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Examining the Management of Strategic Resources in Projects

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Doctor of Philosophy (PhD)

by

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Declaration

I declare that this thesis - for the degree of Doctor of Philosophy - was

- I. entirely composed by myself
- II. solely the result of my own work
- III. not submitted for any previous application for a degree

Dedication

This thesis is dedicated to:

- My mother and my father who left this life before seeing me realize my dream; you were not alive when I started my PhD, but I am sure that you would be so proud and happy with what I have accomplished today
- My lovely three years old daughter Basma, my dearest wife Fatma; without your endless support, strong encouragement and patience, I could not have made this happen.

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Abstract

The resource-based theory theme concerns the exploitation of resources at organization level. However, the utilization of resources can be realized by the unique exploitation of those resources at the level of individual projects, supported by specific organizational dynamic and project capabilities in an innovative environment. In addition, project management as an application of knowledge and skills is a resource that can be utilized and could be a source of competitive advantage. This thesis seeks to explore how organizations might improve their performance and sustain their business by managing effectively their strategic resources at project level. The main underlying theory used in this thesis is the resource-based theory. Strategic resources are identified by four main characteristics. A strategic resource should be: valuable, rare, inimitable and should be supported by the organization Accordingly, the thesis aims to explore the possibility of applying the resource-based theory at project level. The methodology involved the use of both qualitative research, using semi-structured interviews and focus groups, and quantitative technique, using questionnaires. The data were all collected from petroleum industry organizations based in United Arab Emirates and Oman; petroleum industry (Projects team/department) and were analyzed using interpretations of the interview extracts and statistical questionnaires. The results show that at project level, the valuable and organizational support characteristics of strategic resources are valid and positively related to competitive advantage, both being affected by dynamic capabilities and innovative environment, while the rareness and inimitability characteristics showed less evolution. The results suggest a trend of replacing these with two other characteristics, namely unique exploitation and timely availability of resources. In addition, the results show a positive relationship between strategic resources and organizational/project performance. Finally, the thesis proposes a framework for the project-based resource characteristics which

is expected to increase project success and become a source of competitive advantage for an organization. The possibility of generalizing the outcome to projects in other industry sectors and countries is also discussed. The implication of the findings is that, for organizations at project level, the main characteristics of strategic resources are that they are valuable, organizationally supported, can be uniquely exploited and are readily available. Those characteristics are better achieved in projects depending on two main factors: the dynamic capabilities of the organization and projects, and an innovative environment. Having strategic resources with these accompanying factors impacts the success of projects and, accordingly, organizational performance and its sustainability.

1 Introduction

One main goal of strategic research is to understand and determine the reason why some organizations outperform others (Almarri and Gardiner, 2014; Barney, 1995). Moreover, strategic research also helps to discover how those organizations sustain their performance and achieve their competitive advantage (Newbert, 2008). Competitive advantage can be defined as the implementation of unique strategies using organizational resources and capabilities the combinations of which is hard be copied or implemented by other competitors (Barney, 1995). For such competitive advantage to be gained and sustained, an organization should be equipped with resources and capabilities that provide it with a better or unique position in a fast-changing and dynamic environment (Barney, 2001). The main theory describing the need for strategic resources in organizations and addressing their characteristics is the Resource-Based Theory (RBV thereafter) (Barney,1991); (Almarri and Gardiner, 2014). Resource-based theory covers two main areas. The first is the characteristics needed for a resource to be strategic (Barney, 1991). Resources should be: valuable, rare, inimitable and supported by organization (Barney, 1991). The other aspect of resource-based theory is the benefits that strategic resources give to an organization as a source of competitive advantage (Baia et al., 2019). To exploit those strategic resources and give the expected competitive advantage, one main factor should be available. That factor is dynamic capabilities (the ability of firm to utilize and exploit resources) (Ringov, 2017; Ambrosini and Bowman, 2009; Teece, 2007,1997). As per the literature (Hitt et al., 2015; Barney, 2011; Barney, 2001), resources that have the four characteristics and are equipped with dynamic capabilities can be exploited by an organization as a source of competitive advantage, and accordingly achieve sustainability of the business over a longer period of time. This thesis seeks to test the application of resource-based theory at project level in order to achieve

better project performance, and accordingly better organizational performance, which should in turn lead to competitive advantage. The thesis is concerned with the availability of strategic resources at project level, and addresses the necessary characteristics of these project resources from a resource-based theory point of view. Furthermore, the thesis addresses the relationships between the project strategic resources and competitive advantage in order to understand the impact of strategic resources on organizational competitiveness in the market. The relationship of strategic resource and project performance is also tested to understand the potential and perceived effect that strategic resources might have on project deliverability and success criteria. The main aim of the thesis is to provide a framework to address how project strategic resources can be managed and exploited for better business sustainability, and accordingly provide recommendations to an organization on the factors that could lead to better exploitation of those resources. The data is collected from petroleum industry projects from organizations from United Arab Emirates and Oman. The structure of this chapter is as follows: first, the research problem will be addressed in the next section (section 1.1). Secondly, the aim and objectives of the research are listed in section 1.2. After that the main research questions are addressed, with discussion on how they evolved in section 1.3. In Section 1.4, the significance of the research is presented and discussed followed by research paradigm section. The final section (1.6) includes an introduction on the main theory (resource-based theory) used in this research. This introduction is placed at the end of the chapter and serves as an entry to the literature review chapter, which will discuss the resource-based theory and its related area of literature (in detail). Figure 1 below summarizes the sequence of sections addressed in this chapter.



Figure 1: Chapter-1 flow chart

1.1 Research problem statement

Oil and Gas projects are facing economic difficulties resulting mainly from the fluctuation in oil prices, which has made their businesses more complicated to run. As an example, over the last few years, oil prices fell from over 110 dollars per barrel in January 2014 to 20-30 dollars per barrel in 2016, and back up to around 50-60 dollars in 2017. Even with the rise in the price of oil in 2018 and 2019, prices are still only around 65 dollars per barrel (Infomine.com, 2019), and oil and gas companies are having to deal with reduced profit margins. For example, Petroleum Development Oman (the major oil production company in Oman and among the largest in the Arab Gulf) has been forced to completely revisit all projects and tender evaluations and go through a rough cost-cutting policy in the last three years as dictated by their director of projects. Difficulties such as budget shrinkage due to low oil prices and inefficient resource management has forced oil and gas organizations generally to cut costs and reduce their expenditure. So, the main challenge is how to maintain the same level of oil and gas production at lower cost as a mean of shoring up profit margins. Organizations will need to be looking more and more at incorporating innovative solutions to uniquely execute

their projects, increase performance and preserve market competitiveness. In the midst of such oil and gas price fluctuations, services and operating oil organizations tend to reduce their resources (tangible and intangible) in order to react to the challenges of sustaining the production of oil and making a reasonable profit. One main issue of many organizations in such a dynamic market is the utilization of resources to achieve their strategies while maintaining their market share and competitiveness. The tangible (assets and infrastructure) and intangible components (people, knowledge and capabilities) are an organization's chief resources, which need to be managed effectively for better performance (Molloy et al., 2011). This thesis studies the identification and effective management of strategic resources in organizational projects in order to explore the relationships between the project strategic resources and project-organizational performance. Furthermore, it looks into how project management can be a source of competitive advantage for an organization in terms of strategic resource capability, and explains the possibility of applying strategic theory at project level. In addition, it looks at the role of project management for better execution of strategic resources. In addition, the thesis explores the perceived link between strategic resources and performance in the domain of such a competitive market as the oil and gas industry, where that relationship explains the possible impact of strategic resources in the successful rate of projects. Although the literature suggests that decisions on resource utilization are enacted at organizational level, any accrued benefit from resource utilization can only be realized by its use at the level of individual projects, supported by specific project management methodologies and processes (Mathur et al., 2013). While some studies address the idea of how to identify and utilize strategic resources for better performance, there is still a lack of more focused empirical work on the area, especially at project level. Accordingly, the main concern of this thesis is to explore how organizations may increase their performance

and sustain their business by managing effectively their strategic resources at project level. The problem having been stated, the next section addresses the main aim of this thesis, and accordingly the related objectives.

1.2 Aim and objectives of the research

Noting the main problem facing oil and gas companies commissioning projects whilst increasingly dealing with reduced profit margins (as oil prices plummet), the main aim of this study is to provide a theoretical framework to help explain how projects' strategic resources are identified, utilized and exploited so they become a source of competitive advantage for organizations and accordingly lead to the achievement of sustained business. This aim can be achieved by the following specific objectives:

- Identify the available strategic resources and capabilities of the organizations in the area of projects.
- Explore the relationship between strategic resources and project success, and firm performance.
- Examine the factors affecting the relationship between strategic resources and competitive advantage that help explain the perceived relationship between them.

1.3 Research questions

The research aim is to explore the question, "How could organizations increase their performance and sustain their business by managing effectively their strategic resources at project level?" In line with this aim, some aspects need to be addressed in order to attempt to resolve the problem. The main aspects are strategic resources, the management of strategic resources, organizational performance, organizational sustainability and competitive advantage, which could help sustain the business of organizations through the

success of individual projects. Each of those aspects is addressed in more detail in the literature. The outcome of the literature review chapter, along with an understanding of the research problem is set out in the three main research questions below:

1. What are the strategic resources and capabilities available in an organization's projects?

This is an introductory question to understand the situation of the strategic resources in projects, and is mainly trying to check if those strategic resources available at organizational level are, at the same time, available at project level. Furthermore, it asks what different resources and capabilities are available at the project level. In addition, the intention is to list those resources and capabilities at project level, to analyse them and check their impact on competitive advantage and organizational performance later on in the research.

Once the strategic resources and capabilities have been addressed at project level, then their relationship to competitive advantage will need further analysis. In addition to this relationship, the role and application of the resource-based theory at project level needs to be addressed as well. The resource-based theory is normally only applied at organizational level. Accordingly, the novel presentation of resource-based theory at project level is required, and needs further analysis and discussion. Hence the second research question is formulated below:

2. How do the project strategic resources and capabilities provide competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level?

After addressing the relationship between strategic resources and competitive advantage, further analysis is needed to present the expected factors that affect both aspects of this relationship. This leads to the third research question:

3. What are the factors affecting the relationship between strategic resources and competitive advantage at project level?

