	confirming the right achievements, plans, actions, processes, products, and performance indicators.	confirming the right projects/program	Operating portfolio to deliver and maintain.	Portfolio tracking phase for assessment to determine whether to continue with the project. And reviewing phase for re-verification of the projects.

For the simplification purpose, the portfolio practice will be for knowledge and persuasion as shared understanding that the portfolio is translated from strategic initiatives (EY 2015); shared understanding about the portfolio procedures (Filippov, Mooi & van der Weg 2012); and shared understanding of holistic view of portfolio (Pennypacker 2005; Unger, Germunden & Aubry 2012; PWC 2017). Then, for decision and evaluation phase, portfolio analysis helps to confirm new investigation needs (Kopmann *et al.* 2017); the selection of the projects are based on market needs (Martinsuo 2013; Kopmann *et al.* 2017; Abubakar *et al.* 2018); value benefits analysis used for maintaining the balance between projects (Levine 2005); frequent reviewing whether the strategy of the project portfolio is still valid in the light of changed conditions (Kopmann *et al.* 2017); frequent evaluation of the interdependency between programs and projects; and the selection is based on decision framework (EY 2015). Finally, for the

implementation and adaptation stage the strategy initiatives are implemented through portfolio (Unger *et al.* 2012; Beringer *et al.* 2013; Kock Petro & Gardiner 2015; Heising & Gemünden 2016); the portfolio charter is approved (Levine 2005; EY 2015); the resources are allocated to projects (Levine 2005; Jonas 2010); the communication plans are set (PWC 2017); and the risk management plan is established (EY 2015).

3.4.3. Strategy diffusion at the program level (strategy operationalising / implementation phase)

Linking business strategy directly with project prioritization and section scheme is usually hard to do specially when managing them for long term. Thus, to facilitate the connection it is better to establish a program management model inserter in between portfolio management and project management (Levine 2005).

According to PMBOK (2017) from the strategic management point of view, the program management is considered as a key driver for managing various projects after the portfolio, but in a different manner. Programs normally include multiple projects that are supposed to contribute to the achievement of organisational strategic objectives and tactics. Furthermore, various programs take into account elements of existing actions. It also represents organisations that have a robust goal and purpose, predefined expectations related to the benefits and values system, and a plan for effort organising. Moreover, based on Pellegrinelli (1997) program management is about defining the strategic needs for the program and undertakes obligation for accomplishing the benefits, grouping existing projects or accepting new projects.

A program is a framework that can be practiced to generate specific results and outcomes, which can be identified at a high level of a ‘vision’. Therefore, in detail, program management is meant to manage interfaces among the projects, where the objectives of projects under the same project program are interdependent. Therefore, program management can be defied as the synchronised

management of a portfolio of projects that can lead organisations to achieve their important strategic benefits (Artto & Dietrich 2007).

The program management lifecycle requires demonstrating the oratory and perceptions of strategic long-term objectives, instead of the short-term's one. This is to gain top management support and to be able to support strategic decision making (Thiry 2010). Thus, Thiry (2010) built a program management lifecycle based on a benchmarking study between three guides including PMI® standard, MSP Transformation Flow standard, and P2M standard, as well as adding the PgPM® certification specification's process, to establish a generic practice-based lifecycle of program management practice as shown in table 3.4.

Table 3.4: Program lifecycle comparison

PgMP® Specification	PMI® 2008 Life Cycle	MSP™ 2007	P2M 2005	Benchmark (Thiry, 2002)
Defining	Pre-Program Preparation	Identifying Programme	Define Program	Formulation
Initiating	Program Initiation	Defining Programme	Acquire Common View *(Program Mission and Value)*	Organization
Planning	Program Setup		Understand Common View *(Program Community and Architecture)*	
Executing	Delivery of Program Benefits *(Monitoring and Control)*	Managing the Tranches	Integration Management *(Integrative management of projects)*	Deployment
		Delivering the Capability		
Controlling		Realizing the Benefits	Structured Value Assessment	Appraisal
Closing	Program Closure	Closing the Programme	*No identified closing phase*	Dissolution

Source: (Thiry 2010)

By applying Rogers' diffusion theory on the program management lifecycle, we can find it is totally in line with it, as shown in table 3.5.

Table 3.5: Strategy diffusion in programs

Rogers' diffusion theory process	Program Management (Thiry 2010)

(Rogers 2003)	
The Knowledge Stage **(Awareness)**	**Formulation stage**: Defining the strategic programs expected benefits via stakeholder analysis and agreement on the program objectives and purpose, which consist of functional action plans.
The Persuasion Stage **(Interest)**	**Organisation stage** where detailed programs, operational procedure and structures are included, with technical action plans.
The Decision Stage (Evaluation)	**Appraisal stage** consists of program level benefit realization, assessment, evaluation of the operational achievements.
The Implementation Stage (Trail)	**Deployment stage** is the delivery of capabilities via program's essential projects and actions that consist of turn into the business.
The Confirmation Stage (Adoption)	**Dissolution stage** where closing process will be practiced with long-term benefits measurement process.

Again, for the purpose of simplification, the program practices the knowledge and the persuasion stage. This is done through shared understanding of programs' expected benefits (Thiry 2010; PWC 2017), understanding the resources required by the program, and establishing a common understanding about program stakeholders' roles and responsibilities (Ribbers & Schoo 2002; Thiry 2010).

Then, for the decision and evaluation part, a program must prioritise projects using evaluation framework, select projects based on organisational strategy (Blomquist & Müller 2006), and program decision making should be supported by intelligent data analysis (PWC 2017). Finally, for the implementation and adaptation part, projects are prioritised within a program. Interdependencies between projects are also managed. Synergy between projects within the program is created, the program's resources are planned (Blomquist & Müller 2006), and the

benefits realisation plan is developed. Change plans are ultimately created and communication plans are established (PWC 2017).

3.4.4. Strategy diffusion at the project level (strategy implementation phase)

Integrating project management and project portfolio management allows organisations to choose the top collection of projects that are suitable to the business strategy, track and monitor their outputs, and reprioritise from time to time the portfolio as per business circumstances and financial plan change, see figure 3.5 (Levine 2005).

Furthermore, Shenhar (2004) recognised two scopes to distribute projects for strategic portfolio management: 1) the strategic goal dimension that consists of strategic and operational projects, and 2) the customer dimension that consists of internal and external customers. For strategic projects, they deal with new long-term business aspects, while operational projects deal with existing business.

As per PMI, the project management process is launched with the initiation of a project, followed by planning, execution and control, and closing processes, see figure 3.5. Each of these stages includes activities and sub-processes that are practiced for the sake of project management effectiveness during the life of a project (Levine 2005).

Table 3.6: Strategy diffusion in projects

Rogers diffusion theory process (Rogers 2003)	Projects Management level (PMI, 2017; Patanakul & Shenhar 2012)
The Knowledge Stage **(Awareness)**	**Project Strategy**: The project views, positions, and plans for what to do, how to do it, and why to do it. All that is for gaining greater competitive advantage. **Initiation stage:** It is done via identifying business desires, founding a project strategy with priorities, approving on the

	project characterisation containing defining project objectives and success criteria.
The Persuasion Stage (Interest)	**Planning phase:** How to achieve objectives and goals, via setting all the projects plans, methods, processes, and guidelines.
The Decision Stage (Evaluation)	**Control and Monitoring phase:** Admiring important outputs and making decisions or recommendations at serious points in the project's life whenever needed and when compared to project plans. Ongoing monitoring of the project's business environment.
The Implementation Stage (Trail)	**Executions phase:** project managers in this phase are responsible to ensure that the project meets its all needs objectives.
The Confirmation Stage (Adoption)	**Closing phase:** Delivering success or failure for projects, benefit realization. Taking delivery of a project at completion, and project reporting systems that focus on performance against plan or specific objectives.

For the simplification resolutions, the projects practicing knowledge and persuasion stage are done by shared understanding of project management methodology, projects constraints (time, cost, quality, and scope), project risk (Dietrich & Lehtonen 2005; Buys & Stander 2010; Serra & Kunc 2015; PMI 2017), realisation of project benefits outputs (Serra & Kunc 2015; Papke-Shields & Boyer-Wright 2017; Musawir *et al.* 2017), project roles and responsibilities for project governance (Khoshgoftar & Osman 2009; PMI 2017; Musawir *et al.* 2017), and knowing clearly the projects critical milestones (Sheykh *et al.* 2013). Then, for the decision and evaluation part projects' constraints (time, cost, quality and scope) are evaluated based on project information (Papke-Shields & Boyer-Wright 2017; Khoshgoftar & Osman 2009; Musawir *et al.* 2017), and predefined rules and methods (Dietrich & Lehtonen 2005). Project decisions are communicated to the relevant stakeholders (Musawir *et al.* 2017). Project

execution management plans are checked (PMI 2017; Papke-Shields & Boyer-Wright 2017). The projects' schedule management plan is then set and the cost management plan is confirmed. The scope management plan is approved, the quality management plan is set and the risk management plan is approved. Following this, the resource management plan is approved, the communication management plan is established and the procurement management plan is confirmed; and in addition, the stakeholder management plan is accepted (PMI 2017). Finally, for the implementation and adaptation, projects are managed according to project management methodology, where the progress is managed against the project schedule. Cost is monitored-controlled against project the budget plan. The scope of work is done against the scope plan. Quality is monitored-controlled against the quality plan. Risk is responded against the risk plan. Communication is managed against the communication plan. Procurement is conducted against the procurement plan. Stakeholder engagement is managed against the stakeholder plan, and change is monitored-controlled against the change plan (PMI 2017).

3.5. Performance (bottom-up) alignment

The strategy top-down and bottom-up mechanisms roles are diverse based on the organisation. This has also been explored in prior studies (e.g., Artto & Dietrich 2007; Killen *et al.* 2012; Kim *et al.* 2014). For instance, see figure 3.6 representing the model of the process of decision-making divided at three organisational levels, which highlights communication and data sharing amongst those levels. The communication and information flows are very important for the entire decision-oriented procedure for the multiple projects' strategic management. The arrows show communication and information flows, which considered as essential inputs and outputs for particular decision options (Artto & Dietrich 2007).

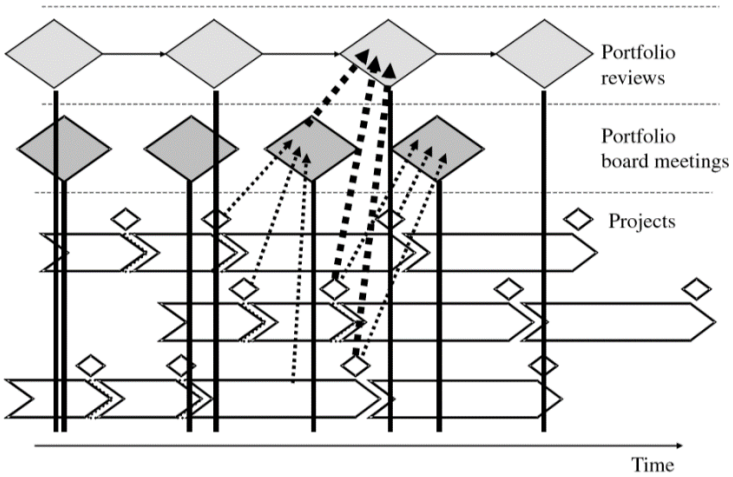


Figure 3.6: Bottom-up method for information and communication flows within the organisational levels

Source: (Artto & Dietrich 2007)

A bottom-up approach can be developed as an unplanned outline of activities and possibly will realize outcomes not originally proposed by top management. Therefore, bottom-up can shape objectives and action of the operations strategy, at least partially through the knowledge and lessons learnt from its day-to-day activities. According to the initial outcomes, top management strengthens or adjusts its plans as applicable (Kim *et al.* 2014).

Furthermore, a study by Serra and Kunc (2015) provided a conceptual example about benefits realisation, launching from projects and ending with the accomplishment of business objectives, as shown in figure 3.7. Theoretically, the process initiates on project results allowing direct delivery of intermediate benefits or business changes. In addition, as a strategic viewpoint, effective projects deliver the predictable benefits, then generate strategic value to the organisation. Hence, a good project management ensures the delivery of outputs, which enables outcomes, and then in turn facilitates the right benefits realisation.

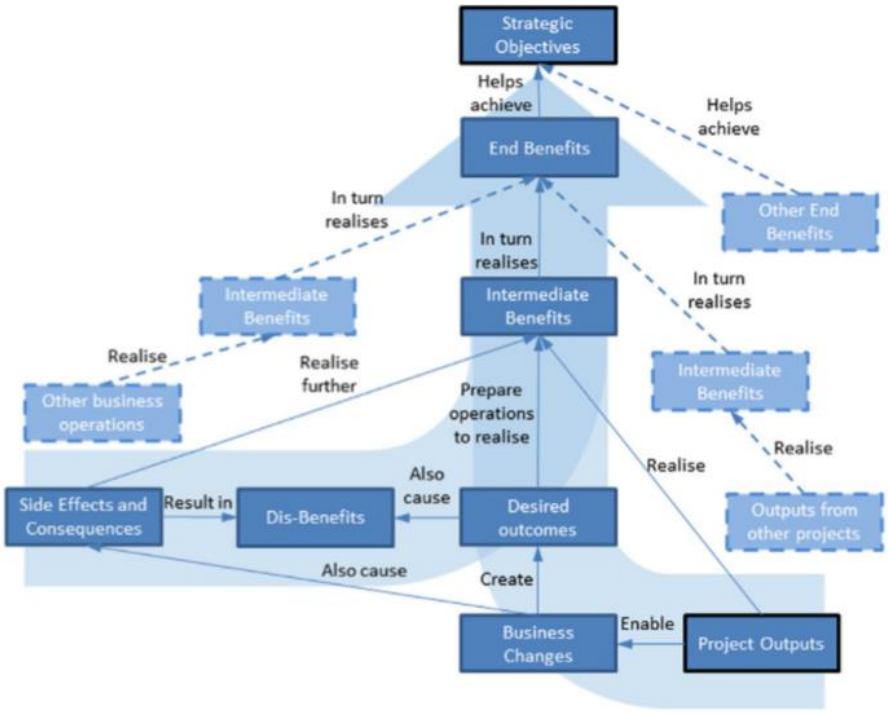


Figure 3.7: Benefits realization process

Source: (Serra & Kunc 2015)

As highlighted by EY (2015) that despite the importance of portfolio, programs and projects should work coherently although they have different objectives, however, in order to deliver the organisational objectives effectively. For example, project management focuses on providing a concrete output, and to do the things right. On the other hand, program management is the intermediary level that focuses on the provision of business benefits and realising the benefits. Portfolio management focuses on doing the right things via the decision-making process about which projects and/or programs should be implemented, based on their association with the organisational strategic key objectives and goals (see figure 3.8).

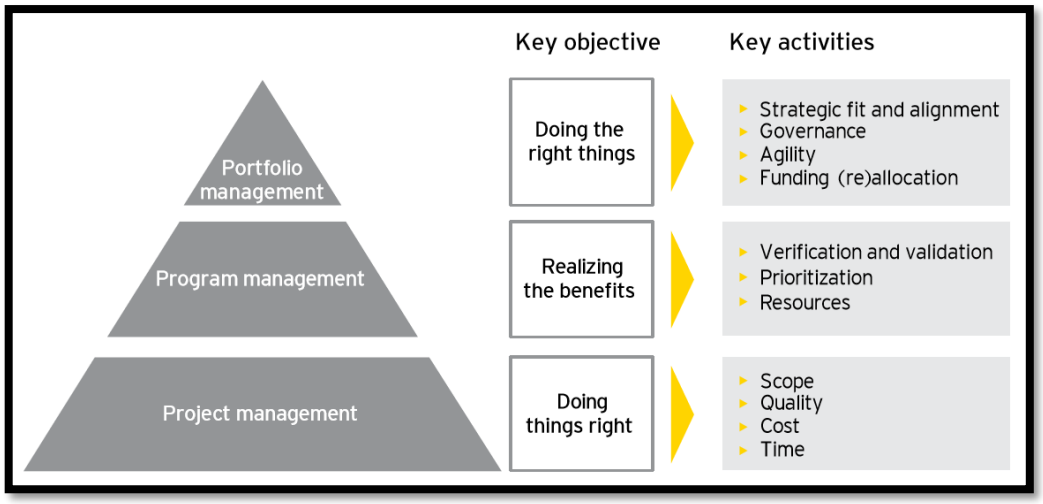


Figure 3.8: Portfolio, program and project management objectives and activities

Source: (EY 2015)

3.6. Strategy performance evaluation phase

3.6.1. Performance (data) feedback/reporting from the projects level to the program level (strategy evaluation phase)

Once the selection process of the right projects is done, then there is a need to assess the project success. The project success assessment is proposed to be done in two steps, which are normally called appraisal and evaluation. The appraisal arises before the commencement of respective project, to facilitate the approval of the business case, whereas the evaluation happens at project closing stage. This is in order to identify project accomplishment. Therefore, the success of projects is very important for organisations, because the success of projects reflects the success of implementing the organisational strategy and that their vision has turned into reality (Serra & Kunc 2015). Clearly, project management teams are supposed to identify how to evaluate project success.

Historically, project management has been seen as a functional and operational rather than a strategic advantage and success in operational level measured in terms of time, cost and quality.

Just lately, scholars and specialists have started to inspire the measurement of the strategic influence from project results. This is because the project management community has supported its attention on the strategic sides of project management, as well as has put its significant intention on project management and its link with strategy (Killen *et al.* 2012). Moreover, Shenhar *et al.* (2001) proposed that there are two types of projects; one of them is operational projects while the other is strategic projects. The operational projects are those in which practitioners are dedicated on getting the job done and meeting cost and time objectives. On the other hand, strategic projects are motivated to achieve business results and succeeding in the marketplace. The in-charge teams in strategic projects spend a huge time and attention on decisions and actions that aimed at improving business outcomes in the long-term period. For instance, these teams are concerned with competitive advantage, customer needs, and future market success, and rather than running through the primary plan, they keep doing modifications that will generate improved business outcomes, while an operational projects teams, focus on short run outputs and results.

Thus, it has been advised that, in order to measure both project process and business aspects, it is better to utilise a project balanced scorecard method, and the measurements can be used as follows (Comninos & Frigenti 2002): financial measures, such as economic value-add, business growth, cost saving, and investment; client measures, such as use of product, market share, satisfaction, new clients, and retention; learning and growth measures, such as productivity, empowerment, team satisfaction, motivation, and training; and project process measures, such as time, cost, quality, performance, use of resources.

In the end, various studies (Musawir *et al.* 2017; Papke-Shields & Boyer-Wright 2017; PMI 2017) strongly recommended to use measurements, including meeting business purposes, meeting project's operational performance goals, meeting project's technical performance goals, meeting project's schedule objectives, staying within project's budget limits, meeting

project's quality objectives, meeting project's scope objectives, and finally the rate of project's stakeholders satisfaction with project's results. These are intended to act as key indicators to measure the project success at project level within project-based organisations.

3.6.2. Performance (data) feedback/reporting from the program level to the portfolio level (strategy evaluation phase)

Previous studies have emphasised the programs performance phase, which needs to be reported to the portfolio level. It is important for program management to identify benefits and understand the program context, how it contributes to the broader business strategy, develop a full benefits realisation plans aligned with broader portfolio plans, and then realise the benefits. However, it is also very essential to monitor and report program progress whenever new information is available; in order to assess fairly the performance of benefits against the realization plan and to understand the early warning to whether project outputs are enabling change and delivering benefits. Indeed, in the end, program evaluation stage supports the organisation to take corrective actions if needed and provides lessons learned for future actions (Thiry 2002, 2004a, 2004b, 2010).

For these reasons, the main program performance measurements suggested by scholars were whether programs reflect the business strategy implementation, the program's shareholders satisfaction rate, and the programs cost-benefit achievements (Musawir *et al.* 2017).

3.6.3. Performance (data) feedback/reporting from the portfolio level to the strategy level (strategy evaluation phase)

The project portfolio management is a complicated process that begins at the highest level of the enterprise. It is considered as a key step to generally execute the strategic process. It facilitates the conversion of an enterprise's strategy into results that it desires. It also makes

sure that the required results are achieved, new business initiatives are formed. The building blocks of these initiatives are the programs and projects, in which they create products/services that provide ultimate help to achieve the organisational goals by creating value (Kodukula 2014; Serra & Kunc 2015).

Thus, project portfolio management is meant to monitor the progress of single projects and intermittently re-prioritising all the projects within the portfolio to have the correct balance, collaboration and success while implementing the organisational strategy (Unger *et al.* 2012).

In general, all organisations should control their business and execute their projects wisely through project portfolio management, since project portfolio management allows organisations to put a criteria for picking the correct projects and removing wrong ones, assign right resources to the right projects. This will reduce wasteful cost, make ownership between workforce by contribution at the exact points, support project teams to recognise the value of their influences, and create paths for entities to get support and recognise opportunities (Levine 2005).

Consequently, monitoring portfolio of project performance must be against the strategic needs. This includes project evaluation, portfolio balancing, and portfolio analysis. In particular, based on the results, projects are selected and prioritised at the right time depending on their contribution to the company's strategy (Pajares & López, 2014). Moreover, the continuous review and ‘learning’ is associated with a continuous improvement philosophy in the portfolio domain. In other words, providing feedback to the strategic decision makers and governing body is based on the ‘special knowledge’ gained through effective portfolio management activities, and that contributes to the organisation strategic objectives modification in response to changing circumstances, as well as it minimises the overall costs of converting ‘input’ to ‘output’ through projects (Ghasemzadeh & Archer 2000; Too & Weaver 2014).

Authors gave a comprehensive review on portfolio performance management linked to the right number of projects against the resources available, containing a high-value projects, excellence balance of projects, whether these projects are aligned with business strategy, budget allocation correctly between projects and based on business strategy, portfolio stakeholders satisfaction rate, portfolio achieves their time, cost and quality goals, portfolio achieves their financial goals, portfolio fulfils stakeholders' requirements, and projects within portfolio achieve their purposes (Teller *et al.* 2012).

3.6.4. Performance (data) feedback/reporting from the strategy level to the organisational level (strategy evaluation / formulation phase)

Strategy performance management according to David (2011) initiates managerial questioning of expectations and assumptions, must indicate a review of goals and objectives, and should inspire creativity in creating substitutes and framing criteria for the strategy evaluation. Strategy evaluation is essential to ensure that stated objectives are being achieved, where it compares planned to actual progress toward meeting stated objectives. Strategy evaluation can lead to strategy-formulation changes, or to strategy-implementation changes, or to both changes, or even to no changes required at all. The final strategy evaluation task facilitates for taking corrective actions to ensure that performance conforms to plans and requires making changes to competitively relocate a firm for the future. Feedback information must be economical, effective, meaningful, and timely based information. For these reasons, several studies examined the strategic performance measures through strategic initiatives' stakeholders satisfaction rates, meeting strategic initiatives' service expectations, strategic initiatives' benefits realisation expectations, strategic initiatives' revenue expectations, strategic initiatives' profit expectations, strategic initiatives' sales growth expectations,

strategic initiatives' market share expectations, and strategic initiatives' environmental conditions adaptations (Lechner & Floyd 2012; Walter *et al.* 2016; Musawir *et al.* 2017).

3.7. Key problems identified from the reviewed literature

This chapter proved the possibility of complete integration of the three theories namely David's strategic management model, Rogers's diffusion theory and project management theory in project-based organisation levels from top-down and bottom-up viewpoints. Furthermore, it showed the possibility of matching Rogers' diffusion theory key terms, elements, characteristics, and decision process stages with the strategy management sides. In addition, it paved the road for coming up with a conceptual framework proposal, which will be shown in the coming chapter. This has allowed solving the research problem that was exposed previously from the literature review, which is the absence of a robust framework for strategy diffusing process that could impact the strategy translation, improvement, and completion the full strategy management cycle in project-based organisations.

Therefore, by resolving the issue of strategy diffusion top-down by using Rogers' diffusion process in strategy diffusing, and performance reporting bottom-up for completing the strategy cycle at each of the pyramid levels of the project-based organisations. This will support ultimately in improving the organisational performance within project-based organisations and solve the research problem.

3.8. Chapter summary

In conclusion, from the literature reviews top-down and bottom-up links between strategy, projects, and project portfolio management was explained in detail. First, from the literature review the chapter elaborated matching the Rogers' innovation diffusion theory key

terms, elements, characteristics, and decision process stages with the strategy management elements, characteristics, and process stages, which provided theoretical underpinning of the similarity of innovation diffusion and strategy diffusion concepts. Rogers's diffusion theory showed a perfect integration with strategic management phases at each level of the project-based organisation in a top-down manner. After that, from the literature review the performance reporting method demonstrated a perfect alignment between project to program to portfolio reaching to strategic levels in a bottom-up method. All that paved the way for the coming chapter, which will provide enlightenment about the established research conceptual framework.

4. CHAPTER FOUR: Proposed conceptual framework

4.1. Introduction

The main aim of this chapter is to demonstrate on how the anticipated research conceptual framework developed with the associated hypotheses, based on the literature review done on the research parts related to the strategy, portfolio, program and project - the four levels - required for the project-based organisations levels.

The start point will be with presenting the construct of strategy initiatives' diffusion (top-down) at each the four levels (strategy, portfolio, program and project) of the project-based organisations, the associated hypotheses for this block and the theoretical reasoning behind it. Then, showing the construct of the reporting back of the performance (bottom-up) at each of the four levels (strategy, portfolio, program and project) of the project-based organisations, the associated hypotheses for this portion and the theoretical reasoning behind it.

After that, describing the construct of the associations between strategy initiatives' diffusion drivers at each the four levels (strategy, portfolio, program and project) of the project-based organisations and the organisational performance, the associated hypotheses for this portion and the theoretical reasoning behind it. Then, illustration of the construct of the organisation culture that influences as a mediator variable required amongst the strategy initiatives' diffusion drivers within each of the four levels (strategy, portfolio, program and project) of the project-based organisations and the organisational performance, the associated hypotheses for this portion and the theoretical reasoning behind it.

Finally, explaining the construct of the performance emerged from each of the four levels (strategy, portfolio, program and project) of the project-based organisations as mediator variables that influence the relationships between all four levels of strategy initiatives'

diffusion drivers (strategy, portfolio, program and project) of the project-based organisations and the organisational performance, the associated hypotheses for this portion and the theoretical reasoning behind it, which serve the main objectives of the research.

This chapter also will provide the diagram of the proposed research conceptual framework and all the related developed hypotheses for all the four required levels of the project-based organisations. At the end, this chapter will show the linkages of the study questions with the related hypotheses that need to be tested and evaluated.

4.2. Research conceptual framework outline

From previous chapters (chapter 2 and 3) a comprehensive literature has been reviewed to study relevant articles and critical analysis of existing concepts of strategic management models, diffusion theories, and project management models, with organisational outcomes. The outcomes of chapters 2 and 3 confirmed the possibility of diffusing top-down the strategy initiatives in project-based organisations via utilising Rogers' diffusion communication process at the agreed four levels of strategy, portfolio, program and project as per the PMI standard construct. This approach used the top-down process. Furthermore, it confirmed the reporting bottom-up of the performance emerged from each of the agreed four levels of strategy, portfolio, program and project as per the PMI standard construct in project-based organisations. Subsequently the confirmation driven from chapters 2 and 3 this research conceptual framework was anticipated with all its associated hypotheses, as shown in the research outline figure 2.24 of chapter 2.

The main objective of this chapter is to illustrate more about the proposed research conceptual framework and the related developed hypotheses. Therefore, the conceptual framework of this study suggests that organisational performance can be improved through the strategy diffusion

(top-down) practices, performance (bottom-up) drivers, and organisational culture driver and their associations directly or indirectly with the organisational performance.

This model suggests that organisational performance is dependent on strategy diffusion (top-down) practices drawn from strategy initiative diffusion practice, portfolio initiative diffusion practice, program initiative diffusion practice, and project initiative diffusion practice.

It also suggests that organisational performance is dependent on strategy diffusion (top-down) practices mentioned with the presence of the mediation roles of the performance (bottom-up) aspects counting strategy performance, portfolios performance, programs performance, and projects performance.

Moreover, the model suggests that organisational performance is dependent on strategy diffusion (top-down) practices with the occurrence of the mediation role of the organisational culture driver.

Furthermore, the framework proposes that there are top-down links amongst strategy diffusion from the strategy level, to portfolio, then to program and project levels, similar to studies (e.g., Ligetvári 2013). These relationships between strategy diffusion (top-down) practices at each level of a project-based organisation including the strategy, portfolio, program, and project levels will be explained, based on PMI (2017).

Furthermore, the model suggests that there are bottom-up links between performance reporter, means reporting from the project level as the bottom level of the organisation to the program level, then to the portfolio, and finally to the top level, which is the strategy level of the organisation, within project-based organisations based on PMI (2017).

4.3. Research hypotheses development

Considering that the strategy diffusion (top-down) approach, performance (bottom-up) approach, strategy initiatives diffusion practices drivers at the four levels of project-based organisations, the influence of performance reporting mediation drivers came out from each of the four levels in project-based organisations and the influence of organisational culture mediation driver at each of the four levels of the project-organisations, are the main causes of organisational performance enhancement in project-based organisations. Therefore, in the coming sub-sections there will be more in-depth illustration about the same and how the research hypotheses have been developed and planned for this study.

4.3.1. Strategy diffusion (top-down) hypotheses

PMI (2017) defined the organisational project management as a "framework in which portfolio, program and project management are integrated with organisational enablers in order to achieve strategic objectives". Thus, portfolio, program and project are associated and governed by corporate strategies. Furthermore, PMI (2017) showed the link for the four levels of the project-based organisation as strategy, portfolio, program and project in the same order, in terms of passing the organisational strategy, where the top-down approach was very noticeable. Likewise, many studies have examined and showed a significant positive relationship between business strategy and project management, particularly the alignments between their policies, practices, tasks, within the organisational hierarchy (Milosevic & Srivannaboon 2006). Moreover, the typical project-based organisation structure is explained more in recent project management literatures with their relationships as strategy, portfolio, program and project model (Soderlund 2004; Thiry & Deguire 2007; Morris & Jamieson 2005).

Specifically, the relationship between strategy and portfolio was explained and approved by many scholars (e.g., Pajares & Lopez 2004) when they mentioned that the portfolio plan launches with the corporate strategy, project identification can be achieved top-down as the strategy process. In addition, when new projects are entered, they must be addressed, and the main assessment criteria is the strategy alignment. It is found that the interactions impacted the capital cost, risk, scheduling, cash flow and resource allocation. Furthermore, Kopmann *et al.* (2017) found that there is a connection between the concepts of strategy and portfolio management. Moreover, the portfolio is a powerful strategic weapon as indicated by Shenhar *et al.* (2001), as it is an important hub for executing the planned organisational strategy (Serra & Kunc 2015). Thus, this research postulates the following hypothesis:

H5a: There is a significant relationship between strategy initiatives diffusion practice and portfolio initiatives diffusion practice in the project-based organisations.

In terms of the association between portfolio and program, PMI (2017) and other scholars like Unger, Gemunden and Aubry (2012) defined portfolio as a management of programs or multiple projects and it is a channel to implement organisational strategic objectives. Moreover, in order to facilitate the linkage between business strategy with project prioritising, it is better to establish a program management between portfolio and project management according to Levine (2005). In addition, based on PMI (2017) the program management is considered to be one of the key drivers for managing multiple projects after the portfolio, but in a different manner. Thus, this research postulates the following hypothesis:

H5b: There is a significant relationship between portfolio initiatives diffusion practice and program initiatives diffusion practice in the project-based organisations.

For the relationship between program and project, PMI (2017) defined program as a group of related projects that can be manged to achieve benefits. Moreover, a study by Hillson (2008)

concluded that there is extensive agreement that programmes are at a higher structural level of the organisation than projects. As indicated by Lycett *et al.* (2004), Shehu and Akintoy (2009) the main role of program management is to support effective relations between individual projects inside the program, to confirm that these projects are working together very effectively and keep jointly focussing on success, via aligning, coordinating and controlling a group of projects. Müller *et al.* (2008) pointed out that many researchers have provided evidence for the project management field; for example, projects are linked to the wider company vision, strategy of the firm, and the business benefits (Artto & Dietrich 2004; Morris & Jamieson 2005). Projects are managed as part of strategic programs (Lycett, Rassau & Danson 2004; Vereecke, Pandelaere, Deschoolmeester & Stevens 2003), and projects relate to programs and portfolios (Turner & Müller 2003). In addition, projects are managed as part of an organisational portfolio of projects (Elonen & Artto 2003; Engwall & Jerbrant 2003; Payne & Turner 1999; Söderlund 2004). Thus, this research postulates the following hypothesis:

H5c: There is a significant relationship between program initiatives diffusion practice and project initiatives diffusion practice in the project-based organisations.

Therefore, theoretically these relationships between strategy, portfolio, program and projects are suitable to be employed in the study framework for strategy diffusion top-down approach, in order to shape their marketing strategies to boost implementation of diffusion the organisational strategy, as shown in figure 4.1.

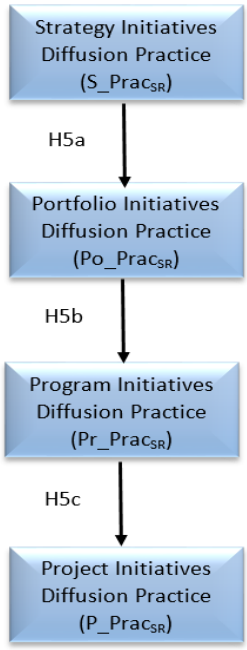


Figure 4.1: Strategy diffusion with top-down approach

4.3.2. Performance (bottom-up) hypotheses

From previous section 4.3.1 that explained the hieratical structure of the project-based organisation as strategy, portfolio, program and project, so in this section there will be an opposite direction (bottom-up) approach.

PMI (2017) noted that portfolio management is meant to align a portfolio with company strategies via choosing the correct programs/projects, prioritising the work and allocation the required resources, while, program management is meant to match its components and to manage interdependencies, in order to secure the desired benefits. However, project management is intended to facilitate the accomplishment of organisations objectives and goals via completing projects within time, cost and quality. Additionally, several studies assessed and showed a significant positive relationship between business strategy and project management, especially the alignments between the outputs and outcomes (performance)

within the organisational hierarchy (Milosevic & Srivannaboon 2006). Furthermore, performance management in project-based organisation is covered by alignment of the portfolio, program and project to the organisational strategic objectives (Thiry 2008). Moreover, supporting evidence has been found about the connections between operational-level performance indicators, and portfolio-level outcomes and organisational-level performance by Muller, Martinsuo and Blomquist (2008). Similarly, Too and Weaver (2014) explained that the three levels of project, program and portfolio can be measured and considered to be instruments for strategic changes implementation, to achieve the firms' strategic objectives and realise values.

For the connection between project performance with program performance, many researchers provided evidence for project management field; for example, projects are linked to wider business benefits (Artto & Dietrich 2004). Similarly, Lycett *et al.* (2004) and Shehu and Akintoy (2009) indicated that there is a connection between an individual project and the wider business goals, where projects need to work together effectively and jointly focus on gaining business benefits. According to Hillson (2008) the project's goals are operational and more related to outputs and deliverables to program. Likewise, Too and Weaver (2014) mentioned that value can be realised at the program level when the projects' output is accomplished. Thus, this research postulates the following hypothesis:

H6a: There is a significant relationship between project performance and program performance in the project-based organisations.

For the connection between program performance and portfolio performance, PMI (2017) explained that program delivers business outcomes and benefits to portfolio, in order to allow portfolio to review and adjust the value needed. Similarly, according to PWC (2017) all the program measurements feedback to portfolio. Furthermore, according to Hillson (2008) the

program's goals are strategic and more related to benefits. According to EY (2015), program management is the intermediary level between the portfolio level at the top of it and the project level at the bottom of it, which focuses on providing of business benefits and realising them. Thus, this research postulates the following hypothesis:

H6b: There is a significant relationship between program performance and portfolio performance in the project-based organisations.

For the relationship between portfolio performance and strategy performance, the strategy can be achieved successfully by portfolio practices and how this impacts significantly on the firms' success at the end (Jonas 2010; Martinsuo 2013; clegg *et al.* 2018). Thus, this research postulates the following hypothesis:

H6c: There is a significant relationship between portfolio performance and strategy performance in the project-based organisations.

Hence, figure 4.2 below shows the Performance (bottom-up) for each level of the project-based organisation including strategy performance at the strategy level, portfolio performance at the portfolio level, program performance at the program level, and project performance at the project level.

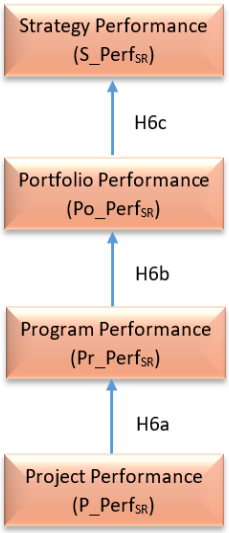


Figure 4.2: Performance bottom-up approach

In the following sub-sections there will be a demonstration about the strategy diffusion drivers' hypotheses, explanation about performance drivers as mediator hypotheses, and description about organisational culture driver as a mediator hypotheses. This is to be done at each level of the project-based organisation levels, including the strategy level, portfolio level, program level and project level.

4.3.3. Strategy level hypotheses

4.3.3.1. Strategy initiative diffusion practice

Monday *et al.* (2015) show the significant relationship between strategic management and firm performance and prove that strategic management implementation lead to the competitive advantage of the organisations. Likewise, Muogbo (2013) utilised David's model and confirmed that there is a significant impact of strategic management on firm's performance and growth. Furthermore, all the business strategy definitions linked to competitive advantages Milosevic and Sirvannaboon (2006). Similarly, Allen and Helm (2006) found that the key

strategic practices significantly related to organisational performance for each of Porter's generic strategic elements. Thus, this research postulates the following hypothesis:

H1a: There is a significant relationship between strategy initiatives diffusion practice and the organisational performance in the project-based organisations.

4.3.3.2. Strategy performance as mediator

Many studies found that there is a strong relationship between strategy performance and the firm performance like (Hoque 2004; de Waal 2007; Pollanen *et al.* 2017). David (2011) explained in his model that companies can succeed when the strategic objectives are achieved via implementing the strategy properly. Likewise, a study conducted by Spencer, Joiner and Salmon (2009) showed that there is a positive connection amongst strategic and organisational performance through the mediation role of strategic performance. Thus, this research postulates the following hypothesis:

H1b: There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by strategy performance in the project-based organisations.

4.3.3.3. Organisational culture as mediator at the strategy level

It is very useful to sight strategic management from a cultural persective, because success often depends on the support that strategies take from the organisation's culture and that facilitate to managers often deploy changes easier and faster. Thus, formations must then improve their managerial strategy based on the condition and situation they are facing. Thus, organisations may choose their strategy based on a cultural aspect (David 2011). Furthermore, the organisational performance outcome's key driver is the organisational culture (Gallagher,

Brown & Brown 2008; Hartnell, Ou & Kinicki 2011). Similarly, Poister *et al.* (2010) utilises a model and agreed that there is an impact of the strategic management on organisational performance improvement with the influence of organisational environment in public sectors. Therefore, for this study the "culture" element is proposed as a mediator. Consequently, this research postulates the following hypothesis:

H1c: There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.

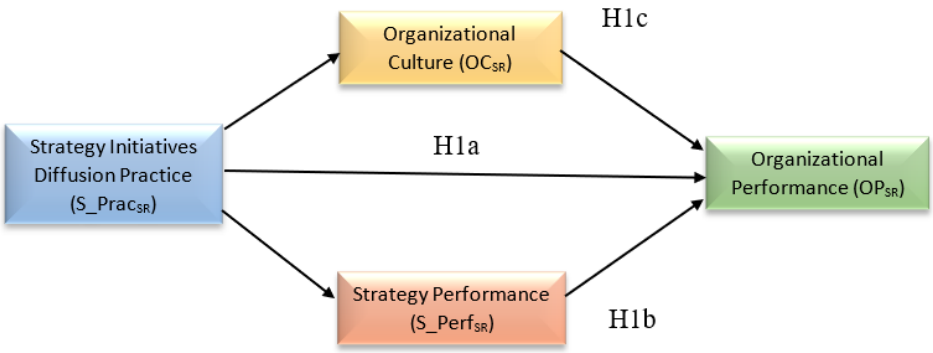


Figure 4.3: Strategy level hypotheses

4.3.4. Portfolio level hypotheses

4.3.4.1. Portfolio initiative diffusion practice

Meskendahl (2010) indicated that there are many influences of project portfolio success on business success. For example, Killen *et al.* (2008), as well as Artto and Dietrich (2007) detected in their study a positive association between project portfolio performance and new product success that representing a main aspect in business success. Many studies showed how

the successful portfolio practices can impact significantly the firms' success ultimately (e.g., Jonas 2010; Unger *et al.* 2012; Killen *et al*. 2012; Martinsuo 2013; Clegg *et al.* 2018). Moreover, Müller *et al.* (2008) display the positive relative amongst strategies adapt portfolio selection and portfolio performance. Furthermore, Levine (2005, p. 22) stated that "the management of the project portfolio so as to maximize the contribution of projects to the overall welfare and success of the enterprise". Similar definition provided by Unger, Gemunden and Aubry (2012) and PMI (2017) that linked the portfolio with the firms' objectives achievement. Thus, this research postulates the following hypothesis:

H2a: There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance in the project-based organisations.

4.3.4.2. Portfolio performance as mediator

The ultimate aim of portfolios is achieving corporate level objectives and goals (PMI 2017). Furthermore, portfolio management was placed in a broader framework called "benefits realization", where portfolio management linked with portfolio performance achievement in order to achieve the needed organisations objectives and gaols (De Reyck *et al.* 2005). Moreover, Kock, Heising and Gemunden (2016) studied and found that there is a positive significant association between front-end success and portfolio success. Other studies experiment a positive influence of project portfolio performance and results on business level outcomes (e.g., Cooper *et al.* 2000). Moreover, Kunisch (2019) linked the performance of the portfolio of initiatives with the performance improvement of the firms. Muller, Martinsuo and Blomquist (2008) found evidence relating to the connection between portfolio-level outcomes and organisational-level performance. Additionally, Petro and Gardiner (2015) investigated in a project-based organisation the influence of portfolio effectiveness and success on business efficiency. Thus, this research postulates the following hypothesis:

H2b: There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by portfolio performance in the project-based organisations.

4.3.4.3. Organisational culture as mediator at the portfolio level

Many studies have investigated important environmental aspects that could influence the portfolio management field like (Teller *et al.* 2012; Kopmann *et al.* 2015). Kopmann *et al.'s* (2015) study explored how instruments like motivation and guidance can influence at portfolio level the organisational performance and beneficial outcomes. Moreover, according to PMI (2017) the organisational culture has an influence on portfolio operation at portfolio level within project-based organisations. Thus, this research postulates the following hypothesis:

H2c: There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.

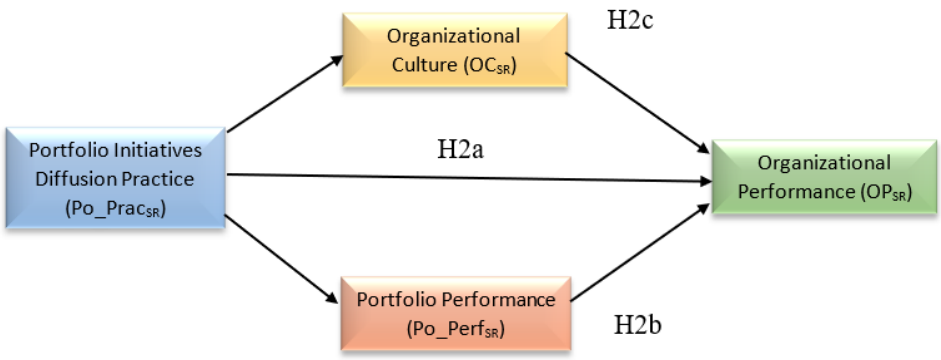


Figure 4.4: Portfolio level hypotheses

4.3.5. Program level hypotheses

4.3.5.1. Program initiative diffusion practice

As per Thiry (2004a) one of the key roles of program management is to validate the needs including the positive impact on the business outcomes. Furthermore, Shehu and Akintoye (2009) demonstrated that there is a need for program management to deliver organisational benefits. According to Hillson (2008) the APM (2006) defined program management as coordinated management for many projects, which together accomplish an organisational benefit. Thus, this research postulates the following hypothesis:

H3a: There is a significant relationship between program initiatives diffusion practice and the organisational performance in the project-based organisations.

4.3.5.2. Program performance as mediator

As per Thiry (2004a) one of the key roles of program management is to consider project deliverables against key performance indicators and analyse project outputs. Furthermore, Pellegrinelli (1997), Lycett *et al.* (2004), and Shehu and Akintoye (2009) mentioned that program management evolves more to the business needs and outcomes. PMI (2017) noted that the program's ultimate aim is achieving corporate level objectives and goals via achieving program's strategic objectives and benefits. Thus, this research postulates the following hypothesis:

H3b: There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by program performance in the project-based organisations.

4.3.5.3. Organisational culture as mediator at the program level

PMI (2017) explained that one of the major categories that have an impact at the program level is organisational culture, which are considered as one of the major internal categories of influences. Furthermore, based on Pellegrinelli (1997) one of the main features of the program management is that it evolved in response to the business' needs in an uncertain environment. Thus, this research postulates the following hypothesis:

H3c: There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.

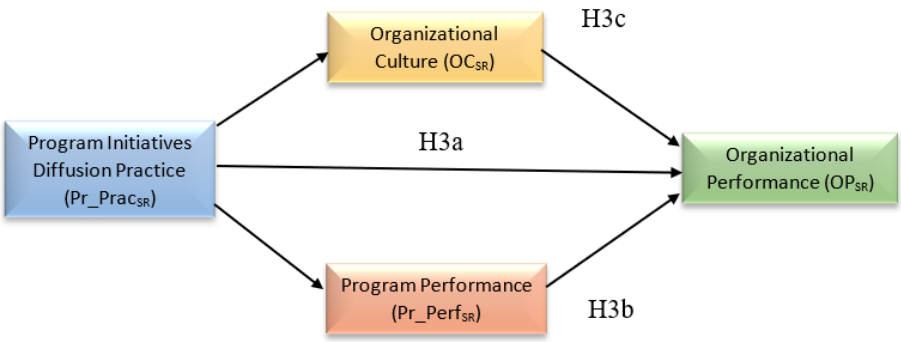


Figure 4.5: Program level hypotheses

4.3.6. Project level hypotheses

4.3.6.1. Project initiative diffusion practice

PMI (2017) explored adopting the project management method to dependably bring success to business. As stated by Patanakul and Shenhar (2012), project management teams should have an idea of how to deal with the corporate aspects of their projects, in order to support their organisation's strategy, instead of just focus on completing traditional budget, time and performance objectives, since, understanding the corporate needs will lead to

customer satisfaction and achieving business success (Meskendahl 2010). Furthermore, many researchers focused on the relationships between project and business success (e.g., Too & Weaver 2014). According to Bonghez and Grigoroiu (2013) performance management in project-based organisations can be defined as an organisation whose business is directed mainly over project or operational activities. Thus, this research postulates the following hypothesis:

H4a: There is a significant relationship between project initiatives diffusion practice and the organisational performance in the project-based organisations.

4.3.6.2. Project performance as mediator

PMI (2017) defined project management as using tools, skills, knowledge and techniques to achieve project needs. However, the project management teams should support their organisation's strategy, beside their work in focusing on the completion of the project budget, time and performance objectives (Meskendahl 2010; Patanakul & Shenhar 2012). Moreover, Muller *et al.* (2008) pointed out that project is linked to the wider business outcomes. Moreover, Comninos and Frigenti (2002) and Too and Weaver (2014) incorporated the project outputs and performance with the business outcomes and needs. Thus, this research postulates the following hypothesis:

H4b: There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by project performance in the project-based organisations.

4.3.6.3. Organisational culture as mediator at the project level

Gupta *et al.* (2019) asked for more investigation if project management is influenced by the culture of the firm. Moreover, based on PMI (2017), organisational internal culture has an impact on project operations at project level within project-based organisations. Furthermore, Gu et al. (2014) approved the relationships between organisational culture and project performance. Another study by Yazici (2009) investigated the associations between project management, organisational performance and organisational culture. Thus, this research postulates the following hypothesis:

H4c: There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.

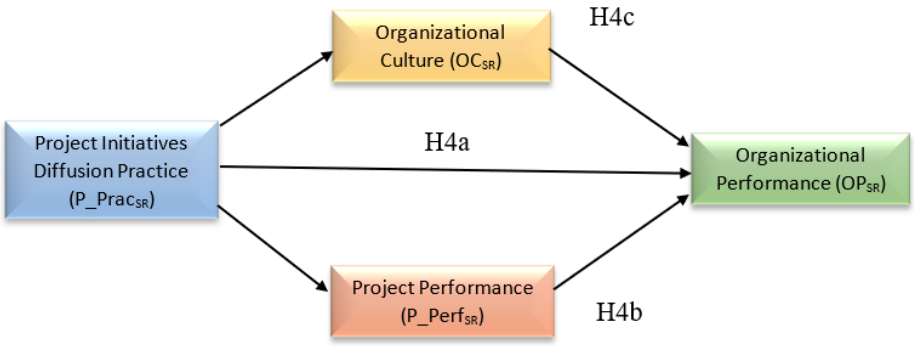


Figure 4.6: Project level hypotheses

4.3.7. Proposed research conceptual framework

From all of the above detailed explanations and according to comprehensive literature reviews, the research theoretical framework is projected, as shown below in figure 4.7.

