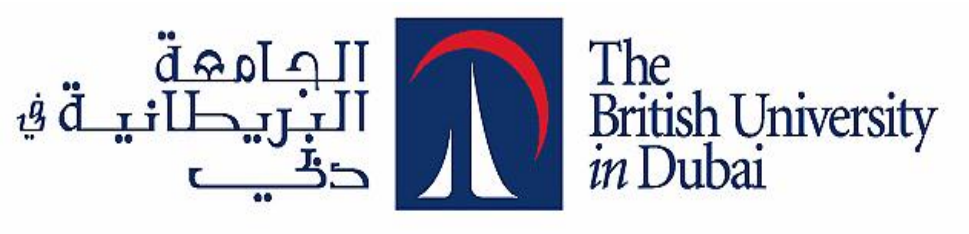

Dissertation

The Orchestration of Small to Medium Enterprises (SMEs) Innovation Networks: The Impact of knowledge sharing on networks' innovation outputs

تمازج وتنسيق شبكات الابتكار للمشاريع الصغيرة والمتوسطة
أثر تبادل المعرفة على مخرجات ابتكار الشبكات

By

Shaikha Abdulla Al Shamsi

90115

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Dissertation Supervisor
Professor Mohammed Dulaimi

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PRELUDE

“On a given day, a given circumstance, you think you have a limit. And you then go for this limit and you touch this limit, and you think, 'Okay, this is the limit.' As soon as you touch this limit, something happens and you suddenly can go a little bit further. With your mind power, your determination, your instinct, and the experience as well, you can fly very high.” **Ayrton Senna**

For my beloved father,

Your endless support and unconditional love always pushed me to go beyond my own limits. I love you and will always miss you.

ACKNOWLEDGEMENT

A huge vast of thanks and gratitude to everyone who helped and supported me throughout this journey.

To my mother, aunt and siblings for their constant prayers and undying support that I succeed and pushed beyond my limits in any of my academic pursues. Also, for putting up with my tantrums and stress with patience and affection.

To all my friends, for enduring my craziness with love, support and smiles. Without your presence, it would not have been bearable.

Finally, to Professor Mohammed Dulaimi. For his continued guidance, assistance and moral support, for always answering all my questions and concerns while writing this thesis. He provided me with not only constructive criticism, but also knowledge, expertise and attention to detail, which took this research to whole new level. I thank you professor.

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الملخص التنفيذي

"الابتكار" قد تكون كلمة بسيطة، ولكنها تحمل في ثناياها معاني قوية، حيث أنها خلقت ثورة في العقود الماضية في مختلف القاطعات، وبتأثير يماثل الأثر الذي أحدثته القنبلة الذرية. وعلى جميع الشركات والحكومات في يومنا هذا أن تفكر بطرق مختلفة ومبتكرة لكي تستطيع البقاء في ساحة المنافسة العالمية. ويبدو واضحا أن الكثير من الشركات الكبيرة لديها دائماً الامتيازات التي مكنتها واستطاعت من خلالها أن تصبح مبتكرة، وبالرغم من أن الشركات الصغيرة والمتوسطة لها القدرة على الابتداع والابتكار، إلا أنها تفتقر إلي العوامل الرئيسية التي تساعدها علي أن تكون مؤسسات مبتكرة.

ومن أجل التعويض عجزها وقصورها قامت الشركات الصغيرة والمتوسطة بالآتي: إما أنها لجأت إلى وسائل ووسائط حكومية لكي تقوم بتزويدها بالدعم المالي أو شكلت تحالفا مع شركات آخري أو التحقت بشبكة الشركات الصغيرة والمتوسطة. ولكن كيف تعمل شبكة الشركات الصغيرة والمتوسطة؟ كيف يمكن تحقيق الإبداع والابتكار في هذه الشبكات؟ وعليه تم إعداد هذه الأطروحة لدراسة دور الإدارات الحكومية (شركات المحور) في الاستفادة من المعرفة والخبرة و الموارد لإدارة و تنظيم شبكات الابتكار للشركات الصغيرة والمتوسطة. استهل البحث بمراجعة ودراسة شاملة لكافة ما كتب ونشر وطبع عن الابتكارات وتبادل المعرفة والتنسيق المرتبط بالشركات الصغيرة والمتوسطة والمفاهيم والنظريات والنماذج والتحديات التي تضمنتها الكتيبات والنشرات بجانب كيف أنها جميعا ترتبط مع بعضها البعض . ولقد أعد إطار مفاهيمي وتم تطوير افتراضات لدراسة العلاقة بين التمازج والتنسيق الفعال ومخرجات الشبكة وبالإضافة إلي ذلك بحث العوامل التي تؤثر علي تبادل المعارف والمعلومات في الشبكات وتأثيرها على التجديد والابتكار ولهذا الغرض تم استخدام مداخل نوعية، وتمت معاينة ودراسة ثلاثة إدارات حكومية للحصول على البيانات اللازمة.

أظهرت النتائج أن التمازج والتنسيق يقوم بدور جوهري في ترقية عملية تبادل المعلومة والمعرفة في شبكات الشركات الصغيرة والمتوسطة وأن التمازج الفاعل يؤثر بصورة ايجابية على مخرجات التجديد والابتكار في شبكات الشركات الصغيرة والمتوسطة وفي تبادل المعرفة بين أعضاء تلك الشركات ويؤثر بشكل ايجابي علي الابتكار والتجديد المتعلق بها. وعليه لضمان فاعلية الشبكة فإنه يتعين على المنسق اختيار أفضل الشركات الصغيرة والمتوسطة لضمها للشبكة، بجانب ترقية وتطوير عملية تبادل المعرفة وذلك بتأسيس وإقامة قنوات اتصال وتوجيه موثوق بها مع التشجيع على الالتزام بالتعليم.

ABSTRACT

Innovation, one word, four powerful syllables that have created a revolution over the decades with the effects that are equal of an atomic bomb. Nowadays, companies and governments are obliged to think differently and innovatively, to survive the global competition. It is obvious that large firms have always had the privileges that assisted them in being innovative, whereas small to medium enterprises (SMEs) have the capacity for innovation. But lack all key factors that would support them to be innovative.

To compensate for their shortages, SMEs did the following; they turned to government intermediaries to provide them with financial support, formed alliances with other companies, or joined SMEs networks. Yet, how SMEs networks operate? How innovation can be achieved in such networks? Hence, this thesis was prepared to examine the role of government departments (hub firms) in utilizing knowledge, expertise and resources to orchestrate SMEs innovation networks. The research began with an extensive review of literature on innovation, knowledge sharing, SMEs and orchestration. Concepts, theories, types, models, challenges were all covered in the literature as well as identifying how these constructs are associated with each other. A conceptual framework was prepared and hypothesizes were developed to study the relationships between effective orchestration and the network output. Also, investigate the factors that affect knowledge sharing in networks and influence innovation. A qualitative approach was used and three government entities were interviewed for data collection.

The findings affirmed that orchestration does plays a significant role in promoting knowledge sharing in the networks of SMEs, effective orchestration positively affect the innovation output in the SMEs networks and knowledge sharing between members of the SMEs networks positively affect their innovation. Therefore, to ensure the network effectiveness, the orchestrator must select the right SMEs to join the network as well as promoting knowledge sharing by establishing trust, direction, communication channels and encouraging commitment to learning.

CHAPTER 1: INTRODUCTION

BACKGROUND

Innovation, for the past few decades there has been an eminent, global, emphasis on the topic and in various contexts such as technology, businesses, governments and many more. It is apparent that innovation is the synonym to success and the competitive advantage in this globalized economy. Moreover, not only companies are obliged to think differently and innovatively, but also governments in order to survive the momentous shifts of the global business landscape.

Various governments around the world such as the United States, United Kingdom, South Korea and Singapore encouraged building innovation systems to sustain strong economic developments as well as responding to challenges offered by globalization. This was achieved through direct and indirect involvement of the government in the innovation process by designing innovation polices, developing innovation clusters, offering and fostering research programs in collaboration with academia and private firms.

Since its formation back in 1971, the United Arab Emirates (UAE) has witnessed inimitable economic changes to become less reliant on oil and gas. The government of the UAE has always worked toward positioning itself as a top business/commercial hub in the region to attract foreign investors and international firms, through offering advanced infrastructures and no taxes on income or corporates. Furthermore, it aspires to transform the country to become one of the top countries around the world by 2021. That is, in line with fulfilling UAE 2021 Vision, where one of its core visions is transforming the economy into a model where growth is driven by knowledge and innovation (PMO, 2011).

The government of the UAE is well aware of how ferocious is the global competition and at the same time it understands that that one of the most crucial requirements for private sectors triumph is to have an environment that

both stimulate and endorse knowledge sharing and innovation. In recent years, it has invested heavily in developing the country's infrastructure. What is more, it's continuously enhancing its human resources, research institutions and capabilities to cultivate the level of innovation that is required for the success of the competitive large businesses and small to medium enterprises (SMEs) across the country. Additionally, both of the public and private sectors are working in parallel for innovations in various industries such as aviation, aircraft manufacture, renewable energy, construction, and many more (ECC, 2012).

It is well known that large and well-established companies have always enjoyed having certain privileges that helped them out in being innovative, such as financial resources, qualified human resources, R&D capabilities and strong network base and ties with suppliers. Unlike SMEs, who are regarded as the "underprivileged", they have a strong aptitude for innovation but lack all key factors that would support their quest to innovation. There are several methods and solutions, which SMEs turn to and uses to compensate for their shortages in resources. For instance, they turn to government intermediaries to provide them with financial support, they form alliances with other companies, or join SMEs networks. Yet, how SMEs networks operate? What are the means for monitoring and controlling them? How innovation can be achieved in such networks? How knowledge sharing affect SMEs innovation networks?

As stated previously, the UAE national agenda aspiration is to have a knowledge-based economy. Thus, several governmental bodies from the public sector in the UAE have cooperated with SMEs to assist them in developing innovative solutions and services through the formation of SMEs networks and orchestrating them toward achieving innovative and lucrative outcomes.

Research Question

How effective is orchestration in promoting knowledge sharing in SMEs Networks to achieve innovation?

Research Aim and Objectives

The aim of this thesis is to examine the role of government departments (hub firms) in utilizing knowledge, expertise and resources to orchestrate networks of SMEs to achieve innovation. As for the objectives of conducting this research, they are as follow:

- Investigate the effectiveness of orchestration in inducing knowledge sharing in SMEs innovation networks in the UAE.
- Addressing the challenges that face both orchestrator and SMEs within the network.
- Developing a set of recommendations on how to strengthen knowledge sharing among the members in SMEs innovation networks.

Scope of Work

The scope of this research is to study the means of encouraging and supporting successful innovation in SME networks in the public sector. The significance of this research is that it presents solutions to enable government entities to motivate and foster knowledge sharing and innovation in networks of SMEs effectively to translate UAE 2021 vision aspiration of developing a knowledge-based economy into reality.

As for the structure of this research, it will begin with a literature review, which will look into three main constructs; innovation, knowledge sharing and SMEs. Furthermore, the literature will look into concepts, theories, models, enablers, challenges and how each construct is linked to another. Next, the conceptual framework, which is explained based on the result of the preceding section.

The following chapter will be a description of the methodology for conducting this research and the approaches that have been used to collect data. Followed by two chapters; case studies and analysis and discussion of the case studies, which explores the practical findings that are obtained from the semi-structured interviews against the literature theoretical findings. The final chapter summaries the findings of this research and converse their implications. Additionally, it includes a set of recommendations on key areas

of this study and how to effectively orchestrate SMEs networks. Plus, the chapter will also look into research limitation and what key aspects require further studies in the future.

CHAPTER 2: LITERATURE REVIEW

INNOVATION

Innovation generated a great importance in the early 1990's because most firms around the world were very absorbed by it, even more than efficiency and quality in order to gain competitiveness in markets (Swan et al. 1999). Furthermore, for companies to be powerful they needed to be innovative to survive the competition and to position themselves well in the markets (Miron et al., 2004; Kamaşak & Bulutlar, 2009).

Rosenberg, (2004); Welfens et al., (2008); and Lee et al., (2012) regarded innovation as the world's engine of economic growth where the introduction of new processes, services, products and systems will either advance or revolutionize many aspects of the society, hence, spurring economic growth. What is more, many nations focused on innovation so they can nurture their economies. To achieve such aspiration, governments enacted legislations to encourage the private sector to invest in Research and Development (R&D) as well as supporting research programs at universities. The ultimate reason for such movement was to produce new industries or bolster the existing ones through renovating research results/inventions to products that are socially useful or/and commercially viable (Suh, 2010).

Multiple Definitions

A plethora of definitions and descriptions on innovation are available in the literature, which try to capture its true meaning. Yet, Damanpour and Schneider (2009) asserted that it is not easy to narrow down the meaning of innovation as its very multifaceted construct, which has been studied and examined from various point of views and analyzed by researchers who come from different academic disciplines.