1.4 Significance of the research

The significance of this thesis arises from many perspectives. First, it extends our understanding of the resource-based theory to project management. The literature suggests that this area of research - which is focused on the application of resource-based theory in the project management context (particularly in the area of project management application) - is still developing (see Jugdev, 2004; Killen et al., 2012; Mathur et al., 2013; Almarri and Gardiner, 2014). There appears to be a lack of empirical evidence to support the logic acceptance of resource-based theory, which is what the majority of literature is based on (Newbert, 2008). Accordingly, further application of the resource-based theory (RBT) is recommended, and could contribute to the field of operations management (Hitt et al., 2015). This thesis discusses the conceptual logic of resource-based theory, testing it empirically and setting out to identify the characteristics of project strategic resources that provide a contribution to companies' competitive advantage. The thesis aims to extend the resource-based theory understanding to project management level in the domain of the oil and gas industry by identifying the strategic resources, capabilities and competencies that lead to sustained competitive advantage. Secondly, the thesis explores the relationship between strategic resources and project-firm overall performance and survival, using a new proposed theoretical framework. The framework is divided into two main parts: the first part is strategic resource identification and availability; and the second is strategic resources and their relationship with dynamic capabilities which have an effect on project performance. The framework explores the perceived relationships between managing strategic resources and firm performance, and the long-term survival of organizational projects. The expected

outcome of such relationships will provide project managers with new knowledge about project strategic resources, helping them to implement organizational strategies, increase the possibilities of project success, improve firm performance, and lead the organization towards long-term survival in the market. In summary, this research explores the relationship between firm resources and the success of projects using the resource-based view as a theory. It seeks to answer questions related to the availability of strategic resources, as defined by Barney (1991, 1995, 2001, 2011, 2018), Peteraf and Barney (2003) and Barney et al. (2011) and their perceived link to project performance and success. In addition, it seeks to provide an explanation of the effect of the dynamic capabilities of the project and firm on the implementation of firm strategies. The research uses mixed method of qualitative (semi-structured interviews and focus groups) and quantitative (questionnaires) research techniques (Amaratunga et al., 2002), which are discussed in the methodology chapter.

1.5 Research Paradigm

Regarding the research philosophy, the research ontology is backed up by a mix of normative and modern perspectives of organization theory, where the organization is defined as “objectively real entities operating in a real world; when well designed and managed they are systems of decisions and action driven by norms of rationality” (Hatch and Cunliffe, 2012:16) , 2006:15). The focus of organization theory is on exploring world laws and principles (Hatch and Cunliffe, 2012:18). According to the exploratory and interpretative nature of the study, the research will follow relativism ontology and constructionism epistemology. Relativism assumes no objective reality and that we can only find reality through the involvement and interpretation of people in a social way (Easterby-Smith et al., 2015). The evaluation of relativism as a framework in a study or research will need more wording and rich data to be collected. Epistemology is about the theory of knowledge and how we can discover the basis

of our own knowledge. That basis comes in many forms, but the main two are positivism and constructionism (Boykin and Schoenhofer, 1991; Easterby-Smith et al., 2015). Positivism is more aligned to realism ontology, where there is only one truth and that truth can be measured by numbers and facts using hypothesis and experiments. On the other hand, constructionism is more about words, triangulation and comparisons, using interpretation with more words and less numbers to explain social phenomena (Easterby-Smith et al., 2015). More detail on the research philosophy is to be found in the methodology chapter.

1.6 Introduction to resource-based theory

The term 'sustainability' in business literature has two major meanings. The most common meaning relates to the green environment and the maintaining of natural resources, or the three perspectives of bottom line: environmental, economic and social perspectives (Stankeviciute and Savaneviciene, 2014). The other meaning relates to a firm's ability to sustain its business in a competitive market and survive for longer (Musso and Schiavo, 2008) by being able to achieve sustained competitive advantage (Barney, 1991; Barney et al., 2011) hand in hand with better performance (Bayus and Agarwal, 2007). According to the latter meaning of sustainability, where competitive advantage is achieved, it helps to increase the ability of the firm to stay in the market for a longer time. Competitive advantage and sustained competitive advantage can be achieved by identifying, exploiting and managing a firm's strategic resources and dynamic capabilities (Barney, 1991, 1995; Teece et al., 1997; Barney et al., 2011). The resource-based view (RBV hereafter) which is formulated and refined by Barney (1991, 1995, 2001, 2011, 2018) explains the characteristics of firm resources which could give sustained competitive advantage to a firm.

The RBV has received much attention in strategic management literature (Mahoney and Pandian, 1992; Hoopes et al., 2003; Barney et al., 2011; Almarri and Gardiner, 2014; Andersén

et al., 2015; Baia et al., 2019). Researchers are interested in its ability to sustain a business over time, and the applications that can be implemented using RBV (Hitt et al., 2015). The RBV has two assumptions; it assumes that strategic resources are heterogeneous across organizations, which means that strategic firms possess different resources and capabilities to compete against each other so the way those resources are utilized are different from one organization to other, although they are all share competition in the same market or industry (Almarri and Gardiner, 2014). Accordingly, this implies that some firms are more capable of accomplishing better work performance than their competitors (Barney et al., 2011). The idea is that some firms are capable of creating unique strategies and implementing those strategies using unique combinations of resources and capabilities and accordingly outperform other organizations (Barney, 1995). The second assumption in RBV is that the resources of a firm are immobile, which means that resources do not move from one firm to others at a short period of time. But why cannot the source of sustained competitive advantage be achieved if a firm's resources are homogeneous and mobile? The assumed existence of resource homogeneity and mobility between firms is not practical in this case, as there is always a degree of heterogeneity and immobility. This is because the assumption of homogeneity and mobility means that all firms have the same strategic resources of physical, human and organizational capital and implement the same strategies (Barney, 1991, 1995) and so the competitiveness between the organizations do not exist. Accordingly, there is no reason to examine the possibility of a strategic recourse providing sustained competitive advantage based on those assumptions. Rather, the reverse assumption should be examined - this was undertaken by Barney and constitutes one objective of this thesis, which is to look into immobile and heterogeneous organizations to test the theory and check the relationship between strategic resources and competitive advantage. However, the new view expressed

here is that the assumptions will be tested at project management level. Barney (1991, 1995, 2001) proposed four factors, characteristics or indicators to explain the strategic resources that could potentially improve firm performance, and accordingly help to achieve better competitive advantage. Those characteristics are: the *value* of the resource, the *inimitability* of the resource, the *rareness* of the resource, and the *substitutability* of the resource, later replaced by *organization supported resource*. This is also known as VIRO framework. As per Barney (1995), the definition of competitive advantage is the ability of an organization to create and implement a valuable strategy that is not implemented by other competitors at that time. That competitive advantage is sustained when no competitors are able to duplicate the benefits of the strategy. Barney (1995) argues that competitive advantage cannot be gained without achieving both assumptions (the heterogeneity and immobility of the resources). It is generally agreed that RBV is a common and useful perspective for strategic management literature, and explains a firm's ability to sustain business over other competitors (Szymaniec-Mlicka, 2014). The concept of the resource-based view can be tracked back to the original work of Penrose (1959), where she introduced the importance of internal resources for the growth of a firm, followed by the explanation of inimitability and causal ambiguity by Lippman and Rumelt (1982). Two years later, Wernerfelt (1984) addressed the fact that to achieve sustained competitive advantage, the focus should be more on the firm's resources than on the product. He proposed the term 'resource-based view' (RBV hereafter) for the first time, which Barney (1991) later expanded on with more detailed definitions of strategic resources and their characteristics. In addition to the resource-based view, Teece et al. (1997) formulated an important factor that should be combined with resources to achieve better performance. This was the 'dynamic capabilities' of the firm. Teece et al. (1997) addressed how those capabilities could affect competitiveness

and play an important role in sustaining the business in a changing market. Subsequently the strategic management literature has addressed the usage and critiqued the resource-based view and its application, research in the area having increased dramatically (Priem and Butler 2001; Gavetti, 2005; Kraaijenbrink et al., 2009; Barney et al., 2011).

Strategic resources of organizations are both tacit and explicit in nature. Human capital, financial, intellectual and organizational elements could all be part of any firm's strategic resources. Tacit skills, intuition and knowledge are considered even more strategic for many organizations (Mathur et al., 2014). On the other hand, a strategy combining the usage and implementation of resources and capabilities could of itself be considered a strategic resource and source of competitive advantage (Hansen et al., 2000; Barney and Hansen, 1994). In addition, Barney (1995) suggested that sometimes the implementation of a strategy depends on current resources which are not themselves a source of competitive advantage, but are a strategic complement to other valuable, rare, non-imitable and non-substitutable resources controlled by a firm.

Furthermore, according to Barney (1995), there are four types of resources: the first is *physical* capital such as technology, assets and locations; the second is *human* capital such as training, experience, judgment, intelligence, talent and relationships; and the third is *organizational* capital such as reporting structure, planning, controlling, and coordinating systems, group relations, internal relations and relations with other firms; the fourth type of resources are financial resources such as equity, debts and returned earnings. From the above, it can be argued that only those resources which enable a firm to conceive and implement strategies that improve efficiency and effectiveness, and which also met the VIRO requirement of RBV can be called strategic resources. Barney's aim was to identify the conditions under which those resources can be sources of sustained competitive advantage.