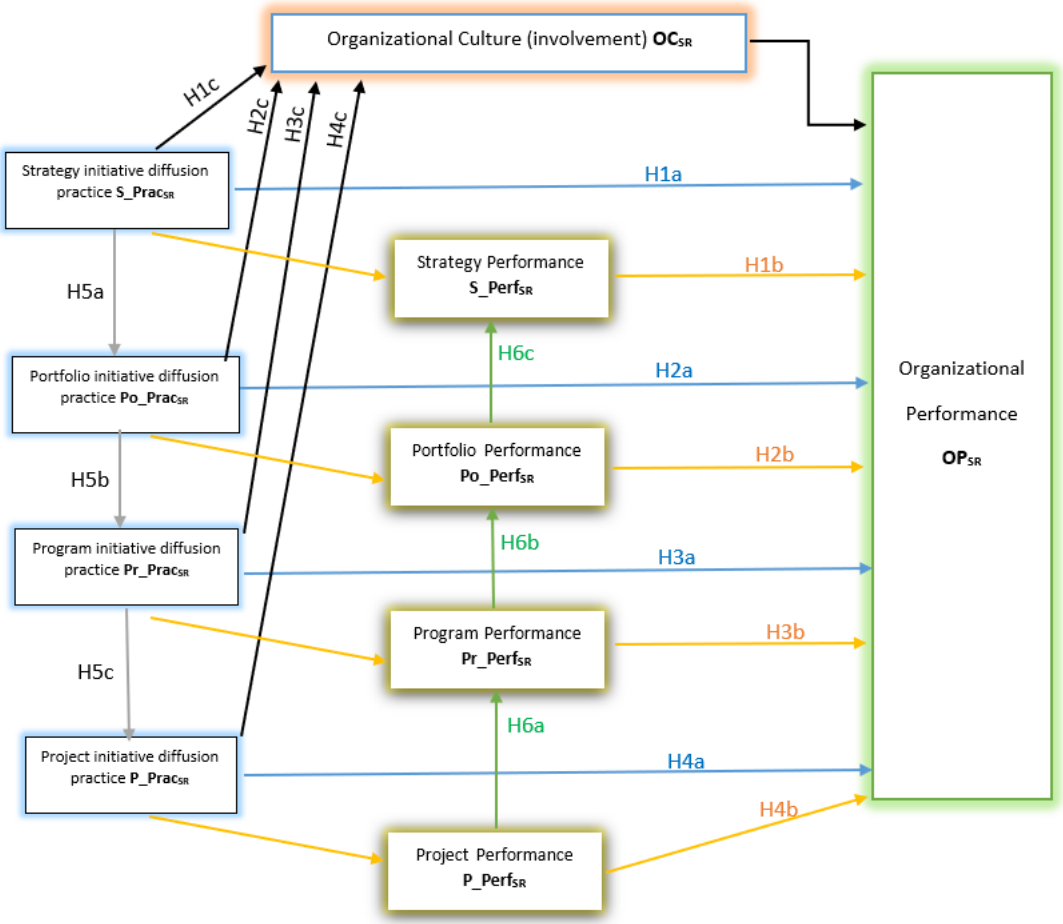


Figure 4.7: The proposed research conceptual framework

4.4. Research hypotheses summary

Table 4.1 summarises the research hypotheses that have been derived from the literature review in order to answer the research related questions, as shown below.

Table 4.1: Research questions and hypotheses

Research questions	Research hypotheses
Q1: How does strategy initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H1a:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance in the project-based organisations.
Q2: How does portfolio initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H2a:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance in the project-based organisations.
Q3: How does program initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H3a:** There is a significant relationship between program initiatives diffusion practice and the organisational performance in the project-based organisations.
Q4: How does project initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H4a:** There is a significant relationship between project initiatives diffusion practice and the organisational performance in the project-based organisations.
Q5: How does strategy performance impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1b:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by strategy performance in the project-based organisations.
Q6: How does portfolio performance impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2b:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by portfolio performance in the project-based organisations.
Q7: How does program performance impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3b:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by program performance in the project-based organisations.
Q8: How does project performance impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4b:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by project performance in the project-based organisations.

Q9: How does organisational culture impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1c:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.
Q10: How does organisational culture impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2c:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.
Q11: How does organisational culture impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3c:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.
Q12: How does organisational culture impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4c:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.
Q13: How does strategy initiatives diffusion practice influence the appearance of portfolio initiatives diffusion practice in the project-based organisations?	**H5a:** There is a significant relationship between strategy initiatives diffusion practice and portfolio initiatives diffusion practice in the project-based organisations.
Q14: How does portfolio initiatives diffusion practice influence the appearance of program initiatives diffusion practice in the project-based organisations?	**H5b:** There is a significant relationship between portfolio initiatives diffusion practice and program initiatives diffusion practice in the project-based organisations.
Q15: How does program initiatives diffusion practice influence the appearance of project initiatives diffusion practice in the project-based organisations?	**H5c:** There is a significant relationship between program initiatives diffusion practice and project initiatives diffusion practice in the project-based organisations.
Q16: How does project performance influence the appearance of program performance in the project-based organisations?	**H6a:** There is a significant relationship between project performance and program performance in the project-based organisations.
Q17: How does program performance influence the appearance of portfolio performance in the project-based organisations?	**H6b:** There is a significant relationship between program performance and portfolio performance in the project-based organisations.

Q18: How does portfolio influence the appearance of strategy performance in the project-based organisations?	**H6c:** There is a significant relationship between portfolio performance and strategy performance in the project-based organisations.

4.5. Chapter summary

This chapter illustrated the in-depth establishment of the research conceptual framework and the associated hypotheses based on the comprehensive literature review. Thus, it showed in detail all the elements that contribute to the concepts of strategy diffusion (top-down), performance (bottom-up), organisational culture, and the organisational performance and all the relationships between them, which served all the aims and objectives of the research. Consequently, this chapter provided the diagram of the arranged research conceptual framework that confirmed theoretically form literature reviews. Finally, the chapter outlined 18 hypotheses that explain the relationships among the four constructs of the project-based organisations, and which could answer the research questions. In summary, this chapter has bridged the previous studies, which are presented in the previous chapters and the research methodology in the coming chapter.

5. CHAPTER FIVE: Research methodology

5.1. Introduction

In this chapter, the study in-depth methodology will be provided based on the study objectives and questions. There will be explanation about the research philosophies, approaches, strategies, choices, time horizons, techniques, and procedures, in different sections. Then, there will be an illustration about the study method, survey development, survey instruments. In the end, there will be a discussion about the data analysis procedure, ethical considerations, and limitations.

5.2. Nature of the research

The research methodology selection is mainly driven from the research theoretical background and in light of the research questions and objectives (Saunders *et al.* 2009). Furthermore, as indicated by Creswell *et al.* (2003) it is important to utilise a research approach that fits with the research problem. This study looks at the impact of strategy diffusion have on organisational performance within the project management context and with organisational culture as a mediator role, which means that the study mainly investigates the relationship's inspiration between the variables.

Saunders *et al.* (2009), in the book 'Research methods for business students', elaborated the research 'onion', which is very much a systematised way for the researcher to define their study's methodology mainly for business students and researchers. Therefore, it will be the key guideline for this study methodology. Figure 5.1 details The research 'onion' by Saunders *et al.* (2009).

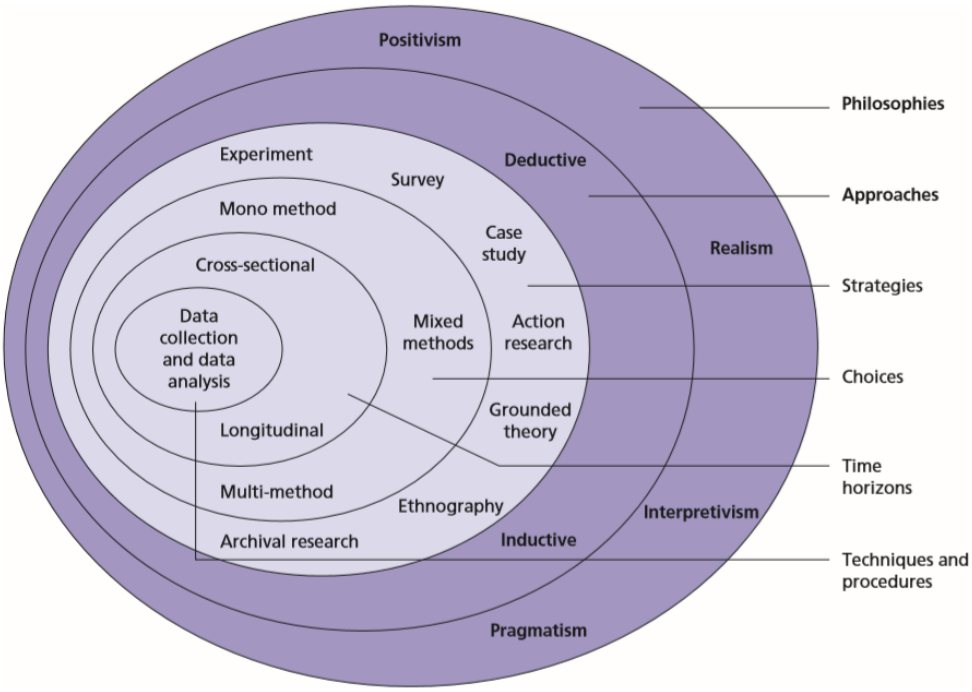


Figure 5.1: The research 'onion'

Source: (Saunders *et al.* 2009)

5.3. Research philosophy

As indicated by Johnson and Clark (2006) management and business researchers must know about the philosophical obligations that they made through the selection of the research strategy; because this has a huge impact on what the research is investigating about.

According to Saunders *et al.* (2009) and comparison table 5.1, there are numbers of type of understanding for researches such as ontology and epistemology. In which, on the one hand, ontology is about the nature of reality or truth, which consists of: 1) objectivism, which means looking at reality as made up of solid objects that can be tested and measured; and 2) subjectivism, which means looking at reality as made up of the insights and communications of living subjects (O'Gorman & MacIntosh 2014). On the other hand, epistemology is about the acceptable knowledge in a particular area of research, which includes: 1) Positivism, which

means working as a natural scientist, like using an existing theory to create new hypotheses; 2) Realism, which means the existence of reality is independent of the mind; 3) Interpretivism, which means knowing about the individuals to the differences; and 4) Pragmatism, which means adopting one position (Saunders *et al.* 2009). See table 5.1 for the management research philosophies comparison.

According to the above explanations given, this research paper is designed as a **positivist paradigm** for an **epistemological position**, as it uses existing theories to create new hypotheses within acceptable knowledge in a particular area of research and focus on causality. In this study existing theories are used, such as diffusion theories, strategic management theories and project management theories in order to create new models with new hypotheses in the area of strategy and project management. Furthermore, as Saunders *et al.* (2009) specified, **positivists** are "resources" researchers who collect research data through observations and using existing theories for emerging research hypotheses that can be measured and tested. Moreover, **positivist** researchers are usually considered to have truthful, actual and objective personalities (Saunders *et al.* 2016).

Additionally, the research paradigm will be one of **objectivism** as an **Ontology position**; since all the research hypotheses proposed can be measured and tested in order to proof its true and real knowledge.

Table 5.1: Research philosophies comparison

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Source: (Saunders *et al.* 2009, p. 119)

5.4. Research approach

Creswell *et al.* (2003) highlighted that quantitative methods can be used to ration cause and effect of specific phenomena. Among quantitative research designs, there are multiple approaches that can be utilised. Additionally, Poister *et al.* (2010) published a systematic review paper about strategic management in public sector in which they recommended for large-N quantitative analyses that could improve the understanding in this critical area. Furthermore, Martinsuo (2013) studied a systematic review and noted that the project portfolio

researchers increasingly used questionnaire-based hypothetic-deductive works. Accordingly, due to the nature of this study, and its goal of understanding the impact strategy diffusion has on organisational performance within project context, a quantitative research approach is utilised in this research.

Based on the research 'onion' model of Saunders *et al.* (2009) there are two common parts for the research approach made up of deductive and inductive reasoning. In the deductive approach, theories and hypotheses are established, and a study strategy is designed to examining the hypothesis. While, in the induction approach, data are collected, and a theory is settled as a consequence of the data analysis. Based on the definitions explained and the comparison shown in the table below between deductive and inductive approaches, the deductive approach is selected in this study. This is because the research theories and hypotheses are developed according to the existing theories and hypotheses from the literature review.

Table 5.2: Comparisons between deductive and inductive approaches

Deduction emphasises	Induction emphasises
• scientific principles • moving from theory to data • the need to explain causal relationships between variables • the collection of quantitative data • the application of controls to ensure validity of data • the operationalisation of concepts to ensure clarity of definition • a highly structured approach • researcher independence of what is being researched • the necessity to select samples of sufficient size in order to generalise conclusions	• gaining an understanding of the meanings humans attach to events • a close understanding of the research context • the collection of qualitative data • a more flexible structure to permit changes of research emphasis as the research progresses • a realisation that the researcher is part of the research process • less concern with the need to generalise

5.5. Research strategies

Research strategy is central to the research framework, and it is the process that will be utilised to collect data and gather information. As per Saunders *et al.* (2009), the scholar's research strategy selection will be decided based on the research question(s) and objective(s), the literature review, the amount of time and other resources available with the scholar, and also according to philosophical foundations. Moreover, based on Saunders *et al.'s* (2009) model, the number of strategies that can be considered for the research are experiment, case study, survey, grounded theory, action research, archival research, and ethnography.

The survey strategy is normally linked with the deductive approach. It is usually common strategy in management and business research and is most frequently utilised to answer what, who, how, and where questions. Therefore, descriptive and exploratory research tends to use it. The advantages of the survey are to allow collecting a huge number of data from the sample population, allowing the collection of quantitative data which can be analysed using descriptive statistics, suggest possible reasons for specific assassinations between variables. This is used to develop models for these associations, to give more control over the research process, and to produce valuable findings (Saunders *et al.* 2009).

Hence, for this study the survey strategy is implemented, as the study is designed to find and examine the associations between strategy diffusion (top-down) variables, performance (bottom-up) variables, organisational culture variable, and organisational performance variable. For the purpose of data collection, a questionnaire is established by the researcher and distributed amongst participants who are mainly work on tasks related to strategy management, portfolio management, program management, and project management within a UAE public utility in Dubai.

5.6. Research time-horizon

It is very important to know the research time horizon, as it must be defined during the planning stage of the research. The time horizon is very much linked to the research questions. Thus, from start the time horizon can be defined, if it needs to be a "snapshot" taken at a particular time, which will be cross-sectional, while if it needs to be done as a series of snapshots referred to as longitudinal findings (Saunders *et al.* 2009). For this study the choice normally suggests a cross-sectional approach as a time horizon; especially as the study uses a survey strategy, where it needs to be observed and analysed as a particular condition at a specific time in different departments (Neville 2007).

The study survey for this research is developed and then sent in distribution for data collection between 30 January 2020 and 25 February 2020, taking 26 days before being stopped by the researcher in order to gather the data from the online database in SPSS setup.

5.7. Research method

As highlighted by Saunders *et al.* (2009), data can be collected using a quantitative data collection method using numbers or a qualitative data collection method using non-numbers which are words data. The selection of the research method can be one of them or both. The mono method is choosing a single data collection method and corresponding analysis procedures, while using more than one data collection method and analysis procedures is called multiple methods.

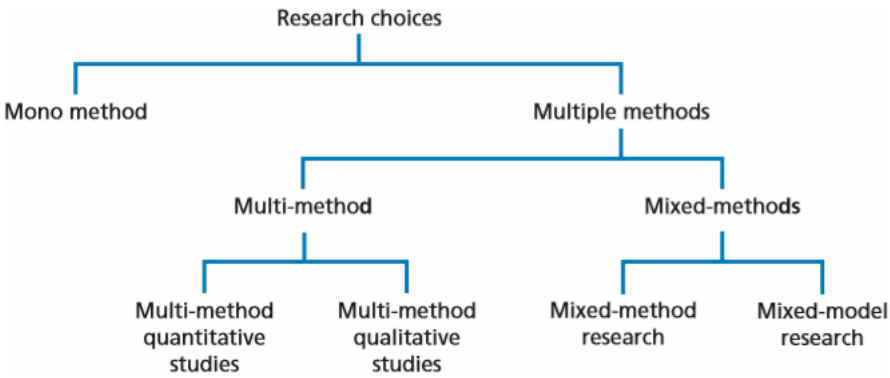


Figure 5.2: Research choices

Many studies related to strategy management and project management utilised a mono method for their assessments (Kock, Heising & Gemunden 2016; Teller *et al.* 2012; Jonas 2010) for portfolio management (Saunders, Mann & Smith 2008; Hernaus, Vuksic & Štemberger 2016) and for strategy management. Hence, this study is considered as a mono method as it uses only one data collection technique and related analysis procedures.

The data collection used the survey techniques and utilised SPSS and AMOS-SPSS software for the data analyses, as both software are interlinked and both can support in proofing, validating, and showing the significance of the relationships between variables, which helps in accepting or rejecting the hypotheses and the models of the researches.

5.8. Research techniques and procedures (data collection)

As mentioned from the previous section (5.9) the survey method is used for this research as a data collection method, where the researcher has employed a questionnaire method in which a structured seven-point Likert scale is utilised with the aim to examine the study hypotheses and define the level of impact of factors involving to the adoption of strategy

diffusion (top-down) and performance (bottom-up) practices within project-based organisations. Contributors to the survey are asked to put their ratings about their company's strategy diffusion (top-down) practices, performance reporting (bottom-up) practices, within project-based organisations at each organisational level, strategy level, portfolio level, program level, and project level, as well as, to rate the organisational culture involvement practices. This is similar to studies related to strategy and project context (Saunders, Mann and Smith 2008, Walter, Lechner & Kellermanns 2016; Hernaus, Vuksic & Štemberger 2016; Kock, Heising & Gemunden 2016; Teller *et al.* 2012). The researcher has selected online survey with self-administrated mode to avoid the low responses rate.

5.9. Research data collection tool

The questionnaire (a survey) tool is designed, as there were many studies used a survey questionnaire tool as shown in table 5.3. Moreover, in terms of this study scale measuring plan, a multi-item measures with 7-point Likert scales was utilised, as the same 7-point Likert scales have been used for strategy and project context researches (e.g., Barringer & Bluedorn 1999; Kock, Heising & Gemunden 2006; Teller *et al.* 2012; Hernaus, Vuksic & Štemberger 2016), and the same 7-point Likert scale has been used to study the impact of organisational culture on project management (Morrison, Brown & Smit 2008). Where, 7 represents "strongly agree", 6 represents "agree", 5 represents "slightly agree", 4 represents "undecided", 3 represents "slightly disagree", 2 represents "disagree", and 1 represents "strongly disagree". As for the demographic data, the scale comprises four sections with carefully stablished questions derived from previous studies to measure the following variables: strategy diffusion (top-down) measures at the strategy level, strategy diffusion (top-down) measures at the portfolio level, strategy diffusion (top-down) measures at the program level, strategy diffusion (top-down)

measures at the project level, performance (bottom-up) measures at the strategy level, performance (bottom-up) measures at the portfolio level, performance (bottom-up) measures at the program level, performance (bottom-up) measures at the project level, organisational culture measures, and finally organisational performance measure.

5.10. Research (data collection method) questionnaire development

From previous studies related to similar fields of this study and from a comprehensive literature review, it has been noticed that the main data collection method was a questionnaire, as indicated in table 5.3 below. Thus, the data collection tool is settled for this study as a questionnaire. This study's questionnaires and items measurement scales have been drawn from existing studies, again the same can be exposed from table 5.3.

Furthermore, for the purpose of having more understanding of strategy diffusion, all the strategic initiatives construct that cascade from the organisational top level to the bottom level are measured, hence, it is linked to (top-down) dimensions including strategy diffusion statement at the strategy level (10 items), portfolio diffusion statement at the portfolio level (15 items), program diffusion statement at the program level (13 items), and project diffusion statement at the project level (31 items), in which each dimension (top-down) has the three sub-dimensions of the diffusion measurements (knowledge and persuasion, decision and evaluation, and implementation and adaptation). Then as for performance construct, it always represents the results reporting from the bottom of the organisation to the top level. Hence, it is linked to bottom-up dimensions, including strategy performance (8 items) at the strategy level, portfolio performance (10 items) at the portfolio level, program performance (3 items) at the program level, and project performance (8 items) at the project level. For the organisational culture dimension (8 items) and for the organisational performance dimension

(8 items), as shown in table 5.3. In summary, a total of 114 latent factors were identified and questions were created with answers on a 7 Likert-type scale.

Table 5.3: Research Questionnaires development

	Variables	Scales	Existing Questionnaire Scales References
1	Strategy diffusion practices scales	10 items	(**Saunders, Mann & Smith 2008**) (**Lechner & Floyd 2012**) (**APM 2019**) (**Walter, Lechner & Kellermanns 2016**)
2	Portfolio diffusion practices scales	15 items	(Abubakar *et al*. 2018) (Martinsuo 2013) (**Kopmann *et al*. 2017**) (**Kock, Heising & Gemünden 2016**) (Petro & Gardiner 2015) (Beringer *et al.* 2013) (**Unger *et al.* 2012**) (Levine 2005) **(Jonas 2010)** (**PMI 2017**)
3	Program diffusion practices scales	13 items	(Thiry 2010) (PWC 2017) (Ribbers & Schoo 2002) (**Blomquist & Müller 2006**) **(PMI 2017)** (**Shehu & Akintoye 2009)**
4	Project diffusion practices scales	31 items	(Dietrich & Lehtonen 2005) (**PMI 2017**) (Papke-Shields & Boyer-Wright 2017) (Khoshgoftar & Osman 2009) (Musawir *et al*. 2017) **(Müller, Martinsuo & Blomquist 2008) (Jonas 2010) (Meskendahl 2010) (Kopmann *et al.* 2017) (Kock, Heising & Gemünden 2016) (Petro & Gardiner 2015)**
5	Strategy performance scales	8 items	(**Rebolledo nd) (Lechner & Floyd 2012) (**Musawir *et al*. 2017) (Walter *et al*. 2016) (**Allen 2006**)
6	Portfolio performance scales	10 items	(**Müller, Martinsuo & Blomquist 2008) (Jonas 2010) (Meskendahl 2010) (Rebolledo nd) (**Unger, Gemünden & Aubry 2012) (Teller *et al.* 2012) (Kopmann, Killen & Gemünden 2017)

			(**Kopmann *et al*. 2017) (Kock, Heising & Gemünden 2016) (Petro & Gardiner 2015) (PMI 2017)**
7	Program performance scales	3 items	(Thiry 2004a) (Thiry 2004b) (Shehu and Akintoy 2009) (**Rebolledo nd) (**Musawir *et al*. 2017) **(Müller, Martinsuo & Blomquist 2008) (Müller, Martinsuo & Blomquist 2008) (Petro & Gardiner 2015) (PMI 2017**)
8	Project performance scales	8 items	(**Rebolledo nd) (Junior & Carvalho 2013) (Shenhar & Dvir 2010) (Raz *et al.* 2002) (**Mir & Pinnington 2014) (Musawir *et al*. 2017) (Papke-Shields & Boyer-Wright 2017) (Gomes & Romão 2016) (**Müller, Martinsuo & Blomquist 2008) (Petro & Gardiner 2015) (Unger *et al*. 2012) (MI 2017)**
9	Organizational Culture scales	8 items	**(Denison 2000) (Nikpour 2017) (Denison *et al.* 2003a) (Denison *et al.* 2003b) (Xenikou & Simosi 2006) (Yilmaz & Ergun 2008)**
10	Organizational Performance scales	8 items	**(Salajegheh *et al.* 2000) (Nikpour 2017) (Yilmaz & Ergun 2008) (Ali *et al.* 2010) (Lesser & Storck 2001) (Marqués & Simón 2006) (Jagasia, Baul & Mallik 2015) (Lechner & Floyd 2012) (Allen 2006)**

The coming sub-sections will illustrate exactly each factor/variable scale.

5.10.1. Strategy diffusion (top-down) at strategy level scale

In this section, the researcher has developed statements covering the strategy diffusion aspect at the strategy level, drawn from previous studies and literatures. The scale is adapted from Saunders, Mann and Smith (2008), Lechner and Floyd (2012), Favaro (2013), Walter,

Lechner and Kellermanns (2016), PWC (2018), Kunisch *et al.* (2019), and APM (2019) to cover the five dimensions from Rogers' diffusion theory (Rogers 2003). The resulting scale consist of 10 items as shown in table 5.4:

Table 5.4: Strategy diffusion (top-down) at the strategy level scale

Sr No.	Item Code	Strategy Initiative Diffusion Practice Statements	References	Diffusion Dimension
1	SKP1	There is shared understanding of the business drivers behind the strategic initiatives	Saunders, Mann and Smith 2008	Knowledge and Persuasion
2	SKP2	There is shared understanding of the capabilities needed for the strategic initiatives	Kunisch *et al.* 2019, PWC 2018, Favaro 2013, Saunders, Mann and Smith 2008	Knowledge and Persuasion
3	SKP3	There is shared understanding of the organisational values/benefits of the strategic initiatives	Lechner and Floyd 2012, APM 2019	Knowledge and Persuasion
4	SKP4	There is shared understanding about the alignment of strategic initiatives with the organisational risk management	Saunders, Mann and Smith 2008	Knowledge and Persuasion
5	SDE1	Strategic initiatives' decisions are based on analysing data	Walter, Lechner and Kellermanns 2016	Decision and Evaluation
6	SDE1	Strategic initiatives' decisions are based on policies, boundaries, and guidance	Saunders, Mann and Smith 2008	Decision and Evaluation
7	SDE3	Strategic initiatives are assessed against organisational values	Saunders, Mann and Smith 2008	Decision and Evaluation
8	SIA1	Capabilities are allocated for the strategic initiatives' deployment	Saunders, Mann and Smith 2008, AMCES	Implementation and Adaptation
9	SIA2	Strategic initiatives' risks are communicated	Saunders, Mann and Smith, 2008	Implementation and Adaptation

10	SIA3	Key performance indicators are set for the strategic initiative's deployment	Saunders, Mann and Smith, 2008	Implementation and Adaptation

5.10.2. Strategy diffusion (top-down) at the portfolio level scale

In this section, the author has developed statements covering the strategy diffusion aspect at the portfolio level, drawn from previous studies and literatures. The scale is adapted from Levine (2005), Pennypacker (2005), Jonas (2010), Filippov *et al.* (2012), Unger, Germunden and Aubry (2012), Beringer *et al.* (2013), Martinsuo (2013), EY (2015), Petro and Gardiner (2015), Kock, Heising and Gemünden (2016), Kopmann *et al.* (2017), PWC (2017), and Abubakar *et al.* (2018) to cover the five dimensions from Rogers' diffusion theory (Rogers 2003). The resulting scale consist of 15 items as shown in table 5.5:

Table 5.5: Strategy diffusion (top-down) at portfolio level scale

Sr No.	Item Code	Portfolio Initiative Diffusion Practice Statements	References	Diffusion Dimension
1	PoKP1	There is shared understanding that the portfolio of projects is translated from strategic initiatives	EY 2015	Knowledge and Persuasion
2	PoKP2	There is shared understanding of procedures for initiating a portfolio of projects	Filippov *et al.* 2012	Knowledge and Persuasion
3	PoKP3	There is shared understanding of roles-responsibilities for project portfolio actors	Beringer *et al.* 2013	Knowledge and Persuasion
4	PoKP4	There is shared understanding of holistic view of the portfolio	PWC 2017, Unger, Germunden and Aubry 2012, Pennypacker 2005	Knowledge and Persuasion

5	PoDE1	Portfolio formation analysis helps to confirm new investment needs	Kopmann *et al.* 2017	Decision and Evaluation
6	PoDE2	Project types are selected based on suitability to the market's needs	Abubakar *et al.* 2018, Martinsuo 2013, Kopmann *et al.* 2017	Decision and Evaluation
7	PoDE3	Value benefit analysis is used to maintain balance between projects	Levine 2005	Decision and Evaluation
8	PoDE4	Frequently reviewing whether the strategy of the project portfolio is still valid in the light of changed conditions	Kopmann *et al.* 2017	Decision and Evaluation
9	PoDE5	The interdependency between program governance, project management are frequently evaluated	EY 2015	Decision and Evaluation
10	PoDE6	The optimal portfolio is selected based on the agreed decision framework	EY 2015	Decision and Evaluation
11	PoIA1	Corporate strategic initiatives are implemented through our portfolio of projects	Kock, Heising and Gemünden 2016, Petro and Gardiner 2015, Beringer *et al.* 2013, Unger *et al.* 2012	Implementation and Adaptation
12	PoIA2	During the portfolio deployment portfolio of project charters are approved	EY 2015, Levine 2005	Implementation and Adaptation
13	PoIA3	During the portfolio deployment resources are allocated to projects	Levine 2005, Jonas 2010	Implementation and Adaptation
14	PoIA4	During the portfolio deployment communication plans are set	PWC 2017	Implementation and Adaptation
15	PoIA5	Risk management plan is set for portfolio of project deployment	EY 2015	Implementation and Adaptation

5.10.3. Strategy diffusion (top-down) at the program level scale

In this section, the author has developed statements covering the strategy diffusion aspect at program level, drawn from previous studies and literatures. The scale is adapted from Ribbers and Schoo (2002), Blomquist and Müller (2006), Thiry (2010), and PWC (2017) to cover the five dimensions from Rogers' diffusion theory (Rogers 2003). The resulting scale consist of 13 items as shown in table 5.6:

Table 5.6: Strategy diffusion (top-down) at the program level scale

Sr No.	Item Code	Program Initiative Diffusion Practice Statements	References	Diffusion Dimension
1	PrKP1	There is shared understanding of programs' expected benefits	Thiry 2010, PWC 2017	Knowledge and Persuasion
2	PrKP2	There is shared understanding of resources requirement by the program	Thiry 2010, Ribbers and Schoo 2002	Knowledge and Persuasion
3	PrKP3	There is shared understanding of programs' stakeholder roles - responsibilities	Thiry 2010, Ribbers and Schoo 2002	Knowledge and Persuasion
4	PrDE1	Projects are prioritized within the program using evaluation frameworks	Blomquist and Müller 2006	Decision and Evaluation
5	PrDE2	Projects are selected within the program on the basis of organisational strategy	Blomquist and Müller 2006	Decision and Evaluation
6	PrDE3	Program decision making is supported by intelligent data analysis	PWC 2017	Decision and Evaluation
7	PrIA1	Projects are prioritized within the program for deployment	Blomquist and Müller 2006	Implementation and Adaptation

8	PrIA2	Interdependencies between projects inside the program are managed	Blomquist and Müller 2006	Implementation and Adaptation
9	PrIA3	Synergy within the projects of program is created	Blomquist and Müller 2006	Implementation and Adaptation
10	PrIA4	Program's resources are planned during their deployment	Blomquist and Müller 2006	Implementation and Adaptation
11	PrIA5	A benefits realization plan is developed during program's deployment	PWC 2017	Implementation and Adaptation
12	PrIA6	At the stage of program's deployment plans that embrace change are created	PWC 2017	Implementation and Adaptation
13	PrIA7	During program deployment communication plans are set	PWC 2017	Implementation and Adaptation

5.10.4. Strategy diffusion (top-down) at the project level scale

In this section, the author has developed statements covering the strategy diffusion aspect at project level, drawn from previous studies and literatures. The scale is adapted from Dietrich and Lehtonen (2005), Khoshgoftar and Osman (2009), Buys and Stander (2010), Sheykh *et al.* (2013), Serra and Kunc (2015), Papke-Shields and Boyer-Wright (2017), Musawir *et al.* (2017), and PMI (2017) to cover the five dimensions from Rogers' diffusion theory (Rogers 2003). The resulting scale consist of 31 items as shown in table 5.7:

Table 5.7: Strategy diffusion (top-down) at the project level scale

Sr No.	Item Code	Project Initiative Diffusion Practice Statements	References	Diffusion Dimension

1	PKP1	There is shared understanding of formal project management methodology	Dietrich and Lehtonen 2005	Knowledge and Persuasion
2	PKP2	There is shared understanding of project constraints (time, cost, quality and scope)	Buys and Stander 2010, Serra and Kunc 2015, PMI 2017	Knowledge and Persuasion
3	PKP3	There is shared understanding of project risks	PMI 2017	Knowledge and Persuasion
4	PKP4	There is shared understanding for the realization of project benefits outputs	Serra and Kunc 2015, Papke-Shields and Boyer-Wright 2017, Musawir *et al.* 2017	Knowledge and Persuasion
5	PKP5	There is shared understanding of the roles/responsibilities for project governance	PMI 2017, Khoshgoftar and Osman 2009, Musawir *et al.* 2017	Knowledge and Persuasion
6	PKP6	There is shared understanding of the critical milestones for projects	Sheykh *et al.* 2013	Knowledge and Persuasion
7	PDE1	Project's constraints (time, cost, quality and scope) are evaluated based on project information	Papke-Shields and Boyer-Wright 2017, Khoshgoftar and Osman 2009, Musawir *et al.* 2017	Decision and Evaluation
8	PDE2	Project's constraints are evaluated based on predefined methods and rules	Dietrich and Lehtonen 2005	Decision and Evaluation
9	PDE3	Project's decisions are communicated to the relevant stakeholders	Musawir *et al.* 2017	Decision and Evaluation
10	PDE4	Projects execution management plans are checked	PMI 2017, Papke-Shields and Boyer-Wright 2017	Decision and Evaluation
11	PDE5	Project execution schedule management plan is set	PMI 2017	Decision and Evaluation

12	PDE6	Project execution cost management plan is confirmed	PMI 2017	Decision and Evaluation
13	PDE7	Project execution scope management plan is approved	PMI 2017	Decision and Evaluation
14	PDE8	Project execution quality management plan is set	PMI 2017	Decision and Evaluation
15	PDE9	Project execution risk management plan is approved	PMI 2017	Decision and Evaluation
16	PDE10	Project execution resource management plan is approved	PMI 2017	Decision and Evaluation
17	PDE11	Project execution communication management plan is established	PMI 2017	Decision and Evaluation
18	PDE12	Project execution procurement management plan is confirmed	PMI 2017	Decision and Evaluation
19	PDE13	Project execution stakeholder engagement plan is approved	PMI, 2017	Decision and Evaluation
20	PDE14	Project execution change management plan is accepted	PMI 2017	Decision and Evaluation
21	PIA1	Projects are managed based according to the project management methodology	PMI 2017	Implementation and Adaptation
22	PIA2	Project progress is managed against project schedule	PMI 2017	Implementation and Adaptation
23	PIA3	Project cost is monitored-controlled against project budget plan	PMI 2017	Implementation and Adaptation
24	PIA4	Project's scope of work is managed against the scope plan	PMI 2017	Implementation and Adaptation
25	PIA5	Project quality is monitored-controlled against quality plan	PMI 2017	Implementation and Adaptation
26	PIA6	Project risk is responded against risk management plan	PMI 2017	Implementation and Adaptation

27	PIA7	Project human resources is managed against human resources plan	PMI 2017	Implementation and Adaptation
28	PIA8	Project communication is managed against communication plan	PMI 2017	Implementation and Adaptation
29	PIA9	Projects procurements are conducted against procurement plan	PMI 2017	Implementation and Adaptation
30	PIA10	Projects stakeholder engagement is managed against stakeholder plan	PMI 2017	Implementation and Adaptation
31	PIA11	Projects change is monitored-controlled against change plan	PMI 2017	Implementation and Adaptation

5.10.5. Performance (bottom-up) at the strategy level scale

In this section, the author has developed statements covering the strategy performance aspect at strategy level, drawn from previous studies and literatures. The scale is adapted from Lechner and Floyd (2012), Walter *et al.* (2016) and Musawir *et al.* (2017). The resulting scale consist of eight items as shown in table 5.8:

Table 5.8: Strategy performance (bottom-up) at the strategy level scale

Sr No.	Item Code	Strategic Initiative Performance Statements	References
1	SP1	Strategic initiatives meet their stakeholder satisfaction expectations	Rebolledo nd, Lechner and Floyd 2012, Musawir *et al.* 2017,
2	SP2	Strategic initiatives meet their service expectations	
3	SP3	Strategic initiatives realize their benefits	
4	SP4	Strategic initiatives meet their revenue expectations	

5	SP5	Strategic initiatives meet their profit expectations	Walter *et al.* 2016
6	SP6	Strategic initiatives deliver their expected company's sales growth	
7	SP7	Strategic initiatives deliver their expected company's market share	
8	SP8	Strategic initiatives adapt to their environmental conditions	

5.10.6. Performance (bottom-up) at the portfolio level scale

In this section, the author has developed statements covering the portfolio performance aspect at portfolio level, drawn from previous studies and literatures. The scale is adapted from Müller, Martinsuo and Blomquist (2008), Jonas (2010), Meskendahl (2010), Rebolledo (nd), Unger, Gemünden and Aubry (2012), Teller *et al.* (2012), Kock, Heising and Gemünden (2016), and Kopmann, Killen and Gemünden (2017). The resulting scale consist of 10 items as shown in table 5.9:

Table 5.9: Portfolio performance (bottom-up) at the portfolio level scale

Sr No.	Item Code	Portfolio Performance Statements	References
1	PoP1	Portfolio has the right number of projects for the resources available	Müller, Martinsuo and Blomquist 2008, Jonas 2010, Meskendahl 2010; Rebolledo nd, Unger, Gemünden and Aubry
2	PoP2	Portfolio contains high-value projects	
3	PoP3	Portfolio has an excellent balance of projects	
4	PoP4	Projects in the portfolio are aligned with the business strategy	
5	PoP5	The budget allocation between projects in the portfolio reflects the business strategy	
6	PoP6	Portfolio leads to a high stakeholder satisfaction	

7	PoP7	Portfolio achieves time, cost and quality objectives	2012; Teller *et al.* 2012, Kock, Heising and Gemünden 2016, Kopmann, Killen and Gemünden 2017
8	PoP8	Portfolio achieves financial objectives	
9	PoP9	Portfolio fulfils stakeholder requirements	
10	PoP10	Projects purpose in the portfolio is achieved	

5.10.7. Performance (bottom-up) at the program level scale

In this section, the author has developed statements covering the program performance aspect at program level, drawn from previous studies and literatures. The scale is adapted from Thiry (2004a, 2004b), Shehu and Akintoy (2009), Rebolledo (nd), and Musawir *et al.* (2017). The resulting scale consist of three items as shown in table 5.10:

Table 5.10: Program performance (bottom-up) at the program level scale

Sr No.	Item Code	Program Performance Statements	References
1	PrP1	Program's implementation reflects the business strategy	Thiry 2004a, 2004b, Shehu and Akintoy 2009, Rebolledo nd, Musawir *et al.* 2017
2	PrP2	Program's impact exceeds stakeholder expectations	
3	PrP3	Programs achieve cost-benefits objectives	

5.10.8. Performance (bottom-up) at the project level scale

In this section, the author has developed statements covering the project performance aspect at project level, drawn from previous studies and literatures. The scale is adapted from Musawir *et al.* (2017) and Papke-Shields and Boyer-Wright (2017). The resulting scale consist of eight items as shown in table 5.11:

Table 5.11: Project performance (bottom-up) at the project level scale

Sr No.	Item Code	Project Performance Statements	References
1	PP1	Projects meet their business purposes	Rebolledo nd, Mir and Pinnington 2014, Musawir *et al.* 2017, Papke-Shields and Boyer-Wright 2017, Gomes and Romão 2016.
2	PP2	Projects meet their operational performance goals	
3	PP3	Projects meet their technical performance goals	
4	PP4	Projects meet their schedule objectives	
5	PP5	Projects stay within budget limits	
6	PP6	Projects meet their quality objectives	
7	PP7	Projects meet their scope objectives	
8	PP8	Project's stakeholders are satisfied with the project's results	

5.10.9. Organisational culture scale

In this section, the author has developed statements covering the organisational culture aspect, drawn from previous studies and literatures. The scale is adapted from Nikpour (2017),

Denison (2000), Denison, Haaland and Goelzer (2003a, 2003b) to cover the three dimensions related to the involvement part from organisational culture only (empowerment, team orientation, and capabilities development). The resulting scale consist of eight items as shown in table 5.12:

Table 5.12: Organisational culture (involvement) scale

Sr No.	Item Code	Organisational Culture (Involvement) Statements	References	Culture involvement Dimension
1	OCE1	Decisions are usually made at the level where the best information is available	(Nikpour 2017) (Denison 2000) (Denison, Haaland and Goelzer 2003a, 2003b).	Empowerment
2	OCE2	Information is widely shared so that everyone can get the information he or she needs when it is needed		Empowerment
3	OCE3	Business planning is ongoing and involves everyone in the process to some degree		Empowerment
4	OCT1	Cooperation across different parts of the organisation is actively encouraged		Team orientation
5	OCT2	Teamwork is used to get work done		Team orientation
6	OCT3	Work is organized so that each person can see the relationship between his or her job and the goals of the organisation		Team orientation
7	OCC1	Authority is delegated so that people can act on their own		Capabilities Development
8	OCC2	The capabilities of people are viewed as an important source of competitive advantage		Capabilities Development

5.10.10. Organisational performance scale

In this section, the author has developed statements covering the organisational performance aspect, drawn from previous studies and literatures. The scale is adapted from Venkatraman (1989), Lesser and Storck (2001), Croteau and Bergeron (2001), Kirca, Jayachandran and Bearden (2005), Marqués and Simón (2006), Yilmaz and Ergun (2008), Ali *et al.* (2010), Alrubaiee *et al.* (2015), Jagasia, Baul and Mallik (2015), Akter *et al*. (2016), Dijkman, Lammers and De Jong (2016), and Aydiner *et al.* (2019). The resulting scale consist of eight items as shown in table 5.13:

Table 5.13: Organisational performance scale

Sr No.	Item Code	Organisational Performance Statements	References
1	OrP1	We are satisfied with our organisational results	(Yilmaz and Ergun 2008) (Ali *et al.* 2010)
2	OrP2	We are satisfied with our organisational market share results	(Yilmaz and Ergun 2008) (Ali *et al.* 2010) (Jagasia, Baul and Mallik 2015) (Aydiner *et al.* 2019) (Venkatraman 1989) (Croteau and Bergeron 2001) (Alrubaiee *et al.* 2015)
3	OrP3	We are satisfied with our organisational profit/Profitability results	(Ali *et al.* 2010) (Akter et al 2016)

			(Venkatraman 1989) (Croteau and Bergeron 2001) (Alrubaiee *et al.* 2015)
4	OrP4	We are satisfied with our organisational employee satisfaction results	(Yilmaz and Ergun 2008) (Lesser and Storck 2001) (Marqués and Simón 2006) (Jagasia, Baul and Mallik 2015)
5	OrP5	We are satisfied with our organisational customer retention results	(Aydiner *et al.* 2019) (Akter et al 2016) (Lesser and Storck 2001) (Marqués and Simón 2006) (Alrubaiee *et al.* 2015) (Jagasia, Baul and Mallik 2015)
6	OrP6	We are satisfied with our organisational quality improvement results	(Yilmaz and Ergun 2008) (Jagasia, Baul and Mallik 2015)
7	OrP7	We are satisfied with our organisational opportunities development capability results	(Yilmaz and Ergun 2008) (Lesser and Storck 2001) (Jagasia, Baul and Mallik 2015)

8	OrP8	We are satisfied with our organisational inventiveness adaptability results	Kirca, Jayachandran and Bearden 2005, Dijkman, Lammers and De Jong 2016

5.11. Scale

The author settled a structured questionnaire for data collection of demographics, independents variables, and dependent variable. The items of the demographics, independents, and dependent variables are planned on a multiple choice base, and Likert scale of 7 is utilised, where 7 represents “strongly agree”, 6 represents “agree”, 5 represents “slightly agree”, 4 represents “undecided”, 3 represents “slightly disagree”, 2 represents “disagree”, and 1 represents “strongly disagree”.

5.12. The research sampling strategy

The research sampling strategy will be shown precisely in the coming sub-sections related to population selection criteria, sampling selection criterial and finally the pilot study.

5.12.1. Population

As indicated by Flynn *et al.* (1990), to choose a population there must be a homogeneous characteristic amongst them. Moreover, they must be knowledgeable about the research subject, to ensure the sample needed homogeneous characteristics, as well as to ensure the data validity at the same time (Walker & Hills 2012). Therefore, the population of this study has been selected from the related fields that cover project-based organisations. Each of which consists of professional and experts that can represent and reflect all the strategy management,

portfolio management, program management and project management related tasks within Dubai (UAE) that are essential for this study, in order to fulfil the study needed methodology.

Furthermore, in this research, the unit of measurement is the participants (n), which perfectly can indicate and attest to the theories and hypotheses proposed for this study. Furthermore, this sample (the participants (n)) is taken from the selected utilities and associated industries linked to project-based companies in Dubai (UAE) as mentioned previously.

5.12.2. Sample

For the study sample size, it is very important to know that the sample is the key reflection of the statistic test, which is used to evaluate the statistical significance of study variables associations. Furthermore, it is hard to accomplish a significant test statistic with a small size of the sample (Saunders *et al.* 2016). Contrarily, using a large sample size for all these relationships among the variables can be more significant due to being closer to the real population size (Anderson 2003), and to reduce the sampling error through increasing the sample size based on Fricker (2008).

Additionally, in order to reduce the risk of bias, the targeted sample must be within the correct range of sample size that represents the actual population opinions, as well as the correct representation from the population who is linked to the research area (Fricker 2008). Moreover, as claimed by Saunders *et al.* (2016) and Fricker (2008), the sampling method is generally related with either simple random sampling (SRS), stratified random sampling, cluster sampling, or systematic sampling, and since, random numbers allow to select the sample size without bias based on Saunders *et al*. (2016).

In summary, the right sample size that represents the actual population and to guarantee accomplishing noteworthy outcomes is preferred over having normally distributed data and utilising parametric statistical assessments. Thus, the study sampling method was done based on a simple random sample (SRS) technique. Then, the Cochran's Formula method was used as a supportive method, to know the approximate sample size of these random populations, which is suitable to be utilised in the case of large populations (Israel 1992).

5.12.3. Simple random sampling (SRS) method

Since the simple random sampling (SRS) is proper method for the purpose of generalization, the selection criteria to be random, and the sample will represent perfectly the targeted population required for the study, and reduces the sample bias (Thompson, 2013), based on that it has been selected in this study as a method of sampling.

The simple random sampling (SRS) (Thompson, 2013) that has been selected for this study. First, the estimated targeted sample, who were from the fields of strategy, portfolio, program, and project within the relevant companies and utilities needed for this study numbered 3,000. The mentioned targeted sample size was selected from the last updated database of labour chapter (employees at local government departments) report published by the Dubai Statistics Centre for the year 2016. Then, to from the estimated targeted sample, the participants that responded to the survey were 567 with the rate of 19% from the estimated targeted sample. However, the final valid sample applicable for analysis was 373 out of the accepted participate to response to the survey.

5.12.4. Cochran's formula sample method

Cochran's formula is used especially in large population situations (Ahmad & Halim 2017; Israel 1992). Thus, this study utilised Cochran's formula to calculate the approximate figure for more endorsement about the sample size required.

The Cochran's Sample Size Formula $n_0 = \frac{Z^2pq}{e^2}$, Where, ***z***-value can be found in a ***Z*** table, ***p*** is the (estimated) proportion of the population which has amplification to the survey questions, for this study = 50% almost, ***q*** is (1 – ***p***), and ***e*** is the anticipated level of accuracy (i.e., the margin of error) (Israel 1992).

Thus, to calculate the sample size for this research based on Cochran's formula, the researcher carried out a study on the populations from the relevant Dubai local departments, and by estimating how many participants are working in strategy, portfolio, program, and project fields, ***p*** = 0.5 (50%). The confidence level is 95% confidence, and at least 5% - plus or minus - precision. A 95 % confidence level gives us Z values of 1.96, according to the Z table, so we get $n = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2}$ about 384 participants.

In summary, the sample size must be around 384 participants. See table 5.14 and table 5.15 for the minimum sample size for the given population size, according to Ahmad and Halim (2017) and Israel (1992). Therefore, this study sample size was 373, which is within the measured figure.

Table 5.14: Minimum sample size for a given population size

Population	Sample Size					
	Continuous Data (Margin of Error=.03)			Categorical Data (Margin of Error = .05)		
	Alpha = .10 t = 1.65	Alpha=.05 t = 1.96	Alpha = .01 t = 2.58	P = .05 t = 1.65	P = .05 t = 1.96	P =.05 t = 2.58
100	46	55	68	74	80	87
200	59	75	102	116	132	154
300	65	85	123	143	169	207
400	69	92	137	162	196	250
500	72	96	147	176	218	286
600	73	100	155	187	235	316
700	75	102	161	196	249	341
800	76	104	166	203	260	363
900	76	105	170	209	270	382
1,000	77	106	173	213	278	399
1,500	83	110	183	230	306	461
2,000	83	112	189	239	323	499
4,000	83	119	198	254	354	570
6,000	83	119	209	259	362	598
8,000	83	119	209	262	367	613
10,000	83	119	209	264	370	623

Note: The margin of error used in the table was .03 for continuous data and .05 for categorical data.

Source: (Ahmad & Halim 2017)

Table 5.15: Sample size for ± 3%, ± 5%,±7%, and ±10% precision levels where confidence level is 95% and p=0.5

Size of Population	Sample Size (n) for Precision (e) of:			
	±3%	±5%	±7%	±10%
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.

Source: (Israel 1992)

5.12.5. Pilot study

Saunders *et al.* (2009) pointed out that the pilot study is required to test the proposed research facets, in terms of the clarity of the survey questions' statements, alignment with the research aim and objectives, participants' interest about the research topic, as well as to validate the research questionnaires. Likewise, Barringer and Bluedorn (1999) said that the purpose of the pilot study is to evaluate the validity and the reliability of the survey's psychometric measures. Therefore, the pilot study was conducted and presented to four practitioners within the field of the strategy management, portfolio management, program management, and project management, one from each field. Moreover, the survey was exposed to three professors from academia within the fields of strategy management and project management.

Feedback and comments were received from one professor and three practitioners. Comments mainly were used to rephrase, modify some statements, and to simplify some terms. As a result of the received feedback, the researcher refined some statements of the measures, and made them more meaningful and clearer. For example, in project level adding word "execution" for the project deployment part and merging some statements together that lead to the same meaning as, "new opportunities" and "new investment needs".