Some definitions were expressed in terms of processes and/or outcomes in a simplistic manner, whereas others were very complex in meaning. For instance, Barnett (1953) described innovation as the presentation of

something new. A further definition was developed by Amiable et al. (1996) and referred to it as implementing creative ideas successfully in an organization. Popadiuka and Choo (2006) pointed out that ideas can not be classified as innovation unless they are implemented and transformed into a form of product, service or process and were commercialized. Similarly, Suh (2010) stated that innovation refers to the act of transforming ideas, inventions, research results or even scientific discoveries into services, systems, processes or products that are commercially successful. Early research by Urabe (1988) presented an in-depth definition for innovation:

> ‘‘Innovation consists of the generation of a new idea and its implementation into a new product, process or service, leading to the dynamic growth of the national economy and the increase of employment as well as to a creation of pure profit for the innovative business enterprise. Innovation is never a one-time phenomenon, but a long and cumulative process of a great number of organizational decision-making processes, ranging from the phase of generation of a new idea to its implementation phase. New idea refers to the perception of a new customer need or a new way to produce. It is generated in the cumulative process of information-gathering, coupled with an ever-challenging entrepreneurial vision. Through the implementation process the new idea is developed and commercialized into a new marketable product or a new process with attendant cost reduction and increased productivity’’. (p.3)

Esteve et al. (2012) pointed that there are several and different usages for the concept of innovation and emphasized that it is not easy to unify them all in a sole definition. Thus, they adopted a definition proposed by Walker (2006), which epitomized the various aspects of the innovation concept: ‘‘innovation is a process through which new ideas, objects, or practices are created, developed, or reinvented, and which are new for the unit of adoption.’’ According to Esteve et al. (2012), Innovation does not mean reinventing the wheel or creating something new from scratch, but rather to do with adopting something, which has not been done before within the organization itself. Innovation can also be described as any new practices, ideas and material

products that the company can adopt for the creation of the innovation process within it.

The Dimensions

Kamm (1986) regarded the innovation concept as multidimensional, which includes source and types as key dimensions. While the former refers to the precedent method the firm follows to develop and acquire its innovations, which will be explained in the up coming few lines. The latter stands for the firm being innovative with a concentration on product, process or administration.

On the other hand, Zahra and Covin (1994) stressed out that innovation type and source are interlinked to each other. Regardless of the type/source of innovation a company would pursue, the decisions related to them must be very well coordinated. For example, the success of an innovative product or process hinders on the application of administrative innovations.

The Sources

This dimension is more focused on the pattern an organization would follow to develop or acquire innovations. The sources of innovation and the organizations' ability to collaborate with partners who tend to differ in firms as well as industries. What is more, it is vital to state that the importance of innovation sources stems from the fact that companies must with hold skills and capabilities, which enables them to succeed in the marketplace (Zahra and Covin,1994; Segarra-Blasco & Arauzo-Carod, 2008).

In their studies, Burgerlman and Sayles (1986) listed three key sources for innovation, which are incubative, acquisitive and imitative. First, incuabtive source refers to the level of commitment a firm has established to build up its own innovations. Also, it is usually achieved through conducting internal Research and Development (R&D). Well-known companies such as Hewlett-Packard (HP) and Merck have been famous for accentuating this kind of innovation source. Next, acquisitive source stands for the firm's degree of involvement in attaining innovations such as equipment, machinery or

software, which were develop externally and have been acquired through purchase, licensing or join ventures. To exemplify, General Motors (GM) acquisition of a computer firm named (EDS) so they can design new cars that incorporate the technological innovations of EDS (Burgerlman & Sayles, 1986). At last, the imitative source where Mansfield (1988) described it as an organization's tendency to mimic their rivals' innovations or other companies in different industries. In the microcomputer industry, for example, IBM's products were copied and sold in lower prices by a company named Zenith (Zahra & Covin,1994).

The Types

Once more, when exploring the body of literature on the types of innovation, studies indicated that many researchers believed that they have grasped the concept of innovation. Yet, the fact was that innovation varied in classification and in relation to the applications and levels that have been examined by researchers, especially in the context of large firms more than small to medium enterprises (Tohidi & Jabbari, 2012).

- **Radical vs. Incremental**

Early studies by Wilhelm (2003) summarized that there are two ways to distinguish innovation "radical" and "incremental" and they are classified by the degree of their novelty. Recent evidence suggests that when it comes to distinguishing innovation, novelty in product, service and process are the key facets to consider when differentiating innovations (Tohidi and Jabbari, 2012).

Radical innovation refers to the new changes in products, services, processes or even in organizational structures and there is a shared consensus among researchers that such innovation contribute to shaping great changes (Tohidi and Jabbari, 2012). In the same context, Markides (2006) draws our attention to the theory of disruptive technologies, firstly introduced by Christensen (1997), and how authors used the same theory to describe the different types of disruptive innovations, which he regarded as a huge mistake. The author argued that disruptive innovations must be treated as distinctive prodigies, because each kind of innovation has various - competitive - effects and

results in creating diverse markets. An example on disruptive innovations is business-model innovation, a terminology used to refer to an existing organization finding a fundamentally new and a different business-model. A good example on this is Barnes & Nobles and Amazon. Both businesses are competing in the industry of book retail, but using different ways. Amazon is using virtual merchant, and operates solely on the web. Such model created a huge competition among the traditional book retail companies and forced the likes of Barnes & Nobles to reassess their existing models to survive the competition in the market. Hence, the company is using two models, the traditional brick – and – mortar and implemented a new model, click – and – mortar, where it has a retail establishment as well as a web storefront to compete with Amazon (Markides, 2006; Rappa, 2010).

The incremental innovation is described as changes or improvements in products/goods or in the current structure. An example on this is personal computers; they did not emerge suddenly, but were the outcome of an incessant process of research and development, which lasted for decades to become the way they are in present times (Wilhelm, 2003). Additionally, Varis and Littunen, (2010), sustained the same findings and wrote about the two ways to be considered when differentiating the types of innovation. The first way to innovation is differentiated based on the object of change such as organizational, market, product and process innovations (Schumpeter, 1934 edited by Varis & Littunen, 2010). The second way is based on the level of change, where innovation is measured by how much of “new” or “radical” it is.

- **Exploitative vs. Exploration**

There are two other types of innovation, which have been mentioned in the literature, “exploitative” and “exploration”. Exploitative innovation was described as the use of general knowledge to enhance the existing product, services or processes of an organization. Contrastingly, exploration was explained as using a specific kind of knowledge where it works as the baseline for producing new technologies and products (Bierly et. al, 2009).

- **Product, Process, Technology, Market and Ancillary Innovations**

In the body of literature there are a variety of classifications of innovation types, particularly in the context of large firms. For instance, Afuah (1998) distinguished them to product, process technological, market, and organizational, each type carrying out certain characteristics.

Firstly, the most common form of innovation is product innovation. It is defined as introducing new products and services or modifying an organization's existing line of products and services (Damanpour & Evan, 1984; Zahra & Covin, 1994, Oke et al. 2007). Secondly, technological innovation and it usually refers to the components and the knowledge associated with it's linkages, techniques and methods, which go into service/product Also, it refers to managing and commercializing activities such as the marketing of a new product as well as applying and commercializing of new tools or processes, especially if it was for the first time (Afuah, 1998; Tohidi & Jabbari, 2012). Technological innovation includes technical design, manufacture and production, management and commercialization of the activities such as marketing for a new product and or for the first time it includes commercialization and application of new process or tools.

Thirdly, process innovation, which refers to organizations adopting/enhancing the firm's operations. This involves taking on substantial changes in equipments, techniques, information flow mechanisms, input materials and software. This type of innovation is widely seen in manufacturing settings where manufacturers constantly looking for new ways to reduce the cost of unit production as well as improving quality, products and delivery as well (Afuah, 1998; Popadiuk & Choo, 2006; Gunday et al. 2011).

Another type has been identified is marketing innovation. It's about employing new approaches in marketing to result with noteworthy changes on products specifically in design, packaging, pricing, promotion and product placement. This sort of innovation is usually tied with the marketing mix, that is, product, price, place and promotion. Plus, it is foremost concerned with addressing the

consumers needs, positioning the firm on the market, marketing new products and all kind of activities that are associated with the it, such as examining new markets prior to launching new products, configuring products to fit different markets and advertising launch. (Popadiuk & Choo, 2006; Gunday et al. 2011).

Popadiuk and Choo, (2006) stated that organizational innovations are more concerned with the new approaches a firm would pursue in its workplace, business practices and external relationships. What is more, this type of innovation tends to reduce costs (administrative, transactional and cost of supplies), improve labor productivity by improving work-place satisfaction and acquire access to non-tradable assets. An example on this is initiating practices to codify knowledge through developing databases where it consist of various types of knowledge such as best practices and lessons learnt, which can be accessed by others easily. Also, it involves introduction a bundle of training programs for the employees' development and retention. For this reason, organizational innovations have strong ties with the administrative efforts to promote coordination, collaboration, sharing, learning and innovativeness by renewing organizational routines, systems, mechanisms and procedures (Gunday et al., 2011).

Lastly, Ancillary innovations, Walker (2006) quoted Damanpour (1987, p. 678) to define it; "organization-environment boundary innovations" This form of innovation includes after-school supplementary education and community service programs and according to Walker (2006), the success of ancillary innovations relies on factors that are beyond the firm's control. Also, he explained that the main concern for ancillary innovations is to work across boundaries with users, public agencies, and other services and this indicated that the success of their implementation hinders on others.

The Process

The literature indicated that there are a number of theories, which were developed to investigate and understand the innovation nature and how it arises, each depending on the area that influenced the era it was cultivated in (Galanakis, 2006). Rothwell (1994) divided them into 5 different theories as follows:

Figure 1: Technological Push, First Generation (Rothwell, 1994)

1. The Technology Push Theory:

This theory was dominant back in the 1950s. As figure 1 shows, it is a simple linear process, which advances from scientific discovery into technological development resulting in introducing a new product in the market (Rothwell, 1994; Galanakis, 2006).

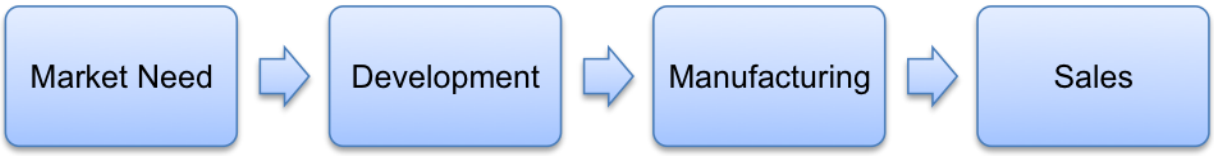

Figure 2: Market Pull, Second Generation (Rothwell, 1994)

2. The Market Pull Theory:

Back in the 1960's, this theory was dominant. Similar the former theory, the market pull theory is a liner process (figure 2), yet with a slight difference. According to Rothwell (1994), in that period the level of competition was high among companies and the emphasis was shifting from developing new products to the demand factor. In other words, the market needs were emerging as the hub of all new ideas, which was the engine behind R&D activities and hence, the development of new products.

3. The Coupling Innovation Process Theory

Rothwell (1994) pointed that the two-oil crisis of the 1970's were the turning points for the innovation process. As a result, the level of inflation was high during that period and the demand was in saturation. Also, the capacity of supply usually outstripped the demand. Not to mention, the growing level of unemployment. Former studies reported that the first and second generations of innovation theories were considered extreme, which resulted in the introduction of new theory, that is the coupling model theory (Rothwell and Zegveld, 1985).

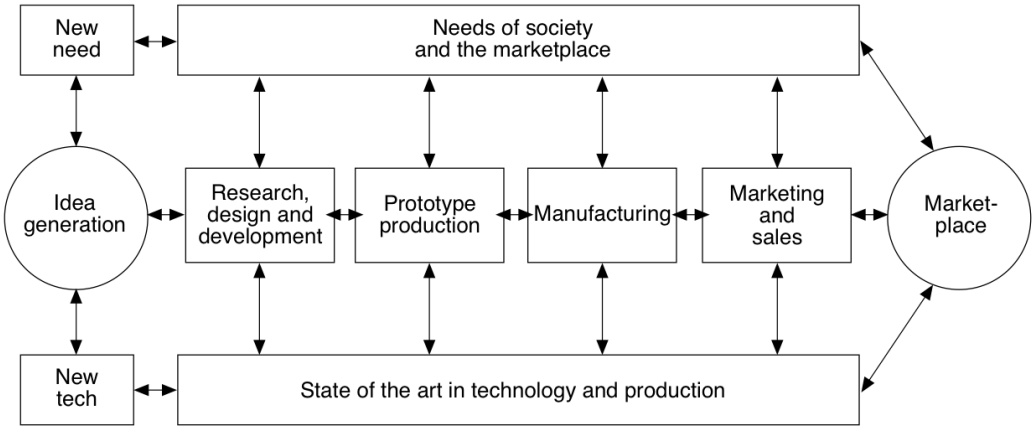

Figure 3: The coupling model of innovation, Third Generation (Rothwell, 1994)

The diagram above illustrates a logical and sequential process of the third generation model. Obviously the diagram is nothing like its linear predecessors. It's a much complicated one, but with much effective results. It gives or shows more than one outcome through the confluence of the market-needs and the technological capabilities within the framework of the innovating firm (Rothwell & Zegveld, 1985).

4. The Functional Integration Innovation Process Theory

The start of 1980's was known as the recovery era among businesses/companies, since it ushered the new adaptation of the innovation process. It began with observing the Japanese automobile and electronics

industries and then via deploying their methods by both large and small enterprises (Peters & Waterman, 1982).

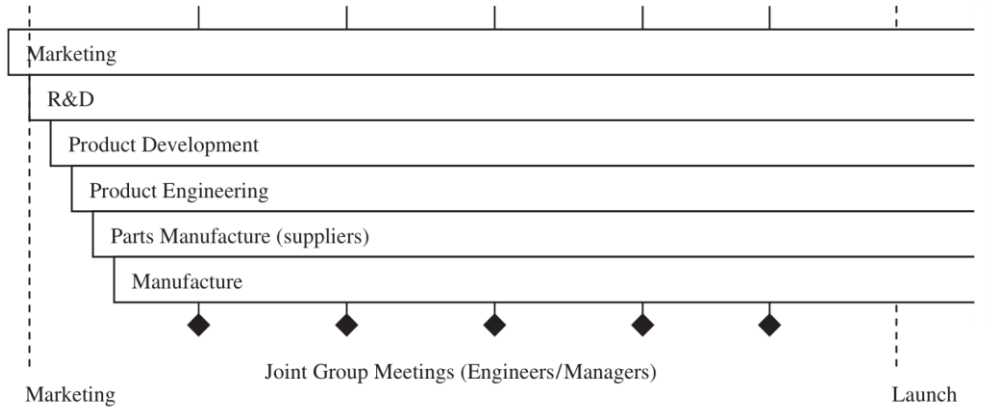

Figure 4: Integrated innovation process, Fourth Generation (Rothwell, 1994)

The figure above depicts a parallel technique that was preferred at the time over the sequential one, which was used by the previous theories. This process engages the different expertise of different specialists during any point of the project in order to reduce the completion time and the rework that might be needed in later stages like with the process of manufacturing and marketing (Galanakis, 2006).