A company has a competitive advantage when it implements a strategy that is not being implemented by other firms at the same time, and it has a sustained competitive advantage when this strategy cannot be duplicated by other firms (Newbert, 2008), provided that the firm can withstand economic structural changes over time, so the process of strategy is dynamic (Barney, 1995). Accordingly, sustained competitive advantage does depend on time as per Barney; and more specifically it depends on how much *calendar* time that other firms will take to duplicate the strategy, which implies that sustainability is not infinite, but rather finite, especially in a rapidly changing industrial environment. This is what Hirshleifer (1982) termed as equilibrium definition. “It should be noted that the sustained competitive advantage is finite, because the changes to economic structure could make what was once a source of sustained competitive advantage no longer such a source”. This is what is called Schumpeterian Shocks (Barney 1991). This idea of finite sustained competitive advantage gives a good explanation as to why such theory (RBV) can be extended to project management literature, as projects are temporary endeavors, and sustained competitive advantage has the same characteristic. Thus, the resource-based theory can be implemented for projects and this will increase our understanding of project management as one source of competitive advantage (Jugdev, 2004). In addition, the resource-based view can be used in project management applications (Jugdev and Mathur, 2013; Almarri and Gardiner, 2014), this being one objective of this thesis. Barney (1995) added more detailed sub-characteristics to the condition where the resource needs to be imperfectly imitable; those sub-characteristics are *history of the firm, ambiguity and social complexity*. These need to be taken into consideration when identifying the strategic resources of any organization and project. As per the traditional model of firm performance, for example, Porter (1981) suggested that strategies can be a source of sustained competitive advantage when the resources can exploit opportunities

and/or neutralize threats. The resource-based theory added to this the attributes of *valuable* resource (a resource that will help to implement strategy and improve efficiency and effectiveness). A valuable resource needs to be rare, which means that only few other current or potential competitors have the capability of exploiting that resource in the same way. Such valuable and rare resources need to be difficult for other firms to obtain or copy, in order to create a source of sustained competitive advantage (imperfectly imitable). According to Barney (1995), there are three requirements to reach the stage of imperfectly imitable resource (as per Figure-2 below):

- **Unique historical conditions:** an understanding of the idiosyncratic nature of a firm's attribute is important to have an imperfectly imitable resource. So, the ability of the firm to exploit and acquire resources will depend on their place in time and space.
- **Causal ambiguity:** this means that the relationship between the resources controlled by a firm and the source of competitive advantage is not understood, either by the controlling firm or by other strategic firms.
- **Social complexity:** the resource can be imperfectly imitable if it is a socially complex phenomenon, and the firm cannot manage or influence in a systematic way. This makes it difficult for other firms to imitate.



Figure 2: State of imperfectly imitable resource by Barney (1995)

After identifying the strategic resources, the question should then be how does the utilization of those resources achieve better performance for the organization? This thesis addresses this in the second research question, and explores the relationship between those resources and project performance, and, accordingly, organizational competitive advantage and company survival. The issue of firm survival is not new in the literature; in fact, numerous studies have been conducted in this area from different perspectives. Coleman et al. (2013) addressed the factors affecting the survival of new firms using the resource-based theory. Other studies done in Europe (Mata and Portugal, 1994) and the USA (Phillips and Kirchhoff, 1989) investigated firm duration after entrance in the market. Other researchers, such as Sapienza et al. (2006) discussed the early internationalization process of new firms as a factor affecting growth and survival. Furthermore, the entry time in the market is also an important survival factor, suggested by Dowell and Swaminathan (2006), who examined the effects of entry timing on how fast a firm selects its initial product technology, and how fast it could

change technologies in response to dominant designs. Several factors affect firm survival, and these are divided into two main groups: *internal* which are firm-specific; and *external* which are factors related to the environment outside of the firm (Manjón-Antolín and Arauzo-Carod, 2007). The effect of resources on a firm's survival has also been studied in the literature (Esteve-Pérez and Mañez-Castillejo, 2006; Barney, 1991, 1995, 2001, 2011). At this point it can be concluded that RBV sets a framework to identify strategic resources and their ability to provide competitive advantage for an organization. These strategic resources should meet the RBV requirements. The utilization of strategic resources and their relationship to competitive advantage and project/organizational performance is the focus of the rest of this thesis. Table 1 (The research map) below summarizes the main aspects of this chapter. The research map will be updated as appropriate in the coming chapters. Following the research map, the next chapter addresses the related literature of this research area in order to produce the research framework. Table 1 gives a general idea of this chapter and about the research itself, addressing the main problem statement and accordingly the main aim of the research. Based on the main aim, the other three objectives are also addressed. Each objective is related to one of the main questions of the research. Finally, the main underlying theory of the research is shown the last column of the table. This table is a dynamic tool that will be updated as the research goes further to address more information that summarizes the coming chapters. The end product of the research map is to have all the main information in this research presented in a high-level summary. Next chapter 2 (Theory) is addressing the main theories used in this thesis followed by chapter-3 (literature) which gives in details all other related literature to the study. The theory chapter is separated from literature to give more focus first on the main underlying theories for this thesis and then carry on with the other related topics in chapter 3: literature.

| Problem Statement | Research aim | Research objectives | Research questions | Underlying theories |
|---|--|--|---|--|
| <p>Oil and Gas organizations are facing economic difficulties resulting mainly from the fluctuation in oil prices, which has made their businesses more complicated to run. This has led to in some circumstances, these organizations completely reviewing and scaling back on their project offerings with a view to reduce operational costs. However, doing so is particularly complicated by the simultaneous need to maintain levels of oil and gas production with lower levels of tangible (assets and infrastructure) and intangible resources (people, knowledge and capabilities). So, the thesis seeks to explore how organizations may increase their performance and sustain their business by managing effectively their strategic resources at project level.</p> | <p>To provide a theoretical framework to help explain how projects' strategic resources identification and utilization could lead to achievement of sustained business for the organization.</p> | <p>Identify the available strategic resources and capabilities of the organizations in projects.</p> | <p>What are the strategic resources and capabilities available in the organization's projects?</p> | <p>Resource-based theory; Dynamic capability</p> |
| | | <p>Explore the relationships between strategic resources and project success, and firm performance.</p> | <p>How do the project strategic resources and capabilities provide competitive advantage? How can the role of resource-based theory and dynamic capabilities be better understood at project level?</p> | |
| | | <p>Examine the factors affecting the relationship between strategic resources and competitive advantage which help to explain the perceived relationship between them.</p> | <p>What are the factors affecting the relationship between strategic resources and competitive advantage in projects?</p> | |

Table 1: The research map: First Revision

2 Theory

This chapter looks at the main theories relating to the thesis, and how they help to tackle the problem and find answers to the research questions. The chapter begins with an overview of the research agenda, followed by a section on sustainability, covering its definitions and how it is related to resource-based theory (the main theory in this thesis). Details of the resource-based theory are then presented, outlining its main characteristics, after which the main critiques of the theory are addressed. The final two sections present the dynamic capability theory, and how it relates to the resource-based theory. In addition, a section about strategic resources availability forms a guide to tackle the main question of the thesis. The next section is an attempt to place the study firmly within the operations management and project management research agenda.

2.1 Operations, performance management and the research agenda

The literature (Buffa, 1980; Stevenson, 1986) suggests that in addition to finance and marketing, operations represents one of the three key functional and constituent dimensions of business. Operations as a concept are mainly focused on resource transformation – either of a physical or non-physical nature – conceptualized in the form of goods (physical/tangible) and services (non-physical/intangible). Hence, as management predominantly attempts to ensure efficient and effective transformation, operations management is seen as providing the knowledge base and theories that provide primary support to production (Johnston, 1994). Thus, it can be posited that the main emphasis of operations management is to provide production activities with theories that enhance and facilitate organizations' understanding and appreciation of how they may best (effectively, efficiently and optimally) produce goods and services. Nie and Kellogg(1999) suggest that an operation consists of two key dimensions,

one focused on physical and tangible aspects (products), and the second focused on non-physical and intangible aspects. This duality does not necessarily imply that conceptually these two dimensions are well articulated and explicitly differentiable along operations. As the extant literature drawn from Sullivan (1982), Iravani et al. (2005) and Sampson (2012) has suggested, in reality, both products and services actually encompass individual duality. In sum, it is posited that operations management has its theoretical roots in production management (Meredith and Amoako-Gyampah, 1990; Johnston, 1994; Sprague, 2007). One critical aspect of operations is performance.

A review of operations management by (Battistoni et al., 2013) and project management by (Svejvig and Andersen, 2015) literature suggests that 'performance' is at the heart of both operations' management and project management scholarship. The literature emphasizes that project management is a constituent element of operations management (Meredith, 2001; Bryde, 2003; Ramasesh and Browning, 2014). In fact, according to Hayes (2002) and Maylor et al. (2008), projects remain key to operations, themselves seen as transformational value-laden processes (see Lovejoy, 1998). In particular, project management provides the control structures and mechanisms required for the effective management of operations. Evidence for this position is also supported by the existence of special issues on project management found in Operations Management journals such as the Journal of Operations Management (see Vol. 14, No. 3, 1996). More specifically, scholars such as Lord (1993) and Pellegrinelli and Bowman (1994) tell us that project management is a constituent element of operations, in that it provides the control mechanisms and structures that ensure that the strategic visions of firms are transformed into operational strategies. More specifically, the relationship between operations, project management and strategy are best articulated by Longman and Mullins (2004) who state that "...any strategy session that is worth its salt

ultimately distils vision [statements] into critical business issues, and if the organization is really serious, these issues get distilled into projects". Thus, according to Rolstadas (1994) and Maylor et al. (2008), the major role of project management in an operations environment is to provide the delivery mechanism for the management of operations.

Scholars such as Lebas (1995) and Otley (2003) pointed out in their writings that the term 'performance' is ambiguous. The ambiguous nature of performance provides scholars with a justifiable rationale to explore the specific nature of performance that arises within particular firm and organizational environments. This exploration, however, requires that an organization will need to articulate clearly its perception of performance and how, when and why it is to be of interest. This is particularly important when noting that the management of performance may serve as a strategic tool for modifying firm behavior; thus, in the words of Lebas (1995:23), there is a need to "...reach organizational targets". There is also a need for firms to define performance in a manner that is not only clear (Neely, 2005; Neely et al., 2005; Franco-Santos et al., 2007), but that also takes into consideration the various perspectives of different stakeholders. Clarity in the definition of performance also implies that stakeholder power relationships are acknowledged. Thus, from the works of Bourne (2005), Micheli and Kennerley (2005), Busi and Bititci (2006) and Bititci et al. (2012), it can be posited that performance management refers to various managerial tools and techniques that have been designed and developed to meet - in line with the firm objectives - optimal outcomes. It appears that performance management is also related to performance measurement - providing the encompassing philosophy of the objectivity of its measurement which scholars such as Johnson and Kaplan (1987), Hood et al. (1998), Franco-Santos et al. (2007) and Pinheiro de Lima et al. (2013) expound. Thus, for the purpose of this study, performance measurement is theorized to represent a series of metrics that a firm may employ in order to

be able to efficiently and effectively quantify its actions. Lebas (1995: 23) suggests that performance measurement implies “transforming a complex reality into a sequence of limited symbols that can be communicated and that can be more or less reproduced in similar circumstances”. In effect, the measurement of performance is primarily focused on assessing historical achievements. For this reason, it is highly dependent on the relationship between the vision, the strategic objectives of a firm, and the anticipated plan to attain this vision and strategic objectives. It can be safely posited that the measurement of performance is an integral and key aspect of any operational process. However, this being the case, recently the performance measurement was seen as being primarily focused on the budgetary control system – in effect, leading scholars such as Neely (2005), Neely et al. (2005), Nudurupati et al. (2011) and Bititci et al. (2012) to claim that this sole focus on financial perspectives implies that performance measurement was characterized by short-termism, rigidity and ineffectiveness – particularly in terms of any contribution to a firm’s capacity to communicate its strategic priorities. However, Nudurupati et al. (2011) and Bititci et al. (2012) suggest that as the understanding of performance measurement has matured, there has been a corresponding development of scholarly interest in the utilization of such matrices as a means of enhancing a firm’s performance from actual measurement metrics (Meredith and Amoako-Gyampah, 1990).