5.13. Reliability and validity analysis

5.13.1. Reliability analysis

Due to the importance of validation and reliability analysis for the study survey questions in measuring the study analytical questions and constructs, the researcher needed to check the validity and reliability of the study survey scales. As there are many types of reliability and

validity tests, thus, this study utilised some types according to their appropriateness to this study and based on the types of questionnaire. The position of the reliability test lies in that it determines the quality of the questionnaire and to make sure that all the questions are understandable to the respondents as the researcher wanted.

Furthermore, reliability refers to the consistency of the measurement instrument to create consistent results each time it is used with the same individuals, under the same conditions, and with the same subjects. Moreover, reliability value ranges from 0 to 1, in which higher reliability value indicating higher degrees of reliability (Kimberlin & Winterstein 2008). Based on Kimberlin and Winterstein (2008), there are three types of reliability tests can be used to measure questionnaires quality as test retest, inter-rater and internal consistency, where internal consistency test reflects as an internal reliability and test retest with inter-rater tests consider as external reliability tests. First of all, the test retest method relates to provide the same questionnaire on two separate occasions to same respondents with similar conditions; to measure the constancy of the test over time. However, the researcher decided not to utilise the test retest reliability test, as there is a difficulty of asking individuals to respond to the questions twice, as well as the potential of obtaining different answers by the respondents especially if the duration between administering the two questionnaires is too long; which could bias the results. Secondly, the inter-rater reliability test refers to the level to which different rates provide stability estimates of the same behaviour.

In another words, respondents' feedback are associated to alternative forms of the same questions. However, the researcher decided not to use the inter-rater radiality test, mainly because the survey is already long enough and fearing that the respondents will lose interest with the length of the questionnaires (McLeod 2007; Saunders *et al.* 2016). The final method for reliability testing is the internal consistency reliability test that refers to the degree of the similarity among the items from the same test, to make sure the all the items are determining

the same concept. Furthermore, the most widely used method for estimating internal consistency is Cronbach's alpha, which the researcher decided to use, as it is easy to use (Kimberlin & Winterstein 2008, Taherdoost 2016).

Therefore, the researcher decided to test the research questionnaire reliability via practicing the internal consistency reliability test, where the Cronbach's alpha test purpose is to measure the average intercorrelations of the survey items and the number of items in the scale (Kimberlin & Winterstein 2008). For instance, the research all items under each level of strategy, portfolio, program, and project; organisational culture and organisational performance will be measured for internal consistency based on associations among the items. Furthermore, to make sure that all the items measurements under each construct having similar scores.

Moreover, it is agreed that when utilising Likert scales in a survey, Cronbach's alpha test seemed to be the most appropriate reliability measure (Taherdoost 2016). For future reliability the questions have been written clearly for this research, the survey instructions were easy to understand, and training has been provided to make the raters more effective by making the rules for scoring explicit, according to Drost (2011).

5.13.2. Validity analysis

It is suggested by several researchers that the study's reliability alone is not enough, but it also needs to be combined with validity in order to gain strength (Taherdoost 2016). Thus, in the next part there was more elaboration about the validity tests adopted for this research.

According to Drost (2011) the research validity has four main types, which need to be addressed by the researchers: internal validity, external validity, statistical conclusion validity, and construct validity. First, internal validity refers to the validity of the research itself, in which there are casual relations between dependent variable and independent variables. Furthermore,

the research assumptions and interpretations are correct, as all variables are well-controlled and defined. However, since the researcher knows the independent variables (strategy diffusion top-down, performance bottom-up, organisational culture) in relation to the dependent variable (organisational performance), then this validity type is achieved for the research.

Second, external validity refers to whether the results of the study can be genialised beyond the sample, for example to other setting, persons, and times. This validity type is not appropriate for this research as the research sample was according to specific organisations linked to project-based organisations and based on selected number of individuals there works connected to strategy and projects contexts. Therefore, the research results cannot be applied to the rest of the organisations specially in different type of organisations.

Third, statistical conclusion validity determines whether a relationship exists between the two variables (cause and effect variables). This validity test is effective for the research and it was applied to test the relationships by appropriate statistical tests were conducted, adequate sampling was ensured, and proper measurement procedure was followed. Statistical conclusion validity was reasonable to deduce covariation given a specified alpha level and the obtained variances. The last type of validity is construct validity, is refers to the results of the study can be used to generalised to the construct. In another words, it is the degree to which the results can be translated a behaviour or idea (construct) into operating reality (operationalisation) (Heale & Twycross 2015).

Construct validity includes six types of validity: content validity, face validity, convergent and discriminant validity, and concurrent and predictive validity. See figure 5.3 for the different types of construct validity.

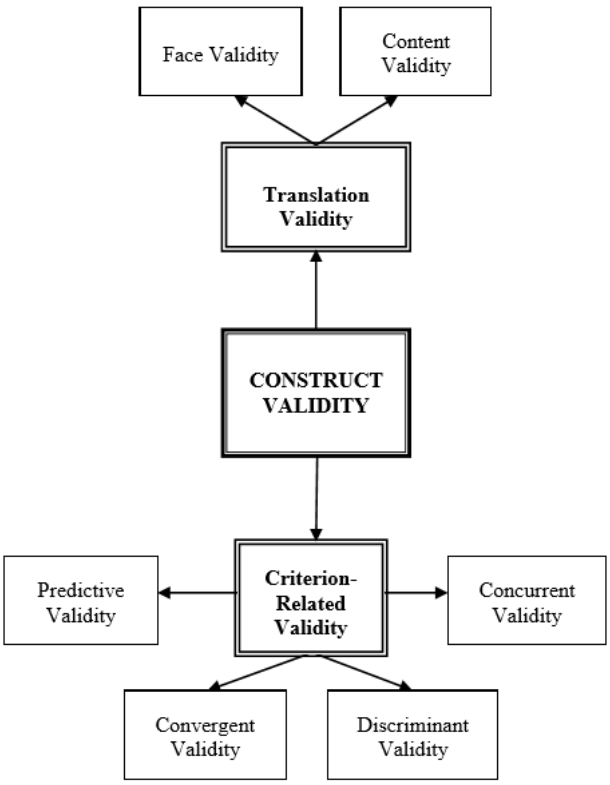


Figure 5.3: Different types of construct validity

Source: (Drost 2011)

First, the face validity which means a subjective judgment on what the measures look like by the researcher or by some random people. As a result, face validity is often never been trusted on its own merits for construct validity and it's the weakest form of validity (Drost 2011; Taherdoost 2016). Thus, for this research a face validity has not been adopted. Second, content validity which means a qualitative type of validity, whether the measures used covers all the content that the researcher anticipate to measure (Drost 2011; Heale & Twycross 2015). Consequently, the researcher's duty is making sure to provide a theoretical definition about the concept that is recognised by others and then to select measures that rationally cover the needed fields and scopes. Fundamentally, there are two ways for leading content validity, by demanding the decision of specialists and/or asking many questions about the assessment within the same study field. The researcher decided to check the content validity through the in-depth literature review and to utilise similar field validated questions/measures from existing

studies. Furthermore, the survey questions content validity was assessed by some experts in the field and asked about its appropriateness and usefulness to the studied subject (Drost 2011). three academicians that studied the topic of strategy management and project management and four experience strategy managers and project managers were contacted to validate the survey questions; then corrective actions were taken based on their responses.

The third type of construct validity is concurrent validity, which occurs when criterion exists at the same time of the assessment. The fourth type is predictive validity, which occurs when the criterion happens in the future (Drost 2011). The fifth type is discriminant validity or divergent validity, which is the extent to which latent variable X differentiates from other latent variables (e.g., Y, Z). Finally, the last type is the convergent validity, which means the similarity between two measures, in another word, analysing the existence with another questionnaire that is designed to measure the similar construct (Drost 2011). As most of the study survey statements in this research are taken from previous studies' questionnaires (refer to table 5.3 for more clarification), this can validate the instruments construct wise, where it is fulfilling one type of construct validity called convergence, which means that the instrument measures concepts like to other instruments. Figure 5.4 demonstrates the Research questionnaire validation process, where construct validation for the questionnaires done via different types of validation like content validity and convergent validity.

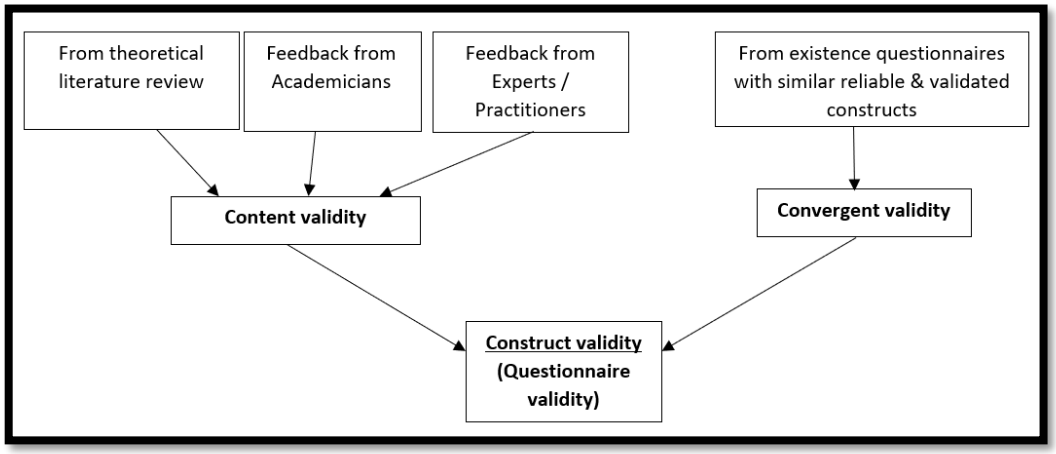


Figure 5.4: Research questionnaires validation process

5.14. Data analysis

In order to understand more about the data analysis and how it will be done, primarily it is very important to know the overall processes involved in the construction of the research methodology and their links to the research problem. Therefore, figure 5.5 below will express more about it. Since, this study looking to solve the problem of the deficiency of strategy diffusion and provide the best way how to diffuse it, then the lack of reporting back the performance of each level of the organisation properly, and the impact of these issues on the organisational performance. Thus, the process is followed to fulfil the aim and the objectives of the study. Firstly, thematic literature reviews with an experts' opinions was carried out to extract all the strategic diffusion (top-down) for each level of the project-based organisations, then the strategic diffusion was clustered based on the agreed diffusion theory for this study. Secondly, thematic reviews with expert's opinions done to identify the organisational performance (bottom-up) for each level of the project-based organisations. Thirdly, thematic reviews with experts' opinions used to identify organisational culture dimensions. Fourthly, a positivism-objectivist philosophy, deductive approach, mono-quantitative method, online survey with a 7-Likert scale, and a cross-sectional time-horizon was applied as a methodology for this study, according to research onion style by Saunders *et al*. (2016). Fifthly, descriptive analysis applied to describe the clean data. sixthly, assumptions and hypotheses confirmation completed via correlation analysis using SPSS and multi-regression using structural equation model. Finally, the final model has been developed to accomplish the study aim and objectives, answer the study questions and to solve the study problem at the end.

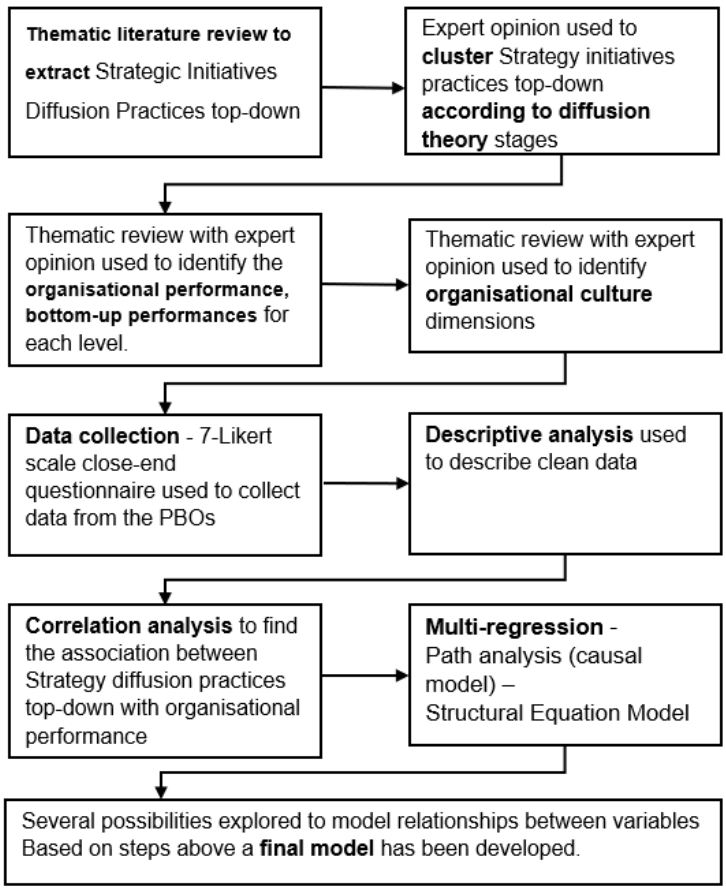


Figure 5.5: Research questionnaires validation process

5.14.1. Descriptive analysis and instrument testing

In this section, the data have gone through preparation process, in order to conduct further assessment for checking the research assumptions and hypotheses planned for this study, as per the following:

- **Descriptive analysis** is conducted for the data collected, individual mean, standard deviation, variance scores for each scale are assessed and ranked based on top scaled according to participants. This is done to know which indicators are best and should be used in strategy diffusion practices within project-based organisations.

- Reliability and validity tests: it is necessary to check the consistency of the survey instruments, in which Cronbach's alpha test is selected for this research to test the reliability assessment. Moreover, Cronbach's alpha test measures the average of all associations in every grouping of split-halves. The Cronbach's alpha test result is a figure between 0 and 1, and the acceptable reliability value range is 0.7 or higher (Heale & Twycross 2015).

- Factor analysis test is normally used to reduce number of scale items into a smaller number of components if needed (Norusis 2000). As well as, to find the constructs of all variables and to check for the uni-dimensionality of each scale by for investigating whether all items load on a single factor (Petro & Gardiner 2015). However, in prior to factor analysis test, the fitting of factor analysis suitability test needs to be done through two statistical tests. These include the Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO) in which if the high KMO coefficient is close to 1.0, the factor analysis is useful for the data collected, while if the KMO coefficient is less than 0.5, this indicates that the factor analysis will not be suitable to be conducted (Field 2009). The second test that needs to be checked is the Bartlett Test of Sphericity to assess the percentage of correlations consequently, test the hypotheses that your association matrix is a distinctiveness matrix, where the small significance level of values (less than 0.05) indicate the suitability of conducting factor analysis (Field 2009; Morgan *et al.* 2004). Thus, the factor analysis test has been done, but not considered for this study, since it shown the parsimonious model for this study that not matching the objective of this study, since this study focus on four levels within the project-based organisation not 2 levels as resulted from the factor analysis test result. Furthermore, because all the variables are well-determined through a comprehensive literature review, with the usage of valid existing surveys questions, and all the items segregated very precisely to its own related factor.

- **Checking the outliers:** outliers are referred when a data value is either below or above all other data, and in many cases some statistical analysis methods are sensitive to outliers, especially if the outliers misrepresent the results. Consequently, checking of outliers for the research data can be done via SPSS Boxplots since it detects outlier cases along with code of the participants linked with it (Pallant 2016). If outliers are found, it can be decided to keep it or remove it based on the type of outlier. One type is a legitimate outlier as it may not affect analyses heavily, an while the extreme outlier affects analyses heavily and must be removed from the data before undertaking further analyses (Hoaglin & Iglewicz 1987).

- **Checking Normality:** Normality tests are usually conducted to compare the shape of research sample distribution with the shape of a normal curve. It is used to evaluate the assumption of data normality, and it is necessary in order to make accurate findings about reality (Pallant 2016). Normality tests can be done through several test like, Skewness and Kurtosis values, the kolmogorov-smirnov test (K-S), Shapiro-Wilk tests, D Agostino-Pearson omnibus test, Anscombe-Glynn Kurtosis test, Jarque-Bera test, and histograms shapes. For skewness and Kurtosis values, the kolmogorov-smirnov test (K-S), and Shapiro-Wilk tests are considered the most commonly used tests on SPSS, therefore, they will be adopted by the researcher of this study.

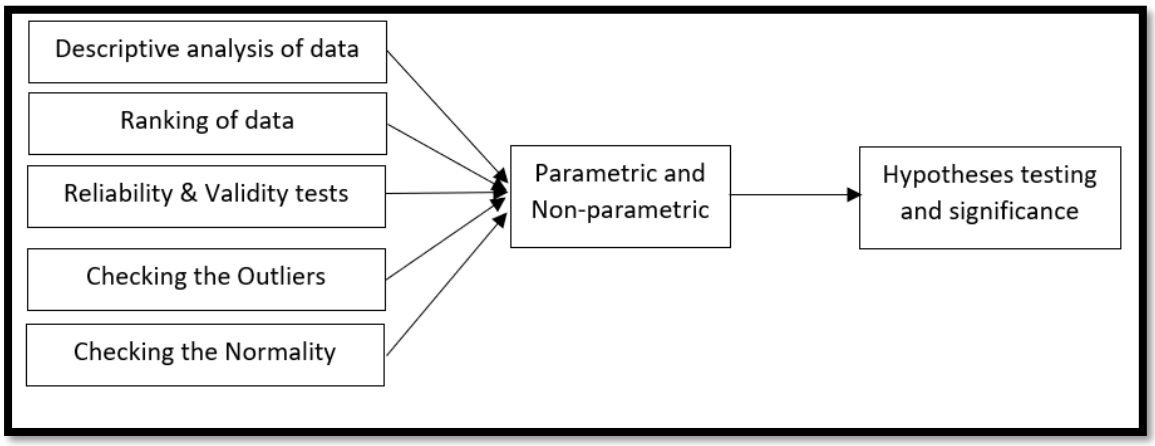


Figure 5.6: Statistical analysis process

5.14.2. Checking assumptions

In this study, there will be two techniques used to check the research assumptions: correlation test and regression test. The correlation test will be via using SPSS, to check the significance of the relationships between the independent variables (strategy diffusion (top-down) variables, performance (bottom-up) variables, organisational culture variable) and dependent variables (organisational performance). The regression test will be via SEM path analysis test using AMOS (path analysis (causal model) – structural equation model), to test the influences of the predictors' variables relationships on the outcome variable as follows:

- (SPSS) Spearman or Pearson Correlation tests: it is used to ensure the suitability of Spearmans or Pearson Correlation tests for this study. The following points will be taken into attention and assessed: Normality: normal distribution of data, independence of observations (respondents not influencing each other), Linearity and Homoscedasticity, Similarity of scores variability for each variable to scores variability to all other variables which are already checked using scatterplots, Related pairs, completion of answers to all variables by every respondent, and Measurement level (continuity of dimension scale should be used) (Pallant 2016). Moreover, a correlational research design is used focusing on comparing between two variables in order to understand their relationship (Voelkl & Gerber 1999).

- AMOS SEM path analysis (causal model) test: the path analysis Structural Equation Model (SEM) is performed on data through Amos statistical package software. Since, AMOS can be used to fit the kinds of factor analysis or regression models that you know. AMOS has a graphical interface and is easy to use. It allows drawing the models as per the researcher's convenience, and it can make path diagrams for robust reporting. All those and more are

important characteristics for software that researcher needs to use. In AMOS, rectangles represent measure observed variables for the model. In addition, complicated models can be represented effectively through its SEM path diagrams. Furthermore, Amos is used to represent and examine the in-depth (the direct and indirect) effects of the identified independent, dependent, and moderator variables, which are equivalent to linear and multi regression analyses in SPSS software (Bacon & Bacon 2001; Byrne 2001). Moreover, AMOS and SEM allow to check, in a simultaneous way, the whole system of variables to determine the degree to which it is consistent with the data (Chenini & Khemiri 2009). Moreover, SEM typically utilises 200 to 400 cases to fit models with 10 to 15 observed variables (Bacon & Bacon 2001), which is very closely to this research's number of variables and number of samples. Moreover, based on Bacon and Bacon (2001) all the latent variables can be observed through building a model that express latent variables in terms of observed variables, and that what has been used, means all the variables had put as observed variables in the study model. Thus, AMOS (SEM path analysis (causal model)) was utilised to check the liner and multi-regression test for this study, to check the variables impacts' strengths, where all identified variables are considered as observed variables. Furthermore, the equation structural model was used in order to create a final (new) model that can be a useful application for project-based organisation, which this research is looking for at the end.

5.14.3. Ethical considerations

The definition of research ethics according to Saunders *et al.* (2009) refers to whether the research topic is formulated and clarified, research design and access gained, data collected, data processed and stored, data analysed, and research findings are written up in a responsible and moral way. Therefore, all these points have been considered for this study by the

researcher. The definition of research ethics according to Flick (2018) refers to the actions that should be applied to protect the research participant's dignity and rights. Hence, to ensure the ethics of this research, the researcher has explained the research aim to participants in an email and within the introduction of the survey without overstating the benefits of the research to participants. Moreover, the researcher has confirmed the agreement of respondents to participate in the research. Furthermore, the researcher intends to avoid any harm caused to research participants by keeping each participant's identity unknown, which has been clearly indicated in the study survey introduction. Refer to Appendix II for the research invitation letter.

5.15. Limitations of the study

The study limitations can be summarised in the following: first, it is related to the generalisability issue since the research sample will be based on selected departments within one organisation in Dubai (UAE). Thus, future research is recommended in different countries and industries on the strategy diffusion impact on organisational performance within project-based organisations.

5.16. Chapter summary

There were many key issues related to methodology of the research discussed in this chapter. First, there were elaborations about the adopted research methodology and details explanations about the research philosophy, approach, strategies, choices, time horizon, research data collection techniques, and research data analyses procedures. Second, providing details about the research method, instruments and selecting research questionnaire. Third, discussions on research sample composition and size. Fourth, research validation and reliability

analyses methods are utilized. Fifth, introducing statistical techniques and the process for checking the research assumptions that will be used in analysing the data. Finally, ethical considerations and limitations were presented.

6. CHAPTER SIX: Data analysis

6.1. Introduction

The aim of this chapter is to investigate the statistical relationships shown in the conceptual framework, through examining the direct relationships of (independent variables) strategy diffusion drivers, performance drivers, and organisational culture drivers in strategy, portfolio, program and project levels on (dependent variable) organisational performance development in project-based organisations. In addition, through examining the direct relationships of (independent variables) strategy diffusion drivers, performance drivers, and organisational culture drivers with each other's, in strategy, portfolio, program and project levels in project-based organisations

Thus, this chapter has been structured in a way to analyse the collated data using the research planned instrument. The chapter starts with descriptive statistics of the population demographics based on factors (type of organisation, gender, years of experience and job position), to check the characteristics of the study population. This is followed by sample analysis via KMO and Bartlett test, common method variance (CMV), normality test and outliers checking. Then, the reliability and validity tests are conducted via Cronbach's alpha. After that, frequencies analysis, the statistical outlook of the study variables, are assessed. Finally, the hypotheses testing is done through Pearson correlations test for all independent and dependent variables of the research, to understand the direct associations nature between them.

Since 1986, SPSS (Statistical Package for Social Sciences) software from International Business Machine Corporation (IBM) has been used widely in research data analysis, because this software has proven the ability to operate complicated statistical tests (Ann 2011; Field 2009). Therefore, all the above-mentioned statistical tests will be carried out via SPSS specially

in this initial stage of the study analyses, in order to either accept or reject the direct relationships hypotheses of the research.

The design of the research's quantitative method ensures the validity and expected generalisation of the founded results from the population selected sample (Saunders, Lewis & Thornhill 2016). Based on the settled survey method, the collected survey responses are quantitatively studied and analysed to investigate the impact the strategy diffusion within projects-based organisations.

6.2. Descriptive statistics

This section provides an overview of the selected sample from a demographic perspective. The purpose of these statistics is to ensure having a variety of the participants as such diversification is sensitive to the conceptual framework selected variables, as well as for the organisational cultural facet. Where the estimated targeted sample was 3000 that reflected the typical strategic management and project management field experiences from the public sector in order to be considered representative. The survey was designed in the format of an online solution, the hyperlink has been generated and shared via email and smart phones to the 3000 estimated randomly selected audiences from world-class public project-based parties in the Emirate of Dubai located in the UAE. Follow-ups were done with these organisations through Human Resource Units (HR) from the hosting organisations. The HR units obtained the required internal permissions from the concerned departments to distribute this survey to the targeted sample. An internal email, including a cover letter and a link to the survey, was shared with all employees through HR units, to increase the number of the response. Survey questions came in the shape of separate serial lists that require answering all questions to move forward to the next list, with an option to exit the survey at anytime. Survey participants were

given almost four weeks (26 days) to complete the survey. Around 567 employees from the public project-based organisation have accepted to participate in this survey, thus, the completion rate of the survey was around 19%, which is considered as an acceptable percentage in this research as it follows Simple Random Sampling (SRS) (Thompson 2013). The final valid sample applicable for analysis was 373, and the rest were uncompleted responses were disqualified.

Based on the literature review, the carefully selected demographic categories were: Type of your Organisation, Gender, Years of Experience, and Job Position Levels (Strategic Level Employment, Portfolio Level Employment, Program Level Employment, Project Level Employment, and Other). The study population sample demographics' summary results are represented in table 6.1:

Table 6.1: Demographic variables

Demographic Variables	Org. Type	Gender	Experience	Position
Public	373 (100.0%)			
Private	-			
Semi – Government	-			
Female		86 (23.1%)		
Male		287 (76.9%)		
1 - 5			113 (30.3%)	
5 - 10			89 (23.9%)	
10 - 20			131 (35.1%)	
Above 20			40 (10.7%)	
Strategic Level Employment				43 (11.5%)
Portfolio Level Employment				32 (8.6%)
Program Level Employment				67 (18.0%)

Project Level Employment				203 (54.4%)
Other				28 (7.5%)

6.2.1. Type of your organisation

The total number of public as organisation type is 373 (100%) and the total number of private and others were 0 (0%), which indicates that the sample organisation type where the survey takes place is actually a public type organisation and that shows that all findings are appropriate for public sector project-based organisations, as shown in figure 6.1.

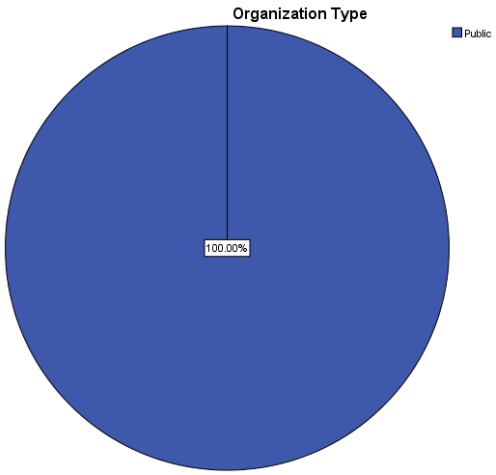


Figure 6.1: Type of your organisation

6.2.2. Gender

The total number of females is 86 (23.1%), and the total number of males is 287 (76.9%), which indicates that the males are more than the females in the sample from a gender perspective. Therefore, all categories are represented in this category in the way is supporting the actual gender ratio in the sample organisation in Dubai organisation according to Dubai workforce (Dubai statistical year book 2016), as shown in figure 6.2.

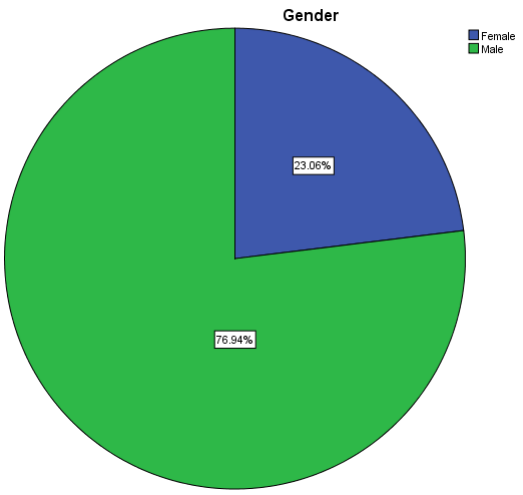


Figure 6.2: Gender

6.2.3. Years of experience in current position

Most of the participants are experts in strategic management and project management fields experience of (10-20) years with 131 participants (35.1%). The second category is (1-5) years with 113 participants (30.3%). Third category of (5-10) years has scored (23.9%) with 89 participants. Finally, the category of (above 20 years) has come last by 40 (10.7%). The variety of number of experts in project-based organisations participating in this survey has provided a level of strength to this selected sample. Therefore, all categories are represented in a way that supports the sample variety and similarity to the public sector project-based organisation, as shown in figure 6.3.

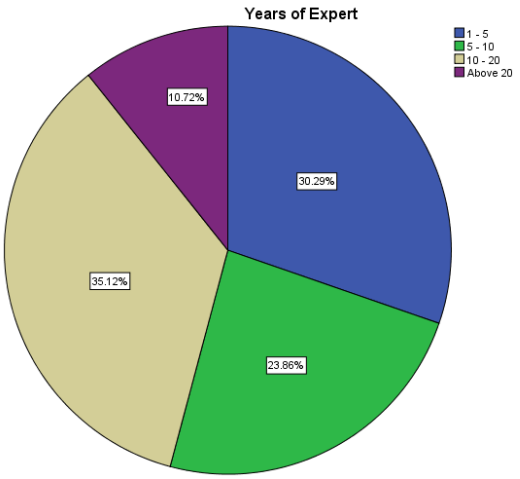


Figure 6.3: Years of experience

6.2.4. Job position and level

Having responses from all the targeted categories is critical. Almost half of the participants are from Project Level Employment with 203 participants (54.4%). Program Level Employment responses come on the second level with 67 (18%). Then, Strategic Level Employment responses come with 43 (11.5%). After that, Portfolio Level Employment responses come with 32 (8.6%). Finally, responses of other staff are 28 (7.5%). Therefore, all categories are represented in a way that supports the sample variety and similarity to the project-based organisation, as shown in figure 6.4.

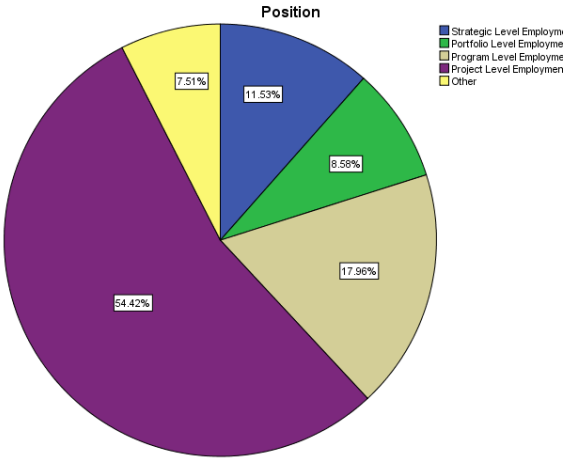


Figure 6.4: Job position and level

In summary, the population demographics should be a reflection of the regular project-based organisation in order to be considered as a representative sample (Fricker 2008). Therefore, the provided demographics results in this research that taken from the questionnaire outputs, showed a good level of involvement to all targeted categories. This has directed to provide the variety and the required reflection as expected, taking into consideration the following of

Simple Random Sampling (SRS) method requirements that were fulfilled in this research sample.

6.2.5. Reliability analyses

Reliability analysis takes place as part of practical validation in order to check whether the properties of a measurement scale and the items that compose the scale are reliable. Low reliability shows that the items that make up the scale do not correlate strongly enough. Thus, they might not be measuring the same construct domain. As a measure of reliability, Cronbach's Alpha is calculated to check the consistency of the research items and to identify the unreliable items that need to be excluded from the scale. Based on George and Mallory's (2003) measures, Cronbach's Alpha is assessed based on George and Mallory (2003) cut-off values, as shown in table 6.2.

Table 6.2: Measure of reliability adopted from

Cronbach's Alpha	Internal Consistency
> 0.90	Excellent
0.80 - 0.89	Good
0.70 - 0.79	Acceptable
0.60 - 0.69	Questionable
0.50 - 0.59	Poor
< 0.50	Unacceptable

Source: George & Mallory (2003)

The reliability of the data has been checked for both initiatives and performance factors for (strategy, portfolio, program, and project) levels, and for organisational performance factors, as well as for organisational culture factors by using Cronbach's test. The Cronbach's Alpha values for all scales indicates very high reliability between 0.981 and 0.944, except for program performance scale, which is in an accepted range as 0.885, as shown in table 6.3.

Table 6.3: Summary of reliability test

Sr No	Description	Cronbach Alpha	Items	New Cronbach Alpha	New Items
1	Strategic Initiatives	.952	10	.900	6
2	Portfolio Initiatives	.972	15	.904	5
3	Program Initiatives	.967	13	.918	6
4	Project Initiatives	.981	31	.910	8
5	Strategic Performance	.966	8	.891	3
6	Portfolio Performance	.964	9	.897	4
7	Program Performance	.885	3	-	-
8	Project Performance	.944	8	.899	5
9	Organisational Culture	.948	8	.921	6
10	Organisational Performance	.954	8	.903	5
11	Overall items	.994	113	.984	51

Values higher than 0.95 are not necessarily good, since they might be an indication of redundancy (Hulin, Netemeyer & Cudeck 2001). Moreover, high values are not an indicator of scale uni-dimensionality based on (Cortina 1993; Cronbach 1951; Green *et al.* 1977; Revelle 1979; Schmitt 1996; Zinbarg *et al.* 2006). Thus, the solution for the same was to eliminate the items with very high correlation and keep good reliable items to scale, this technique support adjusting Alpha values and thus enhance internal consistency according to (Kopalle & Lehman 1997). Therefore, the scales with high Alpha values are reduced till it reached to the acceptable level of Alpha values. The new values are between 0.891 and 0.921. This indicates that the components have significantly good internal consistency, as shown in table 6.4.

Table 6.4: Results of the updated Cronbach Alpha test for the study measurements

Factor	Code	Item	Alpha if deleted	Cronbach Alpha
Strategic Initiatives Level Measurements	SKP1	There is shared understanding of the business drivers behind the strategic initiatives	.877	.900
	SKP3	There is shared understanding of the organisational values/benefits of the strategic initiatives	.877	
	SDE1	Strategic initiatives' decisions are based on analyzing data	.875	
	SDE3	Strategic initiatives are assessed against organisational values	.903	
	SIA2	Strategic initiatives' risks are communicated	.881	
	SIA3	Key performance indicators are set for the strategic initiatives deployment	.886	
Portfolio Initiatives Level Measurements	PoKP1	There is shared understanding that the portfolio of projects is translated from strategic initiatives	.879	.904
	PoIA2	During the portfolio deployment portfolio of project charters are approved	.879	
	PoIA5	Risk management plan is set for portfolio of project deployment	.893	
	PoDE1	Portfolio formation analysis helps to confirm new investment needs	.883	
	PoDE2	Project types are selected based on suitability to the market's needs	.878	
Program Initiatives Level Measurements	PrKP1	There is shared understanding of programs' expected benefits	.910	.918
	PrKP3	There is shared understanding of programs' stakeholder roles/responsibilities	.898	
	PrDE2	Projects are selected within the program on the basis of organisational strategy	.902	
	PrDE3	Program decision making is supported by intelligent data analysis	.904	
	PrIA4	Program's resources are planned during their deployment	.902	

	PrIA6	At the stage of program's deployment plans that embrace change are created	.905	
Project Initiatives Level Measurements	PKP2	There is shared understanding of project constraints (time, cost, quality and scope)	.901	.910
	PKP3	There is shared understanding of project risks	.896	
	PDE1	Project's constraints (time, cost, quality and scope) are evaluated based on project information	.897	
	PDE2	Project's constraints are evaluated based on predefined methods and rules	.899	
	PDE3	Project's decisions are communicated to the relevant stakeholders	.897	
	PIA3	Project cost is monitored-controlled against project budget plan	.899	
	PIA10	Projects stakeholder engagement is managed against stakeholder plan	.898	
	PIA11	Projects change is monitored-controlled against change plan	.902	
Strategic Performance Measurements	SP1	Strategic initiatives meet their stakeholder satisfaction expectations	.844	.891
	SP4	Strategic initiatives meet their revenue expectations	.833	
	SP8	Strategic initiatives adapt to their environmental conditions	.859	
Portfolio Performance Measurements	PoP1	Portfolio has the right number of projects for the resources available	.882	.897
	PoP2	Portfolio contains high-value projects	.860	
	PoP5	The budget allocation between projects in the portfolio reflects the business strategy	.871	
	PoP6	Portfolio leads to a high stakeholder satisfaction	.856	
Program Performance Measurements	PrP1	Program's implementation reflects the business strategy	.850	.885
	PrP2	Program's impact exceeds stakeholder expectations	.848	
	PrP3	Programs achieve cost-benefits objectives	.811	
Project Performance Measurements	PP1	Projects meet their business purposes	.856	.899
	PP3	Projects meet their technical performance goals	.850	

	PP4	Projects meet their schedule objectives	.845	
	PP5	Projects stay within budget limits	.848	
	PP8	Project's stakeholders are satisfied with the project's results	.843	
Organisational Culture Measurements	OCE1	Decisions are usually made at the level where the best information is available	.922	.921
	OCE2	Information is widely shared so that everyone can get the information he or she needs when it is needed	.907	
	OCT2	Teamwork is used to get work done	.904	
	OCC1	Authority is delegated so that people can act on their own	.904	
	OCC2	The capabilities of people are viewed as an important source of competitive advantage	.905	
	OCT3	Work is organized so that each person can see the relationship between his or her job and the goals of the organisation	.901	
Organisational Performance Measurements	OrP1	We are satisfied with our organisational results	.871	.903
	OrP2	We are satisfied with our organisational market share results	.876	
	OrP3	We are satisfied with our organisational profit/Profitability results	.878	
	OrP4	We are satisfied with our organisational employee satisfaction results	.910	
	OrP7	We are satisfied with our organisational opportunities development capability results	.875	

6.3. KMO and Bartlett test

Before conducting factor analysis test, two statistical tests are conducted. The first test, Kaiser-Meyer-Olkin (KMO), measures sampling accuracy, in order to indicate the proportion of variance of the variables that might be caused by underlying factors. High values close to 1.0 in the KMO test indicates that a factor analysis is useful for the data; however, if the value is less than 0.50, this indicates that the results of the factor analysis will not be very useful. The second test is to check the presence of correlations by Bartlett Test of Sphericity, which tests the hypothesis that the correlation matrix is an identity matrix; a small significance level of less

than 0.05 indicates that a factor analysis can be conducted (Field 2009; Morgan *et al.* 2004). The KMO and Bartlett test results are shown in table 6.5 below.

Table 6.5: Results of KMO and Bartlett tests

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.967**
Bartlett's Test of Sphericity	Approx. Chi-Square	19739.348
	df	1275
	Sig.	**.000**

Kaiser (1974) recommends accepting values greater than 0.5 as acceptable. Precisely, KMO values between 0.5 and 0.7 are good, between 0.7 and 0.8 are great, and above 0.8 are superb. In our case, the Kaiser-Meyer-Olkin measure of sampling adequacy value is 0.967, which is great result and the Bartlett's test of Sphericity p value is 0.000 which is < 0.001. Thus, both KMO and Bartlett tests have demonstrated that the factor analysis is appropriate for these data.

6.4. Common method variance (CMV): instrument bias

The data bias is tested using Harman's single factor source; in order to make sure that the total variance of one factor is not excessing 50%. If the loading exceeds the 50%, this means the variation of the response is caused by the instruments rather than the predisposition of the respondents, which means that the instrument is introducing bias that inflating or deflating the relationship between variables (Conway & Lance 2010; Podsakoff, MacKenzie & Podsakoff 2012).

By testing the initial eigenvalues greater with a score more than one, the first unrotated factor captured 56.43% of the variance in data. After Varimax rotation loaded factor captured only

17.26% of variance in data, as shown in table 6.6, and since it is not exceeded 50%, thus, this means that the used instrument does not produce bias.

Moreover, the result testing with the initial eigenvalues greater with a score more than one of exploratory factor analysis EFA via using principle component analysis PCA shown in figure 6.5 and table 6.6, displays that there are six principal components having a loading more than one from the extracted responses, and this is used to validate the underlying structure, which means that the rotational factor analysis with six components is the parsimonious model and can be used for future consideration.

In more details, this indicates how these measured are interconnected to each other and considered as a parsimonious model. Parsimonious factor or ratio is used to see the minimum number needed to explain the correct model. Where, a construct of two independent variables (primary variables) were sufficient to represent the all the four independent variables/measures (strategy, portfolio, program and project) diffusion practices. While, the construct of two mediators' variables (Performance's) independent variables were also sufficient to represent the all the four independent variables/measures performance of the levels of (strategy, portfolio, program and project) and they could be adequate to explain the influences.

However, the parsimonious model for this study, is not needed since the study needs to be done precisely for each four levels of the project-based organisations, and because the measurement scales for the independent and depended variables are adopted from existing surveys from other studies and they already reliable and valid scales based on those studies, as shown in the table 5.3 from chapter 5. Moreover, the four levels of the project-based organisations were based on critical analysis from literature reviews, international manuals, and international standards (e.g., PMI and APM). Furthermore, the study wants to establish the effect in a micro level not the macro level, means focusing on the larger picture and not only on limited items. Moreover,

practically speaking, the four levels is actually more implemented in the project-based organisations.

Table 6.6: Data total variance explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**28.783**	56.438	56.438	28.783	**56.438**	56.438	8.807	**17.269**	17.269
2	**2.118**	4.154	60.592	2.118	**4.154**	60.592	7.329	**14.370**	31.639
3	**1.799**	3.527	64.118	1.799	**3.527**	64.118	6.777	**13.288**	44.927
4	**1.705**	3.344	67.462	1.705	**3.344**	67.462	6.370	**12.490**	57.418
5	**1.193**	2.340	69.802	1.193	**2.340**	69.802	4.002	**7.847**	65.264
6	**1.020**	1.999	71.801	1.020	**1.999**	71.801	3.334	**6.537**	71.801
7	.961	1.884	73.686						
8	.814	1.595	75.281						
9	.763	1.497	76.778						
10	.666	1.305	78.083						
11	.647	1.269	79.352						
12	.610	1.196	80.547						
13	.598	1.173	81.721						
14	.560	1.097	82.818						
15	.529	1.037	83.855						
16	.480	.941	84.796						
17	.443	.869	85.665						
18	.439	.861	86.525						
19	.414	.811	87.337						
20	.400	.784	88.121						
21	.367	.719	88.840						
22	.361	.709	89.549						
23	.340	.666	90.215						
24	.332	.651	90.866						
25	.306	.600	91.466						
26	.299	.585	92.052						
27	.278	.545	92.596						
28	.267	.524	93.121						
29	.258	.507	93.627						
30	.240	.471	94.098						
31	.223	.437	94.536						
32	.212	.415	94.951						

33	.201	.393	95.344						
34	.195	.383	95.727						
35	.185	.362	96.089						
36	.178	.350	96.439						
37	.168	.329	96.768						
38	.162	.318	97.086						
39	.160	.314	97.400						
40	.151	.297	97.697						
41	.142	.279	97.976						
42	.137	.269	98.245						
43	.129	.253	98.498						
44	.123	.241	98.739						
45	.111	.219	98.957						
46	.106	.208	99.166						
47	.103	.202	99.368						
48	.089	.174	99.542						
49	.087	.170	99.712						
50	.077	.150	99.862						
51	.070	.138	100.000						

Extraction Method: Principal Component Analysis. And Rotation method Varimax

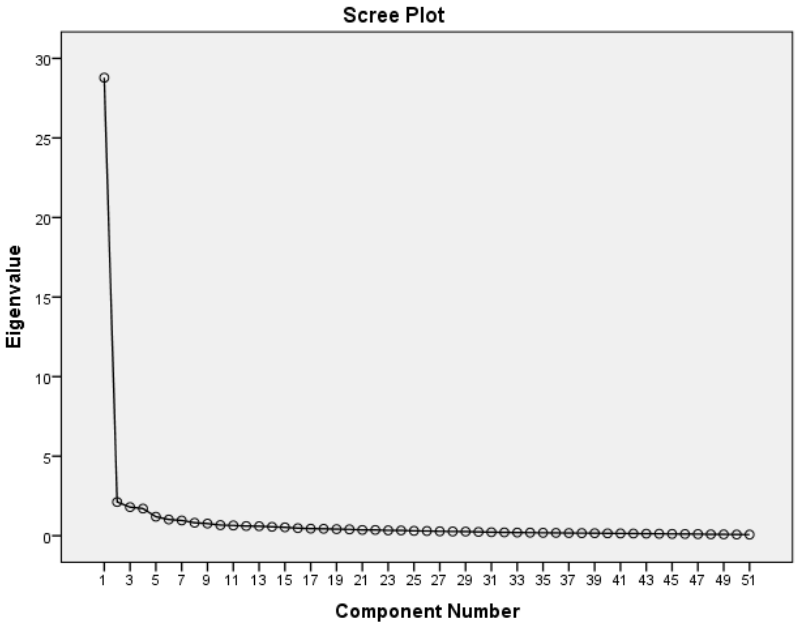


Figure 6.5: Scree plot for the eigenvalues

For the next tests, the Nomenclature are used for this research's variables and their transformations to create coding for SPSS ease of entry and tracking, as shown in table 6.7.

Table 6.7: Nomenclature for variables

Code	Variable
S_Prac_sum	Strategic initiative level
Po_Prac_sum	Portfolio initiative level
Pr_Prac_sum	Program initiative level
P_Prac_sum	Project initiative level
S_Perf_sum	Strategic performance level
Po_Perf_sum	Portfolio performance level
Pr_Perf_sum	Program performance level
P_Perf_sum	Project performance level
OC_sum	Organisational Culture
OP_sum	Organisational Performance
S_Prac_SR	Strategic initiative level Reflected Square Root
Po_Prac_SR	Portfolio initiative level Reflected Square Root
Pr_Prac_SR	Program initiative level Reflected Square Root
P_Prac_SR	Project initiative level Reflected Square Root
S_Perf_SR	Strategic performance level Reflected Square Root
Po_Perf_SR	Portfolio performance level Reflected Square Root
Pr_Perf_SR	Program performance level Reflected Square Root
P_Perf_SR	Project performance level Reflected Square Root
OC_SR	Organisational Culture Empowerment Reflected Square Root
OP_SR	Organisational Performance Reflected Square Root

6.5. Normality test for the independent and dependent variables

In testing the normality for the collated data (well-modelled by normal distribution) to be accepted for further investigation, the method used in this research is testing the skewness and kurtosis for the accepted interval should be between ±2.58 at 0.01 significance level or ±1.96 at 0.05 significance level, and any value beyond that will be considered non-normal Hair *et al.* (2010). The table 6.8 shows the testing results values for skewness and kurtosis and table 6.9 provides the Kolmogorov-Smirnova and Shapiro-Wilk tests results.

Table 6.8: Tests of normality (skewness and kurtosis)

Descriptive Statistics

	N	Maximum	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
S_Prac_sum	373	42.00	-2.349	.126	12.534	.252
Po_Prac_sum	373	35.00	-1.970	.126	10.079	.252
Pr_Prac_sum	373	42.00	-1.661	.126	6.335	.252
P_Prac_sum	373	56.00	-.987	.126	2.073	.252
S_Perf_sum	373	21.00	-1.313	.126	3.142	.252
Po_Perf_sum	373	28.00	-1.203	.126	2.321	.252
Pr_Perf_sum	372	21.00	-1.198	.126	2.522	.252
P_Perf_sum	373	35.00	-1.189	.126	2.669	.252
S_Effe_sum	373	63.00	-1.919	.126	9.490	.252
Po_Effe_sum	373	63.00	-1.556	.126	6.287	.252
Pr_Effe_sum	373	63.00	-1.575	.126	5.495	.252
P_Effe_sum	373	91.00	-.980	.126	2.276	.252
OC_sum	373	42.00	-1.754	.126	7.397	.252
OP_sum	373	35.00	-1.475	.126	4.022	.252
Valid N (listwise)	372					

Table 6.9: Tests of normality (Kolmogorov-Smirnova and Shapiro-Wilk)

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
S_Prac_sum	.183	373	.000	.786	373	.000
Po_Prac_sum	.159	373	.000	.819	373	.000
Pr_Prac_sum	.163	373	.000	.835	373	.000
P_Prac_sum	.143	373	.000	.868	373	.000
S_Perf_sum	.216	373	.000	.808	373	.000
Po_Perf_sum	.175	373	.000	.843	373	.000
Pr_Perf_sum	.227	372	.000	.816	372	.000
P_Perf_sum	.161	373	.000	.846	373	.000
S_Effe_sum	.147	373	.000	.829	373	.000
Po_Effe_sum	.135	373	.000	.858	373	.000
Pr_Effe_sum	.137	373	.000	.850	373	.000
P_Effe_sum	.127	373	.000	.881	373	.000
OC_sum	.171	373	.000	.827	373	.000
OP_sum	.229	373	.000	.794	373	.000

a. Lilliefors Significance Correction

All construct results normality are not accepted, as they all are violating the accepted range. As all variables are considered as non-normal leading to transform these data via accepted statistical processes to enhancing skewness and kurtosis values in order to fall into the accepted interval be between ±2.58 at 0.01 significance level or ±1.96 at 0.05 significance level. This process will take place in all variables in order to make sure that the data fall into the accepted interval of the skewness and kurtosis, and the Kolmogorov-Smirnova and Shapiro-Wilk, to be considered normal in the way to further test the correlation and regression.

6.6. Enhance the skewness and kurtosis for the collated data

There are many transformations methods like square root, log, inverse, which are used to improve the normality of the variables as “Data transformations are commonly-used tools that can serve many functions in quantitative analysis of data, including improving normality of distribution and equalizing variance to meet assumptions and improve effect sizes, thus constituting important aspects of data cleaning and preparing for your statistical analyses.” as stated by Osborne (2010). This process is also supported by Field (2013) to transform the data

to enhance the skewness and kurtosis. Based on that, to enhance the kurtosis of the EIO collated data to fall into the accepted interval be between ±2.58 at 0.01 significance level or ±1.96 at 0.05 significance level in order to be accepted with the defined interval.