5. The Systems Integration and Networking Innovation Process Theory:

This theory was developed based on the fourth generation of the innovation process. Nevertheless, it has one crucial change, which is the requirement of continuous improvements, and change to the process itself. What is more, this enhanced process incorporates new electronic tools such as prototyping to help along the design and development phases. Here we see the parallel method in action. Since the network of suppliers, customers and other firms involved are communicating efficiently and building an innovation network that aids in reducing problems such as complexity of new products (Rothwell, 1994).

KNOWLEDGE SHARING

The study of Knowledge Sharing and Knowledge Management, henceforth

referred to as KS and KM, obtained an immense amount of attention from researchers and scholars. This is widely visible in the large number of publications, which were published, in recent years (Seidler-de Alwis & Hartmann, 2008).

Many academics and managers acknowledged that knowledge is the core component to achieve competitive advantage for any corporate that is looking to succeed in the market. The significance of knowledge stems from the fact that it might hold valuable, inimitable and irreplaceable characteristics. To be precise, the knowledge that is possessed by the employees and the ones built in the corporate structure and systems (Liao, 2006; Lin, 2007; Seidler-de Alwis & Hartmann, 2008). Yet, the main questions are how do organizations produce new knowledge and what are the means of transferring this acquired knowledge.

The body of literature has an extensive amount of descriptions and definitions explaining KS construct. Nonetheless, In order to have a better understanding of (KS), it is quiet essential to comprehend the meaning of “knowledge”. Starbuck, (1992, p.716) defined knowledge as “stock of expertise”, whereas Nonaka and Takeuchi (1995, p. 86) described it as “justified true belief”. A further definition was developed by Purser and Pasmore (1992), where they remarked that knowledge is a collection of ideas, opinions, facts, schemes, models and intuition, which are all used in the process of decision-making. Later studies by Ruggles (1998) sustained a similar explanation to Purser and Pasmore (1992) and he pointed that knowledge is composed of information, norm, value standard as well as experience.

Multiple Definitions

After looking at the concept of knowledge and perceiving its meaning. This part of the research explores the literature to understand (KS) construct. Many academics studied (KS) and came up with various explanations and definitions in different contexts to understand the concept. Yet, they shared a consensus on the description of (KS). For instance, Levitt and March (1988) explained that (KS) is a course of action and involves the individual obtaining

experience from his/her peer, consequently, emphasizing the learning in the organization.

According to Garvin (1993), the principle of KS focuses on transferring knowledge among groups of people or between one individual and another. Moreover, in organizations, knowledge sharing can be applied not only among the employees within the organization, but also can be shared externally. Such practices have a positive impact on the organization as the employees become more connected with external sources of knowledge. Hence, attaining new set of information, ideas and experiences, which the organization is lacking. What is more, the main driver behind organizational innovation is exchanging knowledge as well as learning by being part of a network of organizations (Hamel & Prahalad, 1993; Nooteboom, 2000; Wasko & Faraj, 2005).

KS is regarded as a behavior where the individual disseminate the knowledge he/she acquired with his/her fellow members in the organization (Liebowitz, 2001). Also, the course of one's identifying, sharing and utilizing knowledge in the organization is considered as solid manifestation of knowledge management (Ryu, Ho, & Han, 2003). Similarly, Lin et al. (2012) expound that (KS) is about the discussion and exchange of knowledge, which occurs among employees and various – internal and external - groups, using different means of channels, such as vis-à-vis discussion, best practices, database, formal/informal networks and conferences. Also, there are two core objectives behind such practices, which are creating synthesis and the expansion of knowledge utilization in the course of inter-change of knowledge.

It is important to highlight the difference between KS, transfer and exchange of knowledge. For the knowledge transfer, it includes the sharing of knowledge, through the knowledge source, the acquisition and application of knowledge by the recipient (Wang & Noe, 2010). Furthermore, Szulanski et al. (2004) stated that knowledge transfer was not used to portray the knowledge movement among individuals, but among the various divisions, units or organizations. Although some researchers have used KS and knowledge

exchange interchangeably, it is important to indicate that knowledge exchange consist of KS, which is basically knowledge provided by workers to others, and knowledge seeking where workers are obtaining knowledge from others (Wang & Noe, 2010).

The Types

KS is important because it carries lots of advantages for the organization such as encouraging organizational learning. The most common types of KS that are widely discussed in the literature and were firstly distinguished (Polanyi, 1958) are implicit (tacit) and explicit knowledge (Garvin, 1993).

There are various definitions available in the literature to describe tacit knowledge. But, there is a phrase, which encapsulates the true meaning of tacit knowledge by Polanyi (1966, p. 4) "'we know more than we can tell''. In their research, Seidler-de Alwis and Hartmann (2008) quoted Rosenberg (1982) description of tacit knowledge 'the knowledge of techniques, methods and designs that work in certain ways and with certain consequences, even when one cannot explain exactly why'' (p. 143). Nonaka (1991) presented a broader explanation for the term and stated that it is not easy to formalize and commune tacit knowledge to others, due to the fact that it's extremely personal. He also added that tacit knowledge has two aspects, technical and cognitive. The former focuses on the "know-how", whereas the later encompasses things that the human takes for granted such as ideas, beliefs, values and feelings. Seidler-de Alwis and Hartmann (2008) pointed out that tacit knowledge is considered as unconventional and less recognizable form of knowledge. Moreover, it can only be acquired through observation, imitation and sharing experiences (Kikoski & Kikoski, 2004).

In contrast, explicit knowledge is described as knowledge that can be explained and articulated in a simplistic manner and using formal language such as language, copyright and patents, mathematical expressions and manuals (Nonaka, 1991). It is ubiquitous and can be found relatively easily in journals, books, mass media such as Internet, television, newspapers, etc. In a business context, patents are regarded as the perfect example of explicit

knowledge (Seidler-de Alwis & Hartmann, 2008). Smith, (2001, p.315) remarked that “explicit knowledge is carefully codified, stored in a hierarchy of databases and is accessed with high quality, reliable, fast information retrieval systems”. Yet, the sharing process frequently calls for major investments in the infrastructure needed in order to both support and fund information technology (Hansen et al., 1999 edited by Smith, 2001).

Nonaka et al. (2000) pointed that both tacit and explicit knowledge are considered as two face of the same coin, that is knowledge creation. The interaction between both facets assist in creating knowledge and if one of the elements is missing, the creation formula will not be complete. Furthermore, if companies want to gain and retain their competitive edge and succeed in the future, they have to value the importance of their tacit knowledge since its private and explicit knowledge can be known and shared by others.

Innovation & Knowledge Sharing

Many researchers in the field of innovation expressed that there is an effective and strong relationship between the two constructs. Knowledge sharing is a key ingredient for an effective innovation. (Smith et al. 2005; Darroch & McNaughton, 2002; Kamaşak & Bulutlar, 2009). Furthermore, Dougherty et al. (2002) affirmed that the process of accumulating new knowledge has a strong influence on creating new ideas and innovation in any organization (Kamaşak & Bulutlar, 2009).

In the previous few pages of this chapter, the different types of innovation were discussed, in particular, exploitative and explorative innovations. Knowledge sharing is an important factor for these types of innovations, because the acquisition of general knowledge or transferred knowledge will assist the firm to improve its existing line of product, services or process, which is the case in exploitative innovation. As for explorative innovation, specialized knowledge works as the baseline for the development of new technologies and products. Also, it is worth mentioning that the creation of effective innovation is the outcome of the invisible of total experience as well as visible and obvious expertise. Thus, the employees’ sharing one another

their accumulated knowledge and tangible experience leads to improving innovation (Bierly et al. 2009)

An additional element to be considered is knowledge dissemination, which affects innovation besides knowledge sharing. Both knowledge sharing and knowledge dissemination are crucial, as they tend to have a unique and ambiguous nature in a firm setting. Plus, if an organization continues to support collecting and integrating new knowledge, it will be able to create an efficient innovative environment (Teece, 1998; Subramaniam & Youndt, 2005).

SMALL TO MEDIUM ENTERPRISES (SMES)

Before probing the relationship between innovation and Small to Medium Enterprises (SMEs), it is quite essential to gain an understanding on SMEs, their characteristics and the overall importance in driving a country's economic growth.

The Concept

Knight (2001) formulated a description that has been used extensively in industrialized countries. He defined SMEs as "firms with 500 or fewer employees" (p. 155). Furthermore, Hock (2000) argued that SME's as a group have a lot of heterogeneities with an extreme difference in the spectrum of products and services, as well as market conditions, which they operate under. Similarly, Kaufmann and Tödtling, (2002) affirmed Hock (2000) findings and added that the SME sector is indeed heterogenic and very difficult. It's almost impossible, to create a comprehensive list of related needs to innovation and fits all kind of SMEs at the same time.

Moreover, Kaufmann and Tödtling, (2002) listed a number of factors that led to the heterogeneity in SMEs sector. The first factor was on the technological level. Firms that are "technology-driven" focus more on product innovations, in particular, new products in the market. On the contrary, lower-technology companies are more active on cost reduction and process innovations. The second factor was market relations. It is stated that if a firm is dependent on

dominant customers, it is expected that there will be incremental character on their innovation activities. To exemplify, some clients prefer to stick to applications and solutions that they are already aware off rather than assessing innovations, which are foreign to them. The final factor was strategies of competition. New functions and improved quality stimulate competition more than price competition (Kaufmann & Tödtling, 2002).

Lee et al. (2012) expressed that SMEs do have a significant power on pushing employment and economic growth in a country, unlike giant enterprises, where their growth has been creeping in recent years. For instance, the Organization for Economic Cooperation and Development (OECD) pointed out over 95% of businesses are SMEs creating a total value of 50% around the world. Also, most of new jobs - between 60 to 90% - are created by SMEs. As for the total exports in industrialized nations, SMEs have a share of 18% of the total exports (Knight, 2001).

SMEs: The Models

According to Cooper (1981) SMEs development can be classified into three stages, which are “Start-up”, “Early-growth” and “Later-growth”. For the first stage, the “Start-up”, it involves the strategic decisions to forming the firm and building a competitive strategy to position the start-up in the most suitable industry. The second stage, “Early-growth”, is concerned with testing the initial product-market strategy while the business owner maintaining the responsibility of direct contact of all the major activities in the firm. As for the final stage, “Later-growth”, it has to do more with firm being characterized for service and retail businesses by multiple sites. (Cooper, 1981; Hock, 2000).

Figure 5: The Five Stages of Growth in Small Businesses (Scott and Bruce, 1987)

The figure above demonstrates a proposed model for SMEs by Scott and Bruce (1987). It consists of five stages and they were start-up, survival, growth, expansion and maturity (Lewis & Churchill, 1983). Furthermore, the researchers contended that at the early stages, specifically, the start-up is entirely created by its founders. Plus, the founders are treated as a valuable asset due to the fact that they provide capital, direction and the vital managerial skills for the business survival. The business would pass to the "Survival" stage once it survives, and it turns into viable, financially wise. In some cases, additional staff might be hired. Churchill and Lewis (1983) claimed that the role of business founder at this stage becomes minimal particularly in the process of formal planning. Yet, he is still in control of the business. Scott and Bruce, (1987) contended that several SMEs tend to spend a long period of time operating at this stage and their range of product lines are mostly limited or even a single product.

The third stage of the model, "Growth", is considered as the most critical in the entirety of the stages, as the business turns to be economically stronger. Still, it is dubious that the business owner would generate cash at this stage (Scott & Bruce, 1987). The firm will be more formal in its structure and most of the time will be spent functional managers and coordinating their efforts. Plus, for the firm to expand its range of products, it might embark on small-scale formal researcher and development due to the fact that it still lacks resources. Its crucial to point out at this stage, most of the growth is merely induced by the natural market expansion (Lewis & Churchill,1983).

The next stage on Scott and Brunce (1987) model is “Expansion”. The basic features of this phase are the regular management, decentralization of authority, budgetary control and most of the administrative functions are systemized, as it’s essential for the firm’s survival. One of the major issues the firm might face during this stage is the distance of senior management from being part of the action. As the scope of business is expanding along with the formalization of systems, professional managers are hired to manage the business. Moreover, their level of commitment to the business and willingness to make sacrifices for the business’ sake will not match or be equal to the level of commitment of those who were in the business since the early days. In addition, the more the firm continues to maintain its level of growth, the more decentralization will occur. Consequently, the further the founder/entrepreneur will turn into a planner and a watchdog. Besides, the professional managers will have the upper hand in decision-making (Scott and Bruce, 1987).

The final stage of this growth development model is “Maturity”. The earlier definition on SMEs indicated that the numbers of personnel are below 500 employees (Knight, 2001). In this stage, most of SMEs move out of being small in terms of size and might become twice as large. Furthermore formalization is rising more, whereas centralization is declining. At the same time, the firm is transforming its organizational structures to be further complex than hitherto (Scott & Bruce,1987).