Theory is “the sphere of abstract knowledge and in a broad view is simply the description of new ideas provided that the empirical evidence is available” (Hatch and Cunliffe, 2012). A theory, on the other hand, can be defined as a statement of relationship between units observed or approximated in the empirical world” (Bacharach, 1989; Coehn, 1980; Dubin, 1969; Nagel, 1961). Theory is “built from a combination of concepts in which their relationship produces appreciation and description or explanation of phenomena under focus” (Hatch and

Cunliffe, 2012:16). Theories are important because they help to explain events and trends, in addition to increasing development in the body of knowledge (Olszewski-Walker and Coalson-Avant, 1995). Organization theory, on the other hand, has a different focus, applications and perspectives, the definition of the organization depending on the nature of the research. For example, if the research is from a modern perspective, then organizations can be defined as “objectively real entities operating in a real world” (Hatch and Cunliffe, 2012:16). As a result, the focus of organization theory will be on finding new universal laws that control such organizations. Furthermore, there are different applications of organization theory, but two are related to this thesis - *strategy* and *communication*. From the strategy stance, organization theory helps the researcher who desires to increase a company’s value, to organize and structure its activities and design its processes to attain its strategic goal within the context of organizational culture. From the communication stance, organization theory helps researchers to understand the interaction between employees and environment in order to effectively share knowledge. One main factor of any economy is the firm. However, the business firm as we know it today is a relatively recent phenomenon because, in the past, business was performed on a relatively small scale by farmers, artisans and merchants. For example, in 1790, merchants were carrying out business transactions in America, where they bought and sold products using basic commercial functions. One hundred years later, such business was carried out by specialized firms, the owners of which were still managing their own businesses, or sometimes they appointed managers who they knew personally. The concept of a salaried manager who has no pre-existing personal relationship to the owner was still not in place; that came about only in the mid-1900s, and such organizations (the large companies that dominate the market in advanced countries) are what we have today. However, even with those types of organizations, other types are still important, such as

family-owned companies, cooperatives, and government-owned or non-profit organizations (Hart, 2011). In the research on strategic resources and corresponding firm performance, the resource-based view and the resource-based theory generate a framework that explains firms' competitive advantage basis and firm performance (Slotegraaf et al., 2003; Vorhies and Morgan, 2005; Barney, 2011).

As per the research agenda, the next section summarizes the idea of business sustainability, how this differs from the commonly known green sustainability, and its relationship to the resource-based theory. Following this, more detailed information is given with regard to RBV history, applications and framework. Furthermore, the characteristics that build the theory, along with the dynamic capabilities are also addressed. The dynamic capabilities are addressed here because they are a valuable extension to fully understand resource-based view (RBV).

2.2 Business sustainability and resource-based theory

The term 'sustainability' has two possible interpretations in management literature. The first one is related to the three bottom-line perspectives: environmental, economic and social, which is the idea of using the Earth's resources to meet the present needs without compromising future generations' needs (Somerville and Green, 2012; Purvis et al., 2018; Mohtar et al., 2019). The other meaning refers to business sustainability, which looks at the ability of organizations to survive for a longer time with good performance and competitive market share (Somerville and Green, 2012; Broccardo et al., 2018). Accordingly, the main focus of this thesis is on business sustainability. It should be noted that the researcher will use the word 'sustainability' when referring to the business perspective, unless otherwise identified.

The term is used to reflect the concept of an organization's long-term survival in the market (Musso and Schiavo, 2008; Christie and Sjoquist, 2012; Sasaki and Sone, 2015; Cabrer-Borrás and Rico Belda, 2017) and the ability to maintain competitive advantage (Barney, 1991; Huang et al., 2015) and better performance (Bayusand Agarwal, 2007; Nicolăescu et al., 2015). Such survival and performance are affected by many factors, as described below. A large body of literature has addressed the use and critique of resource-based theory from the 1960s up to the present day (Penrose, 1959; Lippman and Rumelt, 1982; Wernerfelt, 1984; Barney, 1986, 1995, 2001, 2018; Barney et al., 2011; Nason and Wiklund, 2015). The following sections set out to present the main published academic works/studies on the resource-based theory at firm level, along with the body of knowledge that relates to project management level.

2.2.1 Resource-based theory

This section describes the resource-based theory and indicates the characteristics of strategic resources, namely valuable, rareness, inimitable and organizationally supported. Inimitability here consists of three different pillars, namely unique historical conditions, causal ambiguity and social complexity. The resource-based theory is a well-known and very important theory in strategic management, and one of the most powerful theories applied to explain organizational relationships (Barney, 2001; Barney et al., 2011). It helps firms to understand the sources of competitive advantage and sustained competitive advantage (Barney, 1986, 1995, 2001; Barney et al., 2011). The antecedents of the theory go back to over 70 years ago when Penrose (1959) presented his view on firm resources. she stressed the importance of a firm's resources as a factor for its growth, and warned that without adequate resources, firm growth will be difficult (Barney et al., 2011). Although Penrose's explanation about resources was important, the resource-based theory was shaped later, in the 1980s (Lippman and

Rumelt, 1982; Wernerfelt, 1984; Barney, 1986). Barney (1995) argued that for any organization to have a sustained competitive advantage and survive in the challenging market, the management has to look inside the organization for its unique, strategic resources and capabilities, which are valuable, rare, hard and costly to imitate, and then provide the necessary support to exploit them. There are other frameworks and models which discuss firms from the perspective of external points of view, looking more at threats and opportunities - or the structure-conduct-performance paradigm (Porter, 2008). Porter's 'five forces' is an example of such a model. The external view is important, and needs to be considered, but the strategic management literature also started to look inside a firm's resources and capabilities, which are the main elements of the resource-based theory. More detail about other external strategic theories is presented later in this chapter.

During the 1980s and 1990s, the literature on strategic management shifted its attention more towards an organization's internal elements, such as culture, resources and ambiguity (Barney et al., 2011). Lippman and Rumelt (1982) added two main concepts to the resource-based theory, which are the inimitability of the resources and the causal ambiguity. Here inimitability means that for an organization's resources to give competitive advantage, they must be very hard for other firms to copy. Causal ambiguity, on the other hand, means that the complex relationship between the resources exploited by the firm and firm performance cannot be understood, and accordingly it is also hard for them to be explained by competitors and therefore (presumably) copied (Barney et al., 2011). Furthermore, Barney (1995) articulated this factor of inimitability and explained the other sub-characteristics that allow a resource to gain inimitability. He addressed the importance of understanding the historical background of the organization, social complexity and causal ambiguity. He defined the historical factor of organizations as the ability of firms to use resources based on their location

in time and space. Barney also explained the social complexity of resources as the possibility for company resources to be more than a socially complex phenomenon, and that the organization cannot affect it in a systematic way, leading to the same difficulties as its competitors, and accordingly providing a unique position for the firm.

Two years after Lippman and Rumelt's work, Wernerfelt (1984) placed more emphasis on the idea that an organization should concentrate more on its resources than on its products to gain competitive advantage. He proposed the term 'resource-based view', which is interchangeably used with the term 'resource-based theory' to the present day. Barney (1986) suggested that the culture of any organization could give it a unique market position and sustained competitive advantage. The work by these researchers helped to provide a basis for the resource-based theory, which was then presented in a clearer framework by Barney (1991, 1995). In his early research Barney (1991, 1995) presented the main characteristics of the resource-based theory. In his 1991 work, he studied the link between resources and competitive advantage, based on the assumption that strategic resources are heterogeneously distributed across organizations, and that heterogeneity is constant over time. He provides four factors or indicators for resources to have the potential to create better competitive advantage; these are: the value of the resource, their rareness, their inimitability, and the non-substitutability of the resources. It should be noted that the substitutability characteristic (the ability of competitors to substitute resources) was adjusted by Barney (1995), and replaced by organizational support characteristic. This means that for any valuable, rare, inimitable resource to provide sustained competitive advantage, it must be supported by the organization. The organization needs to be managed in a way that allows better exploitation and use of resources (Barney et al., 2011; Wilden et al., 2018). Barney (1991) began by presenting his definition of a firm's resources. Following this, he explained

the role of idiosyncratic, immobile firm resources to provide competitive advantage, and the characteristics of resources that could give an organization a unique position. Finally, he developed a new framework based on the ability of a firm's resources to provide competitive advantage (as per Figure 3). The author defined three key terms: firm resources, competitive advantage and sustained competitive advantage. He defined firm resources as all assets - tangible and intangible - that are controlled by a firm, which allows it to implement its strategies to achieve better efficiency and effectiveness. Barney (1991) then described the competitive advantage of an organization as the ability to implement a created valuable strategy which has not been implemented by competitors at that time. Competitive advantage becomes sustained when no competitors are able to duplicate the benefits of that strategy. He argued that sustained competitive advantage, as explained above, cannot be created if all a firm's resources are homogeneous and mobile, meaning that if all competing firms have exactly the same resources and mobility, then there will be no sustained competitive advantage, because all firms can implement any strategy that other firms have, as all have the same resources. So accordingly, the theoretical model should assume that sustained competitive advantage should be created in a heterogeneous and immobile environment. In addition to that, a firm's resources must be valuable to provide business market share for the firm. They must also be rare, so that no other competitor has the same resources, and imperfectly imitable, with no strategic substitutes. Figure 3 summarizes this.