The first step is to centralise and standardise each variable. The second step is to use the Reflected Square Root (RSR) process as all data produced a negative skewness that follows the RSR shape (Osborne 2010). This process starts with the centralised and standardised entries of all the identified variables by subtracting the variable from the maximum values added to one, and then, apply the square root. When the new data is developed, a new normality test takes place, and the result shows a significant enhancement that fall into the accepted interval range as shown in the tables 6.10 for the skewness and kurtosis values and table 6.11 for the Kolmogorov-Smirnova and Shapiro-Wilk values. These enhanced data will be coded as SR to indicate the usage of the reflected square root on the original data.

Table 6.10: Enhanced normality (skewness and kurtosis)

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
SPrac_S	373	.471	.126	.624	.252
PoPrac_S	373	.362	.126	.277	.252
PrPrac_S	373	.214	.126	.018	.252
PPrac_S	373	.037	.126	-.849	.252
SPerf_S	373	.453	.126	-.344	.252
PoPerf_S	373	.311	.126	-.493	.252
PrPerf_S	372	.403	.126	-.535	.252
PPerf_S	373	.235	.126	-.589	.252
SEffe_S	373	.256	.126	-.026	.252
PoEffe_S	373	.152	.126	-.283	.252
PrEffe_S	373	.159	.126	-.206	.252
PEffe_S	373	-.027	.126	-.887	.252
OC_SR	373	.298	.126	-.083	.252
OP_SR	373	.491	.126	-.497	.252
Valid N (listwise)	372				

Table 6.11: Enhanced normality (kolmogorov-smirnova and shapiro-wilk)

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SPrac_S	.164	373	.000	.885	373	.000
PoPrac_S	.175	373	.000	.891	373	.000
PrPrac_S	.187	373	.000	.895	373	.000
PPrac_S	.196	373	.000	.884	373	.000
SPerf_S	.245	373	.000	.840	373	.000
PoPerf_S	.201	373	.000	.878	373	.000
PrPerf_S	.254	372	.000	.838	372	.000
PPerf_S	.197	373	.000	.877	373	.000
SEffe_S	.145	373	.000	.905	373	.000
PoEffe_S	.145	373	.000	.914	373	.000
PrEffe_S	.149	373	.000	.909	373	.000
PEffe_S	.182	373	.000	.901	373	.000
OC_SR	.187	373	.000	.887	373	.000
OP_SR	.261	373	.000	.831	373	.000

a. Lilliefors Significance Correction

As per Kolmogorov-Smirnova and Shapiro-Wilk, tests we need p to be >0.05 for normal distribution in Kolmogorov-Smirnova and Shapiro-Wilk tests, but still here in both tests the results were $p < 0.001$, their histograms, normal Q-Q plots and boxplots show that the test results are approximately normal. Thus, these results are considered to be as approximately normally distributed for all variables of the data (Razali & Wah 2011). On the other hand, based on skewness and kurtosis tests, data construct normally is distributed. Therefore, the next step will be through furthering the analysis to discover the association between them (Doane & Seward 2011)

6.7. Outliers checking

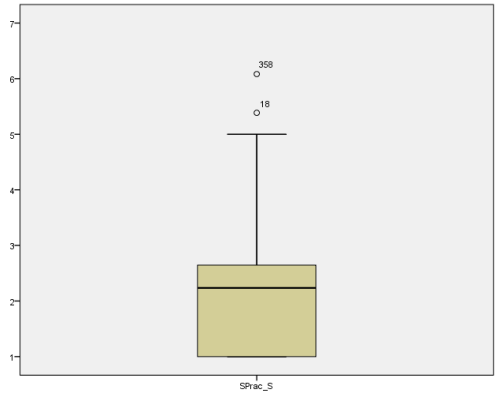
Hoaglin and Iglewicz (1987) from boxplots of the data collected the test detected two outliers, case number 18 and case number 358, where the outlier in SPSS represents the case number of the data/sample collected. Both detected outliers are identified as a circle symbol (o), which means they can be kept in the data set if required; as these two outliers may consider within a legitimate outlier range as well as they may not affect analyses heavily. Additionally, as per some studies like for (Hoaglin & Iglewicz 1987) if the outliers are shown as a star symbol

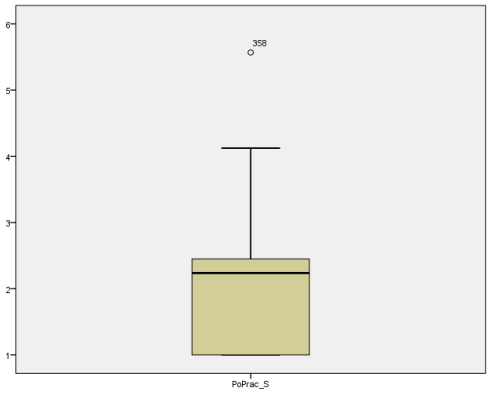
(*), this means these outliers as an extreme outlier, and in this situation, it must be removed from the data before undertaking further analyses.

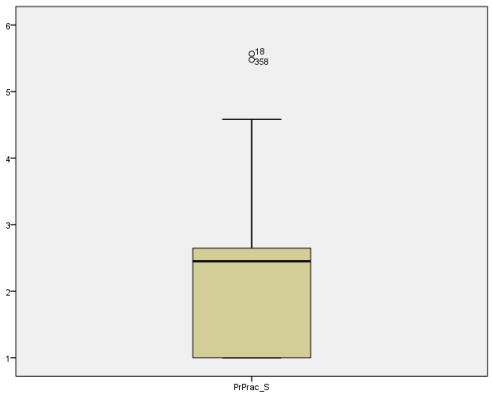
However, for this study analyses, the detected outliers' number 358 and number 18 are being removed, as they have been detected several times from more than one variable, and in order to gain more accuracy of this research analyses. Table 6.12 shows the variables outlier cases and their numbers. Figure 6.6 shows the outliers cases for all variables using boxplots.

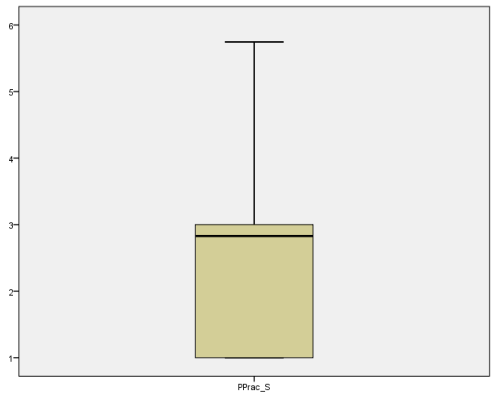
Table 6.12: Outlier cases for all variables

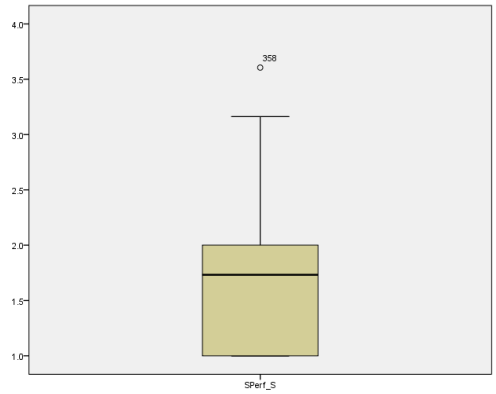
Variables	Outlier Cases No.
SPrac_SR	358 and 18
PoPrac_SR	358
PrPrac_SR	358 and 18
PPrac_SR	-
SPerf_SR	358
PoPerf_SR	358
PrPerf_SR	358
PPerf_SR	-
OC_SR	18
OP_SR	-

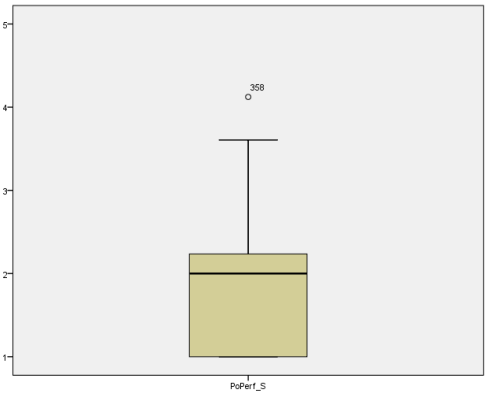

358
18
SPrac_S


358
PoPrac_S


18
358
PrPrac_S


PPrac_S


358
SPerf_S


358
PoPerf_S

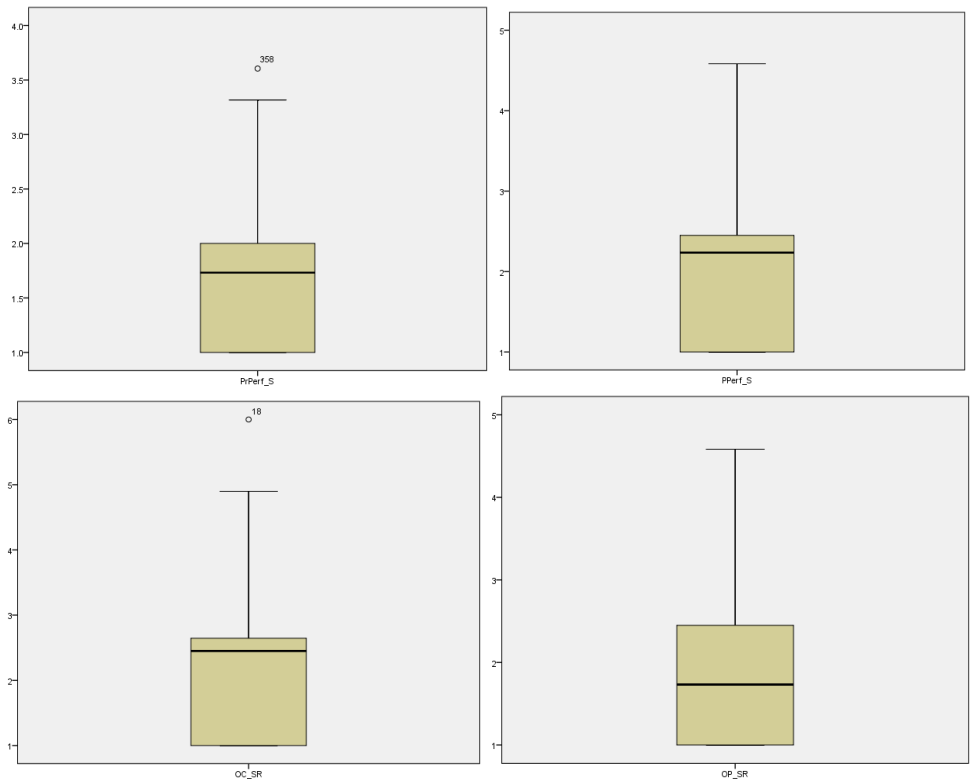


Figure 6.6: Outlier cases for all variables in boxplot

6.8. Frequencies analysis

In this section, there will be an overview of all variables as of a statistical outlook. Ten facets are defined for this study conceptual framework. As the main aim for this research is to investigate about the influence of the independent variables related to strategy diffusion (top-down) of strategy initiative diffusion practice S_PracSR, portfolio initiative diffusion practice Po_PracSR, program initiative diffusion practice Pr_PracSR, and project initiative diffusion practice P_PracSR on the dependent variable of organisational performance OPSR. Then, to investigate the influence of the independent variable related to performance reporting (bottom-up) of strategy performance S_PerfSR, portfolio performance Po_PerfSR, program performance Pr_PerfSR, project performance P_PerfSR; and organisational culture OCSR as mediators' part.

The bar charts shown below provide overall understandings on the frequencies of the survey responses for the 51 questions with the Likert scale of 7, where seven represented strongly agree and one represents strongly disagree. The highest frequencies answers are at a scale of 7 = strongly agree and 6 agree. This is a shred of strong evidence that there is a high level of consensus among the survey participants about the importance of publishing the strategy from top-down and its performance from a bottom-up in project-based organisations in the public sector. These results are still considered to be at an introductory phase till extra investigations will take place by comparing the variables means, standard deviations, and variances.

6.8.1. Frequencies for strategy diffusion (top-down) responses

In order to highlight the important indicators of strategy diffusion (top-down), this section will illustrate more about the practices of strategy diffusion from top of the organisation till the bottom line of the organisation, highlighting indicators within strategy level, portfolio level, program level, then to project level. The subjects are all asked to rate the likelihood of samples' feedbacks to strategy diffusion practices within all the four levels mentioned via using a Likert scale 1 for very strongly disagree, 2 for disagree, 3 for slightly disagree, 4 for undecided, 5 for slightly agree, 6 for agree, and 7 for strongly agree; thus, a higher mean indicates more agreeing response to strategy diffusion (top-down) within all the four levels in this scale.

6.8.1.1. Strategy initiative diffusion practice in strategy level

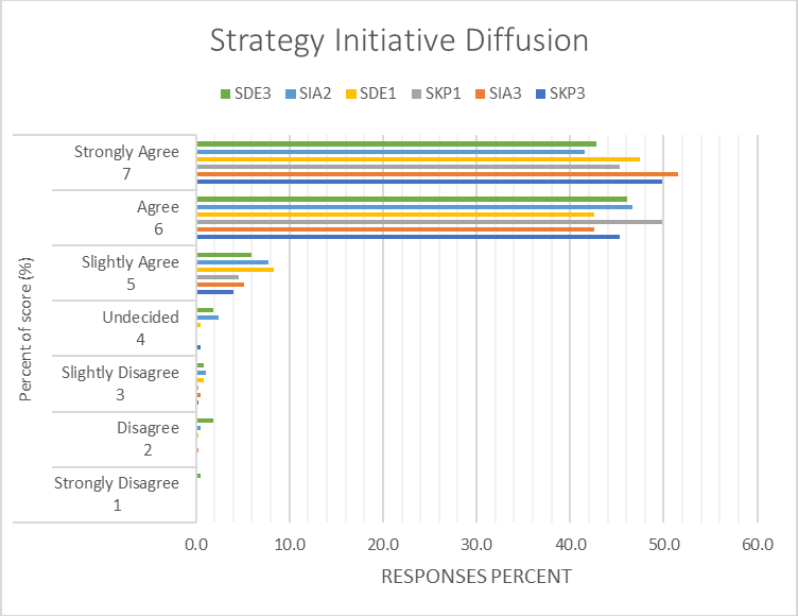


Figure 6.7: Strategy initiative diffusion practice frequencies

Based on the responses to strategy diffusion (top-down) in strategy level, and based on the list of six strategy initiative diffusion practices' items derived from the literature review, as presented in figure 6.7, table 6.13 and figure 6.8 for ranking, and results show that SKP3 and SIA3 are the top-ranked around 30% indicators.

SKP3 defined as "There is shared understanding of the organisational values/benefits of the strategic initiatives" is the strategy knowledge and persuasion practices item of the highest response where 99.2% of respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents slightly disagree. The mean reflects a score of 6.439 (rank=1) along with a low SD of 0.62 that is strongly indicating of the importance of this item.

Similarly, SAI3 defined as "Key performance indicators are set for the strategic initiatives deployment" is the strategy implementation and adaptation practices item of the highest response where 99.2% of respondents strongly agree, agree, and slightly agree, while only 0.8% of the 373 respondents disagree and slightly disagree. The mean reflects a score of 6.437

(rank=2) along with a low SD of 0.68, which is strongly indicative of the importance of this item.

Table 6.13: Descriptive analysis of strategy initiative diffusion practice items

Code	Strategy initiatives diffusion Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
SKP3	There is shared understanding of the organizational values/benefits of the strategic initiatives	0.0	0.0	.3	.5	4.0	45.3	49.9	6.439	0.6268	0.3929	1
SIA3	Key performance indicators are set for the strategic initiatives' deployment	0.0	.3	.5	0.0	5.1	42.6	51.5	6.437	0.6843	0.4683	2
SKP1	There is shared understanding of the business drivers behind the strategic initiatives	0.0	0.0	.3	0.0	4.6	49.9	45.3	6.399	0.6039	0.3648	3
SDE1	Strategic initiatives' decisions are based on analysing data	0.0	.3	.8	.5	8.4	42.6	47.4	6.345	0.7602	0.5779	4
SIA2	Strategic initiatives' risks are communicated	0.0	.5	1.1	2.4	7.8	46.6	41.5	6.235	0.8488	0.7205	5
SDE3	Strategic initiatives are assessed against organizational values	.5	1.9	.8	1.9	5.9	46.1	42.9	6.205	1.0167	1.0336	6

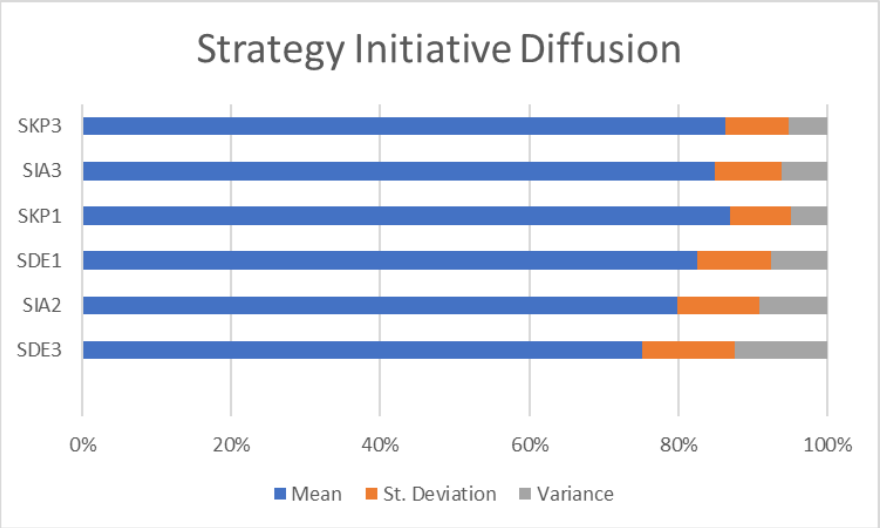


Figure 6.8: Frequency summary of strategy initiative diffusion practice items

6.8.1.2. Portfolio initiative diffusion practice in portfolio level

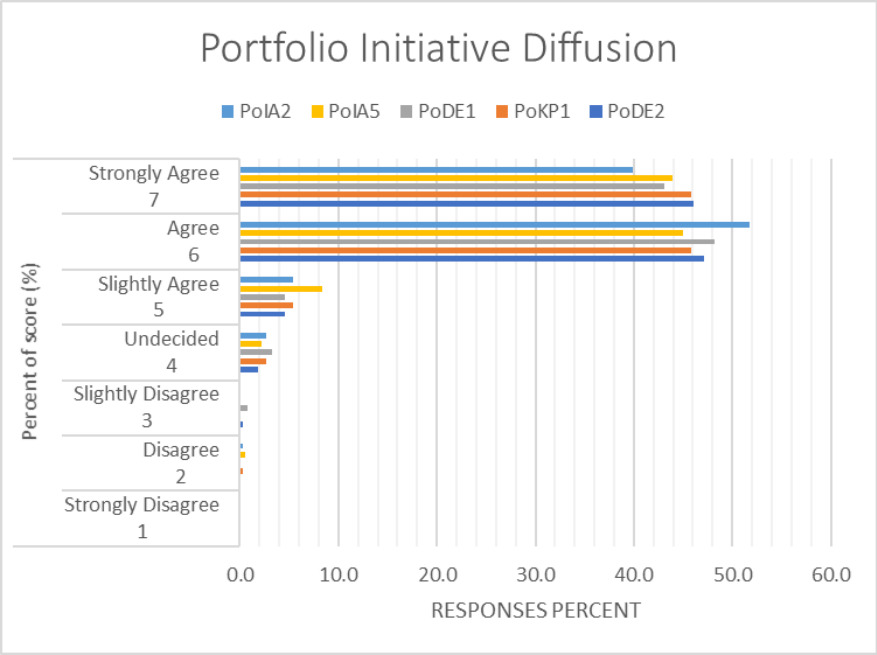


Figure 6.9: Portfolio initiative diffusion practice frequencies

Based on the responses to strategy diffusion (top-down) in portfolio level, and based on the list of five portfolio initiative diffusion practices' items derived from the literature review, as presented in figure 6.9, table 6.14 and figure 6.10 for ranking, and the results show that PoDE2 and PoKP1 are the top-ranked around 40% indicators.

PoDE2 identified as "Risk management plan is a set for portfolio of project deployment" is the portfolio decision and evaluation practices item of the highest response where 97.9% of respondents who strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents slightly disagree. The mean reflects a score of 6.369 (rank=1) along with a low SD of 0.68, which is strongly indicative of the importance of this item.

Similarly, PoKP1 identified as "There is shared understanding that the portfolio of projects is translated from strategic initiatives" is the portfolio knowledge and persuasion practices item of the highest response where 97% of respondents strongly agree, agree, and slightly agree,

while only 0.3% of the 373 respondents disagree. The mean reflects a score of 6.340 (rank=2) along with a low SD of 0.64, which is strongly indicative of the importance of this item.

Table 6.14: Descriptive analysis of portfolio initiative diffusion practice items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PoDE2	Risk management plan is set for portfolio of project deployment	0.0	0.0	.3	1.9	4.6	47.2	46.1	6.369	0.687	0.471	1
PoKP1	There is shared understanding that the portfolio of projects is translated from strategic initiatives	0.0	.3	0.0	2.7	5.4	45.8	45.8	6.340	0.741	0.549	2
PoDE1	During the portfolio deployment portfolio of project charters are approved	0.0	0.0	.8	3.2	4.6	48.2	43.1	6.296	0.770	0.593	3
PoIA5	Project types are selected based on suitability to the market's needs	0.0	.5	0.0	2.2	8.4	45.0	43.9	6.291	0.783	0.612	4
PoIA2	Portfolio formation analysis helps to confirm new investment needs	0.0	.3	0.0	2.7	5.4	51.8	39.9	6.280	0.726	0.527	5

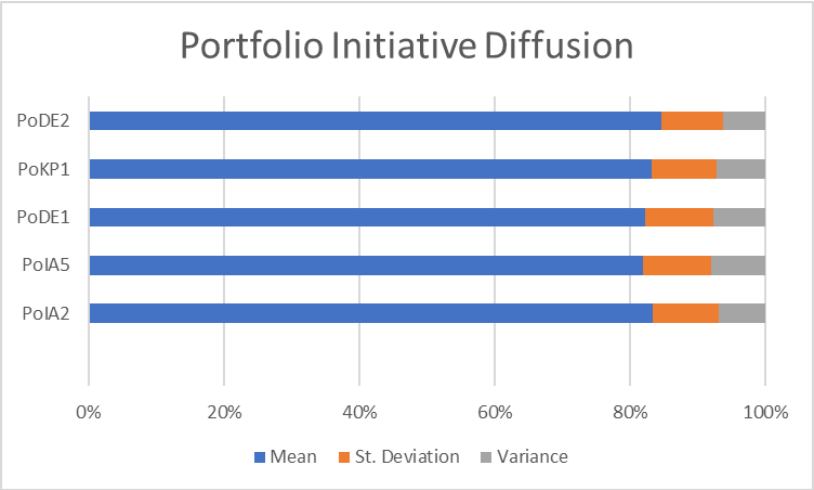


Figure 6.10: Frequency summary of portfolio initiative diffusion practice items

6.8.1.3. Program initiative diffusion practice in program level

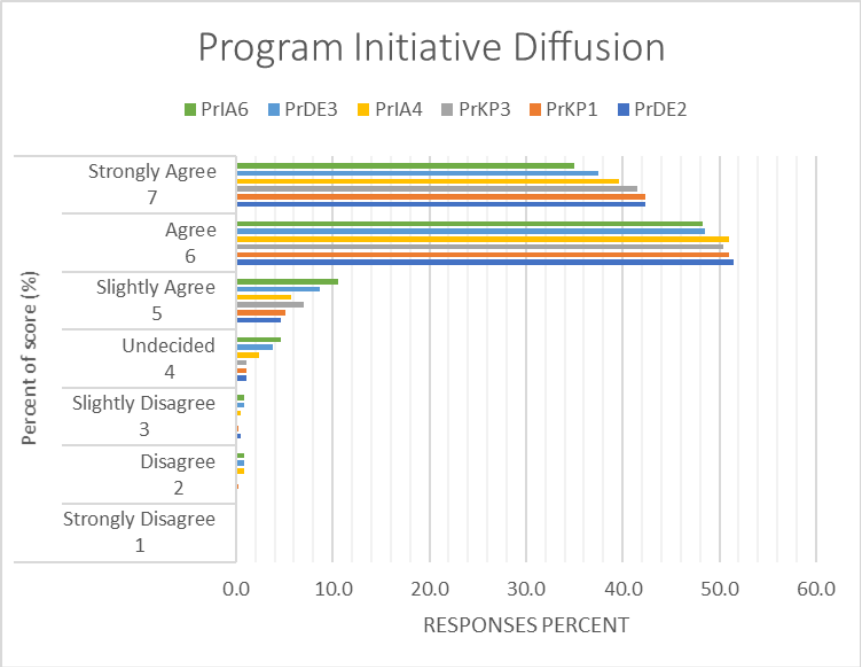


Figure 6.11 Program initiative diffusion practice frequencies

Based on the responses to strategy diffusion (top-down) in program level, and as per the list of six program initiative diffusion practices' items derived from the literature review, as presented in figure 6.11, table 6.15, and figure 6.12 for ranking, and the results show that PrDE2 and PrKP1 are the top-ranked around 30% indicators.

PrDE2 identified as "Projects are selected within the program on the basis of organisational strategy" is the program decision and evaluation practices item of the highest response where 98.4% of respondents strongly agree, agree, and slightly agree, while only 0.5% of the 373 respondents slightly disagree. The mean reflects a score of 6.340 (rank=1) along with a low SD of 0.66, which is strongly indicative of the importance of this item.

Similarly, PrKP1 identified as "There is a shared understanding of programs' expected benefits" is the program knowledge and persuasion practices item of the highest response where 98.3% of respondents strongly agree, agree, and slightly agree, while only 0.6% of the

373 respondents disagree and slightly disagree. The mean reflects a score of 6.332 (rank=2) along with a low SD of 0.69, which is strongly indicative of the importance of this item.

Table 6.15: Descriptive analysis of program initiative diffusion practice items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PrDE2	Projects are selected within the program on the basis of organizational strategy	0.0	0.0	.5	1.1	4.6	51.5	42.3	6.340	0.668	0.447	1
PrKP1	There is shared understanding of programs' expected benefits	0.0	.3	.3	1.1	5.1	50.9	42.3	6.332	0.690	0.476	2
PrKP3	There is shared understanding of programs' stakeholder roles/responsibilities	0.0	0.0	0.0	1.1	7.0	50.4	41.5	6.323	0.652	0.425	3
PrIA4	Program's resources are planned during their deployment	0.0	.8	.5	2.4	5.7	50.9	39.6	6.243	0.819	0.671	4
PrDE3	Program decision making is supported by intelligent data analysis	0.0	.8	.8	3.8	8.6	48.5	37.5	6.156	0.890	0.792	5
PrIA6	At the stage of program's deployment plans that embrace change are created	0.0	.8	.8	4.6	10.5	48.2	35.0	6.097	0.913	0.834	6

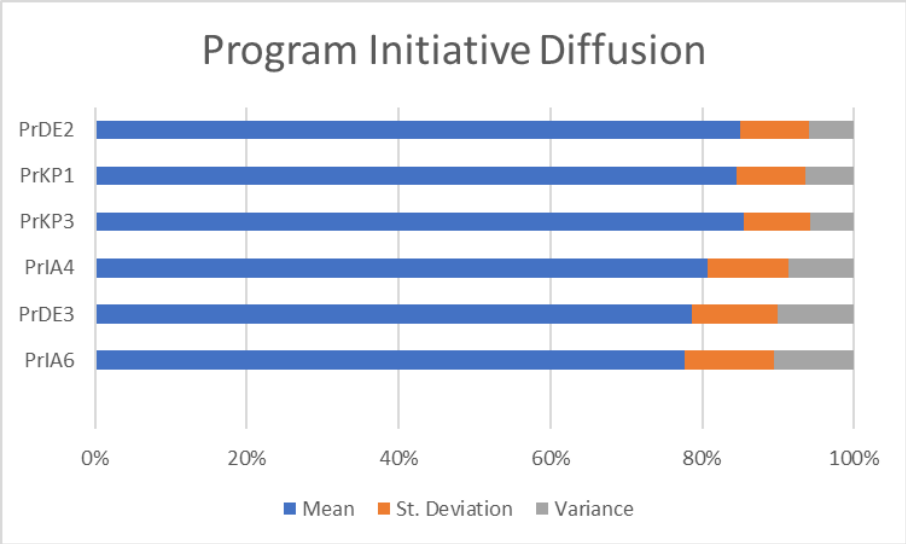


Figure 6.12: Frequency summary of program initiative diffusion practice items

6.8.1.4. Project initiative diffusion practice in project level

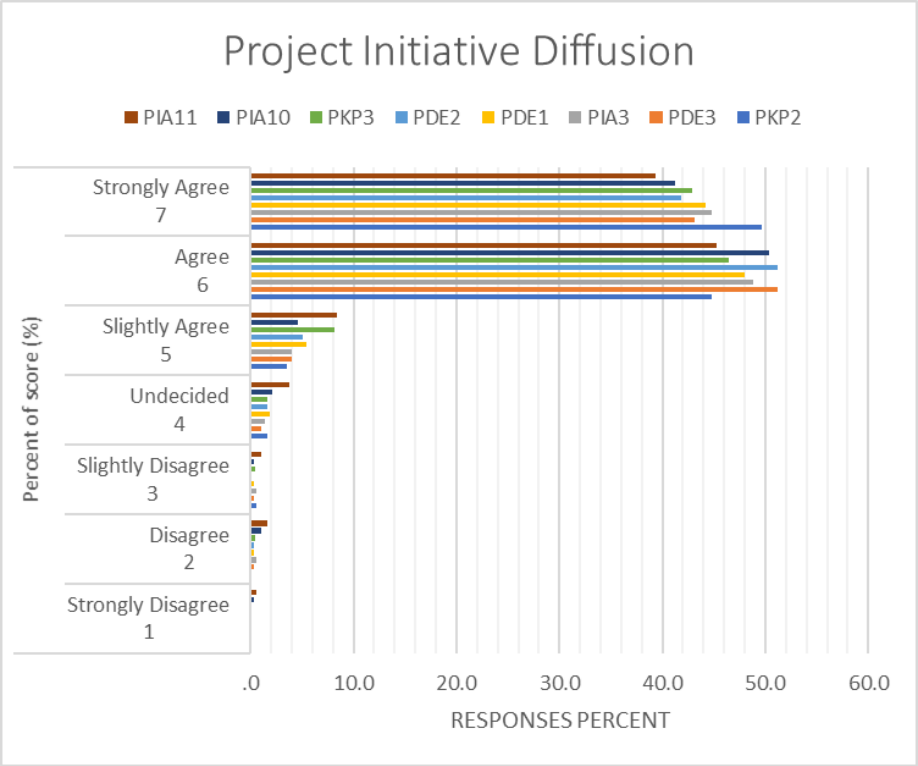


Figure 6.13: Project initiative diffusion practice frequencies

Based on the responses to strategy diffusion (top-down) in project level, and as per the list of eight project initiative diffusion practices' items derived from the literature review, as presented in figure 6.13, table 6.16 and figure 6.14 for ranking, and the results show that PKP2 and PDE3 are the top-ranked around 25% indicators.

PKP2 identified as "There is shared understanding of project constraints (time, cost, quality and scope)" is the project knowledge and persuasion practices item of the highest response where 97.8% of respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents slightly disagree. The mean reflects a score of 6.412 (rank=1) along with a low SD of 0.69, which is strongly indicative of the importance of this item.

Similarly, PDE3 identified as "Project's decisions are communicated to the relevant stakeholders" is the project decision and evaluation practices item of the highest response

where 98.3% of respondents strongly agree, agree, and slightly agree, while only 0.6% of the 373 respondents disagree and slightly disagree. The mean reflects a score of 6.350 (rank=2) along with a low SD of 0.67, which is strongly indicative of the importance of this item.

Table 6.16: Descriptive analysis of project initiative diffusion practice items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PKP2	There is shared understanding of project constraints (time, cost, quality and scope)	.0	0.0	.5	1.6	3.5	44.7	49.6	6.412	0.690	0.475	1
PDE3	Project's decisions are communicated to the relevant stakeholders	0.0	.3	.3	1.1	4.0	51.2	43.1	6.350	0.679	0.461	2
PIA3	Project cost is monitored-controlled against project budget plan	0.0	.5	.5	1.3	4.0	48.8	44.7	6.342	0.749	0.561	3
PDE1	Project's constraints (time, cost, quality and scope) are evaluated based on project information	0.0	.3	.3	1.9	5.4	48.0	44.2	6.332	0.728	0.530	4
PDE2	Project's constraints are evaluated based on predefined methods and rules	0.0	.3	0.0	1.6	5.1	51.2	41.8	6.323	0.688	0.473	5
PKP3	There is shared understanding of project risks	0.0	0.5	0.5	1.6	8.1	46.4	42.9	6.278	0.796	0.634	6
PIA10	Projects stakeholder engagement is managed against stakeholder plan	.3	1.1	.3	2.2	4.6	50.4	41.2	6.259	0.862	0.744	7
PIA11	Projects change is monitored-controlled against change plan	.5	1.6	1.1	3.8	8.4	45.3	39.4	6.111	1.053	1.109	8

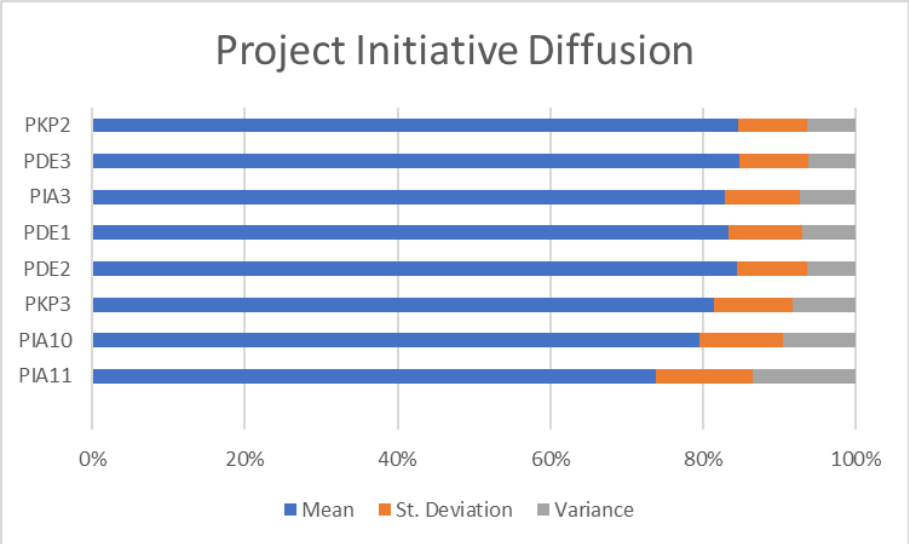


Figure 6.14: Frequency summary of project initiative diffusion practice items

6.8.2. Frequencies for performance (bottom-up) responses

In order to highlight the important indicators of performance reporting (bottom-up) this section will illustrate more about the results of performance reporting from the bottom of the organisation till the top of the organisation, highlighting indicators within project level, program level, portfolio level, then to strategy level. The subjects are all asked to rate the likelihood of samples' feedbacks to performance reporting within all the four levels mentioned via using a Likert scale 1 for very strongly disagree, 2 for disagree, 3 for slightly disagree, 4 for undecided, 5 for slightly agree, 6 for agree, and 7 for strongly agree; thus, a higher mean indicates more agreeing response to Performance reporting (bottom-up) within all the four levels in this scale.

6.8.2.1. Strategy performance

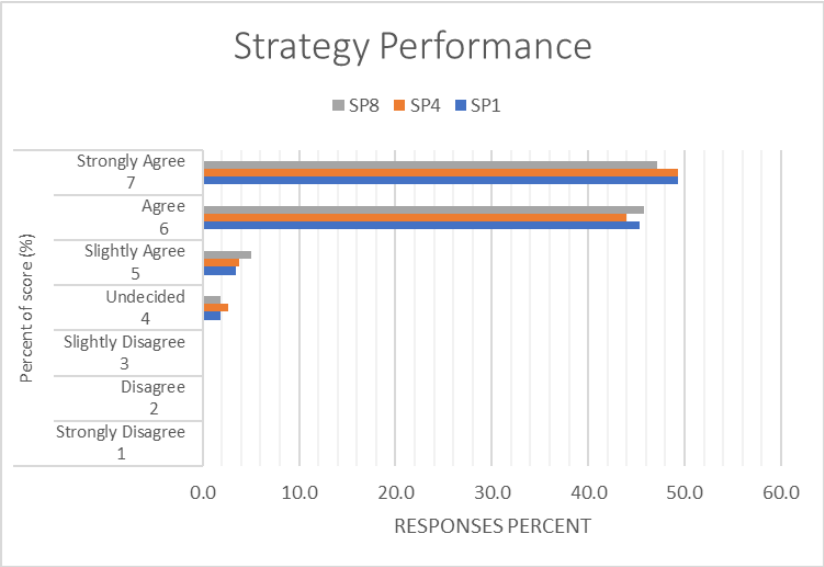


Figure 6.15: Strategy performance frequencies

Based on the responses to strategy performance (bottom-up) in strategy level, and as per the list of three strategy performance items derived from the literature review, as presented in

figure 6.15, table 6.17 and figure 6.16 for ranking, and the results show that SP1 is the top-ranked indicator.

SP1 identified as “Strategic initiatives meet their stakeholder satisfaction expectations” is the strategy performance item linked to stakeholder satisfaction rating element of the highest response where 98.1% of respondents strongly agree, agree, and slightly agree, while none of the 373 respondents consider it as strongly disagreeing, disagreeing, or slightly disagreeing to happen. The mean reflects a score of 6.420 (rank=1) along with a low SD of 0.65, which is strongly indicative of the importance of this item.

Similarly, SP4 identified as “Strategic initiatives meet their revenue expectations” is the strategy performance item linked to revenue’s expectations rating element of the highest response where 97% of respondents strongly agree, agree, and slightly agree, while none of the 373 respondents consider it as strongly disagreeing, disagreeing, or slightly disagree to happen. The mean reflects a score of 6.403 (rank=2) along with a low SD of 0.69, which is strongly indicative of the importance of this item.

Table 6.17: Descriptive analysis of strategy performance items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
SP1	Strategic initiatives meet their stakeholder satisfaction expectations	0.0	0.0	0.0	1.9	3.5	45.3	49.3	6.420	0.654	0.428	1
SP4	Strategic initiatives meet their revenue expectations	0.0	0.0	0.0	2.7	3.8	43.9	49.3	6.403	0.693	0.480	2
SP8	Strategic initiatives adapt to their environmental conditions	0.0	0.0	0.0	1.9	5.1	45.8	47.2	6.383	0.673	0.453	3

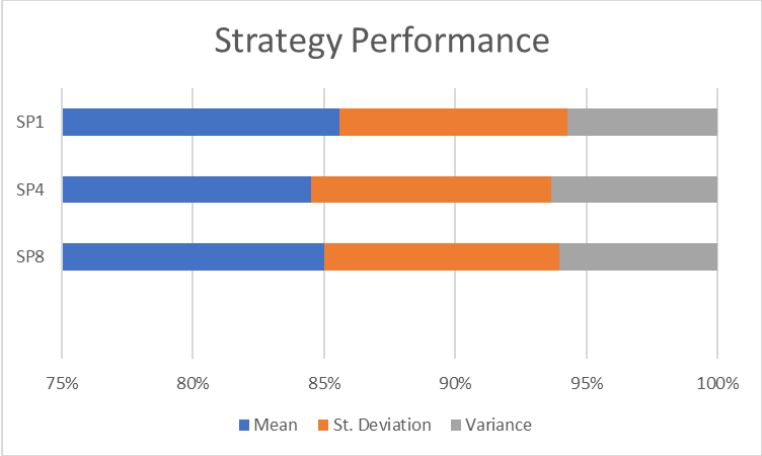


Figure 6.16: Frequency summary of strategy performance items

6.8.2.2. Portfolio performance

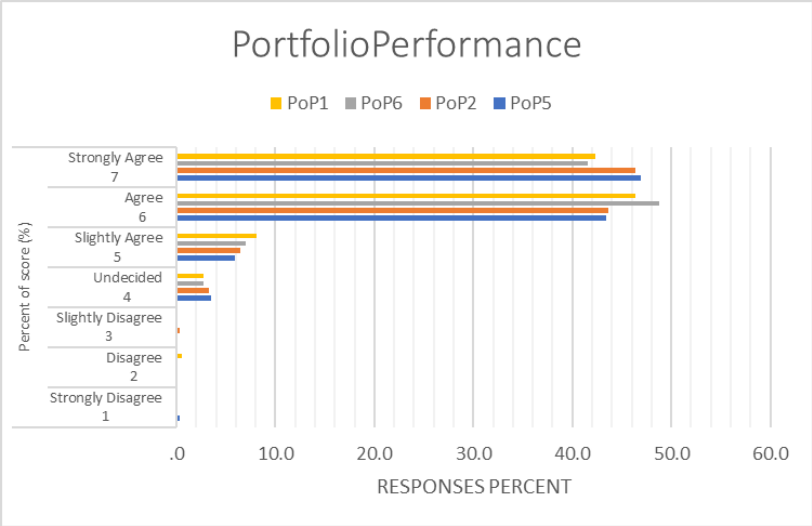


Figure 6.17: Portfolio performance frequencies

Based on the responses to Portfolio performance (bottom-up) in portfolio level, and as per the list of four portfolio performance items derived from the literature review, as presented in figure 6.17, table 6.18 and figure 6.18 for ranking, and the results show that PoP2 is the top-ranked indicator.

PoP2 identified as "portfolio contains high-value projects" is the portfolio performance item linked to high-value projects within portfolio element of the highest response where 96.6% of

respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents slightly disagree. The mean reflects a score of 6.326 (rank=1) along with a low SD of 0, which is strongly indicative of the importance of this item.

Similarly, PoP5 identified as "the budget allocation between projects in the portfolio reflects the business strategy" is the portfolio performance item linked to portfolio budget allocation element of the highest response where 96.2% of respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents strongly disagree. The mean reflects a score of 6.326 (rank=2) along with a low SD of 0.794, which is strongly indicative of the importance of this item.

Table 6.18: Descriptive analysis of portfolio performance items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PoP2	Portfolio contains high-value projects	0.0	0.0	.3	3.2	6.5	43.7	46.4	6.326	0.760	0.577	1
PoP5	The budget allocation between projects in the portfolio reflects the business strategy	.3	0.0	0.0	3.5	5.9	43.4	46.9	6.326	0.794	0.631	2
PoP6	Portfolio leads to a high stakeholder satisfaction	0.0	0.0	0.0	2.7	7.0	48.8	41.5	6.291	0.714	0.510	3
PoP1	Portfolio has the right number of projects for the resources available	0.0	.5	0.0	2.7	8.1	46.4	42.3	6.267	0.793	0.629	4

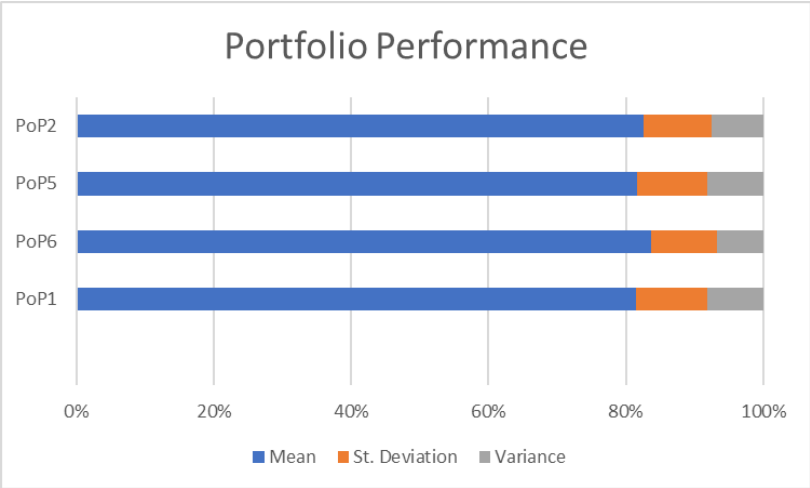


Figure 6.18 Frequency summary of portfolio performance items

6.8.2.3. Program performance

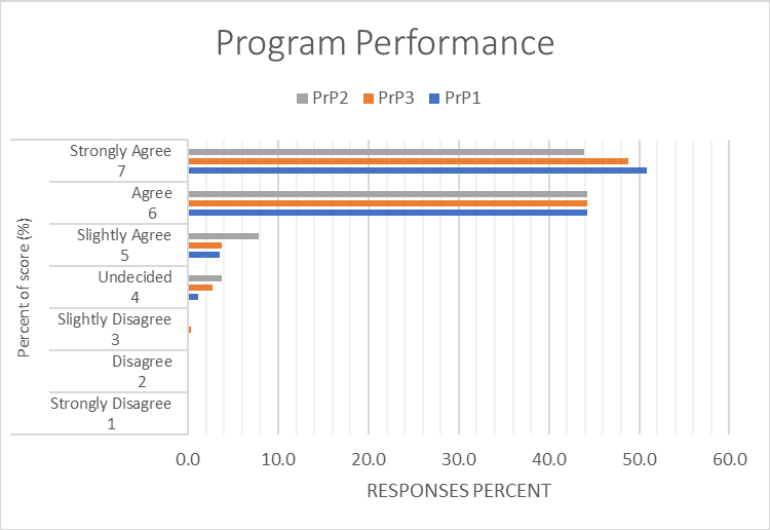


Figure 6.19: Program performance frequencies

Based on the responses to program performance (bottom-up) in program level, and according to the list of three program performance items derived from the literature review, as presented in figure 6.19, table 6.19 and figure 6.20 for ranking, and the results show that PrP1 is the top-ranked indicator.

PrP1 identified as "Programs implementation reflect the business strategy" is the program performance item linked to implementation the business strategy in program level element of the highest response where 98.6% of respondents strongly agree, agree, and slightly agree, while none of the 373 respondents strongly disagree, disagree, or slightly disagree. The mean reflects a score of 6.45 (rank=1) along with a low SD of 0.62, which is strongly indicative of the importance of this item.

Similarly, PrP3 identified as "Programs achieve cost-benefits objectives" is the program performance item link to cost-benefits objectives element of the highest response where 96.8% of respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373

respondents slightly disagree. The mean reflects a score of 6.39 (rank=2) along with a low SD of 0.714, which is strongly indicative of the importance of this item.

Table 6.19: Descriptive analysis of program performance items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PrP1	Program's implementation reflects the business strategy	0.0	0.0	0.0	1.1	3.5	44.2	50.9	6.45	.620	.384	1
PrP3	Programs achieve cost-benefits objectives	0.0	0.0	.3	2.7	3.8	44.2	48.8	6.39	.714	.509	2
PrP2	Program's impact exceeds stakeholder expectations	0.0	0.0	0.0	3.8	7.8	44.2	43.9	6.29	.768	.590	3

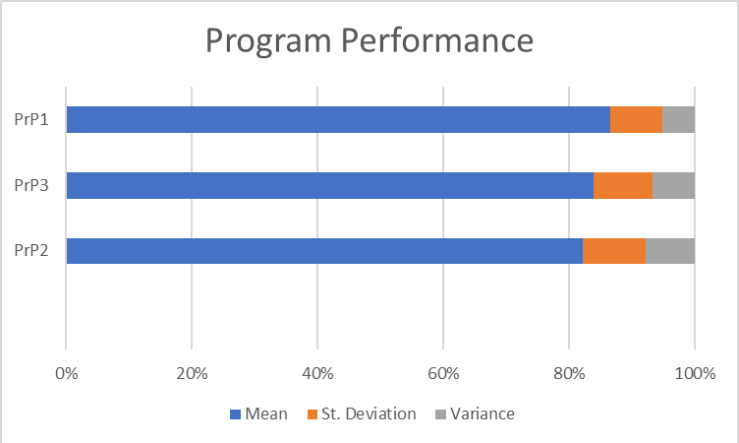


Figure 6.20: Frequency summary of program performance items

6.8.2.4. Project performance

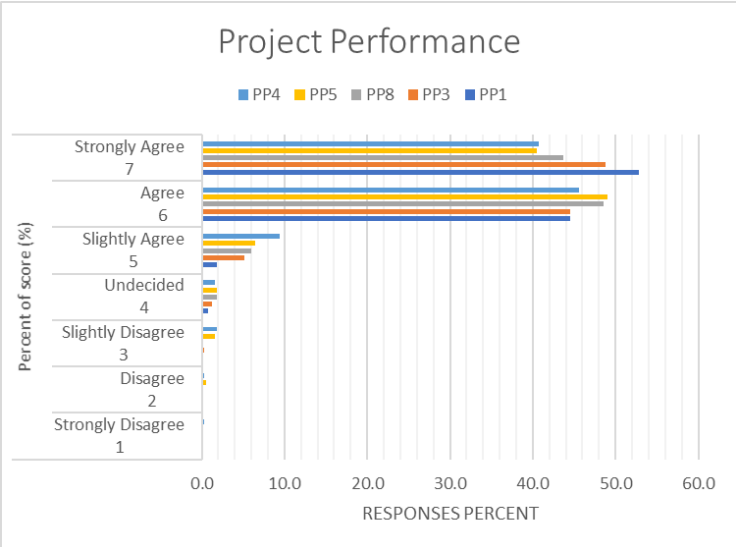


Figure 6.21: Project performance frequencies

Based on the responses to project performance (bottom-up) in project level, and according to the list of five project performance items derived from the literature review, as presented in figure 6.21, table 6.20 and figure 6.22 for ranking, and the results show that PP1 and PP3 are the top-ranked around 40% indicators.