Distinguishing SMEs

Major and Cordey-Hayes (2000) conducted a research on SMEs and Foresight program in UK. The researchers distinguished SMEs into three categories; reactive/uninvolved, strategic/involved and responsive. In one end, there are reactive or uninvolved firms and the sole purpose of their existence is to fulfill the short-term needs of the managers or business owners. On the other extreme lie the strategic/involved firms, which concentrate on their long-term needs. Despite their little knowledge, the management of strategic/involved firms tends to take on forward-thinking approach and look at the future as an opportunity rather than threat. The last

group in this categorization is responsive firms. They have a strong desire for maturity and willing to adopt new approaches, still they require the assistance of professionals in order to initiate the change in their firms to mature and expand.

Innovation in SMEs

Authors such as Hotho and Champion (2011) expressed that the literature on SME innovation is growing promptly, yet with a range of broad biases. In contrast, previous research by Edwards et al. (2005) argues that the study of innovation in SMEs did not cover the multi-level dimensions and the paradoxical links between structure and agency. Factually speaking, most of the previous works studied the traits and behaviors of entrepreneurs', structural characteristics and how they are associated to decisions on innovative activities in the context of their enterprises (Lipparini & Sobrero, 1994; Kickul & Gundry, 2002; Oke et al., 2007; Lee et al. 2010).

Again, regardless of the huge body of knowledge on innovation in SMEs, it was argued that the benefits of such studies were marginal when it came to explaining the process of innovation in SMEs. Also, Major and Cordey-Hayes (2000) discussed the hardship of taking innovations into SMEs and in spite of all the efforts are being done in this matter, the culture of innovation is still not being grasped fully in SMEs. Nevertheless, it is quiet astonishing to notice that there are very few studies that suggested a specialized model for innovation in SMEs (Edwards, Delbridge & Munday. 2005).

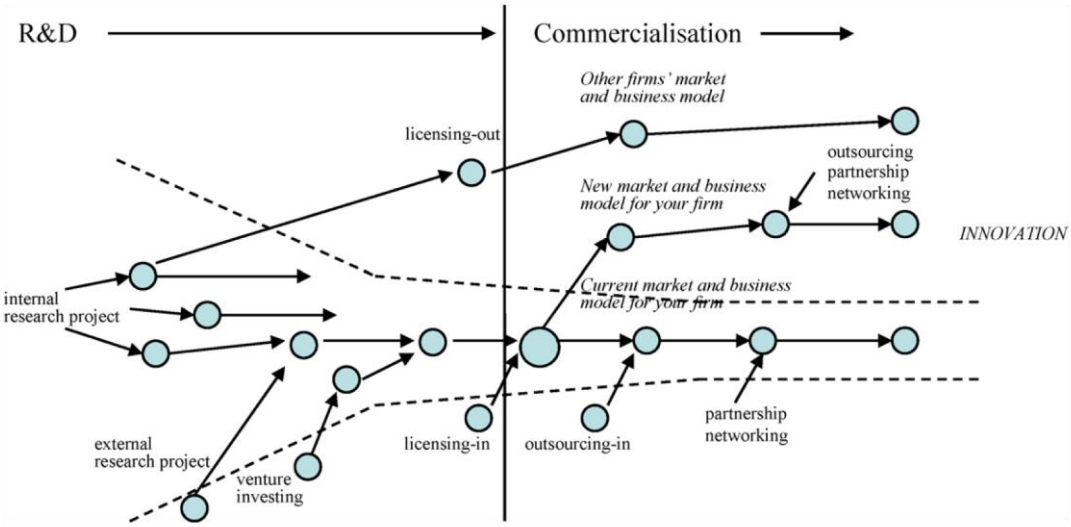

Figure 6: Open Innovation Model in SMEs (Lee et al. 2010)

For instance, Lee et al. (2010) proposed a model for open innovation in SMEs, (Figure 6), with a concentration on commercializing the SMEs' innovations. It is well known that SMEs are commonly deficient in certain areas such not having the facilities to manufacture, lacking marketing channels as well as strong ties with global contacts to assist them in setting up their foots effectively and solidly in the innovation market. The objective behind the model's proposition is to facilitate innovation and fill in for the shortages, which SMEs' suffer from by collaborating with intermediaries such as marketing agencies to grant a successful commercialization of their innovations.

Many researchers shed the light on the key factors that determine SMEs innovativeness and they are classified as "internal" and "external" (Lee et al. 2012). For the internal variables, they focus on SMEs characteristics, which lead to successful innovation in SMEs. Nonetheless, the literature exhibited that the scholars did not share a consensus on these characteristics. For instance, Damanpour (1991) suggested that innovation have a positive correlation with a number of determinants such as administrative intensity, professionalism, managerial attitude toward change, functional specialization and differentiation, slack resources, external and internal communication. Whereas, Lee et al. (2012) list of characteristics included structure, strategy,

level of education, investments in R&D and technology policy. Additionally, they asserted that effective strategy triggered risk-taking behavior and internal creativity in an organization.

Laforet (2012) remarked that a firm's innovation is determined using two measures; soft and hard. The former refers to any critical changes an organization undergoes in the following areas; management practices, strategy and organizational structure. The latter focuses on the company's overall performance in the market, financial statements in terms of net sale, revenues generated from new products and spendings on R&D activities.

To the opposite, Lee et al. (2012) remarked that the external variables are more focused on the opportunities in the SMEs' surrounding environments in which they can seize, such as linkage with knowledge centers, collaborating with other organizations, support regulations, utilizing financial resources and others. Furthermore, Laforet (2012) implied that collaborations between SMEs and customers, business partners or suppliers have a positive impact on the SMEs' innovation as they provide resources, which SMEs lack. Early findings by Rothwell and Dogson (2007) sustained similar findings and indicated that collaborative linkages that occur between companies for the sole purpose of innovation are receiving a great attention from not only academics, but also public policy makers and industrialists. Moreover, most of these collaborations are R&D joint ventures, in the context of technology agreements, between large firms rather than SMEs (Rothwell & Dogson, 2007).

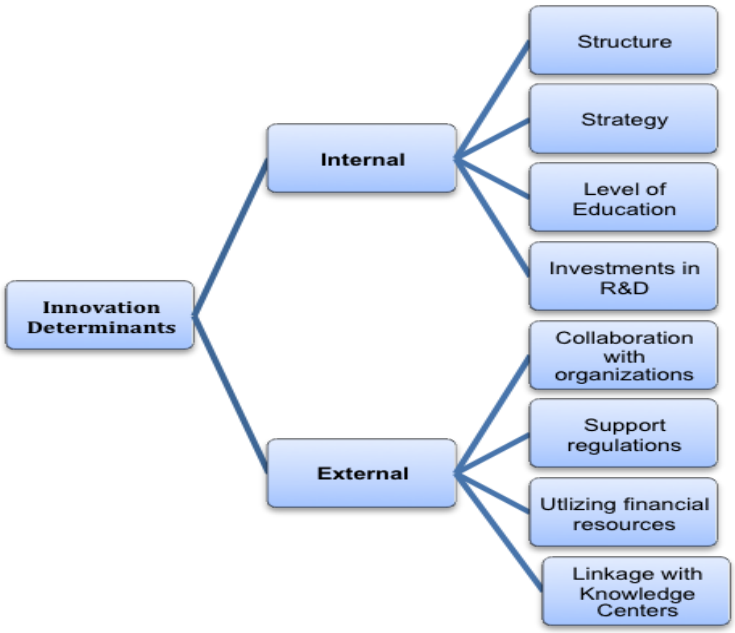

Figure 7: Innovation Determinants

Barriers to innovation in SMEs

As reported by Kaufmann and Tödtling (2002), there are certain numbers of obstacles and risks, to the quest of innovation and they tend to differ between firms and SME's, because of the differences in innovation activities. Plus, most of the identified barriers were associated with cost, human resources, flow of information, organizational culture, institutional constraints and government policy. Madrid-Guijarro et al. (2009) remarked that these barriers are applicable in both small and large firms, but they are widely visible among small firms as their resources base is very limited.

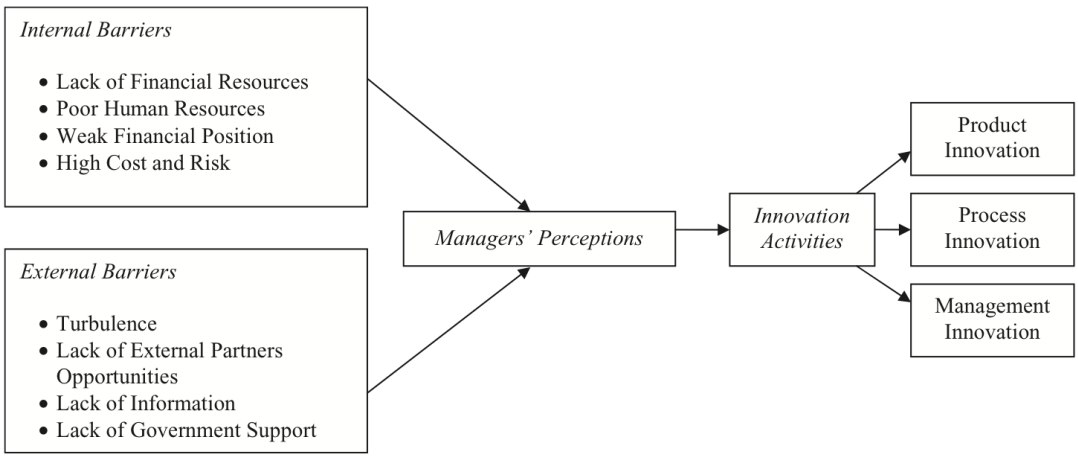

Figure 8: Barriers to Innovation (Madrid-Guijarro et al. 2009)

Figure 8 demonstrates the relationship between two components, firm's innovation and barriers to innovation. As it's shown above, the barriers are split into two categories, internal and external.

The internal barriers include a variety of influences such as the lack of financial resources, poor human resources, weak financial position, high cost and risk. It is believed that the internal barriers have a substantial negative impact on the implementation of innovation activities, as they are hard to surmount (Madrid-Guijarro et al. 2009). For instance, Kaufmann and Tödtling, (2002) ranked financial resources as the most significant internal barrier that hampers innovations. Plus, with innovation projects comes uncertainty and it is regarded as the basis for clashing with the project funders. Likewise, it is common that conflicts arise among the managers/owners to justify the need to invest in innovation and the risks it brings (Bergemann, 2005). Poor manpower ranked in the second place in innovation barriers. This can be clearly seen in SMEs sector, where qualified and adequate personnel are either not present or they do not have the sufficient time to participate in innovation activities (Major & Cordey-Hayes, 2000).

On the contrary, the external barriers that hamper innovation include turbulence, lack of external partners' opportunities, lack of information and government support. Furthermore, there are additional factors, which influence external environment barriers such as government policy, economic uncertainty and global competition (Madrid-Guijarro et al. 2009). A number of researchers affirmed that there is a positive correlation between the rate of innovation and external economic uncertainty (Khan & Manopichetwattana, 1989; Souitaris, 2001; Madrid-Guijarro et al. 2009).

Miller (1987) highlighted that the higher the turbulent external environment, the higher potential rate of innovation in firms. Such conditions encourage organizations to include innovation into their business strategy, so they continue to be competitive and be ahead of their game in aggressive markets. Frishammar and Horte (2005) affirmed that firms must effectively communicate the importance of innovation to managers by making core

objective in the firm's strategy, as it will assist in maintaining the firm's competitiveness in the market.

Lack of information and government assistance are considered as significant factors that hampers innovation. The ability to gain information on the organization's surrounding environment such as the government policy, market opportunities and changes in technology are some of the means deployed to meet end-users expectations and needs as well as the company becoming more innovative. The European companies make a good case for this, since the lack of information was one of the top reasons behind the innovation barriers. As for government support, not having access to funding or intermediary institutions for innovation such as business innovation centers or science parks were among the top reasons that constrained innovation in SMEs. (Galia & Legros 2004; Massa & Stefania, 2008).

Knowledge Sharing in SMEs

Knowledge management is regarded as a key and powerful element for organization's success. When it comes to SMEs, their success is reliant on how well they manage their knowledge. However, knowledge management and acquisition in SMEs did not receive much of attention among scholars (Davenport, 2005).

Sawers, et al. (2008) emphasized that knowledge and dynamic capabilities are the main components for innovation. Also, companies do not have all the resources, expertise, knowledge and competencies to achieve innovations. Thus, it is necessary to access external resources in order to acquire all the required knowledge. Earlier research by Gils and Zwart (2004) suggested that in today's knowledge-based society, there are a number of strategic challenges, which both entrepreneurial firms and SMEs stumble on. To be more precise, they have to manage all issues related to knowledge acquisition. Furthermore, Nunes, et al. (2006) argued that for SMEs to compete, their knowledge must be up-to-date, managed appropriately, disseminated and retained within the firm. Additionally, SMEs will be exposed

to knowledge leakage as well as losses in productivity, efficiency and competitiveness if they do not maintain any of the previous processes.

Within the academic literature, scholars (George et al., 2001; Sadler-Smith et al., 2001) have listed various means and methods that can be used to exchange information and share knowledge in order to compensate for SME's internal deficiencies of knowledge. These include networks and alliances, which are believed to be crucial development options and such co-operative agreements yield in opportunities for accessing knowledge, learning and knowledge acquisition (Grant & Baden-Fuller, 2004).

The literature lists different types of alliances that take place between SMEs and large firms so the former can access and acquire knowledge and hence learn from the latter. One of the most recognized alliances in the business landscape and literature are tactical and strategic alliances. Gils and Zwart (2004) used two variables to distingue the difference in both types; the type of resource/knowledge being shared and the degree of interdependence.