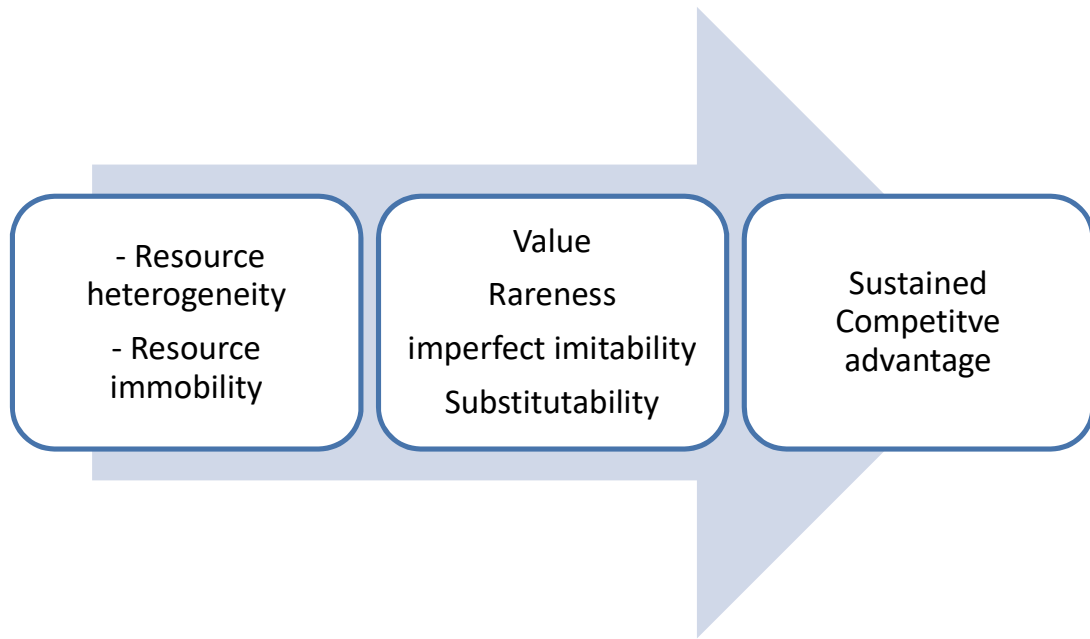


Figure 3: Relationship between resource heterogeneity and sustained advantage, adapted from Barney (1991)

The author (Barney, 1991) then proposed some areas in business where the framework can be applied, such as strategic planning, information processing and positive reputations. Furthermore, he addressed some implications that the model offers, such as social welfare, organization theory and behavior and firm endowment. He explored different factors affecting firm survival, using what he called the resource-based view (RBV) model. He constructed a hypothesis to investigate the impact of tangible and intangible resources in service and non-service firms. The idea is that the successful management of a firm's resources will create a competitive advantage, and accordingly will help the firm's survival. It is worth mentioning that in 1959, Penrose set out the basics of the RBV model when he defined the firm as a collection of resources, and even suggested that it is the heterogeneity of resources that gives a firm its special character.

Barney and Clark (2007) said that a firm could gain competitive advantage when other competing firms are not able to imitate the benefits of its strategy. This competitive

advantage can be achieved when the firm understands the two main assumptions of its resource base, which are *heterogeneity* and *immobility*. The heterogeneity assumption means that the firm owns and uses unique resources which allow it to accomplish more activities and gain more market share (Ndofor et al. 2014). Immobility means that the firm is using different resource configurations, so that it is difficult to trade resources across other competing firms, even if they operate in the same industry (Peteraf and Barney, 2003; Andersén et al., 2015). Resource that can give a competitive advantage should have four main characteristics, as per Barney and Hesterly (2012), which are: *valuable*, *rare*, *imperfectly imitable* and *non-substitutable* (later changed to organizational support). Below is a short explanation of each of the four characteristics, together with details on the strategic resource characteristics formulated as per Barney and enhanced by other researchers.

2.2.1.1 Valuable

A resource is valuable when it enables firms to achieve lower costs compared with their competitors (De Massis et al., 2017) or when it provides a firm with many other products and services, and furthermore creates rent for the firm (Bowman and Ambrosini, 2000; Priem and Butler, 2001; Wang et al., 2013). It is worth mentioning that RBV studies use the term “resource” to mean a valuable resource which creates rent for a firm; accordingly, it is a good idea to call a resource without rent creation an “asset”, as suggested by Bowman and Ambrosini (2003). Based on Barney (1991), resources and capabilities can be called valuable if they have the potential to reduce costs, have the effect of acquiring market industry opportunities and neutralize the corresponding threats of other competitors. The amount of value gained depends on how effectively the organization deploys these valuable resources and capabilities to achieve competitive advantage.

So, it is assumed that in order to gain the necessary competitive advantage, both resources and capabilities need to be looked at as a combined set. The idea of having competitive advantage is not how to exploit a valuable resource or capability alone, because neither can provide it in isolation from the other. Accordingly, competitive advantage can be achieved when the valuable resource-capability combination is exploited (Hall, 1993; Newbert 2008; Sok and O'Cass, 2011).

2.2.1.2 Rare

A rare resource simply means that the organization owns resources that are not commonly available to competitors (Barney, 1991; Bowman and Ambrosini, 2003), because if the resource is common and used by all competitors, then competitive advantage cannot be achieved and the resource will be a non-rent asset, as previously explained. According to Barney (1991), the valuable resource-capability combination can be more effective and gives better results if those resources and capabilities are rare and not many competitors have them. If the combination is freely available in the market, then other competitors can implement similar strategies, accordingly reducing the firm's unique position in the market (Ashrafi and Mueller, 2015). It is important to mention that rareness does not always mean exploiting rare resource with rare capability, but instead that competitive advantage can be gained by applying, for example, common resources with rare capability (Newbert 2008). An example of this is the use of the same drilling tool for drilling oil wells, but with different sets of well profiles and tool arrangements. The same goals can be achieved by exploiting the rare resource capability combination, reducing cost and responding to market opportunities and threats.

2.2.1.3 Inimitable

It is clear that the firm with valuable and rare resources will be placed to gain a competitive advantage (Barney, 1995, 2001; Barney et al., 2011). However, that competitive advantage can only be sustained in the long term if competitors cannot acquire the same valuable and rare resource(s). In other words, it should be difficult for other firms to duplicate the resource (Barney, 1991). According to Barney, there are three elements leading to that stage of imperfectly imitable resource, which are as follows:

2.2.1.3.1 Unique historical conditions

An understanding of the idiosyncratic nature of a firm's attributes is important to have an imperfectly imitable resource, and the ability of the firm to exploit and acquire resources will depend on their place in time and space. Therefore, an understanding of the firm's historical events will affect its performance (Ansoff, 1965; Learned et al., 1969; Priem and Butler, 2001). Other researchers such as David (1985) have developed models for firm performance that depend heavily on unique historical events as a determinant of subsequent actions. They suggest that firm performance does not only depend on the economic industry structure at a particular point in time, but also on the path from past history, and how the firm reached this point in time. Therefore, when a firm obtains valuable and rare resources because of its unique path in history, it will be better able to exploit those resources which cannot be duplicated by other firms. History thus affects all types of resources and makes them more imperfectly imitable.

2.2.1.3.2 Causal ambiguity:

This means that the relationship between the resources controlled by a firm and the source of competitive advantage is not always understood either by the controlling firm, or by other

competing firms (Barney, 1991; Kull et al, 2016). If that relationship is fully understood by the controlling firm, then it is just a matter of time before others will understand it. But is it possible for a firm not to understand the link between its resources and competitive advantage? I believe it is possible because such relationships are complex and independent, are often implicit, and managers take them for granted rather than explicitly analyzing them. However, the link between resources and competitive advantage remains ambiguous and worth establishing more empirical work, and further studies in this area.

2.2.1.3.3 Social complexity:

A resource can be imperfectly imitable if it is a socially complex phenomenon, and if the firm cannot manage or influence it in a systematic way (Barney, 1991). This makes it difficult for other firms to imitate. Examples of socially complex resources are the interpersonal relationships between managers, firm culture and firm reputation. These can all add value to a firm, and at the same time are difficult for others to imitate. It should be noted that physical technology is not included in this area, because if one firm can adopt an innovative technology, so can others. On the other hand, the exploitation of those technologies could be helpful in building socially complex firm resources that are not imitable.

2.2.1.4 Non-substitutable (later replaced by organizational support)

When a resource cannot be replaced by another one that gives same result, then that resource can be called non-substitutable (Barney, 1991; Bowman and Ambrosini, 2003). This characteristic emerged when Barney published his paper on RBV in 1991. Four years later, the first three characteristics were implicitly addressed. A new fourth characteristic was proposed called organization support, which completed the VIRO framework (valuable, imperfectly imitable, rare and organizational support) (Barney, 1995, 1998, 2002). Organization support

means that a firm must be organized to exploit its capabilities and resources in order to gain competitive advantage (Gita et al., 2014). Going forward in this thesis, the organizational support characteristic will be used instead of the non-substitutable characteristic.

2.2.2 Resource-based theory assessment

There is a large body of literature assessing and critiquing the resource-based theory (Foss, 1997; Barney and Arikan, 2001; Priem and Butler, 2001a; Newbert, 2006; Kraaijenbrink et al., 2009; Nason and Wiklund, 2015; Hitt et al., 2016). A study by Barney and Arikan (2001) reviewed over 150 articles addressing the resource-based theory, and ending up with three key categories - those focusing on strategic management-related disciplines, on human resource-disciplines, and on other disciplines. One of the main areas in the strategic management-related articles was the focus on resources and firm performance. That area is a main objective in this thesis, which we extend to look first at the effect of resources at project level, and on to how they affect firm performance. The resource-based theory of the firm is not above criticism. Although it is considered one of the most powerful and cited theories in strategic management, there are still gaps and critiques that should be answered. One of the main challenges is the definition of a resource. It was defined by Ross et al. (1996) and Werner (1984) as being both a tangible and an intangible asset, simply as skills by Prahalad and Hamel (2003), and as strategic assets by Amit and Schoemaker (1993). This difference in definition is problematic for researchers using RBV, so accordingly such a study should begin by defining the meaning of resource. In this research, resources are defined as the assets and capabilities available in a firm which help to detect and respond to the opportunities of the market.