PP1 identified as “Projects meeting their business purposes” is the project performance item linked to business purposes element of the highest response where 99.2% of respondents strongly agree, agree, and slightly agree, while none of the 373 respondents strongly disagree, disagree, or slightly disagree. The mean reflects a score of 6.49 (rank=1) along with a low SD of 0.581, which is strongly indicative of the importance of this item.

Similarly, PP3 identified as “Projects meeting their technical performance goals” is the project performance item linked to technical performance element of the highest response where 98.4% of respondents strongly agree, agree, and slightly agree, while only 0.3% of the 373 respondents slightly disagree. The mean reflects a score of 6.40 (rank=2) along with a low SD of 0.676, which is strongly indicating of the importance of this item.

Table 6.20: Descriptive analysis of project performance items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
PP1	Projects meet their business purposes	0.0	.0	0.0	.8	1.9	44.5	52.8	6.49	.581	.337	1
PP3	Projects meet their technical performance goals	0.0	.0	0.3	1.3	5.1	44.5	48.8	6.40	.676	.457	2
PP8	Project's stakeholders are satisfied with the project's results	.0	0.0	0.0	1.9	5.9	48.5	43.7	6.34	.676	.457	3
PP5	Projects stay within budget limits	0.0	.5	1.6	1.9	6.5	49.1	40.4	6.23	.851	.724	4
PP4	Projects meet their schedule objectives	.3	.3	1.9	1.6	9.4	45.6	40.7	6.20	.900	.811	5

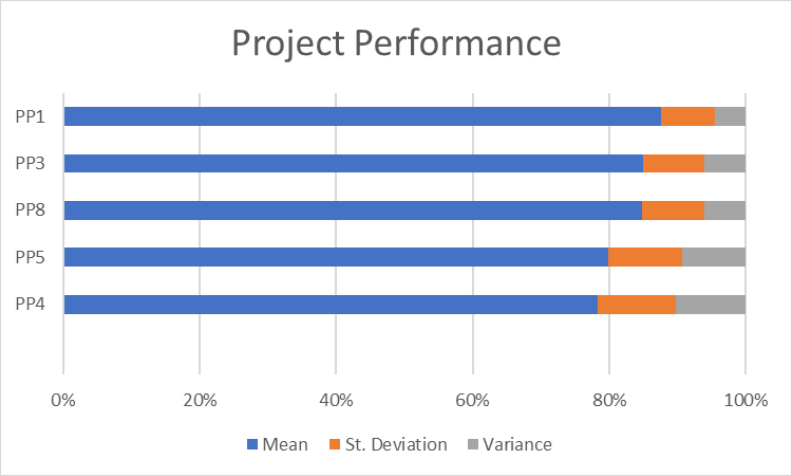


Figure 6.22: Frequency summary of project performance items

6.8.3. Organisational culture

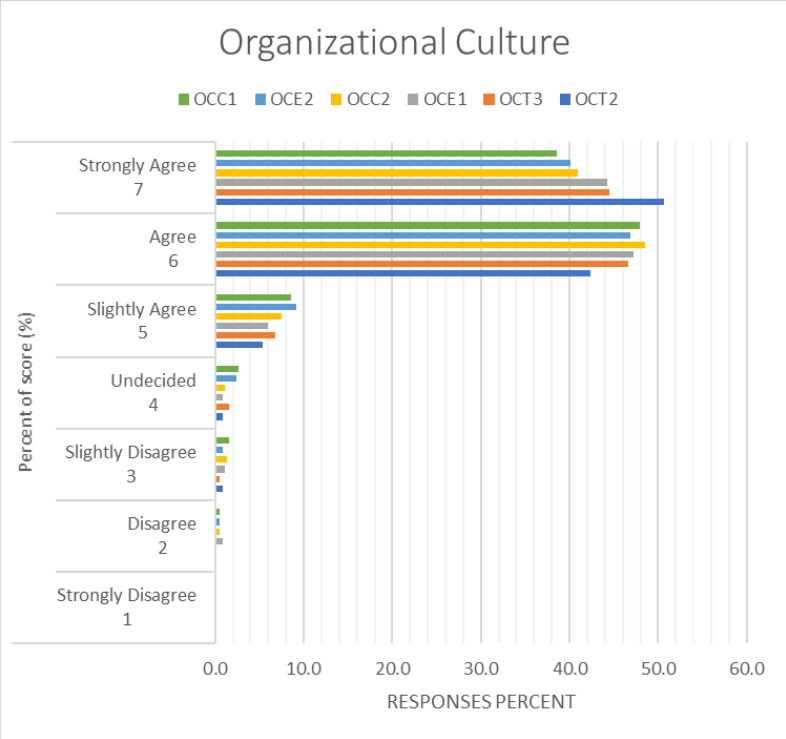


Figure 6.23: Organisational culture frequencies

Based on the responses to Organisational Culture, and based on the list of six organisational culture items derived from the literature review, as presented in figure 6.23, table 6.21 and figure 6.24 for ranking, and the results show that OCT2 and OCT3 are the top-ranked around 30% indicators.

OCT2 identified as “Teamwork is used to get work done” is the organisational culture item linked to teamwork element of the highest response where 98.4% of respondents strongly agree, agree, and slightly agree, while 0.8% of the 373 respondents slightly disagree. The mean reflects a score of 6.41 (rank=1) along with a low SD of 0.705, which is strongly indicative of the importance of this item.

Similarly, OCT3 identified as “Work is organized so that each person can see the relationship between his or her job and goals of the organisation” is the organisational culture item linked to teamwork element of the highest response where 97.8% of respondents strongly agree, agree, and slightly agree, while only 0.5% of the 373 respondents slightly disagree. The mean reflects a score of 6.33 (rank=2) along with a low SD of 0.720m which is strongly indicative of the importance of this item.

Table 6.21: Descriptive analysis of organisational culture items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
OCT2	Teamwork is used to get work done	0.0	0.0	.8	.8	5.4	42.3	50.7	6.41	.705	.497	1
OCT3	Work is organized so that each person can see the relationship between his or her job and the goals of the organization	0.0	0.0	.5	1.6	6.7	46.6	44.5	6.33	.720	.519	2
OCE1	Decisions are usually made at the level where the best information is available	0.0	.8	1.1	.8	5.9	47.2	44.2	6.30	.819	.671	3
OCC2	The capabilities of people are viewed as an important source of competitive advantage	0.0	.5	1.3	1.1	7.5	48.5	41.0	6.25	.821	.675	4
OCE2	Information is widely shared so that everyone can get the information he or she needs when it is needed	0.0	.5	.8	2.4	9.2	46.9	40.2	6.22	.839	.705	5
OCC1	Authority is delegated so that people can act on their own	0.0	.5	1.6	2.7	8.6	48.0	38.5	6.18	.885	.783	6

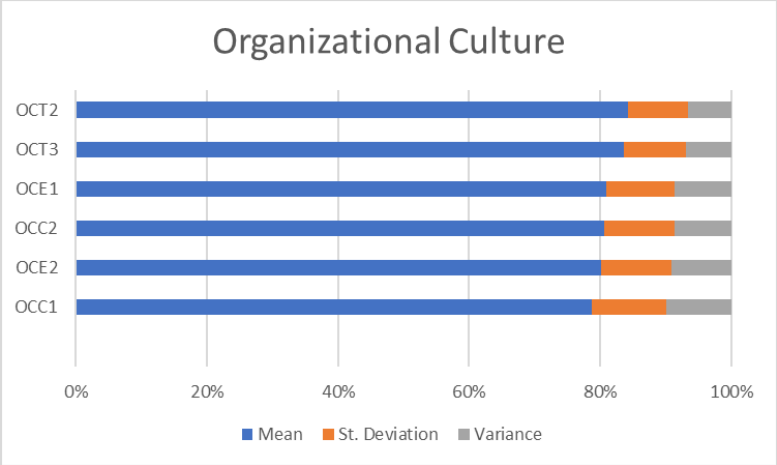


Figure 6.24: Frequency summary of organisational culture items

6.8.4. Organisational performance

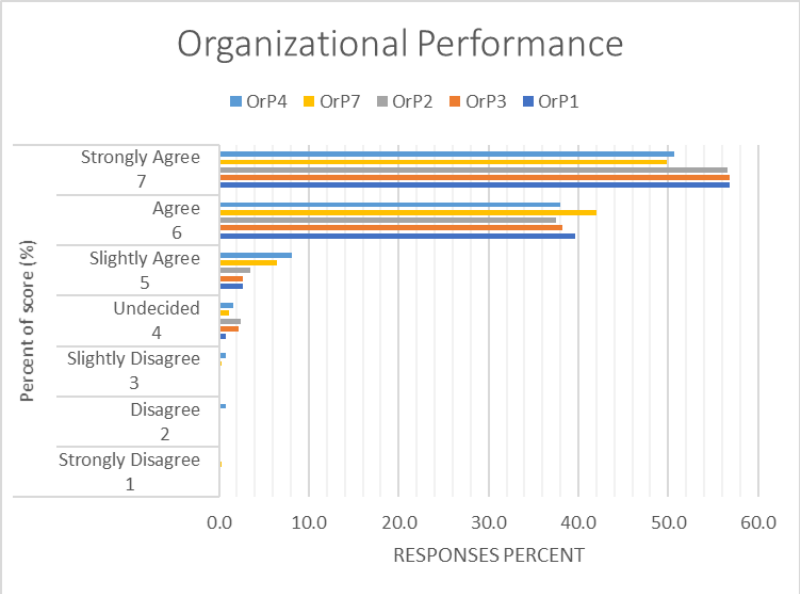


Figure 6.25: Organisational performance frequencies

Based on the responses to Organisational Culture, and according to the list of five organisational performance items derived from the literature review, as presented in figure 6.25, table 6.22 and figure 6.26 for ranking, and the results show that OrP1 and OrP3 are the top-ranked around 40% indicators.

OrP1 identified as “We are satisfied with our organisational results” is the organisational performance item linked to overall organisational results element of the highest response where 99.2% of respondents strongly agree, agree, and slightly agree, while none of the 373 respondents strongly disagree, disagree, or slightly disagree. The mean reflects a score of 6.53 (rank=1) along with a low SD of 0.594, which is strongly indicative of the importance of this item.

Similarly, OrP3 identified as “We are satisfied with our organisational profit/profitability results” is the organisational performance item linked to organisational profit results element of the highest response where 97.9% of respondents agree, agree, and slightly agree , while none of the 373 respondents strongly disagree, disagree, or slightly disagree. The mean reflects a score of 6.50 (rank=2) along with a low SD of 0.6599, which is strongly indicative of the importance of this item.

Table 6.22: Descriptive analysis of organisational performance items

Code	Items	Percent of score (%)							Mean	St. Deviation	Variance	Rank
		Strongly Disagree 1	Disagree 2	Slightly Disagree 3	Undecided 4	Slightly Agree 5	Agree 6	Strongly Agree 7				
OrP1	We are satisfied with our organizational results	0.0	0.0	0.0	.8	2.7	39.6	56.9	6.53	.594	.353	1
OrP3	We are satisfied with our organizational profit/Profitability results	0.0	0.0	0.0	2.2	2.7	38.3	56.9	6.50	.659	.434	2
OrP2	We are satisfied with our organizational market share results	0.0	0.0	0.0	2.4	3.5	37.5	56.6	6.48	.683	.467	3
OrP7	We are satisfied with our organizational opportunities development capability results	.3	0.0	.3	1.1	6.5	42.0	49.9	6.39	.739	.547	4
OrP4	We are satisfied with our organizational employee satisfaction results	0.0	.8	.8	1.6	8.1	38.0	50.7	6.34	.862	.743	5

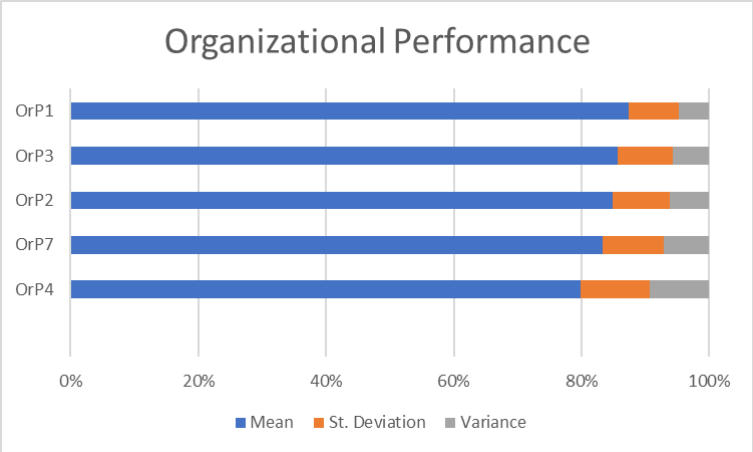


Figure 6.26: Frequency summary of organisational performance items

6.8.5. Independent and dependent variables: mean, standard deviation, and variation

Based on descriptive statistics for the dependent variables and independent variables extracted from the research framework, the project initiative diffusion practice P_Pract_{SR} item has the highest-rank frequency with a Mean of 2.352, St. Deviation of 1.029, and Variance of 1.060. The project initiative diffusion practice P_Pract_{SR} covers eight questions focusing on knowledge and persuasion of project constraints and project risks; deciding and evaluating on project's constraints, project's methods and roles, project decisions' communication; and implementing and adapting of project cost control, project stakeholder engagement, and project change management within project-based organisations.

The second variable in the highest frequency is program initiative diffusion practice Pr_Prac_{SR} with a Mean of 2.185, St. Deviation of 0.857, and Variance of 0.735. The program initiative diffusion practice Pr_Pract_{SR} covers six questions focusing on knowledge and persuasion of program expected benefits, and program stakeholder roles and responsibilities; deciding and evaluating on program selection, and program data; and implementing and adapting of program resource plan, and program change management within project-based organisations.

Organisational culture comes in the third rank with a Mean of 2.128, St. Deviation of 0.887, and Variance of 0.788. The organisational culture OC_{SR} covers six questions focusing on empowerment involvement through availability of information for decisions level, and knowledge sharing; team orientation involvement work done through teamwork, and work is organized in accord with organisation's goals; and capability development involvement through delegation, and giving authority within project-based organisations.

The fourth level is strategy initiative diffusion practice S_Prac_{SR} with a Mean of 2.062, St. Deviation of 0.831, and Variance of 0.690. The strategy initiative diffusion practice S_Prac_{SR}

covers six questions focusing on knowledge and persuasion of strategy initiatives derivers, and strategy initiatives vision/benefits; deciding and evaluating on strategy initiatives data analysis, and strategy initiatives verses organisational values; and implementing and adapting of strategic initiatives risk communication, and strategic initiatives key performance indicators within project-based organisations.

The fifth level is portfolio initiative diffusion practice Po_Prac_{SR} with a Mean of 1.965, St. Deviation of 0.748, and Variance of 0.560. The portfolio initiative diffusion practice Po_Prac_{SR} covers five questions focusing on knowledge and persuasion of portfolio translation from strategic initiatives; deciding and evaluating on confirming new investment needs, and project types based on market needs; and implementing and adapting of project portfolio charters, and portfolio risk management within project-based organisations.

Project performance P_Perf_{SR} comes in the sixth level with a Mean of 1.940, St. Deviation of 0.766, and Variance of 0.588. The project performance P_Perf_{SR} covers five questions focusing on project performance measures via knowing if projects are meeting their business purposes, technical performance goals, schedule objectives, budget limits, and project stakeholders' satisfaction results, within project-based organisations.

The seventh level is portfolio performance Po_Perf_{SR} coming in the sixth level with a Mean of 1.823, St. Deviation of 0.683, and Variance of 0.467. The portfolio performance Po_Perf_{SR} covers four questions focusing on portfolio performance measures via knowing if portfolio within project-based organisations has the right number of projects, contains high-value projects, has budget allocation based on business strategy, and meets the stakeholder satisfaction level.

The eighth level is organisational performance OP_{SR} with a Mean of 1.784, St. Deviation of 0.762, and Variance of 0.581. The organisational performance OP_{SR} covers five questions focusing on organisational performance measures via knowing the satisfaction level of organisational results as overall, organisational market share results, organisational profitability results, organisational employee satisfaction results, and organisational opportunities development capability results within project-based organisations.

Then, the ninth level is program performance Pr_Perf_{SR} with a Mean of 1.601, St. Deviation of 0.554, and Variance of 0.307. The program performance Pr_Perf_{SR} covers three questions focusing on program reflecting the business strategy, program stakeholders' satisfaction level, and program achievement of cost-benefits objectives within project-based organisations.

The last level is strategy performance S_Perf_{SR} with a Mean of 1.587, St. Deviation of 0.541, and Variance of 0.294. The strategy performance S_Perf_{SR} covers three questions focusing on strategic initiatives stakeholder satisfaction level, strategic initiatives revenue expectation level, and if strategic initiatives adapting to their environmental conditions within project-based organisations. See table 6.23 and figure 6.27 for the descriptive and frequency analysis details for all the research variables.

Table 6.23: Descriptive analysis for all variables

Code	Mean	St. Deviation	Variance	Rank
P_Prac_SR	2.3528	1.02963	1.060	1
Pr_Prac_SR	2.1855	.85745	.735	2
OC_SR	2.1283	.88749	.788	3
S_Prac_SR	2.0622	.83061	.690	4
Po_Prac_SR	1.9658	.74864	.560	5
P_Perf_SR	1.9401	.76679	.588	6
Po_Perf_SR	1.8231	.68366	.467	7
OP_SR	1.7848	.76249	.581	8
Pr_Perf_SR	1.6013	.55411	.307	9
S_Perf_SR	1.5870	.54180	.294	10

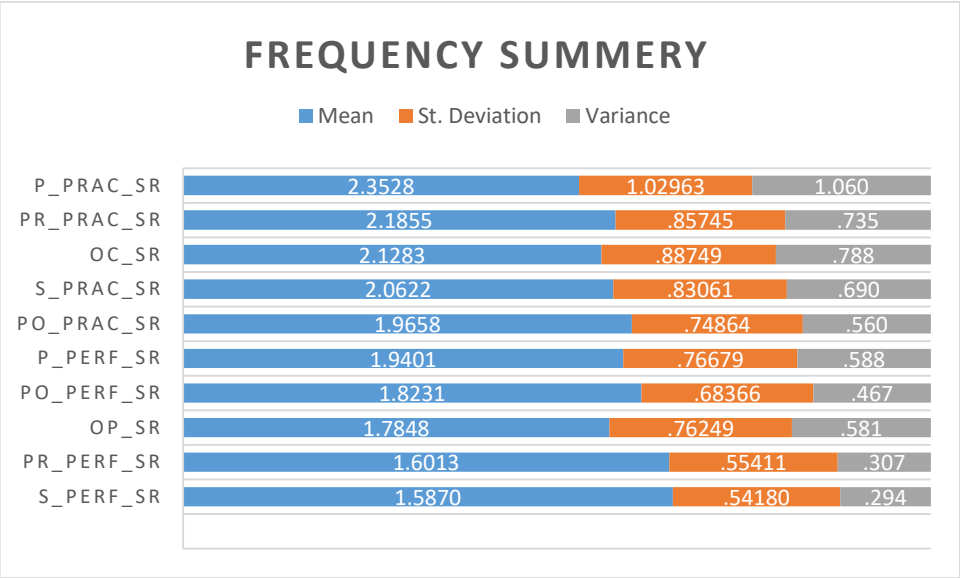


Figure 6.27: Variables frequency summary

In the end, it is noticed that the range of the Means score related to the variables is quite small from 1.587 to 2.352, with the highest range could be taken from 1.965, which includes all the strategy diffusion (top-down) practices along with the organisational culture variables. This result shows that more than 50% of the participants agree on the significant influence on organisational performance through adopting the strategy diffusion (top-down) drivers at the four levels of the project-based organisation, which consist of strategy, portfolio, program, and project levels, including with it the substantial adaptation of the organisational culture as well.

6.8.6. Frequencies analysis summery

In this chapter, there is a provision of descriptive analysis for both demographic variables, also for independent and dependent variables. The variables' analyses are based on their mean scores and the top two indicators, which represent the top 25%, 30%, 40%, and sometimes 60%. The top two ranked indicators for each variable were highlighted and presented in table 6.24.

Table 6.24: Variable with top-two indicators

Variable	Original Number of indicators	Code of the Top-two indicators
Strategy initiative diffusion practice	6	SKP3 and SIA3
Portfolio initiative diffusion practice	5	PoDE2 and PoKP1
Program initiative diffusion practice	6	PrDE2 and PrKP1
Project initiative diffusion practice	8	PKP2 and PDE3
Strategy performance	3	SP1 and SP4
Portfolio performance	4	PoP2 and PoP5
Program performance	3	PrP1 and PrP3
Project performance	5	PP1 and PP3
Organisational Culture	6	OCT2 and OCT3
Organisational performance	5	OrP1 and OrP3

6.9. Correlation tests

In this section, the correlation tests are conducted between the research identified variables and reported them in the way to have a better understanding of the relationships between the independent and dependent variables that are assumed in the proposed framework discussed previously. The correlation test step will be considered as the initial stage for testing the research hypotheses that will be followed by the regression test for accepting or declining the study projected theories and hypotheses. The assessment will also contain an in-depth evaluation of the variable that may have a mediation impact on the associations.

6.9.1. Correlation test analyses

For initial stage for association tests, a bivariate correlation test is used to run both Pearson and Spearman's Correlation tests between, as after the data transformation, the skewness and kurtosis are within the limits of acceptability. Thus, either test can be used for the correlation examination, although the parametric tests are more strong than non-parametric tests.

First, the test conducted between the dependent variable Organisational Performance (OP_{SR}) and the four strategy diffusion levels of the organisation (top-down) approach: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}) are the independent variables.

Secondly, the test is conducted between the independent variable Organisational Culture (OC_{SR}) and the four Strategy diffusion levels of the organisation (top-down) approach: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}). In addition to that, the test is done between the dependent variable Organisational Performance (OP_{SR}) and the independent variable Organisational Culture (OC_{SR}).

Thirdly, Pearson and Spearman's Correlation tests are conducted between the dependant variable Organisational Performance (OP_{SR}) and the four performance independent variables (bottom-up) approach: Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}). Furthermore, Pearson and Spearman's Correlation tests are done between all the independent variables, including the four strategy diffusion levels of the organisation (top-down): Strategy initiative diffusion

practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}), and the four performance independent variables (bottom-up): (Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})).

The associations between the top-down variables amongst each other are reviewed to check the top-down assumption. Then, the associations between the bottom-up variables amongst each other are reviewed to check the bottom-up assumption.

See figure 6.28, for the assumed research hypothesized prototype, which shows all the relationships that need to be tested and approved, in order to support all the anticipated and identified research theories and hypotheses.

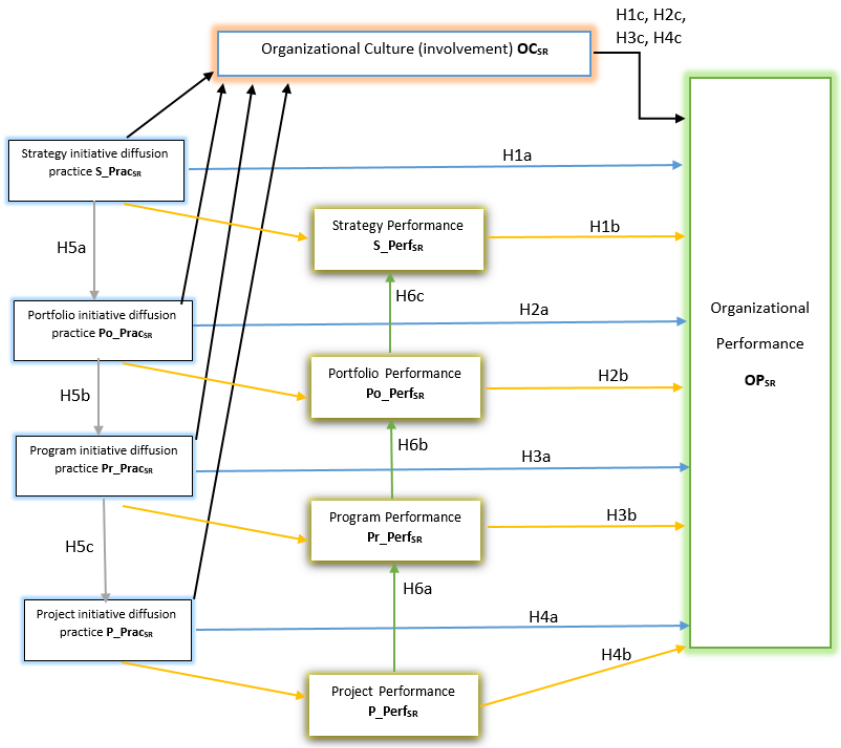


Figure 6.28: Proposed research hypothesised model (top-down) and (bottom-up)

6.9.1.1. Associations test between strategy diffusion drivers and organisational performance (OPSR)

As initial stage for association tests, a bivariate correlation test is used to run both Pearson and Spearman's Correlation tests, refer to table 6.25 and table 6.26, between the dependent variable Organisational Performance (OP_{SR}), organizational culture (OC_{SR}) and the four Strategy diffusion variables (top-down) approach: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}).

First, the result shows in the tables 6.25 and 6.26 below indicates a statistically significant positive association at $p<0.01$ level between the Organisational Performance (OP_{SR}) and the Strategy initiative diffusion practice (S_Prac_{SR}); Organisational Performance (OP_{SR}) and Portfolio initiative diffusion practice (Po_Prac_{SR}); Organisational Performance (OP_{SR}) and Program initiative diffusion practice (Pr_Prac_{SR}); and Organisational Performance (OP_{SR}) and Project initiative diffusion practice (P_Prac_{SR}).

Table 6.25: Results of correlations tests (parametric correlations)

Correlations

		S_Prac_SR	Po_Prac_SR	Pr_Prac_SR	P_Prac_SR	OC_SR	OP_SR
S_Prac_SR	Pearson Correlation	1	.843**	.792**	.750**	.726**	.681**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	371	371	371	371	371	371
Po_Prac_SR	Pearson Correlation	.843**	1	.827**	.783**	.754**	.666**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	371	371	371	371	371	371
Pr_Prac_SR	Pearson Correlation	.792**	.827**	1	.837**	.784**	.682**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	371	371	371	371	371	371
P_Prac_SR	Pearson Correlation	.750**	.783**	.837**	1	.801**	.722**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	371	371	371	371	371	371
OC_SR	Pearson Correlation	.726**	.754**	.784**	.801**	1	.733**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	371	371	371	371	371	371
OP_SR	Pearson Correlation	.681**	.666**	.682**	.722**	.733**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	371	371	371	371	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.26: Results of correlations tests (nonparametric correlations)

Correlations

			S_Prac_SR	Po_Prac_SR	Pr_Prac_SR	P_Prac_SR	OC_SR	OP_SR
Spearman's rho	S_Prac_SR	Correlation Coefficient	1.000	.836**	.777**	.718**	.712**	.683**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000
		N	371	371	371	371	371	371
	Po_Prac_SR	Correlation Coefficient	.836**	1.000	.806**	.752**	.754**	.675**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000
		N	371	371	371	371	371	371
	Pr_Prac_SR	Correlation Coefficient	.777**	.806**	1.000	.796**	.749**	.683**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000
		N	371	371	371	371	371	371
	P_Prac_SR	Correlation Coefficient	.718**	.752**	.796**	1.000	.773**	.718**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000
		N	371	371	371	371	371	371
	OC_SR	Correlation Coefficient	.712**	.754**	.749**	.773**	1.000	.729**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000
		N	371	371	371	371	371	371
	OP_SR	Correlation Coefficient	.683**	.675**	.683**	.718**	.729**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.
		N	371	371	371	371	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

Accordingly, table 6.27 below shows the related hypotheses acceptance status summary, as indicated in the framework chapter for the direct relationships: **Fully accepted H1a, H2a,H3a and H4a.**

Table 6.27: Correlations tests summary

No	Independent Variable	Dependent Variable	Parametric Correlation Summary	Nonparametric Correlation Summary	Related Hypothesis	Hypothesis status Accept
1	**S_Prac_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H1a	Yes
2	**Po_Prac_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H2a	Yes
3	**Pr_Prac_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H3a	Yes
4	**P_Prac_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H4a	Yes

6.9.1.2. The associations test between strategy diffusion drivers, organisational culture (OCSR) and organisational performance (OPSR)

Secondly, a bivariate correlation test is used to run both Pearson and Spearman's Correlation tests, refer to table 6.25 and table 6.26, between the dependent variable Organisational Performance (OP_{SR}), organisational culture (OC_{SR}) and the four Strategy diffusion variables (top-down) approach: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}).

The result shown in tables 6.25 and 6.26 is conducted between the independent variable Organisational Culture (OCSR) and the four Strategy diffusion levels of the organisation (top-down) approach: Strategy initiative diffusion practice (S_PracSR), Portfolio initiative diffusion practice (Po_PracSR), Program initiative diffusion practice (Pr_PracSR), and Project initiative diffusion practice (P_PracSR).

The result shows a statistically significant positive association at $p<0.01$ level between the independent variable Organisational Culture (OC_{SR}) and the Strategy initiative diffusion practice (S_Prac_{SR}); Organisational Culture (OC_{SR}) and the Portfolio initiative diffusion practice (Po_Prac_{SR}); Organisational Culture (OC_{SR}) and the initiative diffusion practice Program (Pr_Prac_{SR}); and Organisational Culture (OC_{SR}) and the initiative diffusion practice Project (P_Prac_{SR}).

Furthermore, there is a statistically significant positive association at $p<0.01$ level between the dependant variable Organisational Performance (OP_{SR}) and the independent mediator variable Organisational Culture (OC_{SR}).

Table 6.28 below shows the related hypotheses acceptance status summary, as indicated in the framework chapter: **Partially accepted H1c, H2c, H3c, and H4c.**

Table 6.28: Correlations tests summary

No	Independent Variable	Dependent Variable	Parametric Correlation Summary	Nonparametric Correlation Summary	Related Hypothesis	Hypothesis status Accept
1	**S_Prac_SR**	**CO_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H1c	Yes
2	**Po_Prac_SR**	**CO_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H2c	Yes

3	**Pr_Prac_SR**	**CO_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H3c	Yes
4	**P_Prac_SR**	**CO_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H4c	Yes
5	**CO_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H1c, H2c, H3c and H4c	Yes

6.9.1.3. Associations test between strategy diffusion drivers, performance drivers and the organisational performance (OPSR)

Similar bivariate correlation tests are conducted, refer to table 6.29 and table 6.30, for Pearson and Spearman's Correlation tests between the dependent variable Organisational Performance (OP_{SR}), the four performance independent variables (bottom-up) approach: Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}), and the four Strategy diffusion variables (top-down) approach: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}).

The result shows in table 6.29 and table 6.30 a statistically significant positive association at $P<0.01$ level between the independent variable Strategy initiative diffusion practice (S_Prac_{SR}) and Strategy Performance (S_Perf_{SR}); between Portfolio initiative diffusion practice (Po_Prac_{SR}) and Portfolio Performance (Po_Perf_{SR}); between Program initiative diffusion practice (Pr_Prac_{SR}) and Program Performance (Pr_Perf_{SR}); and finally between Project initiative diffusion practice (P_Prac_{SR}) and Project Performance (P_Perf_{SR}),

Moreover, the result shown in the tables below indicates a statistically significant positive association at $p<0.01$ level between the dependant variable Organisational Performance (OP_{SR}) and the Strategy Performance (S_Perf_{SR}); Organisational Performance (OP_{SR}) and the Portfolio Performance (Po_Perf_{SR}); Organisational Performance (OP_{SR}) and the Program Performance (Pr_Perf_{SR}); and Organisational Performance (OP_{SR}) and the Project Performance (P_Perf_{SR}). which shows the related hypotheses acceptance status as indicated in the framework chapter: **Partially accepted H1b, H2b, H3b, and H4b.**

Table 6.29: Results of correlations tests (parametric correlations)

Correlations

		S_Prac_SR	Po_Prac_SR	Pr_Prac_SR	P_Prac_SR	S_Perf_SR	Po_Perf_SR	Pr_Perf_SR	P_Perf_SR	OP_SR
S_Prac_SR	Pearson Correlation	1	.843**	.792**	.750**	.705**	.743**	.706**	.694**	.681**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
Po_Prac_SR	Pearson Correlation	.843**	1	.827**	.783**	.698**	.756**	.710**	.702**	.666**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
Pr_Prac_SR	Pearson Correlation	.792**	.827**	1	.837**	.732**	.799**	.754**	.766**	.682**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
P_Prac_SR	Pearson Correlation	.750**	.783**	.837**	1	.741**	.782**	.759**	.818**	.722**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
S_Perf_SR	Pearson Correlation	.705**	.698**	.732**	.741**	1	.764**	.738**	.760**	.810**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
Po_Perf_SR	Pearson Correlation	.743**	.756**	.799**	.782**	.764**	1	.833**	.773**	.695**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000
	N	371	371	371	371	371	371	370	371	371
Pr_Perf_SR	Pearson Correlation	.706**	.710**	.754**	.759**	.738**	.833**	1	.800**	.713**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000
	N	370	370	370	370	370	370	370	370	370
P_Perf_SR	Pearson Correlation	.694**	.702**	.766**	.818**	.760**	.773**	.800**	1	.771**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
	N	371	371	371	371	371	371	370	371	371
OP_SR	Pearson Correlation	.681**	.666**	.682**	.722**	.810**	.695**	.713**	.771**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	371	371	371	371	371	371	370	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.30: Results of correlations tests (nonparametric correlations)

Correlations

			S_Prac_SR	Po_Prac_SR	Pr_Prac_SR	P_Prac_SR	S_Perf_SR	Po_Perf_SR	Pr_Perf_SR	P_Perf_SR	OP_SR
Spearman's rho	S_Prac_SR	Correlation Coefficient	1.000	.836**	.777**	.718**	.727**	.736**	.709**	.703**	.683**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	Po_Prac_SR	Correlation Coefficient	.836**	1.000	.806**	.752**	.722**	.739**	.697**	.700**	.675**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	Pr_Prac_SR	Correlation Coefficient	.777**	.806**	1.000	.796**	.749**	.768**	.741**	.755**	.683**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	P_Prac_SR	Correlation Coefficient	.718**	.752**	.796**	1.000	.745**	.759**	.737**	.805**	.718**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	S_Perf_SR	Correlation Coefficient	.727**	.722**	.749**	.745**	1.000	.781**	.750**	.768**	.811**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	Po_Perf_SR	Correlation Coefficient	.736**	.739**	.768**	.759**	.781**	1.000	.833**	.786**	.704**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000	.000
		N	371	371	371	371	371	371	370	371	371
	Pr_Perf_SR	Correlation Coefficient	.709**	.697**	.741**	.737**	.750**	.833**	1.000	.806**	.719**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000	.000
		N	370	370	370	370	370	370	370	370	370
	P_Perf_SR	Correlation Coefficient	.703**	.700**	.755**	.805**	.768**	.786**	.806**	1.000	.791**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000
		N	371	371	371	371	371	371	370	371	371
	OP_SR	Correlation Coefficient	.683**	.675**	.683**	.718**	.811**	.704**	.719**	.791**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.
		N	371	371	371	371	371	371	370	371	371

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6.31 below shows the related hypotheses acceptance status as indicated in the framework chapter: **Partially accepted H1b, H2b, H3b and H4b.**

Table 6.31: Correlations tests summary

No	Independent Variable	Dependent Variable	Parametric Correlation Summary	Nonparametric Correlation Summary	Related Hypothesis	Hypothesis status
						Accept
1	**S_Prac_SR**	**S_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H1b	Yes
2	**Po_Prac_SR**	**Po_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H2b	Yes
3	**Pr_Prac_SR**	**Pr_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H3b	Yes

4	**P_Prac_SR**	**P_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H4b	Yes
5	**S_Perf_SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H1b	Yes
6	**Po_ Perf _SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H2b	Yes
7	**Pr_ Perf _SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H3b	Yes
8	**P_ Perf _SR**	**OP_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	Partially to H4b	Yes

6.9.1.4. Associations test among the strategy diffusion (top-down) independent variables (the strategy (S_PracSR), portfolio (Po_PracSR), program (Pr_PracSR), and project (P_PracSR))

A bivariate correlation test is conducted using both Pearson and Spearman's Correlation tests, refer to table 6.29 and table 6.30 between the independent variables of Strategy diffusion (top-down) variables: Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}), as the associations between the top-down variables amongst each other, to check the top-down assumptions.

The results shows in table 6.29 and table 6.30 a statistically significant positive association at $P<0.01$ level between the independent variables of the four Strategy diffusion (top-down) variables: The Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative

diffusion practice (P_Prac_{SR}). Thus, the result shows a statistically significant positive association at $P<0.01$ level between Strategy initiative diffusion practice (S_Prac_{SR}) and Portfolio initiative diffusion practice (Po_Prac_{SR}); between Portfolio initiative diffusion practice (Po_Prac_{SR}) and Program initiative diffusion practice (Pr_Prac_{SR}); and between Program initiative diffusion practice (Pr_Prac_{SR}) and Project initiative diffusion practice (P_Prac_{SR}), which shows the related hypotheses acceptance status as indicated in the framework chapter: **H5a, H5b, and H5c.**

Table 6.32 below shows the related hypotheses acceptance status summary, as indicated in the framework chapter: **Fully accepted H5a, H5b and H5c.**

Table 6.32: Correlations tests summary

No	Independent Variable	Independent Variable	Parametric Correlation Summary	Nonparametric Correlation Summary	Related Hypothesis	Hypothesis status
						Accept
1	**S_Prac_SR**	**Po_Prac_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H5a	Yes
2	**Po_Prac_SR**	**Pr_Prac_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H5b	Yes
3	**Pr_Prac_SR**	**P_Prac_SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H5c	Yes

6.9.1.5. Associations test among the performance (bottom-up) independent variables (The Strategy (S_PerfSR), portfolio (Po_PerfSR), program (Pr_PerfSR), and project (P_PerfSR))

Furthermore, a bivariate correlation test is conducted using both Pearson and Spearman's Correlation tests, refer to table 6.29 and table 6.30 between the independent variables of the performance (bottom-up) variables: The Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}). This will assess the associations of the top-down variables with the bottom-up variables, as the associations between the bottom-up variables amongst each other, to check the bottom-up assumptions.

The results show a statistically significant positive association at $P<0.01$ level between the independent variables of the four Performance (bottom-up) variables: Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}). The result shows a statistically significant positive association at $P<0.01$ level between Project Performance (P_Perf_{SR}) and Program Performance (Pr_Perf_{SR}); between Program Performance (Pr_Perf_{SR}) and Portfolio Performance (Po_Perf_{SR}); and finally between Portfolio Performance (Po_Perf_{SR}) and Strategy Performance (S_Perf_{SR}),which shows the related hypotheses acceptance status as indicated in the framework chapter: **H6a, H6b, and H6c.**

Table 6.33 below shows the related hypotheses acceptance status summary, as indicated in the framework chapter: **Fully accepted H6a, H6b, and H6c.**

Table 6.33: Correlations tests summary

No	Independent Variable	Independent Variable	Parametric		Related Hypothesis	Hypothesis status

			Correlation Summary	Nonparametric Correlation Summary		Accept
1	**P_ Perf _SR**	**Pr_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H6a	Yes
2	**Pr_ Perf _SR**	**Po_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H6b	Yes
3	**Po_ Perf _SR**	**S_ Perf _SR**	Positive correlation significant p< 0.01	Positive correlation significant p< 0.01	H6c	Yes

6.9.1.6. Correlation test conclusion

To summarise the previous results and findings, it is noticed that the relationships between all the independent and dependent variables are statistically positive and significant correlations coefficients. This conclusion means that an increase in the independent variables from the four Strategy diffusion (top-down) levels within the project-based organisations Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}) will lead to an increase in the dependent variable Organisational Performance (OP_{SR}), which initially leads to accepting the research hypotheses **(H1a, H2a, H3a, and H4a).**

Moreover, there are statistically positive and significant associations between independent variables of Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}) with independent variables of Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project

Performance (P_Perf_{SR}). This indicates that an increase in the independent variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) will lead to an increase in the independent variables of Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}).

There are also statistically positive and significant associations between independent variables (Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})) with the dependent variable Organisational Performance (OP_{SR}). Thus, an increase in the independent variables of Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}) will lead to an increase in the dependent variable Organisational Performance (OP_{SR}). This result initially shows the four mediators Performance variables influence among the relations on rising the Organisational Performance (OP_{SR}), which initially leads to accepting partially the research hypotheses **(H1b, H2b, H3b, and H4b).**

Moreover, there are statistically positive and significant associations between independent variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})), and the independent variable Organisational Culture (OC_{SR})., This indicates that an increase in the independent variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) will lead to an increase in the independent variables of Organisational Culture (OC_{SR}). Furthermore, there are also statistically positive and significant associations between the dependent variable Organisational Performance (OP_{SR}) and the independent variable Organisational Culture

(OC_{SR}). Then, an increase in the independent variable of the Organisational Culture (OC_{SR}) will lead to an increase in the dependent variable Organisational Performance (OP_{SR}). This result initially shows the mediator variable Organisational Culture (OC_{SR}) influences among the relations on increasing the Organisational Performance (OP_{SR}), which initially leads to accepting partially the research hypotheses **(H1c, H2c, H3c, and H4c).**

In addition, there are statistically positive and significant associations between the independent variables with each other linked to strategy diffusion (top-down) variables (Strategy initiative diffusion practice (S_Pract_{SR}), Portfolio initiatives diffusion practice (Po_Pract_{SR}), Program initiatives diffusion practice (Pr_Pract_{SR}), and Project initiatives diffusion practice (P_Pract_{SR})). This indicates that an increase in Strategy initiative diffusion practice (S_Pract_{SR}) will lead to an increase in Portfolio initiatives diffusion practice (Po_Pract_{SR}), which in turn leads to an increase in both Program initiatives diffusion practice (Pr_Pract_{SR}), and Project initiatives diffusion practice (P_Pract_{SR}). This means that there is initially acceptance of the (Top-down) method related to the research hypotheses **(H5a, H5b, and H5c).**

Moreover, there are statistically positive and significant associations between the independent variables with each other linked to performance (bottom-up) variables (Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})), which indicates that an increase in Project Performance (P_Perf_{SR}) will lead to an increase in Program Performance (Pr_Perf_{SR}), which in turn leads to an increase in both Portfolio Performance (Po_Perf_{SR}), and Strategy Performance (S_Perf_{SR}). This means that there is initially acceptance of (bottom-up) method related to the research hypotheses **(H6a, H6b, and H6c).**

6.10. Chapter summary

This chapter conducted successfully the collected data analyses by using the planned research instrument. The descriptive statistics of the population demographics characteristics checked based on factors as (type of organisation, gender, years of experience and job position). Then, sample analysis was checked, to validate the underlying structure via KMO and Bartlett test, EFA (PCA) test, common method variance (CMV). After that, normality test and outliers were carried out. Then, the reliability and validity tests done via Cronbach's alpha. After that, frequencies analysis, the statistical outlook of the study variables. Finally, the hypotheses testing done through Pearson an Spearman's Correlations tests for all independent variables (strategy diffusion drivers, performance drivers, and organisational culture drivers) and dependent variable (organisational performance) of the research. This was done to understand the direct associations among them at the strategy, portfolio, program and project levels in project-based organisations. This was undertaken in order to accept or reject the direct research proposed hypotheses.

In summary, from these results it is obviously observed that there is a significance acceptance in the research conceptual framework, philosophy, approach, design, methodology, and method, which successfully built the variables through linking them with directional and unidirectional connections. Such promising positive associations for all variables encourage further investigation to the regression level for hypotheses further validations, especially on the role of mediators' variables to create more fitting associations of study main constructs.

7. CHAPTER SEVEN: AMOS path analyses (SEM)

7.1. Introduction

The main objective of this chapter is to conduct the regression analysis, to examine the relationships between the outcome variable and the predicted variables with the presence of mediator variables. Especially, that the influence of strategy diffusion drivers in strategy, portfolio, program and project levels on organisational performance development in project-based organisations needs to be evaluated. Furthermore, the mediating roles of performance (bottom-up) drivers in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations needs to be appraised.

The meditating role of the organisational culture driver in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations needs to be appraised. Therefore, the regression test will be done via path analysis (causal model), to get the structural equation model (SEM). There will be a model establishing process through adopting an initial model, then modifying the model, till getting the best fit model (final model) for the study that compliance the model fitness required criteria; in order to accomplish the research aim and objectives.

Accordingly, this chapter will present the results of the path analysis Structural Equation Model (SEM) performed on data through Amos statistical package software. According to Bacon and Bacon (2001), Byrne (2001), Chenini and Khemiri (2009) AMOS can be used to fit the kinds of factor analysis or regression models. AMOS has a graphical interface easy and effective to use and represent complicated models. It allows drawing the models according to researcher convenience, and it can make path diagrams for robust reporting, all those and more are important characteristics for software that researcher needs to use. Furthermore, AMOS is used

to represent and examine the in-depth (the direct and indirect) effects of the identified independent, dependent, and moderator variables, which are equivalent to linear and multi regression analyses in SPSS software.

7.2. Hypotheses testing results

Amos is used to test the influence of the predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) on the outcome variable Organisational Performance (OP_{SR}).

Then, it is used to test the mediation of Organisational Culture (OC_{SR}) influence on the relations between the predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) on the outcome variable Organisational Performance OP_{SR}). Accordingly, these test results will support or reject the theory of the Strategy diffusion practices from the Strategy level to the Portfolio level, then to the Program level, and finally to the Project level, using the (top-down) approach recognised in this research.

After that, to test the influence of the predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) on the outcome variable Organisational Performance (OP_{SR}) with mediation influence of the variables (Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})). Consequently, these test results will approve or not the theory of reporting back the performance data from the Project level, to the Program

level, that in turn will report back to the Portfolio level, then to the Strategy level, and in the end to the organisational level, by using the bottom-up approach indicated in this research. See figure 7.1, for the proposed research hypothesised prototype, which shows all the relationships that need to be approved from the data collected in order to support all the proposed and identified research hypotheses.

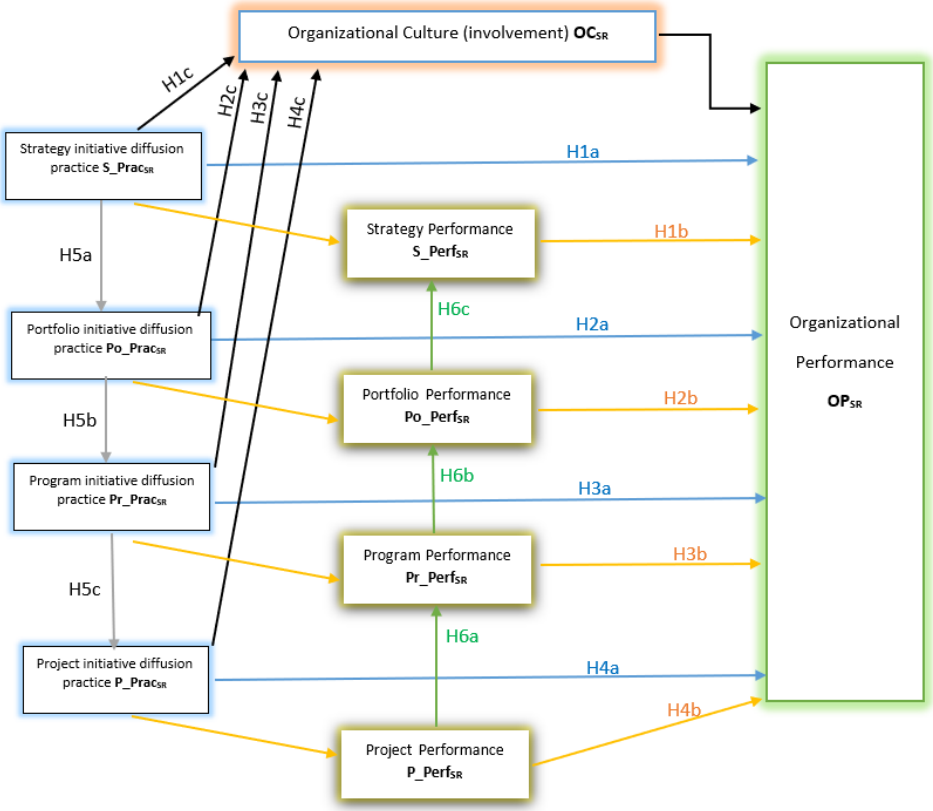


Figure 7.1: Proposed research hypothesised model (top-down) and (bottom-up)

7.3. Strategy diffusion (top-down) hypotheses testing results

At first, Amos software with Maximum likelihood parameter estimation is used to assess the degree to which the predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) related to the outcome

variable Organisational Performance (OP_{SR}). Furthermore, Amos software is used to check the degree in which Organisational Culture (OC_{SR}) related to Organisational Performance (OP_{SR}).

Then, Amos is used to check the huge mediation role of Organisational Culture (OC_{SR}) between the independent variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), Project Initiative Diffusion Practice (P_Prac_{SR})), and the dependent variable Organisational Performance (OP_{SR}).