Gils and Zwart (2004) described tactical alliances as agreements with a mere purpose of attaining scale advantages. Also, the agreements involve several transactions and the relationship usually lasts for a short period of time. As for the nature of information that being shared, they are regarded as not critical. In other words, the competitive position of none of the allies is endangered if the information was transferred to other organizations that are not associated with the alliance (Grant & Baden-Fuller, 2004).

In contrast, strategic alliances are cooperative agreements between two partners and lasts for a long period of time. The agreements involve sharing significant knowledge or financial assets between both partners so they can gain, maintain or enhance competitive positions (Gills & Zwart, 2004). Unlike tactical alliance, communicating and sharing knowledge, specifically tacit knowledge, to other firms that are not part of the agreement could have a severe negative impact on the competitive position of both firms (Davenport, 2005).

Strategic SMEs Networks

It was mentioned many times and in different parts of this research that SMEs have to be innovative to confront globalization and endure the aggressive economy. Except that some SMEs seems to be at a disadvantage and find themselves in a very weak position to survive the competition, because they are in short of the right resources - human and financial - to innovate (Wincent, Anokhin and Örtqvist, 2010).

Collins and Hitt (2006) pointed that throughout the history, forming and sustaining strong interpersonal relationships between several parties such as entrepreneurs, dyadic business associations with a selected number of partners were of aid in realizing these kinds of demands. Besides, SMEs tend to join informal networks with other SMEs and work together but independently to meet their shared goals. On the contrary, some SMEs participate in a more of formal cooperative form of networks (i.e. Strategic Networks) to compensate for shortages in resources, which obstruct them from being innovative (Wincent, Anokhin and Örtqvist, 2010). Also, Human and Provan (1997) defined strategic networks as

> "Intentionally formed groups of small- and medium- sized profit-oriented companies in which the firms: (1) are geographically proximate, (2) operate within the same industry, potentially sharing inputs and outputs, and (3) undertake direct interactions with each other for specific business outcomes" (p. 372)

Wincent, et al. (2010) explained that these groups of SMEs cooperate with one another and their mere intention is to enhance and elevate their innovative performance using multilateral, intra-network technology as well as the exchange of know-how and development of new and innovative services or products. As for the network's size, Thorgren et al (2009) noted that they are very large. They might consist of between 50 to 100 members of firms, and despite the fact that they work independently; they joint their forces together to work and fulfill a shared goal, which is developing innovation.

According to Zeng et al. (2010), of the main advantages SMEs can get from participating in external partnerships are having privileges of accessing external capabilities and resources. Consequently, having both incentive and capacity to be innovative. Similarly, Cumbers et al. (2003) mentioned another pro, strategic networks aid in making up for the size-related advantages of bigger organizations. A good example on this is YWOOD, a Swedish network where it comprise of around 50 manufacturing firms. These firms have come to work together in order to develop competitive and innovative products in the wood industry and to offer them to the large retailers globally. As a result, firms that participated in the network were not able to develop manufacturing equipments, which were used to process using new methods, but also manufactured new goods that were exported successfully by the member firms (Wincent, Anokhin and Örtqvist, 2010).

Despite the advantages that were mentioned above, the existing literature did not present a full picture and overlooked the challenges that hamper the facilitation of innovation in SME networks. For example, in some scenarios few SMEs in the network were found seeking to satisfy their own personal agendas and interests on the expense of other network members and this created challenge in the sense of future cooperation. Other issues involved the shortages of resource as well as the legitimacy of network, which all may possibly result in failure to innovate (Rosenfeld, 1996; Human and Provan, 2000; Wincent, 2008).

According to Wincent, et al. (2010), SME networks came to a shared consensus that the most suitable governance device that can use to monitor and manage the network is by having network boards. These boards consist of a officers who are entrusted to make important decisions in all matters that are related to the network in terms of; ensuring the innovative effectiveness' of the network, addressing the shortcomings of its members, taking into account the interest of all independent members, and choosing and implementing the most fitting and innovative projects for the network. Thus, protecting the interest of participants in the network in the long run.

Innovation Networks & Orchestration

For a company to sustain the capacity to innovate, it needs to look beyond its resources, internal capabilities as well as organizational boundaries. The extant literature stated that innovation is the main reason behind firms' collaboration with each other and becoming involved in inter-organizational relationships (Corsaro et al. 2012). For instance, Batterink et al. (2010) have described innovation networks as "cooperative relationships between companies and other actors who seek innovation" (p.50). Furthermore, these companies are either governed by a board of companies as stated in the previously, or orchestrated by a hub firm. This research focuses on the network orchestrator who is a subset of innovation network (Dhanaraj and Phrakhe, 2006). But, what does orchestration means?

In the music industry, we usually hear the term "Orchestra", which means "a conductor holding sway with her wand, directing a group of musicians, each a specialist in a specific musical instrument" (Zahra & Nambisan, 2012, p. 222). On the other hand, the literature of management has another description for it. Dhanaraj and Phrakhe (2006) defined network orchestration as "the set of deliberate, purposeful actions undertaken by the hub firm as it seeks to create value (expand the pie) and extract value (gain a larger slice of the pie) from the network" (p.659).

Generally, many key companies in different industries engage in orchestrating networks to acquire knowledge as well as to increase the level of innovation outputs such as exploration and exploitation, process and product innovation, etc. For instance, Procter & Gamble (P&G) has an initiative, which is called "Connect and Develop". It is part of the organization's innovation strategy and aims is to look for innovation outside the company. This approach played a significant role in extending P&G innovation process outside the company's premises and the network includes more than 1.5 million people from different parts of the world are taking part in it. Other companies that followed (P&G) footsteps include Boeing, Microsoft and IBM (Chesbrough, 2006).

For an innovation network to have outputs of value, an orchestrator must sustain trust, joint ownership and procedural justice (Dhanaraj & Parkhe, 2006). Furthermore, it is stated that network orchestration demand articulation, network composition and the management of innovation process for the network to reach its potential of creating innovation outputs. The first element refers to the constant vision development and translation of related knowledge, technology and other needs. The second element refers to the action of examining, filtering, and bringing new partners to the network in order to access specific resources. As for the last element, it stands for the process of coordinating the network, monitoring its progress, building trust, promoting mutual learning, identifying problems, resolving conflicts to keep the network stable, fostering reciprocity, and enhancing transparency (Dhanaraj & Parkhe, 2006; Batterink, Wubben, Klerkx, and Omta; 2010).

Figure 9: The Role of Network Orchestrator in Controlling Resources

On the other hand, Busquets (2010) wrote about the role of network orchestrators. He mentioned that there are two ways for an orchestrator to apply their powers; controlling resources and putting forth a precise role. Figure 9 shows the factors, which assist in controlling the resources. As seen

in the illustration above, the orchestrator can have a strategic position in the network if the decision-making process becomes centralized. Moreover, the orchestrator is responsible of controlling assets of strategic importance that might grant the network the advantage of being competitive. Besides, the orchestrator must build trust among the members as well as performing sanctions whenever it's required. Additionally, the orchestrator is required to manage the network processes, which include the selection and mobilization of resources and managing everything related to global operations in the network (Lorenzoni & Baden-Fuller, 1995; Molm et al., 2000, Fung et al., 2007). As for the orchestrator's specific role, it is mostly concerned with the "managerial" aspect such as having the capacities to lead people and influence their behaviors (Busquets, 2010).

CHAPTER 3: RESEARCH PROPOSITION

The previous chapter focused on exploring the literature thoroughly and study the scholars/academics perspectives on KS, innovation and SMEs. It gave an in-depth review on the significance of the relationship that exists between KS and innovation particularly in SMEs. In addition, there are a number of factors that leads to higher level of innovative outputs in innovation networks, which will be discussed in the upcoming few lines.

This part of the research will start by presenting a conceptual framework that is drawn after further investigation of the literature review on how orchestration is applicable on innovation network of SMEs within the context of the public sector. This section formulates a framework that will help in analyzing the case studies. Then, a set of hypotheses will be developed in order to attain the main objectives of this study.

CONCEPTUAL FRAMEWORK

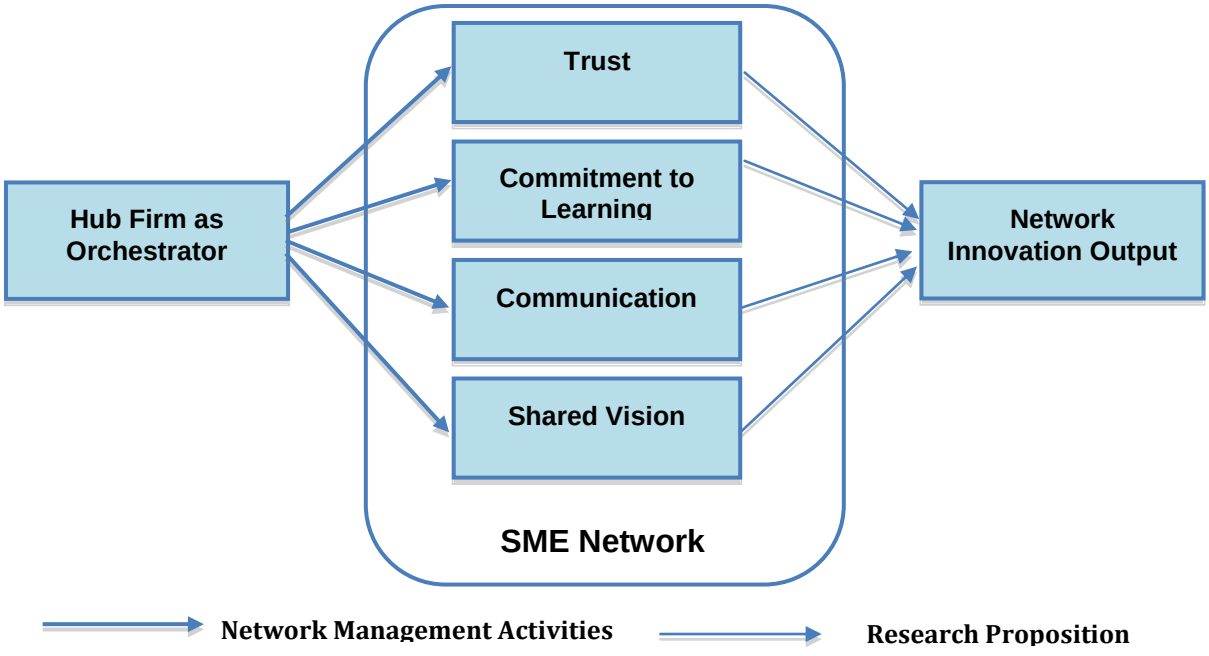

Figure 10: Conceptual Framework for Orchestrating SMEs Innovation Networks

Figure 10 illustrates the model of orchestrating the SMEs innovation networks. The model consist of three parts, where the first part is related to the hub firm, hereafter orchestrator, which is responsible of initiating, designing the innovation network according to its requirements and needs and at the same time, orchestrating the entire network.

As for the second part of the model, it depicts a number of characteristics that encourages knowledge sharing among the network members. These include trust, commitment to learning, communication and shared vision. Moreover, these factors should be considered in order to attain the desired innovation outcomes at the end of the process. The final part of the model reflects on the output of this network whether it's a product, process, etc.

KNOWLEDGE SHARING IN INNOVATION NETWORKS

It was stated previously that for a company to survive in the long run, it would need to obtain access to an external knowledge source. Yet, the problem is that a substantial part of knowledge is not always easily accessed and it is difficult to purchase them of the marketplace. The reason behind such difficulty is that most of the knowledge on the market are in a form of "tacit knowledge", in other words it is not codified. Also, it might need the use of specific capabilities to absorb it. Thus, researchers suggested that joining innovation networks assists organizations in attaining this form of knowledge (Borgatti & Foster 2003).

Many researchers believe that knowledge is the main trigger in innovation networks and from an orchestrator point of view; value should not only be created but also extracted from the network (Kogut, 2000; Dhanaraj & Parkhe, 2006). One of the first steps to be applied in orchestration is ensuring that knowledge is being shared, acquired and deployed across the network. The desired value cannot be created and generated, if each member did not interact with his/her peer in the network and kept on locking himself/herself within the boundaries of their firms. Thus, the network innovation output will be negligible (Khanna, Gulati, & Nohria, 1998). In such situations, the orchestrator needs to create a climate that encourages KS practice among

the members. The factors that facilitate such ambiance are trust, commitment to learning, communication and strategy. It is crucial to point that some of these factors are usually applied in organizational contexts, but for the purpose of this study they will be tested in a network set up (Kale, Singh, & Perlmutter, 2000)

Trust

According to Wu et al. (2007), the importance of trust stems from the fact that the lack of trust between individuals or groups (i.e. teams) would result in locking away knowledge and not sharing it. Mayer et al. (1997) described trust as the absolute belief and reliability of one party toward another.

The existing body of research indicated that trust consists of two dimensions; cognition based and affect based (Lewis & Weigert, 1985). Cognition based trust refers to the individual's (truster) behavior toward his/her colleagues (trustees), where the truster will only give his/her trust in certain scenarios or occasions, especially if they were based on real proofs and valid evidences, which can be in a form of understanding the truster's personality, and capabilities. On the other hand, affect based trust is about the individual sharing mutual feelings with his/her peers that meets their best interests and virtues. Plus, trust is bound to grow if the individuals continue to care about their peers. Later studies suggested that employees tend to trust their superiors at work. Furthermore, if such relations continue to exist, the confidence level will keep on growing and consequently greater cooperative behavior among employees (Ramaswami, Srinivasan and Gordon, 1997). Wu et al. (2007) affirmed in their findings that there is a positive correlation between KS and affect based trust and cognition based trust mainly in dyadic or team levels.