Another major criticism of the resource-based theory is that it is tautological, as Priem and Butler (2001a) explained by saying that the theory gives statements with true and valid

definitions, but also that those statements cannot be tested. Furthermore, the theory cannot meet the criteria for a real theory from Kraaijenbrink et al.'s (2009) point of view. Barney argued that although it is difficult to test and measure resources, trials have been undertaken to measure resource heterogeneity and performance (see Ketchen and Bergh, 2004; Bontis et al., 1999). Moreover, a relatively recent study by Molloy et al. (2011) tried to measure intangible resources using a new model called the 'multidisciplinary assessment process' (MAP), in which the idea is to embed the intangible into the theory, measure it and validate the measure to achieve firm performance. Another critique of the resource-based theory is that numerous resource configurations may create the same value for an organization, but are not a source of competitive advantage. Although that critique seems valid, there are many ways in which the gap can be reduced. The idea of testing the theory using qualitative methods such as participant observations (Brahma and Chakraborty, 2011) and interviews, and using focus groups to measure intangible and unseen resources is promising. In addition, the formula modelling and quantitative approaches are valid and effective (Brahma and Chakraborty, 2011). More recently, Bromiley and Rau (2016) argued that the resource-based view and its applications were not fit to be used in operations management, and instead they introduced a new perspective, more suitable to "explain the entire range of performance". Although this perspective adds value, many critiques have already been superseded by extensions of the theory (see Tables 1-3 for more examples). Finally, Hitt et al. (2016) argue that the applications of the resource-based theory are still valid for future use by operations management researchers, the trend being towards its greater use and testing in empirical work (Barney et al., 2011).

It could be concluded that although there are arguments and debates on the resource-based theory, the fact is that one of the main reasons for organizational sustainability is the

immobility of critical or strategic resources. Finally, it should be noted that the resource-based theory is not a replacement for any analytical model, such as Game theory or Porter's five forces, but it should be seen as a complement to those models and tools to achieve the goal of sustained competitive advantage. A forward-looking view should be towards testing and using the resource-based view and resources for better organizational performance (Brahma and Chakraborty, 2011). Newbert (2008) published some useful research to test the conceptual framework of the resource-based theory using survey. His study introduced the perspective of a resource-capability combination in which he assumes that for any firm to gain competitive advantage, it should exploit both its resources and corresponding capability. Newbert (2008) tested the relationship between the value (resource-capability) combination and firm performance with the effect of competitive advantage. Newbert did the same for the rareness characteristic of the firm. Although his study offered very good empirical test and filled some gaps in the area of resource-based theory, it also had some limitations. First, the study did not articulate the inimitability characteristic, which is one main factor of Barney's (1991,1995) VIRO framework. Secondly the study failed to find significant competitive advantage mediation between valuable resource-capability combination and firm performance. Finally, it only provides partial significance on competitive advantage mediation between the rare resource-capability combination and firm performance. In summary, it is a good initial study on which to build resource-based theory testing.

Since Barney (1991) established his framework on the resource-based view, the strategic management literature has produced numerous studies which provide an extension and development of RBV, but in different domains such as dynamic capability (Teece et al., 1997) and the knowledge-based view (Kogut and Zander, 1992). Other scholars have been attracted to the debate on the usefulness of RBV, and critique its theoretical perspectives. For example,

Priem and Butler (2001a) raised some concerns about RBV, arguing that resource configurations could, in fact, provide the same value, and so cannot be a source of competitive advantage. Furthermore, one of the main challenges of the RBV is the inability to measure capabilities and competencies on which primary data collection is needed, but which might bring greater slippage and respondent bias (Newbert, 2007).

That said, Peteraf and Barney (2003) concluded that RBT does not replace either the industry analytic tool or strategic group analysis, but is instead a complement to these tools. Aside from the debate on RBV, there is a general agreement that sustainability is strongly related to a firm's critical resources and other factors' immobility, raising questions such as what makes a critical resource valuable? And what new knowledge can be added to a firm's ability to create better performance? (Brahma and Chakraborty, 2011) This is one of the main investigative areas of this thesis.

In literature, the importance of an organization's resources for its success was explained long ago (Penrose, 1959), but the framework of the topic (resource-based theory) was only established in the 1980s. Part of that work involves studies looking at the internal factors of firms and their active role in competitive advantage by introducing the resource-based view. Theories such as those of Wernerfelt (1984), Lippman and Rumelt (1982), and Barney (1986), followed by the updated theory of Barney (1991) outline the core tenets and defining characteristics of resources and competitive advantages that constitute a critical demarcation point. There is still argument about the terms 'resource-based view' or 'resource-based theory'. Some researchers are still using the term 'resource-based view' (Coleman et al., 2013), even though it has long been presented as theory (Barney et al., 2011). In this thesis, the researcher uses both terms as needed, and each term is explained and credited to the original author. Organizations often face difficulties in hiring the right team for their projects,

a team that has the necessary knowledge and skills to achieve the project goals (Davies and Brady, 2016). However, even when an organization finds the right people with the necessary skills and knowledge, they are normally lost at the end of the project. There is a need for capabilities at the organizational level to be aligned with an organization's projects in order to achieve the required quality and project goals (Morris, 2013). Project capabilities refer to the managerial knowledge and skills in an organization which are used to exploit resources for better project performance. Those capabilities are used to find and explore opportunities, and to help in dealing with the dynamically changing conditions (Davies and Brady, 2016). As can be seen from definitions of both dynamic capabilities and project capabilities, they are reciprocal. This thesis concentrates on how resources are managed at project level, using the lenses of resource-based theory. Dynamic capabilities at organizational level should be combined with an overview of project capabilities, as they play an important role, along with project resources, in achieving better performance. The first part of this study examines the availability of strategic resources in organizational projects, and lists the strategic resources available. Therefore, the next section looks at the area of strategic resource availability in the literature.

To summarize the literature around RBV, the tables below explain in brief what has been discussed in this section: The first two tables (Tables 2 & 3) below explain the focus and development of RBV over a span of time until it was formulated in the way we know it today.

| Aspect / Reference | Penrose (1959) | Barney (1995) | Teece et al. (1997) | Barney and Clark (2007) |
|-------------------------------|---|--|---|---|
| What is RBV focuses on | The firm is a collection of resources which are needed for the firm growth and it is the heterogeneity of those resources that gives a firm its special character | For any organization to have a sustained competitive advantage, the management has to look inside the organization for their unique and strategic resources and capabilities that are valuable, rare, hard and costly to imitate, and then provide the necessary support to exploit them | The firm needs to establish a specific characterization of resources and exploit those strategic resources using organizational dynamic capabilities in order to gain sustained competitive advantage | A firm can gain a competitive advantage when other competing firms are not able to imitate the benefits of its strategy |

Table 2: RBV focus

| Aspect / Reference | Penrose (1959) | Lippman and Rumelt (1982) | Wernerfelt (1984) | Barney (1995) | Teece et al.(1997) |
|-------------------------------|--|---|--|--|--|
| The development of RBV | The first is a collection of resources | added two main concepts to the resource-based theory, which are the inimitability of the resources and the causal ambiguity | The organization should concentrate more on resources compared with products to gain the competitive advantage | The firm gained competitive advantage by exploiting rare, valuable, hard to copy resources | The firm gained competitive advantage by exploiting rare, valuable, hard to copy resources using unique dynamic capabilities |

Table 3: The development of RBV

Table 4 below shows the main critiques on RBV and the underlying responses to them.

| Aspect / Reference | Priem and Butler (2001a) | Priem and Butler (2001a) | Newbert (2007) | Brahma and Chakraborty (2011) | Bromiley and Rau (2016) |
|-------------------------------------|---|---|---|---|---|
| The main critiques on RBV | Resources configurations could in fact provide the same value, and accordingly such resources cannot be a source of competitive advantage | The theory gives statements with true and valid definitions, but also believes that those statements cannot be tested | Inability to measure the capabilities and competencies | Numerous resource configurations are creating the same value for the organization but are not a source of competitive advantage | The resource-based view applications are not fit for operation management |
| Aspect / Reference | Peteraf and Barney (2003) | Brahma and Chakraborty (2011) | Ketchen and Bergh (2004) | Molloy et al. (2011) | Hitt et al. (2016) |
| The response to the critique | RBT is not replacing the industry analytic tool and not replacing strategic group analysis either, but is instead a complement to these tools | Get the theory tested by qualitative methods like participant observations | Fails to measure the resource heterogeneity and performance | Measure the intangible resources using a new model called the 'multidisciplinary assessment process' | The resource-based theory is still, and continues to be valid to be used by operations management researchers |

Table 4: Critiques and responses to RBV

According to the critiques in the above table, the future use of RBV is mainly based on its ability to overcome the challenges mentioned, especially towards testing the theory empirically, and future research should focus on the same. This thesis is one trial towards having the theory tested at project level.

2.2.3 Strategic resources availability

According to Barney (1991), firms need to establish a specific characterization of their resources, and to exploit these strategic resources using organizational dynamic capabilities in order to gain sustained competitive advantage. Resources can be defined as tangible and intangible assets (Ross et al., 1996; Werner, 1984), or skills (Prahalad and Hamel, 2003), or strategic assets (Amit and Schoemaker, 1993), or something that organizations count on to attain their goals (Helfat et al., 2007). This difference in definitions is problematic for researchers using RBV, so accordingly the researcher should embark on such a study by first defining the meaning of resource and strategic resource. In the current research, resources are defined as *assets and capabilities available in the firm, which help to detect and respond to the opportunities of the market*, while strategic resources, in addition to the above, are defined as valuable, rare, hard and costly to imitate (Barney, 1991,1995).

This view of resource specialization is also supported by Amit and Schoemaker (1993). In their view, assets specialization is important to establish a strategic resource, and firms seeking competitive advantage need to do something specialized. The resource-based view of Barney provides a link between strategic resources and competitive advantage based on the assumption that strategic resources are heterogeneously distributed across the organization, which means that competing firms possess different resources and capabilities, even if they are sharing competition in the same market or industry. Accordingly, this implies that some firms are more capable of accomplishing work activities than their competitors. The second assumption is resource immobility, which means that some resources last for a long period of time.