The opening stage of modelling the association is to test whether performance can be predicted from the strategy diffusion (top-down). The tested initial model is shown in table 7.1 and figure 7.2. The results from the testing show that strategy diffusion (top-down) is not a good predictor of the organisational performance (RMSEA = 0.689). Precisely, the results also indicate that S_Prac_{SR} and P_Prac_{SR} only have significant predictors of the organisational performance with $p<0.001$, however the other two predictors Po_Prac_{SR} and Pr_Prac_{SR} also can be accepted with $p<0.5$. Thus, this initial model supports and accepts all the hypotheses: **H1a, H2a, H3a and H4a.**

Table 7.1: Regression weights: (group number 1 - default model)

Outcome	Path	Predictor	Standardized Estimates (Beta)	S.E.	C.R.	P
OP_SR	<---	S_Prac_SR	,249	,061	4,063	***
OP_SR	<---	P_Prac_SR	,294	,048	6,077	***
OP_SR	<---	Po_Prac_SR	,051	,075	,680	,497
OP_SR	<---	Pr_Prac_SR	,096	,065	1,468	,142

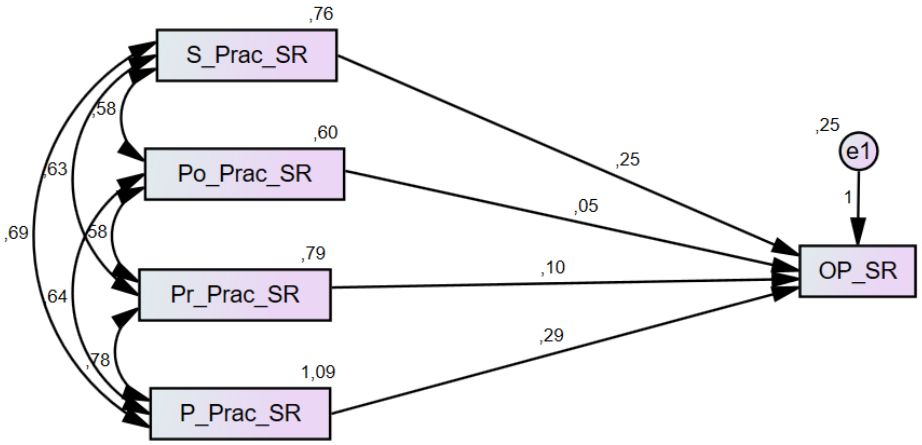


Figure 7.2: Research initial model with standardized estimates

The next analysis is to introduce OC_{SR} as mediator, to check whether it will have an influence on the associations between organisational performance and strategy diffusion (top-down). Thus, in order to make sure of these assessments, model 1 has been created. See the graphical model figure 7.3, for more explanation of model 1 with the mediation of Organisational Culture (OC_{SR}) role. The graphical model illustrates the Standardised Estimates, and all estimated path coefficients were statistically positive.

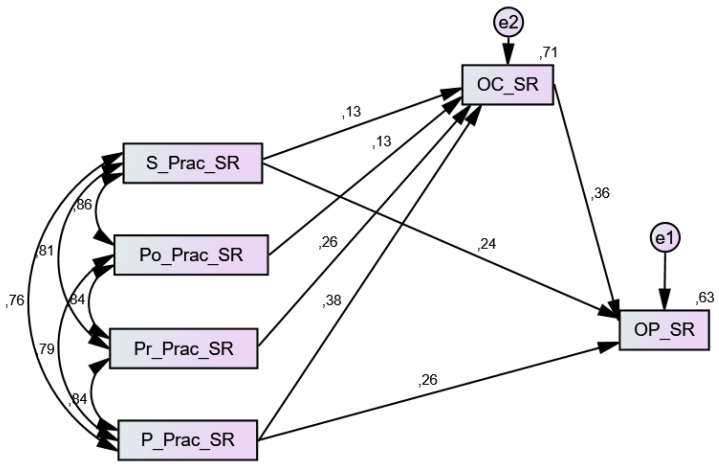


Figure 7.3: Research (model 1) with standardised estimates with OC_{SR} mediation role

7.3.1. Model fit analysis summary (model 1) in case of the presence of OCSR mediation role

It is very essential to evaluate the model fitness before starting the data analysis of the model. The model fitness includes the following (as shown in table 7.2):

- The absolute fit indicator CMIN = 0.056 at ($p < 0.972$) an insignificant level,
- And the normal CMIN/DF = 0.028 is an excellent fit.

In addition, TLI = 1.006 indicates an excellent fit, CFI = 1.000 indicates an excellent fit, and RMSEA = 0.000 is less than 0.06 which is an excellent value. Overall, the theoretical model fit is considered to be in an excellent fit range, based on Cut-off Criteria table 7.3.

Table 7.2: Model fitness analysis summary (model 1)

Measures of Fit	Estimate Value	Indications of Model Fit	Interpretation
Chi-Square (CMIN)	0.056	-	-
DF	2	-	-
P	0.972	A value is greater than 0.05 indicates a close fit.	**Acceptable fit**
CMIN/DF	0.028	A value less than 1 indicates an over-fit of the model.	**Acceptable fit**
GFI	1.000	A value close to 1 indicates a perfect fit.	**Excellent fit**
TLI	1.006	A value greater than 1 indicates an over-fit of the model.	**Excellent fit**
CFI	1.000	A value close to 1 indicates a very good fit.	**Excellent fit**
NFI	1.000	A value close to 1 indicates a very good fit.	**Excellent fit**
RMSEA	0.000	A value of 0.0 indicates the exact fit of the model.	**Excellent fit**

Table 7.3: Cut-off criteria

Measure	Terrible	Acceptable	Excellent
CMIN/DF	>5	>3	>1
CFI	<0.90	<0.95	>0.95
SRMR	>0.10	>0.08	<0.08
RMSEA	>0.08	>0.06	<0.06
P Close	<0.01	<0.05	>0.05

Source: (Hu & Bentler 1999)

7.4. Path analysis results in (model 1)

The standardised regression weights are used since they allow the researcher to compare directly the relative effect of each independent variable on the dependent variable. Table (00) presents the standardised regression estimates allowing us to examine the direct association between the study constructs. It is noted that the level of significance is based on the critical ratio (CR) of the regression estimate, Where all CR values are greater than or equate to 2.58, indicating a 99 percent level of significance, except for the paths amongst (S_Prac_{SR} and OC_{SR}) and amongst (Po_Prac_{SR} and OC_{SR}).

Table 7.4: (Model 1) regression weights: (group number 1 - default model)

Path			Standardized Estimates (Beta)	S.E.	C.R.	P
Outcome		**Predictor**				
OC_SR	<---	S_Prac_SR	,127	,060	2,216	,027
OC_SR	<---	Po_Prac_SR	,131	,074	2,092	,036
OC_SR	<---	Pr_Prac_SR	,261	,064	4,205	***
OC_SR	<---	P_Prac_SR	,383	,048	7,034	***
OP_SR	**<---**	**S_Prac_SR**	**,238**	**,047**	**4,614**	*******
OP_SR	**<---**	**P_Prac_SR**	**,262**	**,044**	**4,519**	*******
OP_SR	<---	OC_SR	,361	,048	6,401	***

Significance of Correlations: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, $p < 0.1$

7.4.1. Path analysis results in (model 1) between strategy initiative diffusion practice (S_PracSR) and organisational performance (OPSR)

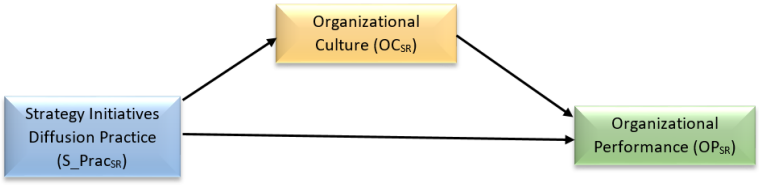


Figure 7.4: The associations between strategy level and organisational performance

7.4.1.1. The influence of strategy initiative diffusion practice (S_PracSR) on the organisational performance (OPSR)

In testing the direct effect on the relationship between S_Prac_{SR} and OP_{SR} variables, there is statistically a significant and positive effect at 0.001 level found in the path coefficient. This supports **H1a**; the hypothesis shown in the path (S_Prac_{SR} → OP_{SR}). Thus, Strategy Initiative Diffusion Practice **(**S_Prac_{SR}) will lead to increase the emergence of (OP_{SR}) in the public project-based organisations.

7.4.1.2. The influence of organisational culture (OCSR) as a mediator on the relationships between strategy initiative diffusion practice (S_PracSR) and organisational performance (OPSR)

In testing the mediator effect of OC_{SR} on the relationships between the S_Prac_{SR} and OP_{SR} variables, there is statistically a significant and positive effect found. Therefore, H1c is accepted. Then, Strategy Initiative Diffusion Practice **(**S_Prac_{SR}) will lead to increase the development of (OP_{SR}) with existence of the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.5: The summary of AMOS (model 1) test results between strategy initiatives diffusion practice and organisational performance direct and indirect paths.

	Dependent Variable	Correlation	Regression

Independent Variable X	Y	X and Y	Direct X on Y	OC as Mediator on X to Y
S_Prac$_{SR}$	**OP$_{RS}$**	Yes Positive	Yes Positive Effect **Accept H1a**	Yes Positive Effect **Accept H1c**

7.4.2. Path analysis results in (model 1) between portfolio initiative diffusion practice (Po_PracSR) and organisational performance (OPSR)

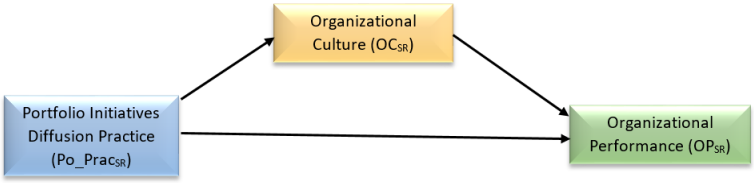


Figure 7.5: The associations between portfolio level and organisational performance

7.4.2.1. The influence of portfolio initiative diffusion practice (Po_PracSR) on the organisational performance (OPSR)

In testing the direct effect on the relationship between Po_Prac$_{SR}$ and OP$_{SR}$ variables, there is statistically an insignificant found, which does not support **H2a**. Thus, Portfolio Initiative Diffusion Practice **(**Po_Prac$_{SR}$) will not lead to increasing the emergence of OP$_{SR}$ in the public project-based organisations directly.

7.4.2.2. The influence of organisational culture (OCSR) as a mediator on the relationships between portfolio initiative diffusion practice (Po_PracSR) and organisational performance (OPSR)

In testing the mediator effect of OC$_{SR}$ on the relationships between Po_Prac$_{SR}$ and OP$_{SR}$ variables, there is statistically a significant and positive effect found. Therefore, H2c is accepted. Then, Portfolio Initiative Diffusion Practice **(**Po_Prac$_{SR}$) will lead to increase the development of

OP_{SR} with existence of the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.6: The summary of AMOS (model 1) test results between portfolio initiatives diffusion practice and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression	
			Direct X on Y	OC as Mediator on X to Y
Po_Prac_{SR}	**OP_{RS}**	Yes Positive	No Effect **Not Accept H2a**	Yes Positive Effect **Accept H2c**

7.4.3. Path analysis results in (model 1) between program initiative diffusion practice (Pr_PracSR) and organisational performance (OPSR)

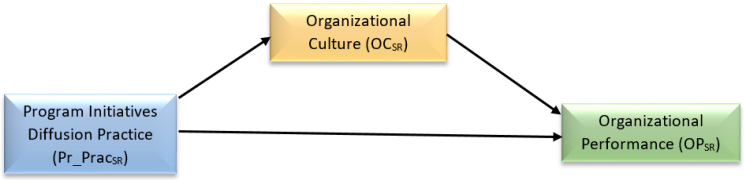


Figure 7.6: The associations between program level and organisational performance

7.4.3.1. The influence of program initiative diffusion practice (Pr_PracSR) on the organisational performance (OPSR)

In testing the direct effect on the relationship between Pr_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant found, which does not support **H3a**. Thus, Program Initiative Diffusion Practice **(**Pr_Prac_{SR}) will not lead to increase the emergence of OP_{SR} in the public project-based organisations directly.

7.4.3.2. The influence of organisational culture (OCSR) as a mediator on the relationships between program initiative diffusion practice (Pr_PracSR) and organisational performance (OPSR)

In testing the mediator effect of OC_{SR} on the relationships between Pr_Prac_{SR} and OP_{SR} variables, there is statistically a significant and positive effect found. Therefore, **H3c** is accepted. Then, Program Initiative Diffusion Practice **(**Pr_Prac_{SR}) will lead to increase the development of OP_{SR} with existence of the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.7: The summary of AMOS (model 1) test results between program initiatives diffusion practice and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression	
			Direct X on Y	OC as Mediator on X to Y
Pr_Prac_{SR}	**OP_{RS}**	Yes Positive	No Effect **Not Accept H3a**	Yes Positive Effect **Accept H3c**

7.4.4. Path analysis results in (model 1) between project initiative diffusion practice (P_PracSR) and organisational performance (OPSR)

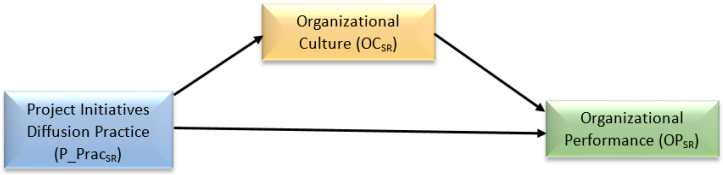


Figure 7.7: The associations between project level and organisational performance

7.4.4.1. The influence of project initiative diffusion practice (P_PracSR) on the organisational performance (OPSR)

In testing the direct effect on the relationship between P_Prac_{SR} and OP_{SR} variables, there is statistically a significant and positive effect at 0.001 level found in the path coefficient, which support **H4a**; the hypothesis shown in the path (P_Prac_{SR} → OP_{SR}). Thus, Project Initiative

Diffusion Practice (S_Prac$_{SR}$) will lead to increase the emergence of OP$_{SR}$ in the public project-based organisations.

7.4.4.2. The influence of organisational culture (OCSR) as a mediator on the relationships between project initiative diffusion practice (P_PracSR) and organisational performance (OPSR)

In testing the mediator effect of OC$_{SR}$ on the relationships between P_Prac$_{SR}$ and OP$_{SR}$ variables, there is statistically a significant and positive effect found. Therefore, H1c is accepted. Then, Strategy Initiative Diffusion Practice (S_Prac$_{SR}$) will lead to increase the development of OP$_{SR}$ with existence of the influence of Organisational Culture (OC$_{SR}$) in the public project-based organisations.

Table 7.8: The summary of AMOS (model 1) test results between project initiatives diffusion practice and organisational performance direct and indirect paths

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression	
			Direct X on Y	OC as Mediator on X to Y
P_Prac$_{SR}$	**OP$_{RS}$**	Yes Positive	Yes Positive Effect **Accept H4a**	Yes Positive Effect **Accept H4c**

7.4.5. The influence of (model 1) total effects, direct effects, and indirect effects on the associations amongst the independent variables and dependent variable

To check the total, direct, and indirect effects of the variables on this model 1, the researcher has formed a comparative judgment by comparing the direct and indirect with the total coefficients of the S_Prac$_{SR}$, Po_Prac$_{SR}$, Pr_Prac$_{SR}$, and P_Prac$_{SR}$ predictor variables, as

well as reporting the results of S_Prac$_{SR}$, Po_Prac$_{SR}$, Pr_Prac$_{SR}$, and P_Prac$_{SR}$ prediction of Organisational Performance (OP$_{SR}$) via using the mediator variables (OC$_{SR}$).

Table 7.9: (Model 1) standardised total effects (group number 1 - default model)

	Pr_Prac_SR	Po_Prac_SR	P_Prac_SR	S_Prac_SR	OC_SR
OC_SR	,261	,131	,383	,127	,000
OP_SR	**,094**	**,047**	**,401**	**,284**	**,361**

Table 7.10: (Model 1) standardised direct effects (group number 1 - default model)

	Pr_Prac_SR	Po_Prac_SR	P_Prac_SR	S_Prac_SR	OC_SR
OC_SR	,261	,131	,383	,127	,000
OP_SR	,000	,000	**,262**	**,238**	**,361**

Table 7.11: (Model 1) standardized indirect effects (group number 1 - default model)

	Pr_Prac_SR	Po_Prac_SR	P_Prac_SR	S_Prac_SR	OC_SR
OC_SR	,000	,000	,000	,000	,000
OP_SR	**,094**	**,047**	,138	,046	,000

7.4.5.1. Total effects, direct effects, and indirect effects (model 1) on the associations amongst the independent variable strategy initiative diffusion practice (S_PracSR) and the dependent variable organisational performance (OPSR)

As per above tables, the influence of OC$_{SR}$ as mediator, is statistically significant contributing to the impact of S_PracSR on OP$_{SR}$. However, the total effect of S_Prac$_{SR}$ on OP$_{SR}$ = 0.284 has increased from the direct effect of S_Prac$_{SR}$ on OP$_{SR}$ = 0.238, and has increased by the influence of the indirect effect of S_Prac$_{SR}$ on OP$_{SR}$ = 0.046 caused by the mediator (OC$_{SR}$). Moreover, based on statistically positive and significant correlations conclusions, the increase of the higher impact of S_Prac$_{SR}$ on OP$_{SR}$ is caused by the direct effect of S_Prac$_{SR}$ more than the fact that the mediator (OC$_{SR}$) is the causal results of the S_PracSR.

Thus, the direct path between S_Prac$_{SR}$ and OP$_{SR}$ and the indirect path between S_Prac$_{SR}$ and OP$_{SR}$ through mediating (OC$_{SR}$) both lead to increasing the Organisational Performance (OP$_{SR}$)

in the public project-based organisations. This result means that the mediation of OC_{SR} on Strategy Initiatives Diffusion Practice (S_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations. However, as per the Beta coefficient calculated shown in table (00), the direct path between S_Prac_{SR} and OP_{SR} is the better way to increase the Organisational Performance (OP_{SR}) in the public project-based organisations.

7.4.5.2. Total effects, direct effects, and indirect effects (model 1) on the associations amongst the independent variable portfolio initiative diffusion practice (Po_PracSR) and the dependent variable organisational performance (OPSR)

As per above tables, the influence of OC_{SR} as mediator is statistically significant contributing to the impact of Po_Prac_{SR} on OP_{SR}, as the total effect of Po_Prac_{SR} on OP_{SR} = 0.047 has increased by the influence of the indirect effect of Po_Prac_{SR} on OP_{SR} = 0.047 caused by the mediator (OC_{SR}). Moreover, based on a statistically positive and significant correlations conclusions, the increase of the higher impact of Po_Prac_{SR} on OP_{SR} is caused by the fact that the mediator (OC_{SR}) is the causal results of the Po_Prac_{SR}, and at the same time, the mediator (OC_{SR}) is the causal antecedent of the OP_{SR}. Thus, the indirect path between Po_Prac_{SR} and OP_{SR} through mediating (OC_{SR}) will lead to increase Organisational Performance (OP_{SR}) in the public project-based organisations. This result means that the mediation of OC_{SR} on Portfolio Initiatives Diffusion Practice (Po_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations.

7.4.5.3. Total effects, direct effects, and indirect effects (model 1) on the associations amongst the independent variable program initiative diffusion practice (Pr_PracSR) and the dependent variable organisational performance (OPSR)

As per above tables, the influence of OC_{SR} as mediator is statistically significant contributing to the impact of Pr_Prac_{SR} on OP_{SR}, as the total effect of Pr_Prac_{SR} on OP_{SR} = 0.094 has increased by the influence of the indirect effect of Pr_Prac_{SR} on OP_{SR} = 0.094 caused by the mediator (OC_{SR}). Moreover, based on a statistically positive and significant correlations conclusions, the increase of the higher impact of Pr_Prac_{SR} on OP_{SR} is caused by the fact that the mediator OC_{SR} is the causal results of the Pr_Prac_{SR}, and at the same time, the mediator (OC_{SR}) is the causal antecedent of the OP_{SR}. Thus, the indirect path between Pr_Prac_{SR} and OP_{SR} through mediating (OC_{SR}) will lead to increased Organisational Performance (OP_{SR}) in the public project-based organisations. This result means that the mediation of OC_{SR} on Program Initiatives Diffusion Practice (Pr_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations.

7.4.5.4. Total effects, direct effects, and indirect effects (model 1) on the associations amongst the independent variable project initiative diffusion practice (P_PracSR) and the dependent variable organisational performance (OPSR)

As per the above tables, the influence of OC_{SR} as mediator, was statistically significant contributing to the impact of P_PracSR on OP_{SR}. However, the total effect of P_Prac_{SR} on OP_{SR} = 0.401 has increased from the direct effect of P_Prac_{SR} on OP_{SR} = 0.262, and has increased by the influence of the indirect effect of P_Prac_{SR} on OP_{SR} = 0.138 caused by the mediator (OC_{SR}). Moreover, based on a statistically positive and significant correlations conclusions, the increase of the higher impact of P_Prac_{SR} on OP_{SR} is caused by the direct effect of P_Prac_{SR} more than the fact that the mediator OC_{SR} is the causal results of the P_PracSR.

Thus, the direct path between P_Prac_{SR} and OP_{SR} and the indirect path between S_Prac_{SR} and OP_{SR} through mediating (OC_{SR}) both lead to increase Organisational Performance (OP_{SR}) in

the public project-based organisations. This result means that the mediation of OC_{SR} on Project Initiatives Diffusion Practice (P_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations. However, as per the Beta coefficient calculated shown in table (00), the direct path between P_Prac_{SR} and OP_{SR} is the better way to increase the Organisational Performance (OP_{SR}) in the public project-based organisations.

7.4.6. The influence of (S_PracSR), (Po_PracSR), (Pr_PracSR), (P_PracSR) on the relationships between the variables (top-down) approach (model 1)

In testing the correlation effect between the independent variables S_Prac_{SR}, (Po_Prac_{SR}), Pr_Prac_{SR} and P_Prac_{SR}, there is a statistically positive and significant effects found at 0.001 level between all the independent variables amongst each other, which support the hypotheses: **H5a, H5b, and H5c**. This means that an increase in the Strategy Initiative Diffusion Practice **(**S_Prac_{SR}) will lead to increase the Portfolio Initiative Diffusion Practice **(**Po_Prac_{SR}), which in turn increases the Program Initiative Diffusion Practice **(**Pr_Prac_{SR}), and the Project Initiative Diffusion Practice **(**P_Prac_{SR}) within the project-based organisations.

In conclusion this will support the top-down approach related to this research. With respect to the Squared Multiple Correlations SMC, there is an acceptable value (greater than 0.3) for the two measures (71% variance of Organisational Culture and 63% variance of Organisational Performance), where SMC is similar to the R^2 value in multiple regression.

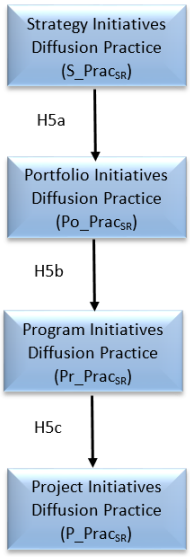


Figure 7.8: Strategy diffusion (top-down) approach

Table 7.12: (Model 1) covariances: (group number 1 - default model)

Outcome		Predictor	Estimate	S.E.	C.R.	P
S_Prac_SR	<-->	Po_Prac_SR	,578	,046	12,538	***
S_Prac_SR	<-->	Pr_Prac_SR	,625	,052	12,131	***
S_Prac_SR	<-->	P_Prac_SR	,691	,059	11,665	***
Po_Prac_SR	<-->	Pr_Prac_SR	,578	,047	12,386	***
Po_Prac_SR	<-->	P_Prac_SR	,643	,054	11,975	***
Pr_Prac_SR	<-->	P_Prac_SR	,782	,063	12,421	***

Table 7.13: (Model 1) correlations: (group number 1 - default model)

Outcome		Predictor	Estimate
S_Prac_SR	<-->	Po_Prac_SR	,856
S_Prac_SR	<-->	Pr_Prac_SR	,809
S_Prac_SR	<-->	P_Prac_SR	,759
Po_Prac_SR	<-->	Pr_Prac_SR	,838
Po_Prac_SR	<-->	P_Prac_SR	,792
Pr_Prac_SR	<-->	P_Prac_SR	,842

Table 7.14: (Model 1) variances: (group number 1 - default model)

	Estimate	S.E.	C.R.	P
S_Prac_SR	,757	,055	13,638	***
Po_Prac_SR	,603	,044	13,638	***
Pr_Prac_SR	,789	,058	13,638	***
P_Prac_SR	1,093	,080	13,638	***
e2	,242	,018	13,638	***
e1	,228	,017	13,638	***

Table 4.15: (Model 1) squared multiple correlations: (group number 1 - default model)

	Estimate
OC_SR	,710
OP_SR	,630

7.5. Summary of (top-down) hypotheses testing results (model 1)

In summary, Strategy Initiatives Diffusion Practice (S_PracSR) and Project Initiative Diffusion Practice (P_Prac_{SR}) will all lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations directly.

The influence of OC_{SR} as a mediator on the relationships between the predictor variables (S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}, and P_Prac_{SR}) and the outcome variable Organisational Performance (OP_{SR}) has shown that the path coefficients of Program Initiative Diffusion Practice (Pr_PracSR) and Project Initiative Diffusion Practice (P_Prac_{SR}) are statistically significant at $p < 0.001$ level and associated positively. However, the paths between Strategy Initiative Diffusion Practice (S_Prac_{SR}) and Organisational Culture (OC_{SR}), as well as between Portfolio Initiative Diffusion Practice (Po_Prac_{SR}) and Organisational Culture (OC_{SR}), are statistically positive and significant at $P<0.05$ level. The path which is between Organisational Culture (OC_{SR}) and organisational performance (OP_{SR}) is statistically significant at $p < 0.001$ level as below table, which means that the organisational culture mediation role are more effective for Portfolio Initiatives Diffusion Practice (Po_PracSR), Program Initiative Diffusion Practice (Pr_PracSR) and Project Initiative Diffusion Practice (P_Prac_{SR}) on Organisational Performance (OPSR).

Based on the Beta coefficient calculation shown in table (00) below, and as per the total, direct and indirect effects matrix, the best ways to emerging the organisation performance within project-based organisations are through:

- The direct influence of strategy diffusion practice and project diffusion practice.

- The indirect influences of portfolio diffusion practice and program diffusion practice, which is caused by the mediation effect of organisational performance.

Table 7.16: (Model 1) standardised specific indirect path effects calculation

Path	Direct Effect (X→Y)	Indirect Effect (X→ M → Y)	Result
S_Prac$_{SR}$ → OC$_{SR}$ → OP$_{SR}$	0.24***	0.13*0.36 = 0.0468*	Partial Mediation
Po_Prac$_{SR}$ → OC$_{SR}$ → OP$_{SR}$	0	0.13*0.36 = 0.0468*	Full Mediation
Pr_Prac$_{SR}$ → OC$_{SR}$ → OP$_{SR}$	0	0.26*0.36 = 0.0936***	Full Mediation
P_Prac$_{SR}$ → OC$_{SR}$ → OP$_{SR}$	0.26***	0.38*0.36 = 0.1368***	Partial Mediation

*****p<0.001; **p<0.01; *p<0.05; p<0.1; ns= "not significant"**

Although, all the diffusion practices show a strong impact on increasing the organisational performance when carrying out the mediation of organisational culture, the organisational culture plays a huge role in mediating between all the diffusion practices at the Strategy, Portfolio, Project, and Project levels and the organisational performance.

Moreover, it is confirmed from the associations' findings through positive and significant correlations at 0.001 level found for all the diffusion practice independent variables (Strategy, Portfolio, Project, and Project), leading to an important conclusion that the strategy initiatives diffusion using top-down approach of this research is supported and endorsed. Therefore, the strategy diffusion occurs from the strategy to portfolio, then to program, and finally to project levels within project-based organisations.

7.6. Global framework's hypotheses (model 2) testing results

For further examination for global framework's hypothesis testing, a final and revised model (Model 2) has been constructed with additional paths that are linked to the company

performance data reporting part, which basically representing the research proposed bottom-up method. Those additional paths are the independent mediation variables (Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})) that also could influence the organisational performance.

Therefore, Amos software with Maximum likelihood parameter estimation is used to assess in (Model 2) again the updated degree to which the predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) are related to the outcome variable Organisational Performance (OP_{SR}). Furthermore, Amos software is used to check the updated degree to which Organisational Culture (OC_{SR}) was related to Organisational Performance (OP_{SR}).

Then, Amos is used to check the huge mediation roles of Organisational Culture (OC_{SR}), Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}) between the independent predictor variables (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})). The dependent variable Organisational Performance (OP_{SR}) connections. See figure 7.9, the final and revised model (model 2) with the mediation of Organisational Culture (OC_{SR}), Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR}). The graphical model below is illustrated with Standardised Estimates, and all estimated paths coefficients are statistically positive as seen.

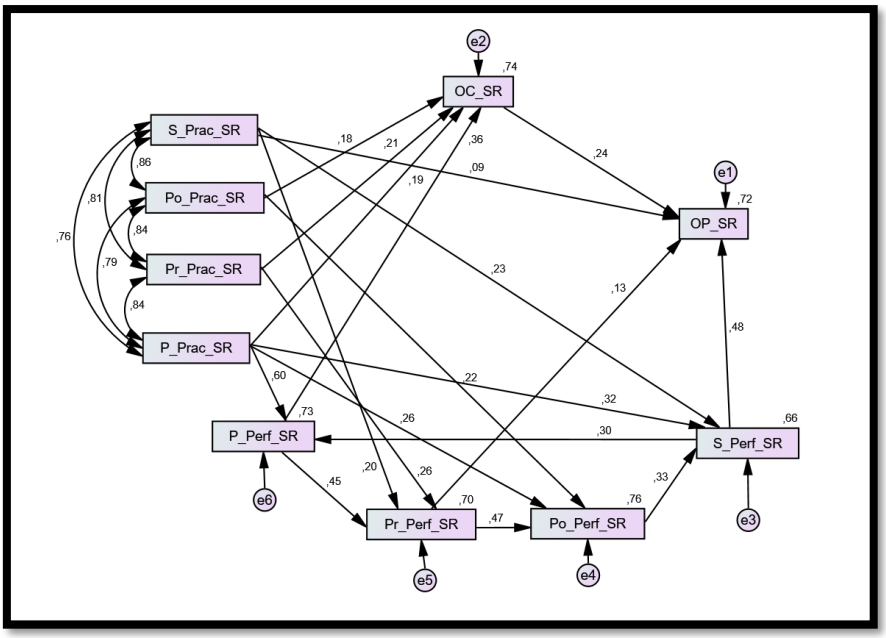


Figure 7.9: Research final revised model (model 2) with standardized estimates with OC_{SR} and Performance mediation variables roles

7.6.1. Final revised model fit analysis summary (model 2) in case of the presence of OCSR and performance mediation roles

The absolute fit indicator CMIN = 65.209 ($p < 0.001$) has reached a significant level, and the normal CMIN/DF = 3.260 is within the reasonable range of acceptance. In addition, TLI = 0.977 indicates a very good fit, CFI = 0.990 indicates a very good fit, and RMSEA = 0.078 is a barely acceptable standard value. Overall, the theoretical model fit is considered to be in the acceptable range. See table 7.17.

Table 7.17: Final revised model fit analysis summary (model 2)

Measures of Fit	Estimate Value	Indications of Model Fit	Interpretation
Chi-Square (CMIN)	65.209	-	-
DF	20	-	-
P	0.000	A value is less than 0.01 indicates a Terrible fit.	**Excellent fit**
CMIN/DF	3.260	As beginning to be reasonable.	**Acceptable fit**

GFI	0.967	A value close to 1 indicates a perfect fit.	**Excellent fit**
TLI	0.977	A value close to 1 indicates a very good fit.	**Excellent fit**
CFI	0.999	A value close to 1 indicates a very good fit.	**Excellent fit**
NFI	0.985	A value close to 1 indicates a very good fit.	**Excellent fit**
RMSEA	0.078	A value of about 0.08 or less indicates a reasonable error of Approximation.	**Acceptable fit**

7.7. Path analysis results in (model 2)

AMOS software is used to assess again the degree to which (Strategy Initiative Diffusion Practice (S_Prac_{SR}), Portfolio Initiative Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}), and Project Initiative Diffusion Practice (P_Prac_{SR})) variables, and Strategy Performance (S_Perf_{SR}), Portfolio Performance (Po_Perf_{SR}), Program Performance (Pr_Perf_{SR}), and Project Performance (P_Perf_{SR})) variables are related to Organisational Performance (OP_{SR}) and Organisational Culture (OC_{SR}). Furthermore, the degree to which Organisational Culture (OC_{SR}) relating to Organisational Performance (OP_{SR}) is also assessed again using AMOS software.

Table 7.18 below presents the standardised regression estimates for Model 2 and has allowed us to examine the direct association between the study constructs. The researcher notes that the level of significance is based on the critical ratio (CR) of the regression estimate. Thus, all CR values are greater than or equate to 2.58, except for the path between S_PracSR and OPSR which is = 1.942.

Table 7.18: (Model 2) regression weights: (group number 1 - default model)

Path			Standardized Estimates (Beta)	S.E.	C.R.	P
Outcome		Predictor				
Po_Perf_SR	<---	Po_Prac_SR	,222	,038	5,178	***
Pr_Perf_SR	<---	Pr_Prac_SR	,258	,033	4,910	***
P_Perf_SR	<---	P_Prac_SR	,599	,031	14,536	***
S_Perf_SR	<---	P_Prac_SR	,316	,029	5,766	***
Po_Perf_SR	<---	P_Prac_SR	,257	,030	5,587	***
Pr_Perf_SR	<---	S_Prac_SR	,204	,032	4,141	***
S_Perf_SR	<---	S_Prac_SR	,233	,031	4,762	***
OC_SR	<---	Po_Prac_SR	,184	,059	3,627	***
OC_SR	<---	Pr_Prac_SR	,211	,059	3,688	***
OC_SR	<---	P_Prac_SR	,192	,054	3,092	,002**
OC_SR	<---	P_Perf_SR	,355	,055	7,568	***
OP_SR	<---	S_Prac_SR	,087	,040	1,942	,052
OP_SR	<---	OC_SR	,240	,038	5,458	***
OP_SR	<---	S_Perf_SR	,484	,063	10,879	***
OP_SR	<---	Pr_Perf_SR	,133	,063	2,917	,004**
Po_Perf_SR	<---	Pr_Perf_SR	,469	,049	11,799	***
Pr_Perf_SR	<---	P_Perf_SR	,454	,030	10,835	***
S_Perf_SR	<---	Po_Perf_SR	,327	,042	6,231	***
P_Perf_SR	<---	S_Perf_SR	,300	,059	7,202	***

Significance of Correlations: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, $p < 0.1$

7.7.1. Path analysis results between strategy initiative diffusion practice (S_PracSR) and organisational performance (OPSR) (Model 2)

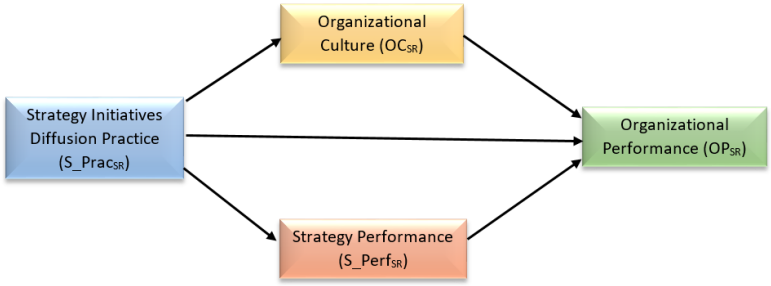


Figure 7.10: The associations between strategy level and organisational performance

7.7.1.1. The influence of strategy initiative diffusion practice (S_PracSR) on the organisational performance (OPSR) (Model 2)

In testing the direct effect on the relationship between S_Prac_{SR} and OP_{SR} variables, there is a positive effect at 0.1 level found in the path coefficient, which supports the hypothesis **H1a**. The hypothesis is shown in the path $S\_Prac_{SR} \rightarrow OP_{SR}$. Thus, Strategy Initiative Diffusion Practice **(**S_Prac_{SR}) will lead to increasing the emergence of OP_{SR} in the public project-based organisations.

7.7.1.2. The influence of strategy performance (S_PerfSR) as a mediator on the relationships between strategy initiative diffusion practice (S_PracSR) and organisational performance (OPSR) (Model 2)

In testing the mediator effect of S_Perf_{SR} on the relationships between S_Prac_{SR} and OP_{SR} variables, there is statistically a significant positive effect at 0.001 level found in the path coefficient, which, supports the hypothesis **H1b**; shown in the paths $S\_Prac_{SR} \rightarrow S\_Perf_{SR}$ and $S\_Perf_{SR} \rightarrow OP_{SR}$. Thus, Strategy Initiative Diffusion Practice S_Prac_{SR} will lead to increasing the development of OP_{SR} with existence of the influence of Strategy Performance (S_Perf_{SR}) in the public project-based organisations.

7.7.1.3. The influence of organisational culture (OCSR) as a mediator on the relationships between strategy initiative diffusion practice (S_PracSR) and organisational performance (OPSR) (Model 2)

In testing the mediator effect of OC_{SR} on the relationships between S_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect found. Therefore, the hypothesis **H1c** is not accepted. Then, Strategy Initiative Diffusion Practice (S_Prac_{SR}) will not lead to increasing the development of OP_{SR} with existence of the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.19: The summary of AMOS test results on (model 2) strategy effectiveness and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression		
			Direct X on Y	S_Perf_{SR} as Mediator on X to Y	OC as Mediator on X to Y
S_Prac_{SR}	OP_{RS}	Yes Positive	Yes Positive Effect **Accept H1a**	Yes Positive Effect **Accept H1b**	No Effect **Not Accept H1c**

7.7.2. Path analysis results between portfolio initiative diffusion practice (Po_PracSR) and organisational performance (OPSR) (model 2)

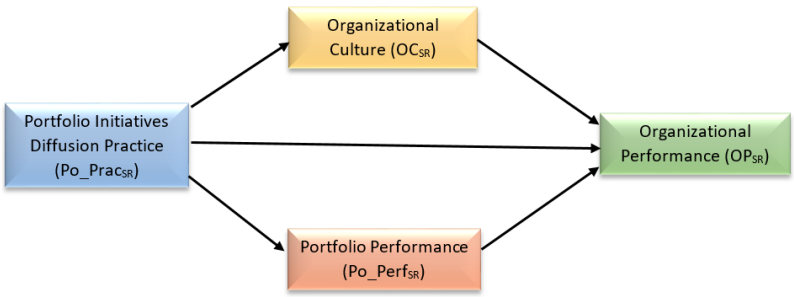


Figure 7.11: The associations between portfolio level and organisational performance

7.7.2.1. The influence of portfolio initiative diffusion practice (Po_PracSR) on the organisational performance (OPSR) (model 2)

In testing the direct effect on the relationship between Po_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect found. Therefore, the hypothesis **H2a** is not accepted. Then, Portfolio Initiative Diffusion Practice **(**S_Prac_{SR}) will not lead to increasing the emergence of OP_{SR} in the public project-based organisations directly.

7.7.2.2. The influence of portfolio performance (Po_PerfSR) as a mediator on the relationships between portfolio initiative diffusion practice (Po_PracSR) and organisational performance (OPSR) (model 2)

In testing the mediator effect of Po_Perf_{SR} on the relationships between Po_Prac_{SR} and OP_{SR} variables, there is statistically a significant positive effect at 0.001 level found in the path coefficient, which supports the hypothesis **H2b**. Thus, Portfolio Initiative Diffusion Practice **(**Po_Prac_{SR}) will lead to increasing the development of OP_{SR} with the influence of Portfolio Performance (Po_Perf_{SR}) and Strategy Performance (S_Perf_{SR}) in the public project-based organisations.

7.7.2.3. The influence of organisational culture (OCSR) as a mediator on the relationships between portfolio initiative diffusion practice (Po_PracSR) and organisational performance (OPSR) (model 2)

In testing the mediator effect of OC_{SR} on the relationships between Po_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect at 0.001 level found in the path coefficient, which supports the hypothesis **H2c.** The hypothesis is shown in the paths $Po\_Prac_{SR} \rightarrow OC_{SR}$ and $OC_{SR} \rightarrow OP_{SR}$. Thus, Portfolio Initiative Diffusion Practice **(**Po_Prac_{SR}) will lead to increasing the development of (OP_{SR}) with the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.20: The summary of AMOS test results on (model 2) portfolio effectiveness and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression		
			Direct X on Y	Po_Perf_{SR} as Mediator on X to Y	OC as Mediator on X to Y
Po_Prac_{SR}	**OP_{RS}**	Yes Positive	No Effect **Not Accept H2a**	Yes Positive Effect **Accept H2b**	Yes Positive Effect **Accept H2c**

7.7.3. Path analysis results between program initiative diffusion practice (Pr_PracSR) and organisational performance (OPSR) (model 2)

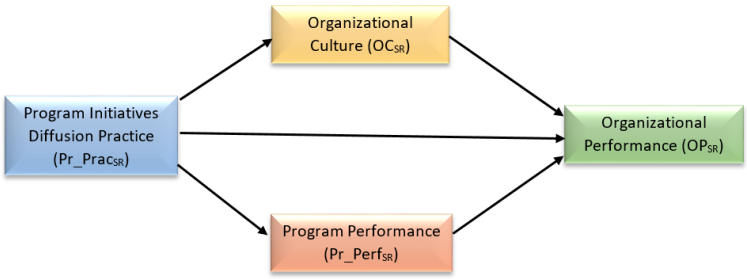


Figure 7.12: The associations between program level and organisational performance

7.7.3.1. The influence of program initiative diffusion practice (Pr_PracSR) on the organisational performance (OPSR) (model 2)

In testing the direct effect on the relationship between (Pr_Prac_{SR}) and (OP_{SR}) variables, there is statistically an insignificant effect found. Therefore, the hypothesis **H3a** is not accepted. Then, Program Initiative Diffusion Practice **(**Pr_Prac_{SR}) will not lead to increase the emergence of (OP_{SR}) in the public project-based organisations directly.

7.7.3.2. The influence of program performance (Pr_PerfSR) as a mediator on the relationships between program initiative diffusion Practice (Pr_PracSR) on the organisational performance (OPSR) (model 2)

In testing the mediator effect of (Pr_Perf_{SR}) on the relationships between (Pr_Prac_{SR}) and (OP_{SR}) variables, there is statistically a significant positive effect at 0.001 level found in the path coefficient (Pr_Prac_{SR} → Pr_Perf_{SR}), as well as, there is statistically a significant positive effect at 0.01 level found in the path coefficient (Pr_Prac_{SR} → Pr_Perf_{SR}), which supports the hypothesis **H3b**. The hypothesis is shown in the paths (Pr_Prac_{SR} → Pr_Perf_{SR}) and (Pr_Perf_{SR} → OP_{SR}). Thus, Program Initiative Diffusion Practice **(**Pr_Prac_{SR}) will lead to increase the development of (OP_{SR}) with the influence of Program Performance (Pr_Perf_{SR}) in the public project-based organisations.

7.7.3.3. The influence of organisational culture (OCSR) as a mediator on the relationships between program initiative diffusion practice (Pr_PracSR) on the organisational performance (OPSR) (model 2)

In testing the mediator effect of OC_{SR} on the relationships between Pr_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect at 0.001 level found in the path coefficient, which supports the hypothesis **H3c.** The hypothesis is shown in the paths Pr_Prac_{SR} → OC_{SR} and OC_{SR} → OP_{SR}. Thus, Program Initiative Diffusion Practice **(**Pr_Prac_{SR}) will lead to increase the development of OP_{SR} with the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.21: The summary of AMOS test results on (model 2) program effectiveness and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression		
			Direct X on Y	Pr_Perf_{SR} as Mediator on X to Y	OC as Mediator on X to Y
Pr_Prac_{SR}	**OP_{RS}**	Yes Positive	No Effect **Not Accept H3a**	Yes Positive Effect **Accept H3b**	Yes Positive Effect **Accept H3c**

7.7.4. Path analysis results between project initiative diffusion practice (P_PracSR) and organisational performance (OPSR) (model 2)

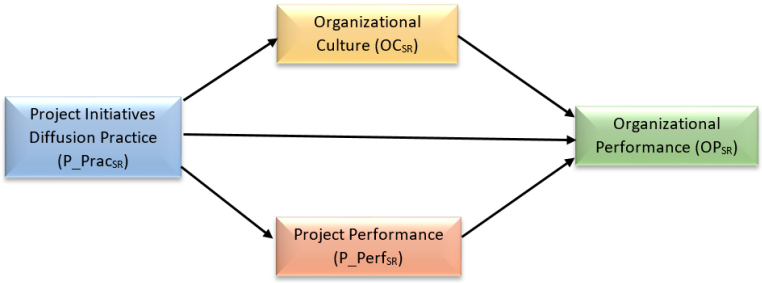


Figure 7.13: The associations between project level and organisational performance

7.7.4.1. The influence of project initiative diffusion practice (P_PracSR) on the organisational performance (OPSR) (model 2)

In testing the direct effect on the relationship between P_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect found. Therefore, the hypothesis **H4a** is not accepted. Then, Project Initiative Diffusion Practice **(**P_Prac_{SR}) will not lead to increasing the emergence of OP_{SR} in the public project-based organisations directly.

7.7.4.2. The influence of project performance (P_PerfSR) as a mediator on the relationships between project initiative diffusion practice (P_PracSR) on the organisational performance (OPSR) (model 2)

In testing the mediator effect of P_Perf_{SR} on the relationships between P_Prac_{SR} and OP_{SR} variables, there is statistically a significant positive effect at 0.001 level found in the path coefficient $P\_Prac_{SR} \rightarrow P\_Perf_{SR}$, which supports the hypothesis **H4b**. Thus, Project Initiative Diffusion Practice **(**P_Prac_{SR}) will lead to increasing the development of (OP_{SR}) with the influence of Program Performance (Pr_Perf_{SR}) in the public project-based organisations.

7.7.4.3. The influence of organisational culture (OCSR) as a mediator on the relationships between of project initiative diffusion practice (P_PracSR) on the organisational performance (OPSR) (model 2)

In testing the mediator effect of OC_{SR} on the relationships between P_Prac_{SR} and OP_{SR} variables, there is statistically an insignificant effect at 0.01 level found in the path coefficient, which supports the hypothesis **H4c.** The hypothesis is shown in the paths $P\_Prac_{SR} \rightarrow OC_{SR}$ and $OC_{SR} \rightarrow OP_{SR}$. Thus, Project Initiative Diffusion Practice **(**P_Prac_{SR}) will lead to increasing the development of (OP_{SR}) with the influence of Organisational Culture (OC_{SR}) in the public project-based organisations.

Table 7.22: The summary of AMOS test results (model 2) project effectiveness and organisational performance direct and indirect paths.

Independent Variable X	Dependent Variable Y	Correlation X and Y	Regression		
			Direct X on Y	P_Perf_{SR} as Mediator on X to Y	OC as Mediator on X to Y
P_Prac_{SR}	**OP_{RS}**	Yes Positive	No Effect **Not Accept H4a**	Yes Positive Effect **Accept H4b**	Yes Positive Effect **Accept H4c**

7.7.5. The influence of total effects, direct effects, and indirect effects on the associations amongst the independent and dependent variables (model 2)

To check the total, direct, and indirect effects of the variables on this model a comparative judgment was formed by comparing the direct and indirect with the total coefficients of the S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}, and P_Prac_{SR} predictor variables. The results of S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}, and P_Prac_{SR} prediction of Organisational Performance (OP_{SR}) via

using all the mediators' variables S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} were reported.

Table 7.23: (Model 2) standardised total effects (group numnbhihpy9ber 1 - default model)

	P_Prac_SR	**Pr_Prac_SR**	**Po_Prac_SR**	**S_Prac_SR**	S_Perf_SR	P_Perf_SR	Pr_Perf_SR	Po_Perf_SR	OC_SR
S_Perf_SR	**,452**	**,040**	**,074**	**,270**	,021	,071	,157	**,334**	0
P_Perf_SR	**,735**	**,012**	**,022**	**,081**	**,306**	,021	,047	,100	0
Pr_Perf_SR	**,334**	**,263**	**,010**	**,241**	,139	**,464**	,021	**,046**	0
Po_Perf_SR	**,414**	**,124**	**,227**	**,113**	,065	,218	**,479**	,021	0
OC_SR	**,453**	**,216**	**,192**	**,029**	,109	**,363**	,017	,036	0
OP_SR	**,371**	**,106**	**,083**	**,257**	**,539**	**,183**	**,215**	**,176**	**,240**

Table 7.24: (Model 2) standardised direct effects (group number 1 - default model)

	P_Prac_SR	**Pr_Prac_SR**	**Po_Prac_SR**	**S_Prac_SR**	S_Perf_SR	P_Perf_SR	Pr_Perf_SR	Po_Perf_SR	OC_SR
S_Perf_SR	,316	0	0	,233	0	0	0	,327	0
P_Perf_SR	,599	0	0	0	,300	0	0	0	0
Pr_Perf_SR	0	,258	0	,204	0	,454	0	0	0
Po_Perf_SR	,257	0	,222	0	0	0	,469	0	0
OC_SR	,192	,211	,184	0	0	,355	0	0	0
OP_SR	**0**	**0**	**0**	**,087**	**,484**	**0**	**,133**	**0**	**,240**

Table 7.25: (Model 2) standardised indirect effects (group number 1 - default model)

	P_Prac_SR	**Pr_Prac_SR**	**Po_Prac_SR**	**S_Prac_SR**	S_Perf_SR	P_Perf_SR	Pr_Perf_SR	Po_Perf_SR	OC_SR
S_Perf_SR	,136	,040	,074	,037	,021	,071	,157	,007	0
P_Perf_SR	,136	,012	,022	,081	,006	,021	,047	,100	0
Pr_Perf_SR	,334	,006	,010	,037	,139	,010	,021	,046	0
Po_Perf_SR	,157	,124	,005	,113	,065	,218	,010	,021	0
OC_SR	,261	,004	,008	,029	,109	,008	,017	,036	0
OP_SR	**,371**	**,106**	**,083**	**,170**	**,055**	**,183**	**,083**	**,176**	**0**

7.7.5.1. Total effects, direct effects, and indirect effects on the associations amongst the independent variable strategy initiative diffusion practice (S_PracSR) and the dependent variable organisational performance (OPSR) (model 2)

As per the above tables, the influence of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} as mediators, are statistically significant contributing to the impact of S_PracSR on OP_{SR}, as the total effect of S_Prac_{SR} on OP_{SR} = 0.257 has increased from the direct effect of S_Prac_{SR}

on OP_{SR} = 0.087 by the influence of the indirect effect S_Prac_{SR} on OP_{SR} = 0.170 caused by all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR}.