Blau (1964) emphasized on the importance of trust as it aids in reducing the complexity and stabilizing social relationships. At the same time, trust is vital particularly among employees precisely in social contexts, which requires interdependence and cooperation. If the climate promotes safeness among

employees, it will encourage proactive behavior, collaboration and KS among employees and this will result in innovation (Baer & Frese, 2003).

Many scholars regarded interpersonal trust as a crucial factor to the transfer of knowledge as it ensures that people are able to share information both effectively and easily at the same time (Levin, Cross and Abrams, 2002). What is more, empirical research affirmed that trust has a significant impact on the exchange of knowledge. For instance, Abrams et al. (2003) conducted semi-structured interviews with more than 20 firms to investigate the behaviors and practices that are required to employ in establishing interpersonal trust in the context of KS. The researchers sustained that collaborative communication is essential to establish trust effectively. On the contrary, Sondegaard et al. (2007) contended that trust do have severe impacts if it was not justified. For instance, some individuals hesitated from inquiring about the value of a certain knowledge and purpose of executing. As a result, the knowledge is misused and/or misapplied. Also, lack of trust deters people from sharing their knowledge, which slows knowledge transmission (Davenport and Prusak, 1998; Andrews and Delahaye, 2000).

Communication

The concern here is how much of influence does communication variable has on KS. Van den Hooff and De Ridder (2004) remarked that communication is a mean of KS with a substantial influence on KS. Moreover, there should be a climate of communication that supports the share of knowledge. But, what is communication climate? It can be described as the atmosphere, which an organization creates to supports and acknowledge communication behaviors (Crino & White,1981)

Crino and White (1981) listed critical factors, which aid in creating the climate and they are as follows; openness, reliability of information, vertical and horizontal flow of information. What is more, authors divided the communication climate into 2 main types: supportive and defensive. The main characteristic of "supportive communication climate" is the culture of knowledge sharing, which is translated into the exchange of information

openly, ease of access of colleagues and supportive interactions (Larsen & Folgero, 1993). Also, the existence of knowledge relies heavily on communication climate for it to resume on being generated and distributed as well (Van den Hooff & De Ridder, 2004).

On the other hand, Johnson et al. (1997) considered communication as one of the key elements to trim down uncertainty and overcome innovation barriers. The authors also highlighted that there is a positive link, which exists between innovation and the improved quality of communication. Moreover, innovation obstacles that are caused by either lack of knowledge or fear can be surmounted through communication. For example, communicating face to face with one another via a network of expertise.

Finally, based on the above explanation on communication and its climate, it is believed that pursuing a constructive communication climate will have a significant impact on KS practices. Hence, better innovation outcomes (Johnson et al. 1997)

Commitment to Learning

This construct refers to how much does a firm value and endorse learning in its environment. Calcantone et al. (2002) discussed that forming a climate that encourages learning between firms (Hub and SMEs) and being committed to it is very essential for gaining competitive advantage, especially if the main activities of the climate are to create and use knowledge for enhancing the company's position in the market. For instance, attaining and sharing information about the clients' needs, changes in the market, the actions of competitors, new technologies to produce new products with higher superiority to the ones created by competitors (Moorman & Miner, 1998). Furthermore, if a firm constantly values learning, the chances are higher that learning will occur consistently. To exemplify, in committed firms, executives have a certain expectation that their subordinates must meet. That is, using their time at the company to acquire knowledge that is outside their scope of work. Undoubtedly, employees will not be encouraged to endorse learning

activities if their organization does not foster knowledge development (Slater & Narver, 1994).

Shared Vision

In the body of literature, researchers described “shared vision” as the act of focusing on learning in an organization (Sinkula, Baker and Noordewier, 1997). Also, Verona (1994) emphasized that a “shared vision” should exists in an organization, because without it, the learning among the organization’s members will be less meaningful. In a network set up, members of the network are usually motivated and encouraged to fulfill the network's aspirations, which can be referred to as overarching vision (Miller, Besser, & Malshe, 2007). For instance, effective networks tend to have a common vision on the things they must achieve. It gives the network the credibility of having a direction and purpose. Also, it establishes guidelines for the members as to what it is expected from them, which encourages them to work in harmony together in order to serve the best interest of the network (Wollebaek and Selle, 2002).

HYPOTHESIS DEVELOPMENT

To sum up, the proposed conceptual framework was created after an extensive study of the literature to develop an understanding and justification for it. The justifications included descriptions of each element and factor in the model and to understand the type of relation (positive or negative) that exists between each one of them. The following hypothesis were developed to compliment the research findings:

- **Hypothesis 1:** Orchestration plays a vital role in promoting knowledge sharing in networks of SMEs.
- **Hypothesis 2:** Effective orchestration would positively affect the innovation output in SMEs networks.
- **Hypothesis 3:** Knowledge sharing between members of the SMEs networks would positively affect their innovation.

CHAPTER 4: RESEARCH METHOD & DESIGN

After setting the stones for this research topic from the previous chapters; literature review and the conceptual framework. This chapter will include a description of the methodology that was used for conducting the research. Yet, before delving further into the methods used, it's important to point out that the chapter will hold a synopsis on the approaches and techniques that are usually used to conducting a research, along with the ones that are used for this study.

As humans, we use various means to gather and interpret data for a certain research or subject. It is the simplest way to comprehend and explain the term research. However, the literature indicated that there is a deeper justification for research wtih a set of characteristics. For instance, Saunders et al. (2007) described research as an approach, which people take on in a systematic manner so that they can find out things as well as expanding their knowledge. Later findings by Collis and Hussy (2009) suggested another definition for research. They described research as processes, which are both systematic and methodical. What is more, they are used to enquire and investigate about certain subjects in order to increase knowledge. Thus, Saunders et al. (2007) suggested that if any researcher is welling to conduct a research, he/she needs to take into consideration a number of characteristics such as systematic data collection and interpretation, and a lucid purpose behind the quest of finding out something.

First of all, systematic data collection. Saunders et al. (2007) described the procedures to be minimal and the sequence of events begins with identifying a number of elements such as the method to be used in the research, the sample of respondents who will participate in the research as well as the questions to be asked and the final step in this series will be approaching the respondents. The second characteristic is “systematic data interpretation”. After collecting the data, the researcher has yet to deeply interpret the

information in a logical order until he/she sustains an outcome that is both reasonable and rational.

The final characteristic that was mentioned by Saunders et al. (2007) is to have a clear purpose or motive for finding out something, as it would decide on what sort of research to be conducted. There are three different types of researchers that academics and investigators implement, which include exploratory studies, descriptive studies and explanatory studies (Porter & Carter, 2000). For instance, a researcher will implement exploratory studies if he/she is looking to explain and elucidate an understanding as well as obtaining insights and knowledge. Another researcher would go with descriptive studies in order to gain accurate and precise description of a certain person or situation. To add to that, descriptive studies are regarded as an extension to the exploratory studies researchers use it to illustrate a situation and move afterwards to explore and investigate all the available knowledge that is related to that particular situation. As for explanatory studies, researchers use this approach if they want to study a cause-effect relationship (Saunders, Lewis, and Thornhill, 2007).

It was stated previously that the aim of this paper is to examine how key organizations can orchestrate knowledge sharing and innovation into networks of SMEs using their extensive resources, expertise and knowledge. Thus, exploratory research will be applied in order to gain a comprehensible understanding of the topic. At the same time, provide the researcher with knowledge in different fields such as orchestration, networks, knowledge sharing and innovation.

THE APPROACH

According to Collis & Hussy (2009) there are two notorious approaches that are widely used by researchers to collect and interpret systematic data; quantitative and qualitative. Quantitative approach focuses on the collection of data, which is described in a numerical mode and acquired using questionnaires. This approach is usually used to examine/study a cause-effect relationship and it is analyzed using graphs, charts and statistics

(Clissett, 2008). But, If the data was not analyzed and translated into information properly, it will be useless and with no value to people (Saunders, Lewis, and Thornhill, 2007).

As for the qualitative approach, its data is descriptive just like quantitative, but it's merely concerned with softer aspect of data rather than hard numerical ones as in the quantitative approach. This method helps in gaining in-depth insights in various aspects such as understanding a person's behaviors and the underlying reasons for such behaviors (Porter and Carter, 2000). What distinguishes the data collection of the qualitative approach from the quantitative is the classification of information into categories and then analyzing it by using conceptualizations (Clissett, 2008). Moreover, researchers like Saunders et al. (2007) indicated that the process of the quantitative research involves the development of data categorization, assigning the collected data into certain categories and indentifying the relationship among the different categories in order to sustain a reasonable conclusion after testing the propositions. Plus, for the data to be understood, it should be put into context, which is one of the main requirements for using this approach (Collis and Hussy 2009). Furthermore, the in-depth interviews, focus groups, dyads, triads are some of the methods used to collect data. Clissett (2008) stated that in-depth interview is the most common method used in collecting data for qualitative research.

As stated previously, the purpose for conducting this research study is to understand the perception of organizations on how orchestration have affected the level of knowledge sharing and innovation within SMEs networks. As for the chosen research approach for this study, it will be qualitative. This method will assist in obtaining an inclusive knowledge on the subject of research and compare it to what have been identified previously by academics and researchers in the existing body literature. What is more, it will aid examining the developed hypothesis and compare them with respondent perspectives to confirm their validity. To add to that, the research will include three case studies from three different organizations and these case

scenarios will be used to illustrate a full picture to support the findings on the subject of research.

CHOICE OF DATA COLLECTION METHOD

The primary tool that was used to collect data for this research is via conducting semi-structured interviews with respondents of three governmental organizations. It's important to highlight that the interviews will look at the subject of research from the perspective of these organization that worked with many SMEs networks on different projects.

Seven governmental organizations were selected to participate in this study. An email from the researcher was sent to all organization with a description on the purpose of the study and pre-set questions – developed by Batterink et al. (2010) - were included in the email as well (Appendix A). Only three organizations agreed to participate in the study with restrictions of keeping certain information confidential. The duration of all interviews lasted between forty-five to sixty minutes. Some of them were conducted either at the respondent premises or over the phone. The researcher was looking to hear the interviewees' perceptions on orchestration and how it impacted the level of KS and innovation among the network members.

THE RESPONDENTS

The respondents for this research were a variety of head of departments, project managers, project coordinators and IT specialists from the below list of entities.

Respondent I

The first respondent is a federal government organization, hereafter known as (MOE), and it's a member of UAE cabinet. MOE consist of five primary sectors; economic policies, commercial affairs, industrial affairs, support services and intellectual properties sector. All these sectors are responsible of fulfilling the entity's responsibilities.

One of MOE central responsibilities is the economic development in the

country. For instance, the entity proposes economic and commercial policies; construct all necessary plans, projects and programs to support these proposed policies. Furthermore, many of MOE responsibilities is setting propositions for projects that are related to legislation and organizational regulation in all matters related to both commercial and economic activities. Also, it prepares legislations, which are designed to sustain both economic and customs unity across all seven Emirates. Other responsibilities include assessment of country's needs when it comes to development and improvements, conducing economic development studies, central statistic work and many more.

Respondent II

The second respondent is the executive council, henceforward known as TEC. It is an executive authority, which was established to assist the Ruler in exercising his powers and performing his duties to draw public policy to sustain both order and security. TEC has eleven government departments and governmental authorities under its umbrella and it has many responsibilities. For example, setting up the general policy for members of the council – municipal departments - to follow. Furthermore, it works on setting up objectives and policies for the development of various sectors such as administrative, social and economic as well as suggesting the methods of measuring and executing them. A further responsibility of the council is organizing government departments and establishing new ones when necessary. Also, monitoring the progress of their work and performance, all in all to serve the public interest effectively.

Respondent III

The final respondent is also a government organization, henceforth DED, and its core mission is forming an environment that enhance both economic welfare and prosperity in order to achieve a sustainable economic development. DED has four agencies under its belt and these agencies are specialized in export development, foreign investment, SMEs developments and events and promotions. Thus, DED overall responsibilities include handling consumer/commercial protection, business registration, licensing

and the development of entrepreneurship, retail and export.

CHAPTER 5: CASE STUDIES

This chapter will begin with a walk-through on three case studies from various governmental departments in the public sector. It is followed by an analysis of every case, which was built up through interviewing the clients, who were also playing the role of orchestrator in all three cases. It is crucial to point that these projects were initiated to fulfill a need they saw within their departments

CASE I: BLS, A UNIFIED SYSTEM

The Scenario

The selected project for this case was a huge I.T. project and the final product was to have a unified web system “Business and Licensing System” with a unified database in order to resolve the issue of having duplicated commercial names around the country. That is to say, all economic departments across the UAE will use the same system. The cost estimation for this project was over two million Dirham and it was fully funded by (MOE). As for the duration, it was to be finished in twenty-four months from the initiation phase.

The network development for this project started in the late 2007. Since MOE is inexperienced in the field of IT, it hired a well-known telecommunication company, referred to (ETS), as a part-time project manager, hereafter known as the network orchestrator, to manage and handle all matters related to the project. Afterwards, the orchestrator formed a network that involved contractors and suppliers from six external IT companies (SMEs) to work on developing the system. In the network, there were representatives from MOE and economic departments to oversee the progress work of the network and provide all necessary information for the system development.

The project officially kicked off in March 2008 and up till late 2010, the network failed to meet its deadline or any of the client’s requirements and expectations of having a solid system.

The Interviews

For this case, three people were interviewed to get a better understanding and full picture about the subject of research. The interviewees were a senior project manager and a project coordinator, both from the project management division. The third interviewee was a software engineer from the IT department. The selected participants are working for MOE.