Barney (1991) proposed four factors or indicators of the potential of resources to create better competitive advantage: the *value* of the resource, the *rareness* of the resource, i the

imitability of the resource, and the *substitutability* of the resource. According to Barney, the definition of competitive advantage in an organization is the ability of the organization to create and implement a valuable strategy that is not implemented by other competitors at that time. Now what are the types of resources that need to show these characterizations? The types of assets are defined, for example, by Williamson (1985), as *site specificity*, *physical asset specificity*, and *human asset specificity*. Site specificity means that the immobile production stages are located near to each other, because that will reduce the cost of transportation and coordination activities. Physical assets are the machinery, tools and equipment, while human assets are the assets relating to know-how, such as level of education, experience and effective communication. All those assets help the organization to perform better (Asanuma, 1989; Zhang et al., 2018). To summarize this section, the strategic resource availability in organizations and projects is discussed in the light of Barney's view. Discussion of strategic resources should be linked to discussion on dynamic capabilities, as the main element completing Barney's VIRO theory. The area of dynamic capabilities is discussed in more detail in the next section.

2.2.4 Dynamic capabilities

Dynamic capabilities are defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997; Katkalo et al., 2010), or simply "a firm's capacity to deploy resources" (Amit and Schoemaker, 1993; Winter, 2003). "The term 'dynamic' refers to the capacity of renewing competences in order to achieve congruence with the changing business environment", whereas 'capabilities' focus on the strategic management role of adopting and integrating the organizational skills and competencies with the resources to fulfil the requirements of a market environment that is continually changing. (Teece et al., 1997). According to these

definitions, dynamic capabilities concentrate on how the firms organize and utilize their resources to gain a competitive advantage (Eltigani, 2013) and accomplish better performance (Amit and Schoemaker, 1993; Schoemaker et al., 2018). According to their definition of resources, Helfat et al. (2007) considered capabilities as a component of resources which need to be used to conduct current or future business, and dynamic capabilities as those that focus on creating, extending or modifying the resource-based view, as per Figure 4 below. Both the resources and the capabilities of firms can provide and determine a firm's profit (Wernerfelt, 1984; Teece, 2007; Ashrafi and Mueller, 2015).

Although dynamic capabilities have received attention in the literature, relating them positively with sustained competitive advantage (Eltigani, 2013; Teece et al., 1997; Amit and Schoemaker, 1993; Ashrafi and Mueller, 2015) there are still some criticism of the linkage between dynamic capability and sustaining competitive advantage (Winter, 2003; Ambrosini and Bowman, 2009). This linkage forms the ambiguity in the relationship between dynamic capabilities and sustaining competitive advantage, as indicated by Winter (2003), who suggested that to better understand dynamic capabilities, that linkage need to be broken. Dynamic capability is helpful, but not necessary for achieving sustained competitive advantage, as "There is no general rule for riches" (Winter, 2003), which do not automatically lead to better performance (Ambrosini and Bowman, 2009). Furthermore, for some other authors, dynamic capabilities are neither vague nor tautological, and although they may be 'idiosyncratic', they exhibit commonalities or 'best practice' of firms. In addition, the competitive advantage of a firm does not depend onto dynamic capabilities, but is more dependent on resource configurations (Eisenhardt and Martin, 2000). Having said that, there are studies in the literature (Salvato and Vassolo, 2017; Choi et al., 2018) describing the importance and vital role of dynamic capabilities on the performance of organizations and

the outcomes of projects which lead to competitive advantage. Accordingly, what this thesis is trying to achieve is to test the linkage between dynamic and project capabilities on the one hand, and their relationship with performance and competitive advantage on the other, aiming to explore that relationship from the point of view of projects. The thesis tests the dynamic and project capabilities in combination with the firm resources as one package, and examines how that combination relates to performance. The relationship between dynamic capabilities, capabilities and resource based is summarized in Figure 4 below. The outer circle represents the resources of the organization, the ones needed to achieve the business aim. The middle circle represents any organizational capabilities. The inner circle is representing the dynamic capabilities the ones that helps to utilize the resources and have the ability to be adjusted if needed.

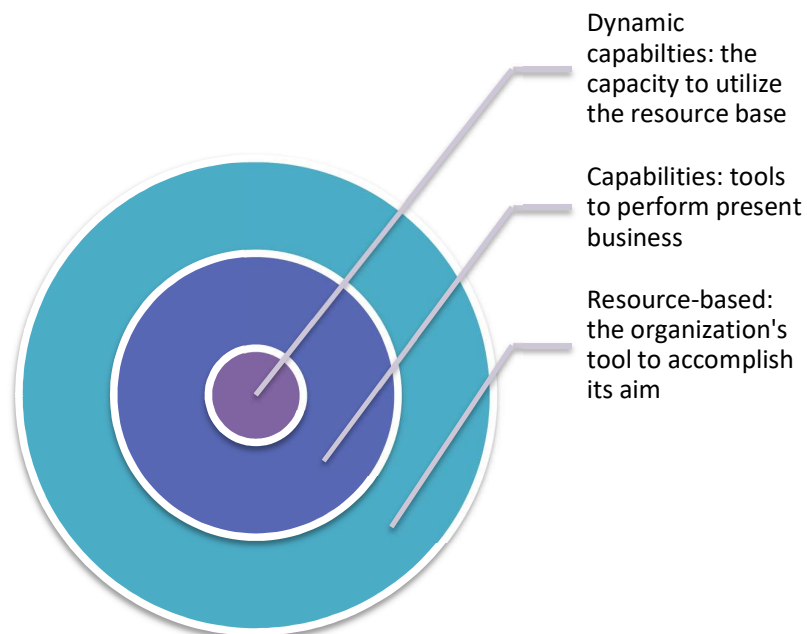


Figure 4: A graphical representation of resource base, capabilities and dynamic capabilities – adapted from Helfat et al. (2007)

Dynamic and project capabilities play an important role with strategic resources in achieving project goals and improving performance. Organizations normally face difficulties in getting the right skilled and knowledgeable team hired for their projects to achieve the necessary project goals (Davies and Brady, 2016). Even when an organization finds the right people with the necessary skills and knowledge, they are normally lost after the project has finished. There is a need for capabilities at an organization level to be aligned with the organization's project in order to achieve the required quality and project goals (Salunke et al, 2011; Morris, 2013; Zerjav et al., 2018). The management of the knowledge and skills within an organization, and which are used to exploit the project resources for better project performance, are known as project capabilities. Those capabilities are used to find and explore opportunities and help in dealing with the dynamically changing conditions. As can be seen from the definitions of both dynamic capabilities and project capabilities, the relationship between them is "reciprocal, recursive and mutually reinforcing" (Davies and Brady, 2016).

Dynamic capabilities and organizational performance have been empirically tested, and show a positive relationship, dynamic capabilities being found to provide new, hard to imitate, valuable and rare resource configurations (Fainshmidt et al., 2016). It is hard to copy such configurations, which serve as one way to give firms a unique position by implementing new strategies and thereby having a better chance to survive for longer and sustain competitiveness in a dynamically changing market (Barney, 2001). The researcher of this thesis uses this as a basis for testing organizational performance and which resources might to be considered strategic, as per Barney's resource-based view framework, identifying the effect of each type of resource on organizational and project success.

As organizations often face difficulties finding suitably skilled and knowledgeable people to lead their various projects, they should maintain the knowledge and skills for other

concurrent projects or programmes, being a main factor in the success of project management (Davies and Brady, 2016). According to Davies and Brady (2016), the term, 'project capabilities' is enhanced, reformulated and extended as being part of the capabilities, although project capabilities are more focused on the project management area. Their view of project capabilities is based on three dimensions that make three contributions to the project lifecycle. First, project capabilities can be used to deal with different situations facing any organization, to find new market opportunities, considering dynamic innovative ideas, deal with the dynamic, changing environment and defend against competitive threats or uncertain conditions, while creating stable and predictable conditions. This ability of project capabilities to explore new opportunities, make continuous innovation and defend against threats is one of the main criteria used in this research to test project capabilities' relation to performance and competitive advantage through the use of strategic resources, as defined by Barney's VIRO framework (valuable, inimitable, rare and organizationally supported). In addition, organizations need innovative dynamic capability to manage the innovation necessary for better performance and a better position in the competitive market (Salunke et al., 2011). The understanding of continuous innovation under any dynamic, highly changing market conditions can lead to a more dynamic view than the resource-based view (O'Connor, 2008; Zhou et al., 2018). Dynamic capabilities are defined as a collection of competencies or capabilities that allow an organization to generate new processes and ideas, and that enable it to react better to highly changing conditions (Sicotte et al., 2014). The second dimension of project capabilities, according to Davies and Brady (2016), is the idea of dividing the capabilities into project capabilities at operational level, and dynamic capabilities at strategic level. The idea is that organizations depend on dynamic capabilities to know when and how to use and maintain their project capabilities, and when these can be adjusted or replaced,

based on the changing conditions. The third dimension is that the relationships between dynamic and project capabilities are reciprocal, recursive and mutually reinforcing. Davies and Brady (2016) also look into project success, and empirically tests the possible extension of resource-based theory and capabilities to be applied in various phases of projects. Dynamic capabilities are vital both for organizations and projects. More specifically, project capabilities are used in the study to test the effect on project outcomes. The study by Davies and Brady (2016) contains both projects embedded within the firm as part of their functional segments, and those projects that are standalone as part of the project-based organization. The dynamic and project capabilities essentially balance the stability of current routine operations, and are capable of changing those routines if needed as a response to market changes. In another words, dynamic and project capabilities deal with explorative and exploitative conditions (Davies et al., 2016). Figure 5 below explains the idea graphically.