Moreover, based on a statistically positive and significant correlations conclusions, the increase of the higher impact of S_Prac_{SR} on OP_{SR} is caused by the fact that all the mediators S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} is the causal results of the S_PracSR, and at the same time, all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal antecedents of the OP_{SR}. This result means that the mediation of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} on Strategy Initiatives Diffusion Practice (S_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations. Thus, the direct path and the indirect paths of the strategy initiative diffusion practice mediated by the performance data (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, and P_Perf_{SR}) are better ways to increase Organisational Performance (OP_{SR}) in the public project-based organisations, than mediating with organisational culture.

7.7.5.2. Total effects, direct effects, and indirect effects on the associations amongst the independent variable portfolio initiative diffusion practice (Po_PracSR) and the dependent variable organisational performance (OPSR) (model 2)

As per the above tables, the influence of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} as mediators, are statistically significant contributing to the impact of Po_PracSR on OP_{SR}, as the total effect of Po_Prac_{SR} on OP_{SR} = 0.083 has increased from the direct effect of Po_Prac_{SR} on OP_{SR} = 0.000 by the influence of the indirect effect Po_Prac_{SR} on OP_{SR} = 0.083 caused by all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} . Moreover, based on statistically a positive and significant correlations conclusions, the increase of the higher impact of Po_Prac_{SR} on OP_{SR} is caused by the fact that all the mediators (S_Perf_{SR},

Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal results of the Po_Prac_{SR}, and at the same time, all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal antecedents of the OP_{SR}.

This result means that the mediation of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} on Portfolio Initiatives Diffusion Practice (Po_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations. Thus, the indirect paths of the portfolio initiative diffusion practice are the better ways to increase Organisational Performance (OP_{SR}) in the public project-based organisations through mediating the Portfolio Initiatives Diffusion Practice (Po_Prac_{SR}) with S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} interactions.

7.7.5.3. Total effects, direct effects, and indirect effects on the associations amongst the independent variable program initiative diffusion practice (Pr_PracSR) and the dependent variable organisational performance (OPSR) (model 2)

As per above tables, the influence of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} as mediators, are statistically significant contributing to the impact of Pr_PracSR on OP_{SR}, as the total effect of Pr_Prac_{SR} on OP_{SR} = 0.106 has increased from the direct effect of Pr_Prac_{SR} on OP_{SR} = 0.000 by the influence of the indirect effect Pr_Prac_{SR} on OP_{SR} = 0.106 caused by all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} . Moreover, based on a statistically positive and significant correlations conclusions, the increase of the higher impact of Pr_Prac_{SR} on OP_{SR} is caused by the fact that all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal results of the Pr_Prac_{SR}, and at the same time, all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal antecedents of the OP_{SR}. This result means that the mediation of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} on Program Initiatives Diffusion Practice (Pr_Prac_{SR}) will lead

to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations. Thus, the indirect paths of the project initiative diffusion practice are the better ways to increase Organisational Performance (OP_{SR}) in the public project-based organisations through mediating the Program Initiatives Diffusion Practice (Pr_Prac_{SR}) with S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} interactions.

7.7.5.4. Total effects, direct effects, and indirect effects on the associations amongst the independent variable project initiative diffusion practice (P_PracSR) and the dependent variable organisational performance (OPSR) (model 2)

As per above tables, the influence of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} as mediators, is statistically significant contributing to the impact of P_PracSR on OP_{SR}, as the total effect of P_Prac_{SR} on OP_{SR} = 0.371 has increased from the direct effect of P_Prac_{SR} on OP_{SR} = 0.000 by the influence of the indirect effect P_Prac_{SR} on OP_{SR} = 0.371 caused by all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} . Moreover, based on statistically a positive and significant correlations conclusions, the increase of the higher impact of P_Prac_{SR} on OP_{SR} is caused by the fact that all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal results of the P_Prac_{SR}, and at the same time, all the mediators (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}), and OC_{SR} are the causal antecedents of the OP_{SR}. This result means that the mediation of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, P_Perf_{SR}, and OC_{SR} on Project Initiatives Diffusion Practice (P_Prac_{SR}) will lead to an increase in the Organisational Performance (OP_{SR}) in the public project-based organisations.

Thus, the indirect paths of the project initiative diffusion practice are the better way to increase Organisational Performance (OP_{SR}) in the public project-based organisations through

mediating the Project Initiatives Diffusion Practice (P_Prac_{SR}) with (S_Perf_{SR}), (Po_Perf_{SR}), (Pr_Perf_{SR}), (P_Perf_{SR}), and (OC_{SR}) interactions.

Table 7.26: (Model 2) standardized specific indirect path effects calculation

Path	Direct Effect (X→Y)	Indirect Effect (X→ M → Y)	Result
S_Prac_{SR} → OC_{SR} → OP_{SR}	0.087	0	Partial Mediation
Po_Prac_{SR} → OC_{SR} → OP_{SR}	0	0.18*0.24 = 0.0432	Full Mediation
Pr_Prac_{SR} → OC_{SR} → OP_{SR}	0	0.21*0.24 = 0.0504	Full Mediation
P_Prac_{SR} → OC_{SR} → OP_{SR}	0	0.19*0.24 = 0.0456	Full Mediation
S_Prac_{SR} → S_Perf_{SR} → OP_{SR}	0.087	0.23*0.48 = 0.1104	Partial Mediation
S_Prac_{SR} → Pr_Perf_{SR} → OP_{SR}	0.087	0.20*0.13 = 0.026	Partial Mediation
S_Prac_{SR} → Pr_Perf_{SR} → Po_Perf_{SR} → S_Perf_{SR}→ OP_{SR}	0.087	0.20*0.47*0.33*0.48 = 0.0148	Partial Mediation
Po_Prac_{SR} → Po_Perf_{SR} → S_Perf_{SR}→ OP_{SR}	0	0.22*0.33*0.48 = 0.0348	Full Mediation
Pr_Prac_{SR} → Pr_Perf_{SR} → OP_{SR}	0	0.26*0.13 = 0.0338	Full Mediation
Pr_Prac_{SR} → Pr_Perf_{SR} → Po_Perf_{SR} → S_Perf_{SR}→ OP_{SR}	0	0.26*0.47*0.33*0.48 = 0.01935	Full Mediation
P_Prac_{SR} → S_Perf_{SR} → OP_{SR}		0.32*0.48 = 0.1536	Full Mediation
P_Prac_{SR} → P_Perf_{SR} → OC_{SR} → OP_{SR}	0	0.60*0.36*0.24 = 0.0518	Full Mediation
P_Prac_{SR} → Po_Perf_{SR} → S_Perf_{SR} → OP_{SR}	0	0.26*0.33*0.48 = 0.0411	Full Mediation
P_Prac_{SR} → P_Perf_{SR} → Pr_Perf_{SR} → OP_{SR}	0	0.60*0.45*0.13 = 0.0351	Full Mediation
P_Prac_{SR} → P_Perf_{SR} → Pr_Perf_{SR} → Po_Perf_{SR} → S_Perf_{SR}→ OP_{SR}	0	0.60*0.45*0.47*0.33*0.48 = 0.0201	Full Mediation

*****p<0.001; **p<0.01; *p<0.05; p<0.1; ns= "not significant"**

7.7.5.5. The influence of (S_PracSR), (Po_PracSR), (Pr_PracSR), (P_PracSR) on the relationships between the variables (top-down) approach from (model 2)

In testing the correlation effect between the independent variables (S_Prac_{SR}), (Po_Prac_{SR}), (Pr_Prac_{SR}), and (P_Prac_{SR}) in (model 2) there is statistically positive and significant effect at 0.001 level found between all the independent variables amongst each other, which supports the hypotheses again: **H5a, H5b, and H5c**. This means that an increase in the Strategy Initiative Diffusion Practice **(**S_Prac_{SR}) will lead to increase the Portfolio Initiative Diffusion Practice **(**Po_Prac_{SR}), which in turn increase the Program Initiative Diffusion Practice **(**Pr_Prac_{SR}), and the Project Initiative Diffusion Practice **(**P_Prac_{SR}) within the project-based organisations. And, in conclusion this will support the top-down approach in this research. With respect to the Squared Multiple Correlations SMC, there is an acceptable value (greater than 0.3) for the six measures (Strategy performance, Portfolio performance, Program performance, Project performance, Organisational Culture and Organisational Performance), where SMC is similar to the R^2 value in multiple regression.

Table 7.27: (Model 2) covariances: (group number 1 - default model)

Outcome		Predictor	Estimate	S.E.	C.R.	P
S_Prac_SR	<-->	Po_Prac_SR	,578	,046	12,538	***
S_Prac_SR	<-->	Pr_Prac_SR	,625	,052	12,131	***
S_Prac_SR	<-->	P_Prac_SR	,691	,059	11,665	***
Po_Prac_SR	<-->	Pr_Prac_SR	,578	,047	12,386	***
Po_Prac_SR	<-->	P_Prac_SR	,643	,054	11,975	***
Pr_Prac_SR	<-->	P_Prac_SR	,782	,063	12,421	***

Table 7.28: (Model 2) correlations: (group number 1 - default model)

Outcome		Predictor	Estimate
S_Prac_SR	<-->	Po_Prac_SR	,856
S_Prac_SR	<-->	Pr_Prac_SR	,809
S_Prac_SR	<-->	P_Prac_SR	,759
Po_Prac_SR	<-->	Pr_Prac_SR	,838
Po_Prac_SR	<-->	P_Prac_SR	,792
Pr_Prac_SR	<-->	P_Prac_SR	,842

Table 7.29: (Model 2) variances: (group number 1 - default model)

	Estimate	S.E.	C.R.	P
S_Prac_SR	,757	,055	13,638	***
Po_Prac_SR	,603	,044	13,638	***
Pr_Prac_SR	,789	,058	13,638	***
P_Prac_SR	1,093	,080	13,638	***
e3	,102	,008	13,579	***
e4	,112	,008	13,622	***
e5	,094	,007	13,619	***
e6	,163	,012	13,594	***
e2	,214	,016	13,638	***
e1	,168	,012	13,638	***

Table 7.30: (Model 2) squared multiple correlations: (group number 1 - default model)

	Estimate
S_Perf_SR	,661
P_Perf_SR	,730
Pr_Perf_SR	,703
Po_Perf_SR	,763
OC_SR	,740
OP_SR	,722

7.7.6. The influence of S_PerfSR, Po_PerfSR, Pr_PerfSR, and P_PerfSR as mediators on the relationships between the variables (bottom-up) approach (model 2)

In testing the mediator effect of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, and P_Perf_{SR} on the relationships between S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}, P_Prac_{SR} and OP_{SR} variables, there is statistically a significant and positive effect at 0.001 level found in the path coefficient which supports **H6a, H6b, H6c, and H6d.** The hypotheses are shown in the paths (from project performance to program performance, then to portfolio performance, then finally to strategy performance, which goes to organisational performance in the end). Thus, the influence and increasing of Strategy Performance (S_Perf_{SR}), and/or Portfolio Performance (Po_Perf_{SR}), and/or Program Performance (Pr_Perf_{SR}), or/and Project Performance **(**P_Perf_{SR}) will lead to increasing the growth of OP_{SR} in the public project-based organisations.

Table 7.31: (Model 2) regression weights: (group number 1 - default model)

Path			Standardized Estimates (Beta)	S.E.	C.R.	P	Ref. Hypothesis
Outcome		Predictor					
OP_SR	<---	S_Perf_SR	,484	,063	10,879	***	H6d
Po_Perf_SR	<---	Pr_Perf_SR	,469	,049	11,799	***	H6b
Pr_Perf_SR	<---	P_Perf_SR	,454	,030	10,835	***	H6a
S_Perf_SR	<---	Po_Perf_SR	,327	,042	6,231	***	H6c

Significance of Correlations: *** p < 0.001, ** p < 0.01, * p < 0.05, p < 0.1

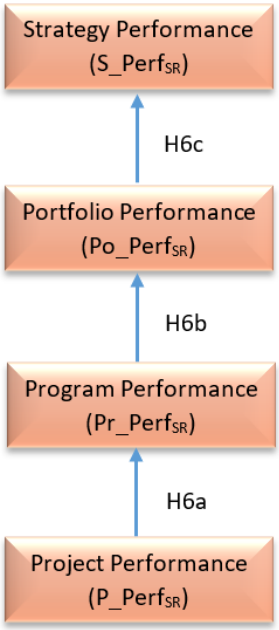


Figure 7.14: Performance (bottom-up) approach

7.8. The global framework's hypotheses (model 2) testing results summary

In summary, from Model 2 the Strategy Initiatives Diffusion Practice (P_Prac$_{SR}$) will lead directly to an increase in the Organisational Performance (OP$_{SR}$) in the public project-based organisations. But it does not lead to increasing the Organisational Performance (OP$_{SR}$) through using the influence of the Organisational Culture (OC$_{SR}$).

In Model 2 the influence of Organisational Culture (OC$_{SR}$) as a mediator on the relationships between the predictor variables (Po_Prac$_{SR}$, Pr_Prac$_{SR}$, and P_Prac$_{SR}$) and the outcome variable

Organisational Performance (OP_{SR}) has shown very good path coefficients being statistically significant at $p < 0.001$ and $p < 0.01$ levels and associated positively. This means that the organisational culture mediation role is effective for Portfolio Initiatives Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}) and Project Initiative Diffusion Practice (P_Prac_{SR}) on Organisational Performance (OP_{SR}).

Furthermore, in Model 2 the influence of S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}, and P_Perf_{SR} as a mediator on the relationships between the predictor variables (S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}, and P_Prac_{SR}) and the outcome variable Organisational Performance (OP_{SR}) has shown very good path coefficients being statistically significant at $p < 0.001$ level and only on path as $p < 0.1$ level and associated positively. This means that the performance variables as a mediation role is effective for Strategy Initiatives Diffusion Practice (S_Prac_{SR}), Portfolio Initiatives Diffusion Practice (Po_Prac_{SR}), Program Initiative Diffusion Practice (Pr_Prac_{SR}) and Project Initiative Diffusion Practice (P_Prac_{SR}) on Organisational Performance (OP_{SR}), which supports the hypotheses **H1b, H2b, H3b and H4b.**

From Model 1, the huge influence of the predictor variables (S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}), and P_Prac_{SR} on the outcome variable OP_{SR} is tested, but only S_Prac_{SR} and P_Prac_{SR} has statistically positive and significant direct effect, which supports the hypotheses **H1a and H4a,** but not the hypotheses **H2a and H3a.**

In addition, from Model 1 and Model 2, the huge influence of the mediation role for organisational culture is very obvious in the relations between all the predictor variables (S_Prac_{SR}, Po_Prac_{SR}, Pr_Prac_{SR}), and P_Prac_{SR} and the outcome variable OP_{SR}, as they have statistically positive and significant effects, which supports the hypotheses **H1c, H2c, H3c and H4c.**

When testing the effect of (S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR}), and P_Perf_{SR} variables amongst each other from Model 1 and Model 2, there is statistically significant and positive effect at 0.001 level and one effect only at 0.052 level found in the path coefficient between Pr_Perf_{SR} and P_Perf_{SR}; Po_Perf_{SR} and Pr_Perf_{SR}; S_Perf_{SR} and Po_Perf_{SR}; and between S_Perf_{SR} and P_Perf_{SR}, which supports the hypotheses **H6a, H6b and H6c.** Thus, this leads to increasing of Strategy Performance (S_Perf_{SR}), and/or Portfolio Performance (Po_Perf_{SR}), and/or Program Performance (Pr_Perf_{SR}), and/or Project Performance **(**P_Perf_{SR}) will lead to increasing the growth of OP_{SR} in the public project-based organisations.

Moreover, it is confirmed from the correlations results a positive and significant associations at $p < 0.001$ level found for all the diffusion practice independent variables (Strategy, Portfolio, Project, and Project), leading to an important conclusion that the strategy initiatives diffusion using top-down approach of this research is supported. Therefore, the strategy initiatives spread from strategy to portfolio, then to program, and finally to project levels within project-based organisations, which totally support the hypotheses: **H5a, H5b, and H5c**.

As per the Beta coefficient and the total, direct and indirect effects matrix in Model 1 the best ways to emerging the organisation performance within project-based organisations are through:

- The direct influence of strategy diffusion practice and project diffusion practice as (Model 1).
- The indirect influences of strategy diffusion practice, portfolio diffusion practice, program diffusion practice, and project diffusion practice, which are caused by the mediation effect of organisational culture as (Model 1).

However, according to the Beta coefficient and the total, direct and indirect effects matrix in Model 2, the best ways to emerging the organisation performance within project based organisations are through:

- The direct influence of strategy diffusion practice only as Model 2.
- The indirect influences of portfolio diffusion practice, program diffusion practice, and project diffusion practice, which are caused by the mediation effect of organisational culture as Model 2.
- The indirect influences of strategy diffusion practice, portfolio diffusion practice, program diffusion practice, and project diffusion practice, which are caused by the mediation effect of the strategy performance, portfolio performance, program performance, and project performance as Model 2.

In public project-based companies, embedding OC_{SR} as a causal effect at the organisation structural levels of Strategy, Portfolio, Program, and Project will lead to increase the development of organisation performance. Therefore, the organisational culture plays a huge role in mediating between all the diffusion practices at the Strategy, Portfolio, Project, and Project levels and the organisational performance. Furthermore, embedding S_Perf_{SR}, Po_Perf_{SR}, Pr_Perf_{SR} and P_Perf_{SR} as a causal effect at the organisation structural levels of Strategy, Portfolio, Program, and Project levels, will also lead to increasing the development of organisation performance. Therefore, the performance management for each level (Strategy, Portfolio, Program, and Project) plays a huge role in mediating between all the diffusion practices at the Strategy, Portfolio, Project, and Project levels and the organisational performance.

Similar closing indicates the necessity of having the OC_{SR} as a mediator of strategy diffusion practices that spreads the top-down strategic initiatives and decision-making from the company till the Project level and then bottom-up learning and reporting the performance data from the project to the organisation.

7.9. Chapter summary

The main objective of this chapter is accomplished via utilising the Amos regression analysis. The relationships between the outcome variable and the predicted variables with the presence of mediator variables were examined. The influence of strategy diffusion drivers at the Strategy, Portfolio, Program and Project levels on organisational performance development in project-based organisations was evaluated. Moreover, the mediating roles of performance (bottom-up) drivers at the Strategy, Portfolio, Program and Project levels among strategy diffusion drivers and organisational performance in project-based organisations were appraised. The meditating role of the organisational culture driver at the Strategy, Portfolio, Program and Project levels among strategy diffusion drivers and organisational performance in project-based organisations needs were appraised. All that was conducted through the regression test via path analysis (causal model), and the structural equation model (SEM) was established. Finally, a final (nested) model (model 2) was established through starting with an initial model, then modifying the model, till getting the best fit model (final model) for the study. All the research hypotheses were checked for their acceptance.

8. CHAPTER EIGHT: Discussion

8.1. Introduction

In this chapter, there will be an overview discussion about the research questions, data analysis, and the key findings of this study considering all the previous study works of literature. There are four parts in this chapter; the first one explains a summary of this study objective and the proposed strategy diffusion and performance in project-based organisations. The second part illustrates the descriptive statistics for the research independent and dependent variables. The third part discusses the findings of the correlation tests used in order to validate the study hypotheses and associate the findings with the literature review. The fourth part debates the findings of the path analyses and compares the findings with the literature review. Finally, the last part will include the discussion summary and conclusion.

8.2. Overview of the study

The main objective of this research is to investigate the impact of strategy diffusion on organisational performance within project-based organisations. Based on the literature review conducted in this research, there is a gap detected in the body of strategy diffusion knowledge related to the traditional using of the top-down approach for spreading the strategy amongst strategy, portfolios, programs, and projects levels within a project-based organisation (Clegg *et al.* 2018). Furthermore, there has been rare evidence of studies about the role and influence of organisational culture on the organisational hierarchical levels (strategic, executive, and operational) (Molina *et al.* 2019). Other studies found the most effective factors on organisational performance are the employees' commitment and organisational culture (Nikpour 2017). The third gap has a lack of extending studies on applying Rogers' diffusion

theory in new and emerging contexts and evolving additional robust methods, such as strategy and project contexts (Kee 2017).

In order to extend the body of knowledge in strategy diffusion within a project-based organisation, and to take the advantage of these promising areas, the researcher has brought these opportunities from the research gaps and integrated them into the proposed research conceptual framework. Thus, this study contributes to the academic studies wildly, through the emergence of using the top-down strategy diffusion and the bottom-up performance outputs/outcomes reporting to fulfil the complete lifecycle of strategy (Clegg *et al.* 2018). This diffusion will be conducted by employing Rogers' diffusion theory within the strategy and project management contexts in a project-based organisation, where the strategy diffusion practice will be shown very obvious in the detailed organisational level to cover strategy, portfolio, program, and projects levels, and streamline the practices at each level towards potential organisation performance (Kopmann *et al.* 2017). Adding to that, the influence of the organisational culture factor on the overall study constructs will be employed too.

The study is engaged with empirical evidence using the data composed from the United Arab Emirates (UAE) and analysed quantitively. The analyses and key findings will be discussed in the following sections.

8.3. Descriptive analysis findings discussion

In this section, there will be a discussion about the demographics analysis based on the survey data analyses, where Cochran's formula and Simple Random Sampling (SRS) has been used successfully. Based on Cochran's formula the sample size of 373 participants falls within the targeted frame of participants. Moreover, based on Simple Random Sampling (SRS), the

completion rate of around 65.78% responses is also considered to be within the acceptance sample range. Thus, all responses received for this study provide the diversification as desired, and their demographic analysis exposed the type of organisation, gender, years of experience, and position.

With regards to gender perception, it is noticed that the females are a quarter fraction of the males as a ratio of responses, where the sample represented about the same ratio as the actual ratio of males to females in the Dubai (UAE) workforce (Dubai Statistical Yearbook 2016). Therefore, the gathered data can be read as an actual picture of reality from the gender perspective. Moreover, years of experience have been impartially distributed in general with two-thirds of participation having more than five years of experience in strategy and project-related roles. Likewise, the analysis has discovered that there is a fair intergroup variance for job levels with more than 90% of the sample from Strategy, Portfolio, Program, and Project levels, which are the exact sample needs for the study. Hence, a similar diverse sample for all required categories is considered as a good representation for the public project-based organisation.

8.4. Validity and reliability discussion

On the one hand, the results of the Kaiser-Meyer-Olkin (KMO) test shows the sampling accuracy, as the value 0.967, very close to 1, which means that the factor analysis can be useful for the data collected. Additionally, the second Bartlett Test of Sphericity result is used for validity that represented the existence of a significant correlation. This result indicates a significance where the level of p is less than 0.05, which means that the survey is measuring what is intended to measure and factor analysis can be conducted (Field 2009; Morgan *et al.* 2004). Thus, both KMO and Bartlett examinations have demonstrated that factor analysis is appropriate for these data.

Although the KMO result is supporting to conduct a factor analysis, the results are not showing the fitness of the defined variables construct when the factor analysis is done, which is normally the desired variable elements to be loaded within its specific component. Another indicator used to direct is not to do the factor analysis test, since six principal components have been loaded in the CMV test instead of the ten principal components required for the study. Accordingly, in summary, there is no factor analysis conducted.

On the other hand, and as indicated by Conway and Lance in 2010, the total variance of one factor needs to be less than or equal to 50%, though using a Common Method Variance (CMV) – Harman's one factor-test – an instrument used to detect bias level. The results highlights that six principal components have been loaded and extracted from data with eigenvalues more than one, and the first component extraction sums of squared loadings is 56.43% with rotation sums of squared loadings equal to 17.3%, which means that it does not produce bias (Podsakoff, MacKenzie & Podsakoff 2012).

Regarding the reliability discussion, Cronbach Alpha test results for the identified ten variables with 113 questions show four variables related to strategy diffusion (top-down), four variables for performance (bottom-up) for Strategy, Portfolio, Program, and Project levels, one variable for organisational performance, and one variable related to organisational culture. All variables have scored more than 0.944 at first, except for one variable (program performance, which was 0.885). Thus, it is essentially required to reduce the reliability within the acceptance range, by taking away the items/questions of highest reliabilities. In the end, the reasonable reliability that has been agreed on for all variables with 51 questions are scored more than 0.885 which means that they are very reliable. The components have significant internal reliability, and the questions at a different timing can measure the variables within the alike means (Field 2009).

Finally, the normality test has been conducted to show if the data are normally spread for obtaining reliable results and then to proceed for research hypotheses testing. As specified by Hair *et al.* (2010) skewness and kurtosis tests' accepted values must be within the range of "±2.58 at 0.01 significance level or ±1.96 at 0.05 significance level", and any value outside that range will be considered non-normal. At first, all variables skewness and kurtosis have not been as per the required range of acceptance, although the Kolmogorov-Smirnova and Shapiro-Wilk test results shows a significance level $p < 0.001$. Thus, as per Osborne in 2010, enhancing the normal has taken place via using the square root method (SRS). Subsequently, the results for all variables have demonstrated a significant enhancement as per skewness and kurtosis acceptance range and resulted in having all ten variables normally distributed.

8.5. Frequencies analysis of the variables findings discussion

The replies are rated for the 51 questions with the Likert scale of 7, where 7 represented strongly agree, and 1 represents strongly disagree. The highest frequencies responses are at a scale of 7 = strongly agree and 6 = agree. This is a piece of strong evidence that there is a high level of consensus among the survey participants about the importance of publishing the strategy via the top-down method and reporting its performance as a bottom-up method within the project-based organisations in the public sector. The project initiative diffusion practice P_Pract_{SR} has the highest-ranked frequency, followed by program initiative diffusion practice Pr_Pract_{SR}, Organisational Culture OC_{SR}, strategy initiative diffusion practice S_Pract_{SR}, portfolio initiative diffusion practice Po_Pract_{SR}, project performance P_Perf_{SR}, portfolio performance P_Perf_{SR}, organisational performance OP_{SR}, program performance Pr_Perf_{SR}, and strategy performance S_Perf_{SR} in the same order.

In summary, it is noticed that the range of the Means score related to the variables is quite small from 1.587 to 2.352, with the highest range which can be taken from 1.965 including all the strategy diffusion (top-down) practices along with the organisational culture variables. This result shows that more than 97.26% of the contributors decide on the substantial adapting the strategy diffusion (top-down) drivers, and the performance reporting (bottom-up) drivers at the four levels of the project-based organisation (Strategy, Portfolio, Program, and Project) levels, as well as including with it the substantial adoption of the organisational culture, in order to enhance the organisational performance outcomes within a project-based organisation.

Regarding strategy initiative diffusion practice, a score about 97.9% supports this variable overall aspect in focusing on knowledge and persuasion of strategy initiatives derivers, and strategy initiatives vision/benefits, deciding and evaluating on strategy initiatives data analysis, and strategy initiatives versus organisational values, and implementing and adapting of strategic initiatives risk communication, and strategic initiatives key performance indicators within project-based organisations.

These results specify a degree of applying the strategy initiative diffusion practice of carefully chosen aspects; it also illustrates a high ratio of strategy initiative diffusion practice in the project-based organisations. On the other hand, about 0.9% is undecided, and around 1.2% is measured as not executing the strategy initiative diffusion fundamentals, which may produce a very minor issue or can be a negligible issue on supporting the emergence of organisational performance outcomes within project-based organisations. These findings are in line with Poister *et al.'s* (2010) findings which explored the linkage between the strategy management process and organisational performance improvement in the public sector.

Regarding portfolio initiative diffusion practice, a score of about 97% supports this variable overall aspect in focusing on knowledge and persuasion of portfolio translation from strategic

initiatives, deciding and evaluating on confirming new investment needs, and project types based on market needs, and implementing and adapting of project portfolio charters, and portfolio risk management within project-based organisations. These results specify a degree of applying the portfolio initiative diffusion practice of carefully chosen aspects, as well as illustrating a high ratio of portfolio initiative diffusion practice in the project-based organisations. On the other hand, about 2.5% is undecided, and around 0.4% is measured not executing the portfolio initiative diffusion fundamentals, which may produce a very minor issue or can be a negligible issue on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding program initiative diffusion practice, a score about 96.7% supports this variable overall aspect in focusing on knowledge and persuasion of program expected benefits, and program stakeholder roles and responsibilities, deciding and evaluating on program selection, and program data, and implementing and adapting of program resource plan, and program change management within project-based organisations. These results specify a degree of applying the program initiative diffusion practice of carefully chosen aspects, as well as illustrating a high ratio of program initiative diffusion practice in the project-based organisations. On the other hand, about 2.3% is undecided, and around 0.9% is measured not executing the program initiative diffusion fundamentals, which may produce a very minor issue or can be a negligible issue on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding project initiative diffusion practice, a score about 97% supports this variable overall aspect in focusing on knowledge and persuasion of project constraints and project risks deciding and evaluating a project's constraints, project's methods and roles, project decisions' communication, and implementing and adapting project cost control, project stakeholder engagement, and project change management within project-based organisations. These results

specify a degree of applying the project initiative diffusion practice of carefully chosen aspects, as well as illustrating a high ratio of project initiative diffusion practice in the project-based organisations. On the other hand, about 1.9% is undecided, and around 1.1% is measured not executing the project initiative diffusion fundamentals, which may produce a very minor issue or can be a negligible issue on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding strategy performance, a score about 97.7% supports this variable overall aspect in focusing on strategic initiatives stakeholder satisfaction level, strategic initiatives revenue expectation level, and if strategic initiatives adapted to their environmental conditions within project-based organisations. These results specify a satisfaction level of the correspondents about the strategy performance selected indicators, as well as illustrating a high percentage of strategy performance results in the project-based organisations. On the other hand, about 2.2% is undecided, and none has showed interest in executing the strategy performance measures, which can be considered as a negligible ratio, as it is not impacting on supporting the emergence of organisational performance outcomes within project-based organisations. Similar consistent findings are found by Poister *et al.* (2010) that the method utilised for strategy implementation has consequences on organisation's performance and outcomes. Furthermore, Poister *et al.* (2010) found that applying performance measures to control and monitor the development of strategic initiatives drives to enhanced outcomes.

Regarding portfolio performance, a score about 96.7% supports this variable overall aspect in focusing on portfolio performance measures via knowing if portfolio within project-based organisations has the right number of projects, contains high-value projects, has budget allocation based on business strategy, meets the stakeholder satisfaction level. These results specify a satisfaction level of the correspondents about the portfolio performance selected indicators, as well as illustrating a high percentage of portfolio performance results in the

project-based organisations. On the other hand, about 3% is undecided, and 0.3% is measured not to executing the portfolio performance measures, which may be considered as a negligible ratio, as it is not impacting on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding program performance, a score about 97.1% supports this variable overall aspect in focusing on program reflecting the business strategy, program stakeholders' satisfaction level, and program achievement of cost-benefits objectives within project-based organisations. These results specify a satisfaction level of the correspondents about the program performance selected indicators, as well as illustrating a high percentage of program performance results in the project-based organisations. On the other hand, about 2.5% is undecided, and 0.1% is measured not to executing the program performance measures, which may be considered as a negligible ratio, as it is not impacting on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding project performance, a score about 97.5% supports this variable overall aspect in focusing on project performance measures via knowing if projects meeting their business purposes, technical performance goals, schedule objectives, budget limits, and project stakeholders' satisfaction results, within project-based organisations. These results specify a satisfaction level of the correspondents about the project performance selected indicators, as well as illustrating a high percentage of project performance results in the project-based organisations. On the other hand, about 1.5% is undecided, and 1% is measured not to executing the project performance measures, which may be considered as a negligible ratio, as it is not impacting on supporting the emergence of organisational performance outcomes within project-based organisations.

Regarding organisational culture involvement practice, a score about 97% supports this variable overall aspect in focusing on empowerment involvement through availability of information for decisions level, and knowledge sharing, team orientation involvement work done through teamwork, and work is organized as per organisation's goals, and capability development involvement through delegation, and giving authority within project-based organisations. These results specify a degree of applying the organisational culture involvement practice of carefully chosen aspects, as well as suggesting the adoption of this concept to support the emergence of organisational performance within project-based organisations. On the other hand, about 1.6% is undecided, and around 1.4% is measured not to adopting the organisational culture involvement fundamentals, which may produce a very minor issue or can be a negligible issue on supporting the emergence of organisational performance outcomes within project-based organisations.

This finding confirms the view of Molina *et al.* (2019), which concludes that there is a high association among hierarchal levels (strategic, executive, and operational) and the organisational culture. Furthermore, findings are in line with Nikpour's (2017) findings, where he found that there is impact of organisational culture on organisational performance.

Regarding organisational performance, a score about 98% supports this variable overall aspect in focusing on organisational performance measures via knowing the satisfaction level of organisational results as overall, organisational market share results, organisational profitability results, organisational employee satisfaction results, and organisational opportunities development capability results within project-based organisations. These results specify a satisfaction level of the correspondents about the organisational performance selected indicators, as well as illustrating a high percentage of organisational performance results in the project-based organisations that support the research proposal about strategy diffusion practices (top-down) and performance feedback as a bottom-up approach for all project-based

organisation including strategy, portfolio, program, and project levels. On the other hand, about 1.6% is undecided, and 0.4% considering the strategy diffusion (top-down) and performance (bottom-up) in project-based organisations will not support the emergence of organisational performance measures, which may be considered as a negligible ratio compare to the domination of responses that agree on it.

8.6. Association analysis findings discussion

Primarily, for the initial hypothesis testing, Pearson and Spearman's Correlation tests were conducted to define the initial type of association between the independent variables and dependent variables. First, the testing of the correlation has taken place between the strategy diffusion (top-down) drivers for the each of the organisation hierarchy level, counting strategy, portfolio, program, and project level and the organisational performance within project-based organisations.

Strategy initiative diffusion practice (S_Prac_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates applying a higher level of strategy initiative diffusion practice will increase the enhancement of organisational performance within project-based organisations. Similarly, (Byungnam Lee & Chee 1996; Allen & Helms 2006; Saunders, Mann & Smith 2008; Lechner & Floyd 2012; David 2011; Kodukula 2014; Monday *et al.* 2015; Mohamud & Mohamud 2015; Walter, Lechner & Kellermanns 2016; Kunisch *et al.* 2019) had found same findings on their empirical studies that revealed a statistically significant relationship between strategic management and firm performance. This means that strategic management concept has a high possibility to be applied within the project-based organisations at a strategic level, in order to increase the organisational performance.

Portfolio initiative diffusion practice (Po_Prac_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio initiative diffusion practice will increase the growth of organisational performance within project-based organisations. Similarly, scholars like Levine (2005), Filippov, Mooi and Weg (2012), Unger, Germunden and Aubry (2012), Martinsuo (2013), Beringer *et al.* (2013), Kopmann *et al.* (2017), PMI (2017), and Abubakar *et al.* (2018) observed in their studies a positive correlation between portfolios project management and the business success. This means that the portfolio management concept has a high possibility to be applied within the project-based organisations at a portfolio level, in order to increase the organisational performance.

Program initiative diffusion practice (Pr_Prac_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program initiative diffusion practice will increase the growth of organisational performance within project-based organisations. The same results have been proved by researchers like Ribbers and Schoo (2002), Thiry (2004a, 2004b, 2010), Blomquist and Müller (2006), and PMI (2017) that program management have positive impact on the business outcomes. This means that the program management notion has a high possibility to be applied within the project-based organisations at a program level, in order to increase the organisational performance.

Project initiative diffusion practice (P_PracSR) is significantly and positively correlated with Organisational Performance (OPSR) at $p < 0.01$, which indicates that applying a higher level of Project initiative diffusion practice will increase the progress of organisational performance within project-based organisations. Likewise, as approved by several scholars like Khoshgoftar and Osman (2009), Dietrich and Lehtonen (2005), Shenhar *et al.* (2007), Buys and Stander (2010), Meskendahl (2010), Patanakul and Shenhar (2012), Serra and Kunc (2015), PMI (2017), Papke-Shields and Boyer-Wright (2017), and Musawir *et al.* (2017) the findings are

found to be the same, where project management should deal with corporate aspects in order to support their organisation's strategy and understand corporate needs; this, it is argued, ultimately leads to achieving business success. This means that the project management aspect has a huge opportunity to be applied within the project-based organisations at a project level, in order to increase the organisational performance.

These distinguishing results confirm that there is a direct relationship and positive correlation at micro organisational levels, which verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), Project initiative diffusion practice (P_Prac_{SR})) and the organisational performance; accordingly, hypotheses H1a, H2a, H3a, and H4a initially are accepted.

Secondly, the testing of the correlation is conducted between the strategy diffusion (top-down) drivers and the performance (bottom-up) drivers within each of the organisation hierarchy level strategy, portfolio, program, and project level within project-based organisations.

Strategy initiative diffusion practice (S_Prac_{SR}) is significantly and positively correlated with Strategy performance (S_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Strategy initiative diffusion practice will increase the enhancement of Strategy performance within project-based organisations. This finding is supported by numerous researchers like Hoque (2004), Lechner and Floyd (2012), Walter *et al.* (2016), Lee *et al.* (2016), and Musawir *et al.* (2017). They indicated a significant and positive association between strategy management and strategy performance results, which means that strategic management concept has a high possibility to be applied within the project-based organisations at a strategic level, in order to increase the strategy performance.

Portfolio initiative diffusion practice (Po_Prac_{SR}) is significantly and positively correlated with Portfolio performance (Po_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio initiative diffusion practice will increase the enhancement of Portfolio performance within project-based organisations. Similarly, the findings of the positive relationship between portfolio management and project portfolio performance are supported with evidences by many scholars like Levine (2005), Müller, Martinsuo and Blomquist (2008), Teller *et al.* (2012), Meskendahl (2010), and PMI (2017), which means that the portfolio management concept has a high possibility to be applied within the project-based organisations at a portfolio level, in order to increase the Portfolio performance.

Program initiative diffusion practice (Pr_Prac_{SR}) is significantly and positively correlated with Program performance (Pr_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program initiative diffusion practice will increase the enhancement of Program performance within project-based organisations. Similarly, these findings are supported by scholars like Thiry (2004a, 2004b), Shao and Müller (2011), Musawir *et al.* (2017), and PMI (2017), which means that the program management notion has a high possibility to be applied within the project-based organisations at a program level, in order to increase the Program performance.

Project initiative diffusion practice (P_Prac_{SR}) is significantly and positively correlated with Project performance (P_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Project initiative diffusion practice will increase the enhancement of Project performance within project-based organisations. Likewise, these findings are supported by many scholars like Shenhar *et al.* (2007), Meskendahl (2010), Patanakul and Shenhar (2012), Musawir *et al.* (2017), Papke-Shields and Boyer-Wright (2017), and PMI (2017) where the project management should focus on carrying out their performance. This means that the project management aspect has a huge opportunity to be applied within the project-based organisations at a project level, in order to increase the Project performance.

These distinguishing results confirm that there are a direct relation and positive correlation at micro organisational levels, which verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) with the performance variables (Strategy performance (S_Perf_{SR}), Portfolio performance (Po_Perf_{SR}), Program performance (Pr_Perf_{SR}), and Project performance (P_Perf_{SR})); accordingly, hypotheses H1b, H2b, H3b, and H4b partially are accepted.

Third step, the testing of the correlation has taken place between the performance (bottom-up) drivers for each of the organisation hierarchy level, at strategy, portfolio, program, and project levels and the organisational performance within project-based organisations.

Strategy performance (S_Perf_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Strategy performance will increase the enhancement of organisational performance within project-based organisations. This finding is supported by many researchers like Hoque (2004), de Waal (2007), and Pollanen *et al.* (2017) who have found that strategic performance measures are positively associated with firms' performance. This means that strategic management performance concept has a high possibility to be applied within the project-based organisations at a strategic level, in order to increase the organisational performance.

Portfolio performance (Po_Perf_{R}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio performance will increase the development of organisational performance within project-based organisations. Similarly, several researchers have experimented a positive influence of portfolio success on business outcomes, such as Cooper *et al.* (2000), Artto and Dietrich

(2007), Killen *et al.* (2008), and Meskendahl (2010), which means that the portfolio management performance concept has a high possibility to be applied within the project-based organisations at a portfolio level, in order to increase the organisational performance.

Program performance (Pr_Perf_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program performance will increase the growth of organisational performance within project-based organisations. Similarly, as per Thiry (2004a, 2004b) and PMI (2017) that program management performance key role is to validate the firms' needs including the positive impact on the business outcomes, which means that the program management notion has a high possibility to be applied within the project-based organisations at a program level, in order to increase the organisational performance.

Project performance (Pr_Perf_{SR}) was significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicated a higher level of Project performance is applied would increase the progress of organisational performance within project-based organisations. Likewise, Milosevic and Srivannaboon (2006), Shenhar *et al.* (2007), Meskendahl (2010), Patanakul and Shenhar (2012), Bonghez and Grigoroiu (2013), and PMI (2017) found the same findings, where the project performance management should be adapted to achieving business success, which means that the project management performance aspect has a huge opportunity to be applied within the project-based organisations at a project level, in order to increase the organisational performance.

These distinguishing results indicate a positive correlation at micro levels, which verifies the relationship of positive influence between all the performance variables and the organisational performance variable; accordingly, hypotheses H1b, H2b, H3b, and H4b partially are accepted.

It is noticed that the integrated facet of the second and third steps are confirmed and that there is indirect relation with positive correlation at each organisational level. This verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and the organisational performance, through mediating variables of the performance (Strategy performance (S_Perf_{SR}), Portfolio performance (Po_Perf_{SR}), Program performance (Pr_Perf_{SR}), and Project performance (P_Perf_{SR})). Accordingly, hypotheses **H1b, H2b, H3b, and H4b** initially are accepted and needs further investigation to check performance derivers' influences as mediators, which will be illustrated clearly in the following section.

Fourthly, Strategy initiative diffusion practice (S_Prac_{SR}) is significantly and positively correlated with Organisational Culture (OC_{SR}) at $p < 0.01$, which indicates that applying a higher level of Strategy initiative diffusion practice will increase the enhancement of Organisational Culture within project-based organisations. Similarly, Denison (2000), Hoque (2004), David (2011), and Martinsuo and Killen (2014) had found the same results on their empirical studies that show a relationship between strategic management and firm Culture. This means that strategic management concept has a high possibility to be applied along with the organisational culture concept within the project-based organisations at a strategic level, in order to enhance the business success.

Portfolio initiative diffusion practice (Po_Prac_{SR}) is significantly and positively correlated with Organisational Culture (OC_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio initiative diffusion practice will increase the growth of Organisational Culture within project-based organisations. Similarly, as proved by Martinsuo and Killen (2014), Unger, Rank and Gemunden (2014), and Wiersma (2017), portfolios project management practice increases in culture via strategy alignment and stakeholder involvement, which means that the portfolio

management concept has a high possibility to be applied along with the organisational culture concept within the project-based organisations at a portfolio level, in order to enhance the business success.

Program initiative diffusion practice (Pr_Prac_{SR}) is significantly and positively correlated with Organisational Culture (OC_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program initiative diffusion practice will increase the growth of Organisational Culture within project-based organisations. Similarly, as indicated by Lycett *et al.* (2004) there is alignment between organisational culture and program management, which means that the program management notion has a high possibility to be applied along with the organisational culture concept within the project-based organisations at a program level, in order to enhance the business success.

Project initiative diffusion practice (P_Prac_{SR}) is significantly and positively correlated with Organisational Culture (OC_{SR}) at $p < 0.01$, which indicates that applying a higher level of Project initiative diffusion practice will increase the progress of Organisational Culture within project-based organisations. Likewise, Gu *et al.* (2014), Unger, Rank and Gemunden (2014), and Aronson (2015) found the same results that support the theory in terms of there being a relationship between project management and firm Culture. This means that the project management aspect has a huge opportunity to be applied along with the organisational culture concept within the project-based organisations at a project level, in order to enhance the business success.

These distinguishing results confirm that there is a direct relation and positive correlation at micro organisational levels, which verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and

Project initiative diffusion practice (P_Prac_{SR})) and the Organisational Culture, accordingly, hypotheses H1c, H2c, H3c, and H4c partially are accepted.

As a fifth step, Organisational Culture (OC_{SR}) is significantly and positively correlated with Organisational Performance (OP_{SR}) at $p < 0.01$, which indicates that applying a higher level of Organisational Culture will increase the progress of Organisational Performance within project-based organisations. Likewise, Yilmaz and Ergun (2008), Gallagher, Brown and Brown (2008), Hartnell, Ou and Kinicki (2011), Boyce *et al.* (2015), Wiersma (2017), and Nikpour (2017) had found the same results, where the positive impact is approved for the organisational culture on organisational performance. This means that the Organisational Culture aspect has a huge opportunity to be applied within the project-based organisations at a project level, in order to enhance the Organisational Performance. Kotter and Heskett (2011) believed that organisational culture has ability to increase the organisation performance.

It is noticed that the integrated facet of the fourth and fifth steps are confirmed that there are indirect relationships with positive correlation at each organisational levels, which verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and the organisational performance, through mediating variables of the Organisational Culture. Accordingly, hypotheses **H1c, H2c, H3c, and H4c** initially are accepted and need further investigation to check Organisational Culture influences as a mediator, which will be illustrated clearly in the following section.

The sixth step is done to check the strategy diffusion (top-down) derivers influences to each other. Strategy initiative diffusion practice (S_Prac_{SR}) is significantly and positively correlated with Portfolio initiative diffusion practice (Po_Prac_{SR}) at $p < 0.01$, which indicated that

applying a higher level of Strategy initiative diffusion practice will increase the appearance of Portfolio initiative diffusion practice within project-based organisations. Similarly, Portfolio initiative diffusion practice (Po_Prac_{SR}) is significantly and positively correlated with Program initiative diffusion practice (Pr_Prac_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio initiative diffusion practice will increase the appearance of Program initiative diffusion practice within project-based organisations.

Likewise, Program initiative diffusion practice (Pr_Prac_{SR}) is significantly and positively correlated with Project initiative diffusion practice (P_Prac_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program initiative diffusion practice will increase the appearance of Project initiative diffusion practice within project-based organisations.

Similarly, the top-down method effectiveness is approved by Milosevic and Srivannaboon (2006) and Killen *et al.* (2012), where the relationships between strategy management, portfolio management, program management, and project management have been discovered for more than two decades by researches. This means that the strategy diffusion (top-down) method through strategy management, portfolio management, program management, project management hierarchy concept has a high possibility to be applied easily within the project-based organisations, to increase the emergence of the organisational performance.

This distinguishing result confirm that there are a direct relation and positive correlation at macro organisational levels, which verifies the relationship of positive influence between the strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}) and Portfolio initiative diffusion practice (Po_Prac_{SR}); between Portfolio initiative diffusion practice (Po_Prac_{SR}) and Program initiative diffusion practice (Pr_Prac_{SR}); and between Program initiative diffusion practice (Pr_Prac_{SR}) and Project initiative diffusion practice (P_Prac_{SR})). Accordingly, (top-down) hypotheses **H5a, H5b, and H5c** are accepted.

The last step is done to check the performance derivers (bottom-up) influences to each other. Strategy performance (S_Perf_{SR}) is significantly and positively correlated with Portfolio performance (Po_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Strategy performance will increase the appearance of Portfolio performance within project-based organisations. Similarly, Portfolio performance (Po_Perf_{SR}) is significantly and positively correlated with Program performance (Pr_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Portfolio performance will increase the appearance of Program performance within project-based organisations. Likewise, Program performance (Pr_Perf_{SR}) is significantly and positively correlated with Project performance (P_Perf_{SR}) at $p < 0.01$, which indicates that applying a higher level of Program performance will increase the appearance of Project performance within project-based organisations.

Similarly, scholars like Thiry (2004a, 2004b), Milosevic and Srivannaboon (2006), Müller, Martinsuo and Blomquist (2008), Killen *et al.* (2012), and PMI (2017) have found that project and program reporting are positively related with portfolio performance. This means that the performance (bottom-up) method through project performance, program performance, portfolio performance, and strategy performance hierarchy concept has a high possibility to be adopted to report to the top level of the organisation easily within the project-based organisations; in order to increase the emergence of the organisational performance.

This distinguishing result confirms that there is a direct relationship and a positive correlation at macro organisational levels, which verifies the relationship of positive influence between the performance variables, between Project performance (P_Perf_{SR}) and Program performance (Pr_Perf_{SR}); between Program performance (Pr_Perf_{SR}) and Portfolio performance (Po_Perf_{SR}); and between Portfolio performance (Po_Perf_{SR}) and Strategy performance (S_Perf_{SR}); accordingly, (bottom-up) hypotheses **H6a, H6b, and H6c** are accepted. Table 8.1 below delivers a summary of the association findings.

Table 8.1: Hypotheses association testing results

Research Questions	Research Hypotheses	Hypotheses Accepted / Rejected
Q1: How does strategy initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H1a:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted
Q2: How does portfolio initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H2a:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted
Q3: How does program initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H3a:** There is a significant relationship between program initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted
Q4: How does project initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H4a:** There is a significant relationship between project initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted
Q5: How does strategy performance impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1b:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by strategy performance in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q6: How does portfolio performance impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2b:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by portfolio performance in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q7: How does program performance impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3b:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by program performance in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q8: How does project performance impact the project initiatives diffusion	**H4b:** There is a significant relationship between project initiatives diffusion	This hypothesis requires more

practice to influence the emergence of organisational performance in the project-based organisations?	practice and the organisational performance mediated by project performance in the project-based organisations.	explanation as shown in the next section
Q9: How does organisational culture impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1c:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q10: How does organisational culture impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2c:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q11: How does organisational culture impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3c:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q12: How does organisational culture impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4c:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	This hypothesis requires more explanation as shown in the next section
Q13: How does strategy initiatives diffusion practice influence the appearance of portfolio initiatives diffusion practice in the project-based organisations?	**H5a:** There is a significant relationship between strategy initiatives diffusion practice and portfolio initiatives diffusion practice in the project-based organisations.	Accepted
Q14: How does portfolio initiatives diffusion practice influence the appearance of program initiatives diffusion practice in the project-based organisations?	**H5b:** There is a significant relationship between portfolio initiatives diffusion practice and program initiatives diffusion practice in the project-based organisations.	Accepted
Q15: How does program initiatives diffusion practice influence the appearance of project initiatives diffusion practice in the project-based organisations?	**H5c:** There is a significant relationship between program initiatives diffusion practice and project initiatives diffusion practice in the project-based organisations.	Accepted
Q16: How does project performance influence the appearance of program	**H6a:** There is a significant relationship between project performance and	Accepted

performance in the project-based organisations?	program performance in the project-based organisations.	
Q17: How does program performance influence the appearance of portfolio performance in the project-based organisations?	**H6b:** There is a significant relationship between program performance and portfolio performance in the project-based organisations.	Accepted
Q18: How does portfolio influence the appearance of strategy performance in the project-based organisations?	**H6c:** There is a significant relationship between portfolio performance and strategy performance in the project-based organisations.	Accepted

This model of Rogers' diffusion theory (Rogers 2003), David's Strategic management (David 2011), organisational hierarchy construction levels of strategy, portfolio, program and project levels (PMI 2017), (top-down) and (bottom-up) methods (Blomquist *et al.* 2010) and (Clegg *et al.* 2018), Denison's organisational culture (involvement) (Denison 2000), to organisational performance management from several scholars form the excellent situation for strategy diffusing to influence the rising of organisational performance within project-based organisations.