All three participants stated that their entity is regarded as the official regulator on everything related to the economic sector in the UAE in terms of setting policies, regulations, providing services for the public and many more. Moreover, one of its core businesses is streamlining sectors for SMEs across the UAE. The senior project manager emphasized on the importance of working with SMEs, especially that the federal government of UAE is investing a lot in developing this sector. Hence, the government launching intermediaries to support SMEs as well as setting laws to support them. Moreover, the participants pointed that one of their means to encourage and support SMEs was through hiring them to work on projects or by supplying them with products and services for these projects.

When it comes to innovative activities that are being carried out within the organization, the participants stated that their entity is mostly focused on delivering competent and efficient services to the public. This is the main driver behind the initiation of such activities. A good example on this was the development of BLS system. The entity saw a problem with the duplication of commercial names across all of the seven Emirates. The Project manager stated, "*Many business owners were complaining about it, especially when they wanted to open branches of their businesses in other emirates. They were not able to register their establishments under the same name, because someone else got the exact commercial name".* The software engineer pointed that all economic departments across the country had their own separate systems and databases for businesses registrations, which was the main reason behind the duplication problem. This gap was the main driver behind the initiation of BLS system project, which is to have a unified

integrated database for business registration and licensing to overcome the duplication problem.

Regarding the factors that had substantial impact on the network performance and on developing innovative output, all three participants shared similar opinions and answers. Some major points were lack of trust between the network members. According to the project manager "*when we attended meetings with the network, we could sense that the level of trust between the network members was* very low". He added that ETS was not doing a good job on promoting and building trust between all involved SMEs. In attempt to rectify the damage, MOE team pitched in and tried to solve the problems within the network through establishing trust between the members and encourage their commitment by mobilizing all resources and any kind of knowledge obtained is being shared and deployed among the members.

Another point the project coordinator highlighted was the poor communication channels among the parties. He stated that some of the SMEs who were working on developing BLS system were not communicating with one another effectively and this resulted in lots of defects and bugs within the new system. This is because the information being shared was most of the time either wrong or of no use. Moreover, lack of commitment toward learning created even more conflicts. According to the project coordinator, some of SMEs were inexperienced in certain area and they did not have any interest in overcoming these weaknesses by learning from other SMEs who were much more experienced.

The last factor that played role in the failure of knowledge sharing is shared vision. The senior project manager stated, "*regardless of the context you are working whether it's a project, organization or network. If there is no shared vision, which endorse knowledge sharing, then innovation will not occur*". In other words, the means of sustaining innovation is through acquiring knowledge, sharing it and deploying it.

CASE II: E-GOVERNMENT

The Scenario

This project came in response to the local government strategy, which stated that all public government bodies within the emirate are required to deliver key services online to both residents and businesses. Hence, TEC teamed up with a well-known IT company, hereafter known as IGS, along with a team of eight IT professionals from all entities to assess the situation in terms of departments' readiness to the implementation and deployment of e-government services.

TEC saw that bringing in IT companies (SMEs) who were contracted previously to do IT work within the entities or supplied products will be better for a couple of reasons. Firstly, they are already aware of the situation in most off the entities. Secondly, they had previously brought-in and developed good IT products and solutions that assisted in enhancing the services within the organizations. For this project, TEC is regarded as the orchestrator.

The project network consisted of IGS, ten different IT companies (SMEs). From TEC side there were three members (chief technology officer, project manager and project coordinator). Also, there were eight IT professionals representing the stakeholders – government entities - in the emirate. The project lasted for eighteen months and consisted of two main phases. Phase one involved the assessment of the existing infrastructure, setting the requirements and identifying all the necessary procedures and policies to back up the council's initiative. As for phase two, it was the implementation of all the new systems. In addition, the project cost was an approximate of over twenty million Dirham and lasted for twenty-four months. In spite the fact that the project was successful, it certainly faced several problems several times during its life cycle.

The Interviews

The interviews were performed with two people at TEC and they were the project manager and the team coordinator of project management division.

When asking the participants on how they are linked to SMEs, their answer stated that TEC has always supported SMEs through establishing programs and intermediaries to help this sector grow even bigger, because of the potential it carries. What is more, TEC interactions with SMEs mostly when they contract them to perform work for a certain project or for supplying purposes.

The participants pointed that most of the innovative activities TEC carries out are focused toward elevating government departments' performances and enhancing the quality of services offered to the public by bringing in the best practices and adopting the latest technologies. An example on this is the e-government project. TEC saw a need to link all government departments electronically and bring in all services and information online under the same portal. Furthermore, the participants both stated that to some, e-government might not be an innovative project, but to TEC it was something new and innovative, which has never been done in any of departments under its supervision.

The first interviewee stated that it was better to let IGS handle the network of SMEs who were working on the project and TEC will handle the stakeholders. When asking the interviewees to justify their decision on choosing SMEs to do the job instead of leaving it all to IGS who is an expert in the field of e-government solutions, their answer was "*SMEs are always available to do the work, despite the scope of work. Although sometimes they lack human capital or resources, they manage to finish the work quickly and with a high level of efficiency"*. An additional reason was they tend have the potential to innovate more than the larger firms, especially if they are provided with the knowledge and resources that they lack.

Some of the major points that both of the interviewees have spoken of were the factors that contributed to the successful outcome of this project. One was the trust factor and second was the shared vision. These factors encouraged sharing knowledge in the network, which led to an innovative outcome.

According to the project coordinator "*It is very crucial that trust exists among the network members, IGS did an excellent job on building up trust with SMEs networks*". Also, she pointed that establishing trust assist in eradicating any negative thoughts SMEs would have about their follow members. With the existing of mutual trust, members will feel safe enough to share their information and knowledge with everyone involved in the network. In contrast, if they do not trust you, it will be difficult to extract any knowledge out of them.

The second factor the interviewees discussed was shared vision. If the network members are all aware of where the network stands and where it wants to reach, they work will very hard toward achieving that vision. Reverting to the case study, IGS succeeded in setting a clear direction on what they want to achieve with this project. Moreover, the project manager stated, "*from our close observation of the situation, we noticed that IGS was constantly reminding the network members of the project objectives. Thus, they became more focused toward achieving the network shared goals".*

Regardless of the network success in achieving an innovative outcome, there are a number of factors that had a certain influence on the network and created some obstacles, especially when it came to KS. These were communication and commitment to learning. Both project manager and project coordinator mentioned that some of the members were not committed to the learning process within the network. They rarely communicated with other members unless it was task related. Also, sometimes they would share information of no use to the network. IGS noticed these issues and worked on resolving them by keeping SMEs up to date with information on all matters related to the development of the end service. Additionally, IGS ensured that the right information was being circulated and shared among the network members. According to the interviewees this have impacted the network significantly and all members became committed to learning as they noticed the new information had an impact on their work progress.

Lastly, the project manager and the team coordinator had a firm believe that the network would have not been innovative or productive without the

effective role of the orchestrator. They added that IGS worked very hard toward articulating and assuring that the network is well composed as well as managing the innovation process within the network efficiently.

CASE III: A PORTABLE DIGITAL ASSISTANT

The Scenario

For this case, the selected project is also an I.T. related job in a local Department of Economic Development (DED). It was an integrated project between the I.T. Department and the Commercial Compliance and Consumer Protection Division. One of the many objectives on DED 2010 strategy was to facilitate growth in the emirate's economic sector, which can be sustained through providing fast, competent and efficient services for the public consumers. Thus, the idea of developing a portable digital assistant (PDA) was born to enhance inspector's assessment processes (e.g. issuing fines, identifying establishments geographical locations, filling reports, etc) that are being carried out in the fieldwork and ensure that they become more efficient and effective.

The project started in June 2010 and lasted eighteen months in the making. The main orchestrator is the I.T. department at DED. Although the department had enough IT professionals among its staff, the orchestrator decided to establish a small sized network that included mostly consultants and technicians from four SMEs that provided products and services for PDAs. The main motive for forming this network is to see what the market has to offer in terms of knowledge about new technologies and IT solutions when it came to PDA devices.

The project was completed right on time and the outcome was of huge success and one of its-kind not only in the UAE, but also across the entire region. One of the remarkable features that the device offered was its interface, which was in form of 3G. Furthermore, it saved the inspectors lots of time and efforts by 70% and 30% respectively. For instance, the inspectors are now able to enter the store geographical locations and details at once and

be synced electronically to the division databases. Other transactions that inspectors can make are issuing fines right on the spot, taking pictures of the location, internet browsing, checking emails and most importantly using the device as a mobile phone to make phone calls.

One of the main contributions to the project success was the formation of a strategic SMEs networks and selecting firms that had the potential to innovate as well as sharing their knowledge to the entire network members. Also, this could have not been achieved without the effective role the orchestrator has played in the network.

The Interviews

A sole interview was performed with an IT project manager from DED. The interview started off by asking the project manager on how his organization in linked to the SMEs. His response was ” *Under DED umbrella, we have an agency which was established to support SMEs especially the ones that are fully owned by Emiratis”.* Also, he added that the government has a procurement program to support SMEs, all the government departments has to annually allocate a minimum of five percent of their purchasing budget to enterprises that are part of the procurement program.

When it comes to innovative activities, the participants indicated that DED always thrives to deliver high level of services for businessmen and businesses. The project manager stated “*We are always in a race with time and competing with other entities to offer pioneer services to our customers*”. Furthermore, the interviewee pointed that over the past decade, the department tried to bring in the latest innovations and adopt the most advanced technologies. For instance, the device that was covered in the previous case study. According to the interviewee, the entity assessed the situation, their needs and requirements and worked toward meeting these needs by developing solutions for them. He added that with the PDA project, it was noticed that the business landscape in the emirate was growing and the number of registered establishments was witnessing an enormous increase. This created a huge load on the inspectors, as they needed to be on the field

performing their tasks and then returning to DED premises to feed the database with all information they acquired from their fieldwork.

For the PDA project, the department decided to work on the project by forming a small and strategic network with SMEs who were specialized in providing solutions for these kind of devices. The project manager spoke of an important point during the interview, which was that, some SMEs are at a disadvantage and cannot compete and be innovative in the market because sometimes they lacked resources, human capital or even knowledge about the market. Offering SMEs opportunities to take part in networks, partnerships or alliances to develop an innovative product or services assist in reducing the shortages they suffer from and give them a chance to innovate. In PDA project, although the selected SMEs lacked knowledge and experience in minor areas, they showed a great potential and capacity to innovate when they were grouped together under the same network and provided with the right resources.

One of the most contributing factors to the network innovative performance is trust. If the network members did not trust one another, then it would be difficult for them to obtain anything from each other in return in terms of knowledge. Trust is a key component in any network, when it's present; the network will be able to communicate easily. Likewise, communication is a critical element, which affects the network performance. The project manger mentioned that "*in previous networks, alliances and partnerships, which we were involved in, parties rarely communicated with each other and this created problems and everyone within the network had no idea what the other party was doing*".

An additional factor that influenced the network's success is commitment to learning. The interviewee pointed that creating a climate within the networks that encouraged learning among its members has a significant impact on the entire network performance. It assists in encouraging the members to share and exchange information and knowledge. When this occurs, the possibilities of developing something extraordinary are high, like what happened in the

PDA project. All members in the networks showed a great amount of commitment to learning and the ending results were even better than what they have imagined. The last factor the interviewee has spoken about is setting a direction to the network. In some scenarios, orchestrators did not take this matter seriously, and SMEs were left to work freely. Hence, the end output did not meet the orchestrator's requirements, because they failed to set a direction and share a vision with the members.

The project manager talked about the role the orchestrator has played in the success of this project. He pointed that if the orchestrator is effective in his role by building trust, coordinating the networks, ensuring knowledge mobility and identifying and monitoring learning, he'll be able to meet the expectation. In contrast, if he fails to achieve any of the elements mentioned above, the network will not be able to produce the desired output. Referring back to the PDA project, the participant indicated that as an orchestrator, they tried to be effective in their role and by bringing the right SMEs when designing the network. Also, they made sure that the knowledge and information is shared between the members. Also, avoiding any conflicts between SMEs through setting a shared vision, building trust, encouraging communication and commitment to learning.

CHAPTER 6: DATA ANALYSIS & DISCUSSION

This chapter will be analyzing the case studies and aligning the findings with what have been discussed previously in the literature review. Prior to performing the analysis for this research, a number of elements were taken into consideration. First of all, the benefits of forming SMEs networks. The second element was the role of the network orchestrator and how it contributed to brining success/failure to the network. as for the third and last element, it was the effect of knowledge sharing characteristics on the network innovation outputs of the chosen case studies.

THE PERKS OF JOINING SMES NETWORKS

After a much observation of all three cases and reading into the interviewees' feedback, it can be sustained that the participation in networks was of great rewards for certain SMEs. It helped them in overcoming certain barriers and obstacles that deterred them from being innovative. For instance, In BLS case, it was visible for MOE that some of the participating SMEs were suffering from a number of barriers which prevented them from the ability to innovate. They were in forms of lack of human resources, lack of information and financial resources. These obstacles can be linked to Madrid-Guijarro et al. (2009) findings in Chapter two of this research. The authors listed some of the most common barriers, which SMEs suffer from and these are; internal (i.e. poor human resources, lack of financial resources) and external barriers such as lack of information.

Likewise, in PDA case study, the client's point of views reflected that the established network had a significant impact on SMEs as it gave them privileges and created opportunities. These privileges were access to resources, qualified manpower and experience and knowledge, which were obtained and circulated among the members. As for the opportunities it created, it increased SMEs capabilities to innovate. This supports Zeng et al. (2010) findings; SMEs gain advantages from participating in external partnerships as they gain access to external capabilities and resources. As a result, they end up having both incentive and capacity to be innovative.