This exceptional model of strategy diffusion (top-down) and performance reporting (bottom-up) with organisational performance presented in this study is screening promising results that inspire implementing them as outstanding mechanisms within the project-based organisations. However, these results as are still initially accepted as it needs further investigations verify these impressions. On the other hand, testing the hypotheses and answering questions related to identified mediating roles needs expanding on the examination of theses mediators' influences, which will be debated in the next section.

8.7. Path analysis SEM findings discussion

In this section, there will be a discussion about structural equation modelling SEM findings of the research model, where a structural model for analysis using SEM, as the arrow to link the variables is controlled by the direction of hypotheses. The double-headed arrow is used to study the correlational effects between constructs, while the single headed arrow is used to assess the direct effect or causal effect. In structural equation modelling, the scholar can analyse and model the multiple relationships amongst the required variables at once (Afthanorhan & Ahmad 2014).

Hence, to facilitate the associations and for better understanding there are three models constructed including the initial model, model 1 and model 2. Starting with the initial model that was constructed to examine only the direct relationships between strategy diffusion derivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance. Then, the initial model was ungraded to model 1, which was constructed to examine the direct relationships between strategy diffusion derivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance. This was also in addition to the indirect relationships between the same strategy diffusion derivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance with checking the mediation roles of the organisational culture.

Ultimately, the final model (Model 2), was constructed to examine all the associations for this research at once. For instance, to assess the direct relationships between strategy diffusion derivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance. This was in addition to the indirect relationships between the same strategy diffusion drivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance with checking the mediation roles of the organisational culture. Then, the assessment is extended to cover the indirect relationships between the same strategy diffusion derivers (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})) and organisational performance with checking the mediation roles of the performance levels (Strategy performance (S_Perf_{SR}), Portfolio performance (Po_Perf_{SR}), Program performance (Pr_Perf_{SR}), and Project performance (P_Perf_{SR})). Finally, there will be a result clarification for both top-down and bottom-up hypotheses.

The model 1 fitting analysis result revealed a perfect fit. Hence, this structural model is acceptable. The results of regression analysis explain the significant mediation effect of organisational culture on the association between all the strategy diffusion measurements and the organisational performance. Therefore, the results are highly support of the hypotheses as the Beta coefficients were within the range of 0.127 and 0.383 and the value of $p<0.001$ for all mediation links except for 2 links the value is $p<0.05$, which is also supporting the hypotheses

Starting with direct relationships, both model 1 and model 2 prove that only two direct relationships are found for strategy initiative diffusion practice (S_Prac_{SR}) predicting organisational performance (OP_{SR}), and project initiative diffusion practice (P_Prac_{SR})

predicting organisational performance (OP_{SR}), which means that the strategy initiative diffusion practice predicting the organisational performance within project-based organisations will lead to an increase in the organisational performance. This rising contributes to increasing the results of organisational performance through adapting the strategy initiative diffusion practice within project-based organisations. Likewise, similar findings were discovered by scholars like Byungnam Lee and Chee (1996), Allen and Helms (2006), Saunders, Mann and Smith (2008), Lechner and Floyd (2012), David (2011), Kodukula (2014), Monday *et al.* (2015), Mohamud and Mohamud (2015), Walter, Lechner and Kellermanns (2016), and Kunisch *et al.* (2019). Hence, hypothesis **H1a** is accepted, as shown in table 8.2.

For the project initiative diffusion practice, this means that the project initiative diffusion practice predicting the organisational performance within project-based organisations will lead to an increase in the organisational performance. This rising contributes to increasing the results of organisational performance through adapting the project initiative diffusion practice within project-based organisations. The same results were found by researchers like Khoshgoftar and Osman (2009), Dietrich and Lehtonen (2005), Shenhar *et al.* (2007), Buys and Stander (2010), Meskendahl (2010), Patanakul and Shenhar (2012), Serra and Kunc (2015), PMI (2017), Papke-Shields and Boyer-Wright (2017), and Musawir *et al.* (2017). Hence, hypothesis **H4a** is accepted, as shown in table 8.2.

However, from the initial model the direct relationships are found for portfolio initiative diffusion practice (Po_Prac_{SR}) predicting organisational performance (OP_{SR}), and program initiative diffusion practice (Pr_Prac_{SR}) predicting organisational performance (OP_{SR}), which means that the portfolio initiative diffusion practice and the program initiative diffusion practice are also predicting the organisational performance within project-based organisations will lead to an increase in the organisational performance. This rising contributes to increasing the results of organisational performance through adapting the portfolio initiative diffusion

practice and the program initiative diffusion practice within project-based organisations. Hence, hypotheses **H2a and H3a** are accepted in the initial model, as shown in table 8.2.

For strategy initiative diffusion practice (S_Prac_{SR}), organisational culture (OC_{SR}) has a positive influence on strategy initiative diffusion practice (S_Prac_{SR}) predicting organisational performance (OP_{SR}), which means that organisational culture as a mediator on strategy initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Organisational culture has increased the association between strategy initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the strategy initiative diffusion practice within project-based organisations with high level of organisational culture involvement. Likewise, researchers like Denison (2000), Hoque (2004), David (2011), and Martinsuo and Killen (2014) had found same results on their empirical studies indicating that the organisational culture mediation role between the strategic management and firm performance is very important to enhance the organisational performance within the project-based organisations at a strategic level.

In portfolio initiative diffusion practice (Po_Prac_{SR}), where organisational culture (OC_{SR}) has a positive influence on portfolio initiative diffusion practice (Po_Prac_{SR}) predicting organisational performance (OP_{SR}) means that organisational culture as a mediator on portfolio initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Organisational culture has increased the association between portfolio initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the portfolio initiative diffusion practice within project-based organisations with high level of organisational culture involvement. Likewise, researchers like Martinsuo and Killen (2014), Unger, Rank and Gemunden (2014), and Wiersma (2017) had found the

same results, where portfolios project management practice increases in culture scale via strategy alignment and stakeholder involvement, which indicating that the organisational culture mediation role between the portfolio management and firm performance is very important to enhance the organisational performance within the project-based organisations at portfolio level.

In program initiative diffusion practice (Pr_Prac_{SR}), where organisational culture (OC_{SR}) has a positive influence on program initiative diffusion practice (Pr_Prac_{SR}) predicting organisational performance (OP_{SR}), this means that organisational culture as a mediator on program initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Organisational culture has increased the association between program initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the program initiative diffusion practice within project-based organisations with high level of organisational culture involvement. Likewise, researchers like Lycett *et al.* (2004) had found the same results, where program project management practice increases in culture scale via strategy alignment and stakeholder involvement, indicating that the organisational culture mediation role between the program management and firm performance is very important to enhance the organisational performance within the project-based organisations at program level.

In project initiative diffusion practice (P_Prac_{SR}), where organisational culture (OC_{SR}) has a positive influence on project initiative diffusion practice (P_Prac_{SR}) predicting organisational performance (OP_{SR}), which means that organisational culture as a mediator on project initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Organisational culture has increased the association between project initiative diffusion practice and organisational performance.

This rising contributes to increasing the results of organisational performance through adapting the project initiative diffusion practice within project-based organisations with high level of organisational culture involvement. Likewise, researchers like Gu *et al.* (2014), Unger, Rank and Gemunden (2014), and Aronson (2015) had found the same results, where project management practice increases with existence of an organisational cultural as a contributing factor to increase the organisational performance, indicating that the organisational culture mediation role between the project management and firm performance is very important to enhance the organisational performance within the project-based organisations at the project level.

In summary, it is confirmed from these findings that organisational culture as a mediator implies a casual effect on the independent variables and antecedent causal effect of the dependent variable is positively involved in the rising the effect. This means that by employing organisational culture as a moderator in strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}) will strongly lead to enhance the organisational performance within project-based organisations. Accordingly, hypotheses **H1c, H2c, H3c, and H4c** are accepted, as shown in table 8.4.

Fitting analysis result for model 2 has determined its acceptance within the ranges. Hence, this structural model is suitable for the research. Starting with strategy initiative diffusion practice (S_Prac_{SR}) where strategy performance (S_Perf_{SR}) has a positive influence on strategy initiative diffusion practice (S_Prac_{SR}) predicting organisational performance (OP_{SR}), which means that strategy performance as a mediator on strategy initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Strategy performance has increased the association between strategy initiative diffusion practice and organisational performance. This rising

contributes to increasing the results of organisational performance through adapting the strategy initiative diffusion practice within project-based organisations with a high level of strategy performance contribution. Likewise, researchers like Hoque (2004), de Waal (2007), and Pollanen *et al.* (2017) had found the same results on their empirical studies. This indicates that the strategy performance mediation role between the strategic management and firm performance is very important to enhance the organisational performance within the project-based organisations at a strategic level.

In portfolio initiative diffusion practice (Po_Prac_{SR}) where portfolio performance (Po_Perf_{SR}) has a positive influence on portfolio initiative diffusion practice (Po_Prac_{SR}) predicting organisational performance (OP_{SR}), this means that portfolio performance as a mediator on portfolio initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Portfolio performance has increased the association between portfolio initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the portfolio initiative diffusion practice within project-based organisations with high level of portfolio performance participation. Likewise, researchers like Cooper *et al.* (2000), Artto and Dietrich (2007), Killen *et al.* (2008), and Meskendahl (2010) had found the same results, where portfolios project management practice increases in portfolio performance, indicating that the portfolio performance mediation role between the portfolio management and firm performance is very important to enhance the organisational performance within the project-based organisations at portfolio level.

In program initiative diffusion practice (Pr_Prac_{SR}) where program performance (Pr_Perf_{SR}) has a positive influence on program initiative diffusion practice (Pr_Prac_{SR}) predicting organisational performance (OP_{SR}), this means that program performance as a mediator on program initiative diffusion practice predicting organisational performance within project-

based organisations will lead to an increase in the organisational performance. Program performance has increased the association between program initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the program initiative diffusion practice within project-based organisations with a high level of program performance connection. Likewise, researchers like Thiry (2004a, 2004b) and PMI (2017) had found the same results, where program project management practice increases in program performance, which indicating that the program performance mediation role between the program management and firm performance is very important to enhance the organisational performance within the project-based organisations at the program level.

In project initiative diffusion practice (P_Prac_{SR}), where project performance (P_Perf_{R}) has a positive influence on project initiative diffusion practice (P_Prac_{SR}) predicting organisational performance (OP_{SR}), this means that project performance as a mediator on project initiative diffusion practice predicting organisational performance within project-based organisations will lead to an increase in the organisational performance. Project performance has increased the association between project initiative diffusion practice and organisational performance. This rising contributes to increasing the results of organisational performance through adapting the project initiative diffusion practice within project-based organisations with high level of project performance involvement. Likewise, researchers like Milosevic and Srivannaboon (2006), Shenhar *et al.* (2007), Meskendahl (2010), Patanakul and Shenhar (2012), Bonghez and Grigoroiu (2013), and PMI (2017) had found the same results, where project management practice increases with existence of a project performance as a contributing factor to increase the organisational performance, indicating that the project performance mediation role between the project management and firm performance is very important to enhance the organisational performance within the project-based organisations at project level.

In summary, it is confirmed from these findings that the performance derivers of (Strategy performance (S_Perf_{SR}), Portfolio performance (Po_Perf_{SR}), Program performance (Pr_Perf_{SR}), and Project performance (P_Perf_{SR})) as mediators suggest causal effects on the independent variables and antecedent causal effects of the dependent variable are positively contributing in expanding the effects. This means that by employing these performance derivers as moderators in strategy diffusion variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR}) will significantly lead to enhance the organisational performance within project-based organisations. Accordingly, hypotheses **H1b, H2b, H3b, and H4b** are accepted, as shown in table 8.3.

With respect to strategy diffusion (top-down) method results for the independent variables (Strategy initiative diffusion practice (S_Prac_{SR}), Portfolio initiative diffusion practice (Po_Prac_{SR}), Program initiative diffusion practice (Pr_Prac_{SR}), and Project initiative diffusion practice (P_Prac_{SR})), both model 1 and model 2 have the same satisfaction results proving the required hypotheses linked to it, including H5a, H5b, and H5c. This is because both models have high positive correlations, variances, and covariances coefficients at significant level of $p<0.001$ for all the strategy diffusion (top-down) relationships (between Strategy initiative diffusion practice and Portfolio initiative diffusion practice; then between Portfolio initiative diffusion practice and Program initiative diffusion practice; and between Program initiative diffusion practice and Project initiative diffusion practice). Hence, hypotheses **H5a, H5b, and H5c** are accepted, as shown in table 8.5. The same finding was supported by scholars like Milosevic and Srivannaboon (2006) and Killen *et al.* (2012), which means this is the perfect association to implement within project-based organisation to enhance the organisation performance.

In regards to performance reporting (bottom-up) method results for the independent variables (Strategy performance (S_Perf_{SR}), Portfolio performance (Po_Perf_{SR}), Program performance (Pr_Perf_{SR}), and Project performance (P_Perf_{SR})), model 2 has the fitting results confirming the required hypotheses related to H6a, H6b, and H6c. This is because of model 2 showing the associations with high positive Beta for the regression weights at significant level of $p<0.001$ for all the performance reporting (bottom-up) derivers' associations (between Project performance and Program performance; then between Program performance and Portfolio performance; and Finally between Portfolio performance and Strategy performance). Hence, hypotheses **H6a, H6b, and H6c** are accepted, as shown in table 8.6. The same finding was supported by scholars like Thiry (2004a, 2004b), Milosevic and Srivannaboon (2006), Müller, Martinsuo and Blomquist (2008), Killen *et al.* (2012), and PMI (2017), which means this is the perfect association to implement within project-based organisation to enhance the organisation performance.

Table 8.2: Regression summary (direct)

No	Independent Variable X (Predictor)	Dependent Variable Y (Outcome)	Correlation (SPSS)	Regression (AMOS)		
				Direct X on Y		
				Model- Initial	Model - 1	Model 2 - Final
1	S_Prac_{SR}	OP_{RS}	Yes Positive Effect Accept H1a	Yes Positive Effect Accept H1a	Yes Positive Effect Accept H1a	Yes (low) Positive Effect Accept H1a
2	Po_Prac_{SR}	OP_{RS}	Yes Positive Effect Accept H2a	Yes (low) Positive Effect Accept H2a	No Effect Not Accept H2a	No Effect Not Accept H2a
3	Pr_Prac_{SR}	OP_{RS}	Yes Positive Effect	Yes (low) Positive	No Effect	No Effect

			Accept H3a	Effect Accept H3a	Not Accept H3a	Not Accept H3a
4	P_Prac_{SR}	OP_{RS}	Yes Positive Effect Accept H4a	Yes Positive Effect Accept H4a	Yes Positive Effect Accept H4a	No Effect Not Accept H4a

Table 8.3: Regression summary (performance variables as mediators)

No	Independent Variable X (Predictor)	Dependent Variable Y (Outcome)	Regression (AMOS)
			Performance drivers (S_Perf),(Po_Perf),(Pr_Perf),(P_Perf) as Mediator on X to Y
			Model 2 - Final
1	S_Prac_{SR}	OP_{RS}	Yes Positive Effect (Partially-Mediation) Accept H1b
2	Po_Prac_{SR}	OP_{RS}	Yes Positive Effect (Multi-Full Mediations) Accept H2b
3	Pr_Prac_{SR}	OP_{RS}	Yes Positive Effect (Full-Mediation) Accept H3b
4	P_Prac_{SR}	OP_{RS}	Yes Positive Effect (Multi-Full Mediations) Accept H4b

Table 8.4: Regression summary (organisational culture as a mediator)

No		Dependent Variable	Regression (AMOS)

	Independent Variable X (Predictor)	Y (Outcome)	OC as Mediator on X to Y	
			Model - 1	Model 2 - Final
1	S_Prac_{SR}	OP_{RS}	Yes (low) Positive Effect Accept H1c	No Effect Not Accept H1c
2	Po_Prac_{SR}	OP_{RS}	Yes (low) Positive Effect Accept H2c	Yes Positive Effect Accept H2c
3	Pr_Prac_{SR}	OP_{RS}	Yes Positive Effect Accept H3c	Yes Positive Effect Accept H3c
4	P_Prac_{SR}	OP_{RS}	Yes Positive Effect Accept H4c	Yes Positive Effect Accept 4c

Table 8.5: Regression summary (strategy diffusion top-down)

No	Independent Variable	Independent Variable	Correlation (SPSS)	Correlations/Covariances (AMOS)		
				Between Variables		
				Model- Initial	Model - 1	Model 2-Final
1	S_Prac	Po_Prac	Yes Positive Effect Accept H5a	Yes Positive Effect Accept H5a	Yes Positive Effect Accept H5a	Yes Positive Effect Accept H5a
2	Po_Prac	Pr_Prac	Yes Positive Effect Accept H5b	Yes Positive Effect Accept H5b	Yes Positive Effect Accept H5b	Yes Positive Effect Accept H5b

3	Pr_Prac	P_Prac	Yes Positive Effect Accept H5c	Yes Positive Effect Accept H5c	Yes Positive Effect Accept H5c	Yes Positive Effect Accept H5c

Table 8.6: Regression summary (performance bottom-up)

No	Independent Variable Predictor	Independent Variable Outcome	Correlation (SPSS)	Regression (AMOS) Predictor → outcome Model-2 Final
1	Po_Perf	S_Perf	Yes Positive Effect Accept H6c	Yes Positive Effect Accept H6c
2	Pr_Perf	Po_Perf	Yes Positive Effect Accept H6b	Yes Positive Effect Accept H6b
3	P_Perf	Pr_Perf	Yes Positive Effect Accept H6a	Yes Positive Effect Accept H6a

Table 8.7: Hypotheses SEM path analysis testing results

Research questions	Research hypotheses	Hypotheses accepted / rejected
Q1: How does strategy initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H1a:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted
Q2: How does portfolio initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H2a:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted in SPSS (correlation test) and accepted in the initial model, but not accepted in SEM model 1 and 2

Q3: How does program initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H3a:** There is a significant relationship between program initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted in SPSS (correlation test) and accepted in the initial model, but not accepted in SEM model 1 and 2
Q4: How does project initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H4a:** There is a significant relationship between project initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted in SPSS (correlation test), accepted in the initial model and accepted in model 1, but not accepted in SEM model 2
Q5: How does strategy performance impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1b:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by strategy performance in the project-based organisations.	Accepted
Q6: How does portfolio performance impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2b:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by portfolio performance in the project-based organisations.	Accepted
Q7: How does program performance impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3b:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by program performance in the project-based organisations.	Accepted
Q8: How does project performance impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4b:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by project performance in the project-based organisations.	Accepted
Q9: How does organisational culture impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1c:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted in SEM model 1, but not accepted in SEM model 2
Q10: How does organisational culture impact the portfolio initiatives diffusion practice to influence the emergence of	**H2c:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by	Accepted

organisational performance in the project-based organisations?	organisational culture in the project-based organisations.	
Q11: How does organisational culture impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3c:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted
Q12: How does organisational culture impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4c:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted
Q13: How does strategy initiatives diffusion practice influence the appearance of portfolio initiatives diffusion practice in the project-based organisations?	**H5a:** There is a significant relationship between strategy initiatives diffusion practice and portfolio initiatives diffusion practice in the project-based organisations.	Accepted
Q14: How does portfolio initiatives diffusion practice influence the appearance of program initiatives diffusion practice in the project-based organisations?	**H5b:** There is a significant relationship between portfolio initiatives diffusion practice and program initiatives diffusion practice in the project-based organisations.	Accepted
Q15: How does program initiatives diffusion practice influence the appearance of project initiatives diffusion practice in the project-based organisations?	**H5c:** There is a significant relationship between program initiatives diffusion practice and project initiatives diffusion practice in the project-based organisations.	Accepted
Q16: How does project performance influence the appearance of program performance in the project-based organisations?	**H6a:** There is a significant relationship between project performance and program performance in the project-based organisations.	Accepted
Q17: How does program performance influence the appearance of portfolio performance in the project-based organisations?	**H6b:** There is a significant relationship between program performance and portfolio performance in the project-based organisations.	Accepted
Q18: How does portfolio influence the appearance of strategy performance in the project-based organisations?	**H6c:** There is a significant relationship between portfolio performance and strategy performance in the project-based organisations.	Accepted

Based on the results of the SEM path analyses, the direct effect of independent variables strategy diffusion (top-down) on the dependent variable organisational performance is significantly positive. This occurs within two levels only in SEM findings for the strategy and project levels, as an increase in the independent variables' strategy diffusion (top-down) will lead to an increase in the dependent variable. These results indicate a positive influence type of association between variables, which means hypotheses H1a and H4a are supported. However, the other two levels portfolio and project only the initial model results supported them, which indicate a positive influence type of association between variables, which means hypotheses H2a and H3a are conditionally accepted.

On the other hand, organisational culture as a mediator is influencing the strategy diffusion (top-down) variables toward increasing the organisational performance within project-based organisations. Many scholars like Hartnell, Ou and Kinicki (2011), Boyce *et al.* (2015), Aronson (2015), and Nikpour (2017) supported the mediator effect of organisational culture as a positive influence on the organisational performance. High organisational culture via team empowerment, team orientation, and capability development would increase the involvement and the level of participation by the organisation employee (Denison 2000; Hoque 2004; Wiersma 2017).

In respect to performance reporting (bottom-up) variables as mediator in influencing all the strategy diffusion (top-down) variables toward increasing the organisational performance within project-based organisations. Several researchers also like Kaplan and Norton (2001), Müller *et al.* (2008), PMI (2017), and Clegg *et al.* (2018) found the same mediation effect of performance reporting as a positive influence on the organisational performance. Thus, high performance reporting from each level of the organisation to the level above it will definitely increase the organisational performance via reporting feedback results, lessons learnt, and evaluation the current situation. This leads to do better decision-making for new or existing

strategy of the project-based organisations, and accordingly, which will lead to enhancing the organisational performance in the end.

8.8. Main research findings' discussion

There are clear significant relationships between the IVs, Mediators V with DV, and the findings were also consistent with previous literature. The proposed framework is workable and can act as the basis of the strategy diffusion within PBOs.

The research questions led to the development several hypotheses that were: 18 Nos tested and 14 Nos accepted, in which 4 Nos were only conditionally accepted.

- Three (direct) relationships between for strategy diffusion practices at the Portfolio, Program, Project levels toward OP were conditionally accepted; the impact is more effective (indirectly) when there is an organizational culture involvement to support the strategy spreading during the implementation of the strategy diffusion (top-down), rather than their direct effects.
- One of the proposed relationships mediated by OC between S-Pract at strategy level and OP, was conditionally accepted supported by study data, as it is supported theoretically.
- All (indirect) relationships that mediated by OC or/and Performances are strongly justified by study data and theoretically.
- All relationships (between the levels): top-down & bottom-up indicates that strategy management within PBOs cannot stand alone (strongly supported by study data and previous studies).

In summary, the final acceptance of the hypotheses and their assignment within the study framework was confirmed the new framework with study data and previous literatures, and the mediations variables had strong impact on the diffusion processes in order to enhance the organizational performance within PBOs.

Finally, the study framework proved to be appropriate as a scaffolding on which to build the strategy diffusion culture within PBOs. Table 8.8 below shows the summary of the research questions and hypotheses tests results.

Table 8.8: Testing results

Research questions	Research hypotheses	Hypotheses accepted / rejected
Q1: How does strategy initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H1a:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance in the project-based organisations.	Accepted Positive influence
Q2: How does portfolio initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H2a:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance in the project-based organisations.	Conditionally accepted Positive influence
Q3: How does program initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H3a:** There is a significant relationship between program initiatives diffusion practice and the organisational performance in the project-based organisations.	Conditionally accepted Positive influence
Q4: How does project initiatives diffusion practice influence the emergence of organisational performance in the project-based organisations?	**H4a:** There is a significant relationship between project initiatives diffusion practice and the organisational performance in the project-based organisations.	Conditionally accepted Positive influence
Q5: How does strategy performance impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1b:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by strategy	Accepted Positive influence

	performance in the project-based organisations.	
Q6: How does portfolio performance impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2b:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by portfolio performance in the project-based organisations.	Accepted Positive influence
Q7: How does program performance impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3b:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by program performance in the project-based organisations.	Accepted Positive influence
Q8: How does project performance impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4b:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by project performance in the project-based organisations.	Accepted Positive influence
Q9: How does organisational culture impact the strategy initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H1c:** There is a significant relationship between strategy initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Conditionally accepted Positive influence
Q10: How does organisational culture impact the portfolio initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H2c:** There is a significant relationship between portfolio initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted Positive influence
Q11: How does organisational culture impact the program initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H3c:** There is a significant relationship between program initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted Positive influence
Q12: How does organisational culture impact the project initiatives diffusion practice to influence the emergence of organisational performance in the project-based organisations?	**H4c:** There is a significant relationship between project initiatives diffusion practice and the organisational performance mediated by organisational culture in the project-based organisations.	Accepted Positive influence
Q13: How does strategy initiatives diffusion practice influence the	**H5a:** There is a significant relationship between strategy initiatives diffusion	Accepted

appearance of portfolio initiatives diffusion practice in the project-based organisations?	practice and portfolio initiatives diffusion practice in the project-based organisations.	Positive influence
Q14: How does portfolio initiatives diffusion practice influence the appearance of program initiatives diffusion practice in the project-based organisations?	**H5b:** There is a significant relationship between portfolio initiatives diffusion practice and program initiatives diffusion practice in the project-based organisations.	Accepted Positive influence
Q15: How does program initiatives diffusion practice influence the appearance of project initiatives diffusion practice in the project-based organisations?	**H5c:** There is a significant relationship between program initiatives diffusion practice and project initiatives diffusion practice in the project-based organisations.	Accepted Positive influence
Q16: How does project performance influence the appearance of program performance in the project-based organisations?	**H6a:** There is a significant relationship between project performance and program performance in the project-based organisations.	Accepted Positive influence
Q17: How does program performance influence the appearance of portfolio performance in the project-based organisations?	**H6b:** There is a significant relationship between program performance and portfolio performance in the project-based organisations.	Accepted Positive influence
Q18: How does portfolio influence the appearance of strategy performance in the project-based organisations?	**H6c:** There is a significant relationship between portfolio performance and strategy performance in the project-based organisations.	Accepted Positive influence

8.9. Chanter summary

This chapter has shown an overview of the research outcomes through briefing the main findings, analysing and explaining the results considering all previous studies in the literature review chapter and answering all research questions and confirming the research hypotheses.

In summation, this chapter has explained a holistic view of the study objective, interpreted and discussed the study's main findings with comparison of the literature review related assumptions, hypotheses, theories, results, and conclusions. This discussion is derived by the study questions in order to find proper answers to them, plus, to test and endorse the study assumed hypotheses. This chapter is divided into four key sections to discuss the data analysis:

1) providing an outline of this study objective and proposing a framework for the strategy diffusion top-down and reporting performance bottom-up approaches, mediating it with organisational culture derivers to enhance the organisational performance within project-based organisations;

2) debating the descriptive statistics for the independent and dependent variables supported by relevant literature review;

3) discussing the findings of the correlation analysis confirmed the study hypotheses and related the results with previous scholars' works;

4) discussing the findings of the SEM path analysis and linked the results with the literature review.

9. CHAPTER NINE: Conclusions and recommendations

9.1. Introduction

In this chapter, the conclusions taken from the study analyses and findings will be presented in six sections. First, the robustness of the implemented research methodology. Second, the accomplishment of the anticipated research objectives. Third, the implication of the research findings. Fourth, the contribution of the study to the knowledge. Fifth, the limitations that challenged the research. Finally, the recommendations for future studies.

9.2. Robustness of the research methodology

The scholar has taken into consideration the necessity of choosing the appropriate research and data collection methods and following a formal research method as explained in the research methodology chapter of the study. The study methodology has considered the comprehensive literature review and survey. Therefore, to detect gaps of knowledge in the anticipated study area and set research objectives and questions, literature review has been adopted to synthesise existing knowledge. Research hypotheses and conceptual framework are built-up based on the gaps from the existing body of research and literature. Moreover, the survey material is adapted from existing surveys and validated from literature review. The study sample size was comparative and was appropriate for the selected analyses tests. In addition, an on-line survey methodology is established and managed to address the research questions and used to collect all the needed primary data on the impact of strategy diffusion on organisational performance in selected project-based organisations. The gathered data have been checked for completeness, errors, and consistency. In order to reduce any cognitive or

motivational biases, the research measures and questions have been validated by both academics and practitioners to implore their professional advice. The comments and feedback collected from the pilot study is used to polish the survey items making it clearer and easy to understand by respondents. Lastly, a number of statistical devices are implemented to assess reliability and validity of research instrument and then carefully analysed and statistically tested the research hypotheses; namely, descriptive statics, Spearman and Pearson correlation by SPSS, SEM Path Analysis by AMOS.

There have been a number of robustness measures adopted in the study methodology like selection of survey respondents' samples and an appropriate method used to analyse the data. High reliability of generated components, and empirically testing significant components of strategy diffusion attributes prior assessing their influence on the association between strategy initiative diffusion practices (top-down), performance (bottom-up), organisational culture and organisational performance to ensure result robustness.

In conclusion, the research methodology strengths can be summarised as the following:

- The theoretical background of this study is established based on a comprehensive literature review and therefore, the study gathered research variables from management and psychology research.
- A comprehensive research conceptual framework is confirmed based on gaps in the literature and call of plethora of authors in identifying the role of different aspects influencing organisational performance in project-based companies.
- A systematic approach is followed in the study, particularly, for proofing of scale validity, performing clusters reliability, analysing collected data, and satisfying the assumption for statistical tools.

9.3. Accomplishment of the research objectives

The study started with a number of objectives in order to accomplish its main aim of investigating the impact of the strategy diffusion on organisational performance within project-based organisation in the one of public utility in Dubai within the UAE. These objectives with their related empirical results are completed as follows:

- Objective related to *evaluate the influence of strategy diffusion drivers in strategy, portfolio, program and project levels on organisational performance development in project-based organisations*. This objective is accomplished successfully, as significantly positive associations are found between the strategy diffusion (top-down) drivers in strategy, portfolio, program, and project levels and the organisational performance expansion within project-based organisations. This means the strategy diffusion (top-down) drivers have influence on the organisational performance development within project-based organisations.
- Objective related to *identify the mediating roles of performance (bottom-up) drivers in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations*. This objective is accomplished successfully, as significantly positive associations are found between the strategy diffusion (top-down) drivers in strategy, portfolio, program, and project levels and the organisational performance expansion within project-based organisations, with the existence of the performance (bottom-up) drivers as mediator roles. This means the strategy diffusion (top-down) drivers have influence on the organisational performance development within project-based organisations with mediator roles of the performance (bottom-up) drivers.

- Objective related to *assess the meditating role of the organisational culture driver in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations*. This objective is accomplished successfully, as significantly positive associations are found between the strategy diffusion (top-down) drivers in strategy, portfolio, program, and project levels and the organisational performance development within project-based organisations, with the existence of the organisational culture drivers as a mediator role. This means the strategy diffusion (top-down) drivers have the influence on the organisational performance development within project-based organisations with mediator roles of the organisational culture drivers.
- Objective related to *develop a final robust model for implementing the organizational strategy diffusion at each level of strategy, portfolio, program and project within project-based organizations*. This objective is accomplished effectively, as the final model verified and confirmed all the significantly positive associations between strategy diffusion drivers, each level performance drivers, organisational culture drivers, and organisational performance. The significant positive influences of the mediation roles of each level performance and organisational culture in strategy, portfolio, program and project levels among strategy diffusion drivers and organisational performance in project-based organisations.

9.4. Implications of research findings

This research is done to grab the practitioner's attention to effectively diffuse the strategy of the organisation to the beneath levels of project-based organisations. The research proposed a practical platform (model) that can diffuse successfully the organisational strategy using the

theory of Rogers' innovation diffusion theory via practicing all the diffusion decision process stages (knowledge, persuasion, decision, implementation and adaptation) through utilising the (top-down) method to each project-based organisational levels at strategy, portfolio, program and project levels. Then, all the needed performance (e.g., KPIs, PIs, performance weekly/monthly/quarterly/yearly reports…etc) were reported via applying (bottom-up) approach from each of these levels. This was done in order to have a proper decision-making bases and for competitive advances, especially as the study is experienced the strategy diffusion at different levels of the organisation, starting from numbers of strategy initiatives at strategy level going down till reaching single project strategy, this research concepts implications in a way to mirror the practices at each of those examined level.

Furthermore, the study has a potential to standardisation the idea of strategy diffusion for project-based organisations. All that was accomplished via investigating the impact of the strategy diffusion on organisational performance within project-based organisation effectively. It attempted to explore the associations between strategy diffusion (top-down), and performance (bottom-up), with organisational culture, at difference levels that include the strategy, portfolio, program, and project levels, to create an impact on organisational performance in project-based organisations. The next implications can be obtained as follows:

- At the strategy level, the executives and strategy leaders adopt strategy initiative diffusion practice by working on the knowledge and persuasive through sharing the familiarity of the reasons behind the strategic initiatives as business drivers, capabilities needed, values/benefits, and the strategic initiatives risk management. Then, the next stage comes to evaluate and decide for the strategic initiatives through proper data analysis, considering the organisation's policies and guidance, as well as, considering the organisational values. The final stage is to implement and adopt the strategic initiatives by capabilities allocation, risk communication, and setting the right key performance indicators. Moreover, the

strategy leaders then need to foster reporting the strategy performance to the organisational level through strategic initiatives results using indicators, such as strategy level stakeholder satisfaction rate, service expectation rate, benefits realization rate, revenue expectation rate, profit expectation rate, sales growth expectation rate, market share expectation rate, and environmental conditions adaptation rate.

- At the portfolio level, the portfolio managers foster the portfolio initiative diffusion practice by working on the knowledge and persuasive through translating the strategic initiatives into portfolio of projects, knowing, and sharing the portfolio procedures, and portfolio roles and responsivities. Then, next is to evaluate and decide upon the portfolio of projects through analysing the new investment needs, project type selection based on market's needs, balancing between projects considering the value benefits analysis, considering the changes, interdependency based on agreed decision framework. In the end, the portfolio, through approved project charters, resource allocation, risk management and communication plan, is implemented and adopted. Moreover, the portfolio managers then need to foster reporting the portfolio performance to strategy level through portfolio results using indicators like, right number of projects rate, high-value projects rate, projects balancing rate, alignment rate between portfolio and strategy, budget allocation rate reflecting the business strategy, portfolio of projects (time, cost, and quality) achievement rate, portfolio financial achievement rate, as well as portfolio stakeholder satisfaction rate.
- At the program level, the program managers foster the program initiative diffusion practice by working on the knowledge and persuasive through shared understanding of program expected benefits, resource needed, and actors' roles and responsibilities. Then, next is to evaluate and decide upon program prioritising based on a decision framework, alignment of program selection with organisational strategy, and the decision making based on data analysis for the program. In the end, the program through program prioritising,

interdependencies, synergy, resource allocation, benefits realisation, change management, risk management, and communication plan deployment, is implemented and adopted. Moreover, the program managers then need to foster reporting the program performance to the portfolio level through program results using indicators, such as business strategy reflection on program rate, program stakeholder's satisfaction rate, and program cost-benefits achievement rate.

- At the project level, the project managers foster the project initiative diffusion practice by working on the knowledge and persuasive through shared understanding of project management methodology, project constraints (time, cost, scope, and quality), project risk, realisation of project benefits, project actors roles and responsibilities, and project critical milestones. Then, next is to evaluate and decide upon project constraints (time, cost, scope, and quality), constraints evaluation based on methods and rules, project decisions communication, and to fully understand the project execution plans. In the end, the project through project management methodology and implement projects against project agreed plans are implemented and adopted. Moreover, the program managers then need to foster reporting the project performance to program level through project using indicators like, projects meeting their business purposes, meeting their operational performance goals, meeting their technical performance goals, and project satisfaction rate for project budget, schedule, quality, scope and stakeholders.

9.5. Contribution to the knowledge

The study has expanded the project management body of knowledge via fulfilling the previous lacks and gaps recorded in the literature and mentioned in the future research suggestions agenda provided by scholars, as follows:

- A comprehensive literature review to identify the suitable strategy management (David's strategic management model) and the suitable diffusion method (Rogers' innovation diffusion theory) were unified in all its elements, characteristics and decision process phases and practiced for the first time to facilitate organisation's strategy translation smoothly and easily to underneath levels of the project-based organisations, like portfolio level, program level, and project level. Hence, this new model has added to the existing knowledge, especially, with a lack usage of Rogers' diffusion theory for strategy diffusing purposes across all levels within project-based organisations.
- A comprehensive literature review to distinguish the top-down and bottom-up methods proposed in this study for strategy diffusing (top-down) and performance reporting (bottom-up) methods, for better embedding the strategy to every day work and to get back and lesson-learnt from the real ground for better decision-making. Hence, this study will be further contribution to the knowledge, as there are rare researches investigated the strategy diffusion impacts on organisational outcomes at each level of the project-based organisations.
- One of the key strengths of this study is that the study is demonstrated by using the strategy diffusion (top-down) and performance (bottom-up) practices at each level of the organisation; such as the strategy level, portfolio level, program level, and project level, as most of the studies have looked at only the organisational top level.
- This study has added to the existing knowledge by introducing new scales to measure the practices for strategy diffusion (top-down) that can be used for the survey questions, where strategy, portfolio, program, and project levels have been laid in a way that can effectively reflect the Rogers' diffusion theory within these measures, which has not been investigated in previous studies and was not part of any of existing models.

- The study has added to the existing strategy knowledge for project-based organisations by developing an integrated strategy diffusion (top-down) and performance (bottom-up) model, established based on a unique, integrated, and robust framework that can be adopted by business executives as a robust platform for their organisations; especially as each bit of this study concept exists more or less unconnectedly in previous works.
- The study has provided empirical evidence for the associations amongst the strategy diffusion (top-down) concept, performance reporting (bottom-up) concept, and the organisational cultural concept, checking their influences on the organisational performance development. Hence, all that support to check the debate in the literature around these correlations and reply to researchers who claim that rare studies have empirically examined the association of these perspectives.
- The study has provided empirical findings for the noteworthy influence of strategy diffusion (top-down) practices on organisational performance enhancement, and the significant influence occurrence in case of mediation exists for organisational culture and performance (bottom-up) on raising organisational performance.

9.6. Limitations of the research

The key limitations of this research are as follows:

- The study sample focuses on one type of utility in the region (public world-class utilities) in Dubai (UAE). Although, the study can be conducted in more than one type of utility, within the region or outside the region, to get more variances in feedbacks, more robustness results, and to reduce the bias element as well as for generalisation purpose.
- The access and permission challenges to conduct the study can be occurred from other utilities, which may consume more time. However, the number of participants for this study

are comparable to other studies, and the sample utility by its own can represent perfectly the region's utilities, as all the regional utilities have similar government systems.

- The potential of response bias in this research might occur, as people normally tend to inflate their work environment (Bansal 2003). Therefore, and due to this assumption, the results of this study may suffer from a positive untrue skew.
- The study has used many concepts and hypotheses. This has caused a huge challenge to merge all the concepts in one model, especially as there was a lack of research in this area of study.
- The study proposed framework and measurements have been validated by limited number of experts and professionals within the study field, though the robustness of the research framework was taken care of through a good number of sample size related to the research fields.

9.7. Recommendations for future research

This study generates some useful and important recommendations. These suggestions might be considered outstanding opportunities for future research, as follows:

- The study found a new conceptual model that captures at once the strategy diffusion top-down method using Rogers' diffusion concept and performance reporting bottom-up method within project-based companies as a promising framework for additional future research investigations. For example, replication of the research in the same area by future academics and providing cross comparison of results, or even in different fields or type of organisations for result standardising and generalising purpose will be very useful.

- This study used the Rogers' diffusion theory in strategy diffusing as top-down; similarly, Rogers' diffusion theory could be used in performance diffusing as a bottom-up idea, to provide a bi-directional method for similar studies.
- As the study delivers empirical evidence from the case study of Dubai-based world-class public utilities in the UAE related to the impact of the strategy diffusion within project-based organisations using top-down and bottom-up methods to enhance the business success, an exciting future line of research can be started to capture similar evaluation in more advanced countries like China, Australia or across Europe and do a cross comparison study to check the model applicability in their nations. This is because the concept of merging the strategy, with Rogers' diffusion theory in top-down and bottom-up methods is a unique idea.
- The study SEM path analyses shows interrelations paths beyond the scope of this research, like the paths between strategy diffusion level and program performance level, involvement of the cultural concept with project performance levels, or multi-mediation variables within the constructed model. These unforeseen paths have widened the horizon to conduct further investigations and more findings with more hypotheses can be proposed for the same constructed model.
- The study will conclude to more precise and in-depth findings if it designated a less specified effect, by using one level at a time with more interrelations among study drivers.
- The study's proposed framework can be used for further validation for future studies, as the study framework has been tested and reviewed by a limited number of the study field practitioners for validation.

9.8. Chapter summary

The chapter has discussed and emphasised the main concepts of this research starting from the adapted methodology, implications from the findings, the contribution to the knowledge, and ending with recommendation for future studies.

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Appendix: Questionnaire

Questionnaire Cover Lettre

Dear Participant,

You are kindly being invited to participate in an online survey. The primary objective of my research is to investigate the effects of the Strategy Diffusion within the Projects based Organizations in Dubai through a questionnaire. Your input will help us to find the relationships between Strategic Management, Project Portfolio Management, Program Management, and Project Management and their performances with the organizational ultimate outcomes and whether those relationships are moderated by organizational (Involvement) culture determinates.

We have estimated that this will take you 20-25 minutes approximately to complete the Questionnaire.

All individual responses will remain confidential and study data will be integrated and analyzed as a whole.

The research outcome will be reported in a summary form to protect confidentiality.

However, if you have any concerns or questions about the questionnaire or about participating in this research, you may contact me on 2016132209@student.buid.ac.ae.

Alternatively, you may communicate my director of studies, Professor H. Boussabaine on 04 279 1437 (halim@buid.ac.ae).

Thank you for your time and support and I look forward to sharing the results of this survey with all of the participants.

Yours faithfully

Jamila Juma Al Maazmi	The research directed by:
PhD Candidate	Professor Halim Boussabaine
British University in Dubai	British University in Dubai
Tel: 04 322 1862	Tel: 04 279 1437
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The Questionnaire Cover

PART 1

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements

Strategy Level Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
There is shared understanding of the business drivers behind the strategic initiatives							
There is shared understanding of the capabilities needed for the strategic initiatives							
There is shared understanding of the organizational values/benefits of the strategic initiatives							
There is shared understanding about the alignment of strategic initiatives with the organizational risk management							
Strategic initiatives' decisions are based on analyzing data							
Strategic initiatives' decisions are based on policies, boundaries, and guidance							
Strategic initiatives are assessed against organizational values							
Capabilities are allocated for the strategic initiatives' deployment							
Strategic initiatives' risks are communicated							
Key performance indicators are set for the strategic initiatives deployment							

PART 2

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Portfolio Level Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
There is shared understanding that the portfolio of projects is translated from strategic initiatives							
There is shared understanding of procedures for initiating a portfolio of projects							
There is shared understanding of roles/responsibilities for project portfolio actors							
There is shared understanding of holistic view of the portfolio							
Portfolio formation analysis helps to confirm new investment needs							
Project types are selected based on suitability to the market's needs							
Value benefit analysis is used to maintain balance between projects							
Frequently reviewing whether the strategy of the project portfolio is still valid in the light of changed conditions							
The interdependency between program governance, project management are frequently evaluated							
The optimal portfolio is selected based on the agreed decision framework							
Corporate strategic initiatives are implemented through our portfolio of projects							
During the portfolio deployment portfolio of project charters are approved							
During the portfolio deployment resources are allocated to projects							

During the portfolio deployment communication plans are set							
Risk management plan is set for portfolio of project deployment							

PART 3

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Program Level Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
There is shared understanding of programs' expected benefits							
There is shared understanding of resources requirement by the program							
There is shared understanding of programs' stakeholder roles/responsibilities							
Projects are prioritized within the program using evaluation frameworks							
Projects are selected within the program on the basis of organizational strategy							
Program decision making is supported by intelligent data analysis							
Projects are prioritized within the program for deployment							
Interdependencies between projects inside the program are managed							
Synergy within the projects of program is created							
Program's resources are planned during their deployment							
A benefits realization plan is developed during program's deployment							
At the stage of program's deployment plans that embrace change are created							

During program deployment communication plans are set							

PART 4

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Project Level Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
There is shared understanding of formal project management methodology							
There is shared understanding of project constraints (time, cost, quality and scope)							
There is shared understanding of project risks							
There is shared understanding for the realization of project benefits outputs							
There is shared understanding of the roles/responsibilities for project governance							
There is shared understanding of the critical milestones for projects							
Project's constraints (time, cost, quality and scope) are evaluated based on project information							
Project's constraints are evaluated based on predefined methods and rules							
Project's decisions are communicated to the relevant stakeholders							
Projects execution management plans are checked							
Project execution schedule management plan is set							

Project execution cost management plan is confirmed							
Project execution scope management plan is approved							
Project execution quality management plan is set							
Project execution risk management plan is approved							
Project execution resource management plan is approved							
Project execution communication management plan is established							
Project execution procurement management plan is confirmed							
Project execution stakeholder engagement plan is approved							
Project execution change management plan is accepted							
Projects are managed based according to the project management methodology							
Project progress is managed against project schedule							
Project cost is monitored-controlled against project budget plan							
Project's scope of work is managed against the scope plan							
Project quality is monitored-controlled against quality plan							
Project risk is responded against risk management plan							
Project human resources is managed against human resources plan							
Project communication is managed against communication plan							
Projects procurements are conducted against procurement plan							

Projects stakeholder engagement is managed against stakeholder plan							
Projects change is monitored-controlled against change plan							

PART 5

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements. Part

Organizational Culture (Involvement) Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
Decisions are usually made at the level where the best information is available							
Information is widely shared so that everyone can get the information he or she needs when it is needed							
Business planning is ongoing and involves everyone in the process to some degree							
Cooperation across different parts of the organization is actively encouraged							
Teamwork is used to get work done							
Work is organized so that each person can see the relationship between his or her job and the goals of the organization							
Authority is delegated so that people can act on their own							
The capabilities of people are viewed as an important source of competitive advantage							

PART 6

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Organizational Performance Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
We are satisfied with our organizational results							
We are satisfied with our organizational market share results							
We are satisfied with our organizational profit/Profitability results							
We are satisfied with our organizational employee satisfaction results							
We are satisfied with our organizational customer retention results							
We are satisfied with our organizational quality improvement results							
We are satisfied with our organizational opportunities development capability results							
We are satisfied with our organizational inventiveness adaptability results							

PART 7

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Strategic Initiative Performance Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree

Strategic initiatives meet their stakeholder satisfaction expectations							
Strategic initiatives meet their service expectations							
Strategic initiatives realize their benefits							
Strategic initiatives meet their revenue expectations							
Strategic initiatives meet their profit expectations							
Strategic initiatives deliver their expected company's sales growth							
Strategic initiatives deliver their expected company's market share							
Strategic initiatives adapt to their environmental conditions							

PART 8

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Portfolio Performance Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
Portfolio has the right number of projects for the resources available							
Portfolio contains high-value projects							
Portfolio has an excellent balance of projects							
Projects in the portfolio are aligned with the business strategy							
The budget allocation between projects in the portfolio reflects the business strategy							

Portfolio leads to a high stakeholder satisfaction							
Portfolio achieves time, cost and quality objectives							
Portfolio achieves financial objectives							
Portfolio fulfills stakeholder requirements							
Projects purpose in the portfolio is achieved							

PART 9

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Program Performance Statements	Strongly agree	Agree	Slightly Agree	Undecided	Slightly Disagree	Disagree	Strongly disagree
Program's implementation reflects the business strategy							
Program's impact exceeds stakeholder expectations							
Programs achieve cost-benefits objectives							

PART 10

INSTRUCTIONS: Please rate the degree to which you agree or disagree with each of the following statements.

Project Performance Statements	**Strongly agree**	**Agree**	**Slightly Agree**	**Undecided**	**Slightly Disagree**	**Disagree**	**Strongly disagree**

Projects meet their business purposes							
Projects meet their operational performance goals							
Projects meet their technical performance goals							
Projects meet their schedule objectives							
Projects stay within budget limits							
Projects meet their quality objectives							
Projects meet their scope objectives							
Project's stakeholders are satisfied with the project's results							

PART 11 General Information

Please provide the required personal details through marking a tick next to the answer of your choice

11.1 Type of your Organization	
	Public
	Private
	Semi-Government
	Other, please specify……
11.2 Gender	
	Male
	Female
11.3 Number of years have you been working for your current position	
	1 - 5

	5 - 10
	10 - 20
	Above 20
11.4 Position	
	Strategic Level Employment
	Portfolio Level Employment
	Program Level Employment
	Project Level Employment
	Other, please specify……