On the other hand, the e-government case showed that SMEs who were taking part in this network saw a great opportunity from participating and collaborating with other enterprises. One of the main advantages of joining the network was partnering with the advisory company, who is a pioneer in the computer industry and an expert on e-government services and solutions. This exposed them to the information in the field of e-government services, especially during a time where e-government services and solutions were witnessing a boom across all federal and local governments. Furthermore, it gave them a chance to work with qualified manpower to provide an innovative service for TEC. These advantages were the main driver behind the network success. Again, this shows the importance of joining networks for SMEs to compensate for their shortages in resources in order to innovate (Wincent, Anokhin and Daniel Örtqvist, 2010)

THE IMPACT OF ORCHESTRATOR'S ROLE ON SMES NETWORK'S PERFORMANCE

The role the orchestrator has played was of a great impact on SMEs network's performance in all three cases. There are two main aspects that contributed the orchestrator's effective/ineffective role. These were:

- **Recruitment Process**

Dhanaraj and Parkhe (2006) pointed that the orchestrator recruitment activities induces the network performance significantly. The network structure and position is strongly controlled by choosing the network partners. Studies and researchers have written extensively on the importance of using certain criteria to measure and determine SMEs innovativeness. For instance, Laforet (2012) mentioned that looking at SMEs practices of management, strategy, marketing and the structure of the organization. All these "soft" aspects assists in measuring if an organization is innovative or not. In the first case, ETS failed in selecting the right SMEs to work with because they did not use the right tools to measure the partners' level of innovativeness. Similarly, in the second case study it was noticed that some of the participating companies

in the network lacked certain treats and qualities, which contributed significantly to network performance. For instance, one of the firms did not have strong communication capabilities, which were problematic in certain occasions. During the project, some of the members were passing information that were not useful for their project progress.

In contrast, the third case study performance was successful, because the orchestrator did a good job in choosing the right SMEs to cooperate with. In the second chapter of this research, Lee et al. (2012) discussed the characteristics SMEs must have to able to innovate, which are professionalism, structure, strategy and level of education. The chosen SMEs in the network possessed most of these characteristics along with strong internal and external communication capabilities and professionalism, which justified their high performance. This also supports Damanpour (1991) findings, that there is a positive relationship between innovation and a number of determinants such as administrative intensity, professionalism, managerial attitude toward change, functional specialization and differentiation, slack resources, external and internal communication.

- **Orchestration Process**

The orchestration model developed by Dhanaraj and Parkhe (2006) showed that the process of orchestration consist of three main dimensions; the management of knowledge mobility, innovation appropriability and network stability.

Knowledge Mobility is considered as the heart of the network system. If the acquired knowledge is not shared and deployed among the members, the network will fail in realizing its desired output (Gausdal and Nilsen, 2011). A solid proof on this is the BLS case. What happened between the SMEs during this case indicated that whatever knowledge was acquired it was not shared nor put into good use. What is more, most of the acquired knowledge was of no use to the network. The same happened in the e-government case. Even though the network succeeded in delivering an output, at certain times the knowledge that was being shared was impacting the network negatively.

These scenarios are similar to what Dhanaraj and Phrakhe (2006) have discussed in their research (chapter 2). According to them, one of the main tasks of orchestration is guaranteeing knowledge mobility in the network. The orchestrator needs to make sure that the following three capabilities exist in the network; knowledge absorption, network identification and inter-organizational socialization. This was clearly visible in PDA case scenario. As an orchestrator, DED was well aware that to create an innovation of significant value, knowledge had to be shared and not remain locked with the network members. Thus, the orchestrator was constantly evaluating the knowledge and information within the network and making sure that any piece of information of significance to the project that resides with any of the network members was being acquired and cascaded across all members of the network. All of this contributed to the successful promotion of knowledge mobility in the network.

As for Innovation appropriability, it's about guaranteeing that the innovators within the network are capable of obtaining profits from the innovations that they have taken part in developing (Teece, 1986; Ritala et al. 2009). The recipients who participated in the study had certain reservation in disclosing confidential information; therefore the assumption is that all orchestrators have handled this aspect in a positive manner.

The final dimension of the orchestration process is **"**Network stability". It stands for the willingness of the network members' to resume on collaborating with the network and the orchestrator. Also, it means that the orchestrator should avoid any threats such as attrition, migration, isolation and cliques from occurring within the network (Dhanaraj and Phrakhe, 2006; Batterink et al. 2010).

It was noticeable that in the first case study, the network had lots of problems and its stability was no exception. One of the main problems was the migration of members to participate in other networks, as the new networks were offering more valuable resources/information for them. Also, the

orchestrator failed to strengthen the ties (i.e. trust) between the network members.

In the PDA case study, the network stability was also in jeopardy to some extent, because the members where loosening their ties with the hub firm by forming cliques within the network. This is similar to what Dhanaraj and Phrakhe (2006); and Gausdal and Nilsen (2011) have discussed in their researches. The orchestrator can sustain stability within the network through the enhancement of its reputation in the market. If the orchestrator is well-reputed leader in the market, the participating firms especially emergent ones in the market, tend to associate themselves with such leaders. Hence, this will stabilize the network and reinforce the ties between the hub firms and the members. This approach was widely visible in the PDA case scenario, DED is a well-noted government body across all markets, and many firms' looks to collaborate and tie themselves with such a strong entity.

To sum up, all three cases have provided rich information on the importance of the orchestrator's role in promoting KS in SMEs networks. Also, the cases indicated that if the orchestrator's role is effective, the network output will be successful and vise versa. These two statements supports two of the hypothesizes, which were developed in chapter three of this research:

- **Hypothesis 1:** Orchestration plays a vital role in promoting knowledge sharing in networks of SMEs.
- **Hypothesis 2:** Effective orchestration would positively affect the innovation output in SMEs networks.

THE EFFECTS OF KNOWLEDGE SHARING ON INNOVATION IN SMES NETWORK

One of the main objectives of this research is to study the positive relation between KS characteristics (trust, communication, commitment to learning and shared vision) and innovation.

Case I: BLS, A Unified System

As mentioned previously the main problems in the network of BLS project were lack of trust, no communication, no shared vision or commitment to learning. Hence, the network was not able to innovate. Repeatedly and throughout the literature, researchers have emphasized on the importance of having trust among individuals, teams, groups, networks and organizations. (Andrews and Delahaye, 2000). Because knowledge cannot be shared or transferred between parties if they do not trust one another. Trust is a key pillar in knowledge sharing. Again, without knowledge sharing and mobility, innovation will not be achieved.

Davenport and Prusak (1998) and Andrews and Delahaye (2000), which were covered in chapter three of this research. They have pointed that lack of trust tend to discourage individuals and teams from sharing any knowledge they have and it leads to slowing the process of transmitting knowledge. As for communication, its effectiveness within the network has also contributed to making trust grow among the members. Hence, better sharing of knowledge. The last factor that had affected the knowledge sharing among members is commitment to learning. According to the project manager all SMEs showed they highly valued learning. This validates Slater and Narver (1994) findings, which stated that the more a firm values learning, the higher chances of learning will occur.

Case II: E-Government

Despite the fact that the network succeeded in delivering what was expected from it, it can be noticed that there were two elements that have affected the process of KS within the network. These were miscommunication and commitment to learning. Some of the participating SMEs were focusing toward meeting the client’s expectations of delivering innovative solutions and did not value learning. In the literature, Calcatone et al. (2002) pointed that if an organization preserves effective learning within its system, it will be able to obtain efficient knowledge and share with other so they can innovate.

The other problem that was associated directly with commitment to learning is communication. Although some of the members were obtaining information and knowledge, they did not communicate it properly with their fellow members. This created problems within the network as information and knowledge being circulated was not of use to members or the expected outcome. If it was not for the orchestrator effective role, the problem could have escalated even more and the trust within the network could have been broken. This shows the importance of having effective communication between the parties, as the existence of knowledge, obtaining and distributing is hugely dependent on it (Johnson et al. 1997).

Case III: A Portable Digital Assistant

From the project manager responses and further observation of the case, it can be concluded that several factors have contributed to the effective implementation of KS. Hence, having successful innovative output. The factors that had a major impact on knowledge sharing within PDA project were trust, communication, shared vision and commitment to learning.

At the beginning of the project, the participating members were reluctant to trusting each other. But, the orchestrator's role has contributed in eradicating any trust problems by constantly encouraging the members to communicate formally and informally. According to Gausdan & Nilsen (2011) socialization can be achieved if the orchestrator succeed in designated areas for common meeting and be used for learning. Additionally, this will lead to improving both of the social and relational capital within the network.

The interviewee pointed that when it came to setting direction for the network, as an orchestrator they tried to set the stones for the project right from the beginning. Plus, from time to time they reminded the members of the network with the overall vision to make them clearly understand the purpose of this network and what it's meant to achieve. Likewise, with the element of commitment to learning. The orchestrator established a climate that encouraged creating and using knowledge.

In summary, the three scenarios have indicated that in one way or another, trust, communication, commitment to learning and shared vision have affected knowledge sharing with SMEs networks. Obviously, when knowledge sharing was not sustained, the networks failed to produce an innovative output. Hence, these finding have a constructive impact on innovation and supports the developed hypothesis:

- **Hypothesis 3:** Knowledge sharing between members of SMEs networks would positively affect their innovation.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

In conclusion, this thesis was prepared to study orchestration in SMEs innovation networks in the context of the public sector. The aim was to investigate the orchestrator's role in such setups and its effectiveness in brining innovation. Plus, to study how much of an influence does KS has on innovation in these networks.

The literature was extensively reviewed and looked at several constructs such as innovation, KS, SMEs and orchestration. Concepts, theories, types, models, challenges were all covered in the literature as well as identifying how these constructs are associated with each other. Afterwards a conceptual framework was prepared and hypothesizes were developed to test the relationships between the effectiveness of orchestration and the network performance. In addition, it investigated the underlying factors that affect knowledge sharing in networks and influence innovation. These factors were trust, communication, commitment to learning and shared vision. in that light, three government entities participated in the research for data collection and interviews were conducted with representatives from each entity. As for the areas that were covered during the interviews were the orchestrator's role in SMEs innovation networks and impact of knowledge sharing on innovation output in SMEs networks.

From the data interpretation in the analysis and discussion chapter, the results were attracting. The findings affirmed the developed hypothesis: orchestration does play a significant role in promoting KS in networks of SMEs, effective orchestration positively affect the innovation output in SMEs networks and knowledge sharing between members of the SMEs networks positively affect their innovation.

RECOMMENDATIONS

This section holds a set of recommendations, which can be endorsed by organizations that are looking to orchestrate SMEs innovation networks successfully and to overcome any obstacles associated with knowledge sharing. The recommendations as follow:

- To ensure that the participating SMEs in the network have the capacity to innovate, it is recommended that the orchestrator uses a certain criteria to measures the level of innovation in potential SMEs prior to designing the network. Laforet (2012) discussed two methods that are commonly used to measure a company's level of innovation: hard and soft measures. The "hard" aspect refers to a firm's current position in the market and how much of its investments went to R&D activities. Also, the implementation of quality practices and measurements within the organization such as ISO9001. As for the "soft" measures they refer to any key modifications in the organization's structure, strategy, and management practices. Applying such measures may assist in selecting the most innovative SMEs within the network. Hence, the potential of achieving remarkable innovative outputs.

- To enhance KS within the network, it is advisable that the orchestrator establishes a common identity and emphasizes on its important by motivating all members to participate in the sharing of their valuable knowledge openly (Dhanaraj and Parkhe, 2006). According to Meyer & Rowan (1997), having a common identity tends to boost confident and good faith in the network as well as a sense of unity.

- To overcome the communication problems in SMEs networks and to encourage KS, it is recommended that the orchestrator encourage both formal and informal socialization between the members. Kale et al. (2000) stated that to enhance socialization, an orchestrator must establish a formal and an informal communication channels among the network members as well as enrolling them in exchange forms.

CHAPTER 8: LIMITATION AND FUTURE RESEARCH

The initial plan for this study was to assess the identified variables from the perspective of both the orchestrator and the SMEs who are taking part in the innovation networks. Unfortunately, documenting both point of views was not possible due to time constrains and difficulties in obtaining all details of the participating SMEs in the networks and encouraging them to contribute to the study. Another limitation was privacy, participating departments did not disclose important information about contracts and legal papers related to SMEs participating in the network due to confidentiality issues that requires high management approvals, even when obtained would be hard to publish in this public forum.

As for future studies and research, it would be recommended to study the subject from the perspective of both the hub firm and SMEs to understand their perceptions and identify the likely discrepancy or gap between the two parties. Moreover, most of the research and studies in the literature are focused on either manufacturing or technology industries. It will be beneficial to focus on other industries such as services. An additional area that can be a potential topic of research is studying the innovation level in SMEs participating in SMEs networks, what determine their innovativeness and how is it measured.

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APPENDIX

APPENDIX A: INTERVIEW QUESTIONS

General Information

- Title/Position:
- Department:
- Organization Name:

Project Information

- Project Scope:
- Cost:
- Network Size:
- No. of Network Members:

Interview Questions:

- Can you explain the kind of projects you are involved in?
- How is your organization linked to SMEs?
- What is the main contribution/added value of your organization to SMEs?
- In your perspective, what sort of benefits SMEs get from joining Networks?
- What activities your organization carries out and they are related to the innovation projects?
- How does your organization initiate innovation projects?
- How are the innovation networks developed?
- What sort of conflicts occurs in the networks you are involved in? How are such conflicts tackled?
- What benefits do SMEs get from joining such networks?
- How important is orchestration in networks?
- How important is knowledge sharing to innovation?
- How important are trust, communication, commitment to learning and shared vision to knowledge sharing? How are they facilitated?
- How do network members interact?
- Can you distinguish important events/factors that influenced performance of innovation networks (positively or negatively)?