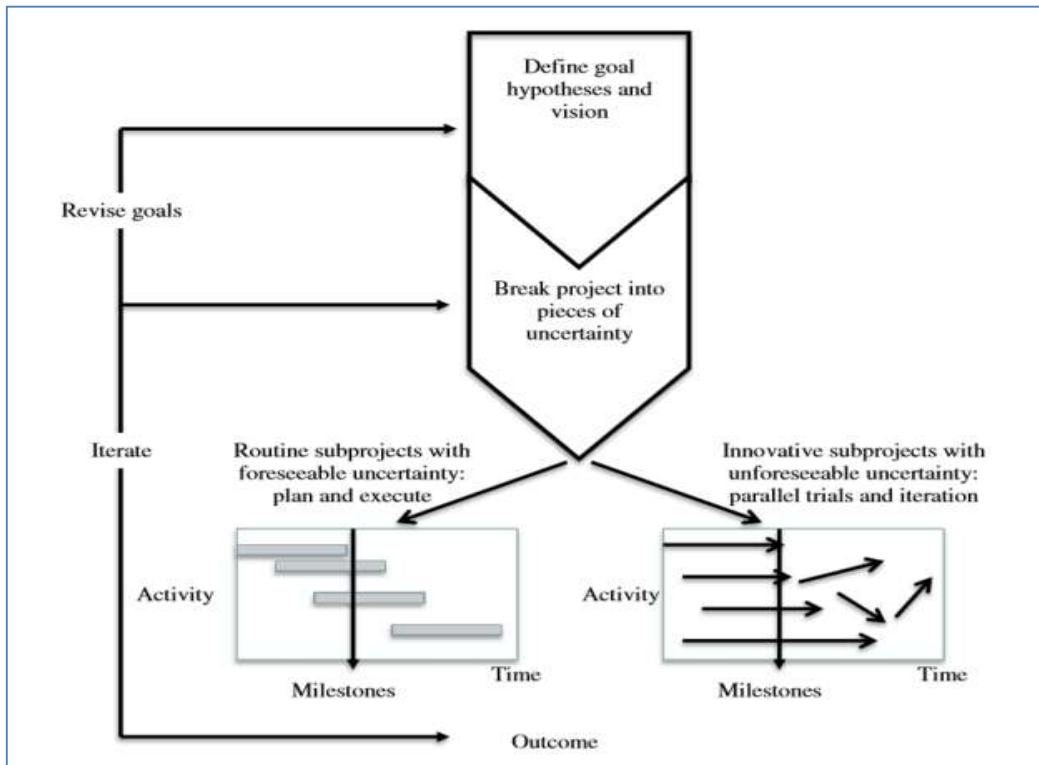


Figure 5: Balancing innovation and routine action in complex projects (from Davies, et al., 2016, adapted from Lenfle and Loch, 2010)

In

summary, as per the literature, dynamic and project capabilities are used to exploit firm resources, and help to explore new opportunities in the dynamic market and to carry out the existing projects concurrently (Bellner and MacLean, 2015; Choi et al., 2018). Critiques on dynamic capabilities are mainly concerned with the vague linkage between those capabilities and sustained competitive advantage, which is encouraging researchers to explain and explore more that area, and which is a main objective of this thesis. The last section discussed RBV and its applications in detail at organizational level, but how RBV is manifested in project management literature is what the next section tries to answer, based on the research in this area. The trend of using RBV in PM literature is evolving, but is still not rich enough, especially in empirical type of research.

3 Literature review

The literature review is a method systematically used to identify, evaluate and synthesize the work done by researchers, scholars and practitioners (Fink, 2010). The current research sets out to investigate the availability of strategic resources in organizations at project management level, to examine the valuable resource criteria using the resource-based theory, and finally to address the relationships between the strategic resources and competitive advantage and firm survival and performance. The research sets out to identify the available strategic resources and capabilities of organizations in the area of projects, to explore the relationship between strategic resources, project success and firm performance and to examine the factors affecting the relationship between strategic resources and competitive advantage which help to explain their perceived relationship. The previous chapter addresses theories related to sustainability: dynamic capabilities, business survival and resource-based theory. This chapter is addressing different related topics including resource-based theory in project management, strategy implementation, firm performance and its relation to the proposed framework of the thesis, project success and project success criteria, and finally a summary on the literature findings and the way forward. Figure 6 below presents the layout of this chapter according to the subjects addressed.



Figure 6: Chapter 3 flow chart

3.1 Resource-based theory in project management

This section relates the resource-based theory from a resources and capabilities point of view to the area of project management, through the literature. Capacity in project management can be defined as the resources and capabilities that support project effectiveness (Nanthagopan et al., 2016), while resources and dynamic capabilities are the main features of the resource-based theory (Barney, 2001; Ambrosini and Bowman, 2009).

Organizations nowadays work in temporary teams to resolve tasks, which accordingly points to the increasing importance of projects execution and their influence on organizational performance. Furthermore, project success, failure, management and administration are increasingly related to the suitable application of project management tools and methods (Albert et al., 2017). “Project management is the art and science of converting vision into reality” (Turner, 1996) or “the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements” (Project Management Institute, 2013).

Effectively managing projects is a task of high importance for any organization from the economic and growth point of view (Winter et al., 2006; von Danwitz, 2018). Today, project management is a valuable way of structuring work in organizations (Munns and Bjeirmi, 1996; Bakker, 2010). Although that importance is well acknowledged in organizations, the models and methodologies of project management have not yet been developed in a dynamic way, most of the work being done using the classical view which lacks good alignment with practice (Svejvig and Andersen, 2015). Over the years, scholars have gained a wider view of project management, that of more *in-practice* management moving from thinking about the project as a tool, to a more project-based organizational view (Packendorff, 1995; Hobday, 2000; Thiry and Deguire, 2007; Gemünden et al., 2018). Accordingly, scholars introduced the use of the resource-based theory to be applied and tested in more project-based organizations (Mathur et al., 2013), and have written about the pros and cons of the resource-based theory based on project management practice and research (Almarri and Gardiner, 2014). In the resource-based theory of the firm, the strategic resources are those that meet *valuable, inimitable, rare and with organizational support* (VIRO) criteria (Barney, 1995). The literature is increasingly supporting the idea that intangible resources (tacit knowledge, soft skills and experience, among others) strongly fit Barney's VIRO framework, and have greater capacity to contribute to sustained competitive advantage of organizations (Almarri and Gardiner, 2014).

3.1.1 Applications of resource-based theory in projects

The use of the resource-based theory concept in project management has increased over the past years (Jugdev and Mathur, 2006; Jugdev et al., 2007; Mathur et al., 2007, 2013; Almarri and Gardiner, 2014; Nanthagopan et al., 2016). The main idea is that projects, as a temporary organization based on the new thinking on project management, incorporate strategic

resources that can give the umbrella organization a unique position and, accordingly, sustain competitive advantage over its competitors. This thesis aims to look in more detail at the relationship between the strategic resources in project management and overall project performance, which give organizations a unique market position and help sustain competitive advantage in the long term. Recent work by Mathur et al. (2013, 2014) tried to address the link between project management process characteristics and project/firm performance. This thesis is different than these studies by going one step before, by first examining the availability of strategic resources and then identifying them as per the resource-based theory characterization. After that applying the theory to test their (resources) relationship with project/organization performance and competitive advantage. They constructed a survey and listed some project management assets such as knowledge, and software and hardware materials, and tested them against the Barney's (1995) VIRO framework with the purpose of relating them to project and firm performance. The results show reasonably positive relationships between strategic resources and competitive advantage, affecting project and firm level performance. They also show that project management knowledge and tangible assets are positively related to an organization's competitive advantage and overall performance, while IT and knowledge sharing, for example, show negative relationships. Although this study is a good example of extending the VIRO framework to project management level, there are some gaps that still need to be addressed in future research. One main limitation is the sample size and the response rate (Mathur et al., 2014). This study derives its importance from the fact that it takes a very detailed look into the project management process, and attempted to provide a good survey questionnaire for future research. However, the study did not specifically provide a separate typology for resources, although it did separate the tangible from the non-tangible to test the affect. In addition, the

study did not measure the resource or the resource capability, but only gives a general idea about the effect of that resource at project and firm level. Furthermore, the study did not articulate the mediation effect of competitive advantage, but instead directly related the resource VIRO characteristics at firm and project level. The authors use performance and competitive advantage interchangeably, which should not be the case, as these are two different terms (Ma, 2000). While competitive advantage is the implementation of unique strategies that are not implemented by other competitors, performance is the result of that implementation (Newbert 2008). Accordingly, testing competitive advantage mediation is important. Studies by Mathur et al., 2013, 2014) suggested that intangible resources have more ability to affect performance than tangible resources. The measurement of intangible resources is one of the main challenges in the resource-based theory, and is still a gap in the strategic management literature. Some good attempts have already been made in the area of conceptual thinking (see Kraaijenbrink et al., 2009; Barney, 2011). However, this research gap in testing the intangible is yet to be filled. This thesis attempts to work on this, by using conceptual frameworks and building on them to test the intangibles at project management level. Killen et al. (2012) studied the application of strategic theories such as resource-based theory, dynamic capabilities and absorptive capability at project management level and project portfolio management level. The authors agreed with Barney's view that for any organization to gain sustained competitive advantage, it needs to apply RBV through the VIRO framework, along with dynamic capabilities to expose the strategic resources. Furthermore, they argued that project management, by itself, can be viewed as a strategic organizational capability which can lead an organization to sustain competitive advantage. The paper shows that strategic management theories are well equipped with good frameworks and methodologies that can be applied in the context of project management and project

portfolio management. Those frameworks and methodologies can be adjusted and fine-tuned to be used in different environments. The paper gives research examples that enrich the strategic management theories in a way that helps to develop, validate and extend those theories in different contexts. It offers some good future research ideas to develop and extend the use of strategic management theories, such as examining the intangible resources of project management (Mathur et al., 2007) and categorizes them using resource-based theory, considering project management as an asset or as a valuable, rare, hard to imitate resource. Another idea is to apply learning theories like communities of practice into intangible project management resources. The research is conducted to provide examples for testing and validation, using strategic management theories. The field of applying strategic management theories in the context of PM and PPM is relatively new. Furthermore, the research highlighted the challenges and lessons learned from the use of those strategic management theories, and finally addresses the recommendation for further enhancement of those theories in future research. In the context of this thesis, this study is important because it highlighted the possibility of using strategic resources, especially the resource-based theory, in the context of Project Management (Jugdev, 2004; Ghapanchi et al., 2014). Furthermore, it suggests ideas for future research, which helps at this stage of the thesis. It also shows how important it is to take into consideration the dynamic capabilities as an extension to resource-based theory in order to apply it in such a dynamic environment (Bellner and MacLean, 2015). Killen et al.'s (2012) study also sheds some light on the idea of using qualitative, quantitative or mixed methods in such a context, which helps to justify why this thesis uses mixed methods. The paper showed some studies following the mixed method, the idea of using mixed methods together with qualitative methods (such as case studies by interviews) being followed by the survey, which is what the researcher of this thesis intended

to do. The authors offer some literature reviews and present four research examples to validate the use of RBT (and other strategic management theories) in the PM and PPM context. In the area of using PM as a strategic resource through RBV, the authors explore many studies focusing on the characteristic of PM as a strategic resource, how to sustain PM as a source of competitive advantage, the difference between tangible and intangible resources for PM, and finally the application of the RBV framework to classify PM resources in terms of complexity and leverage. The research gives examples on how to use strategic theories in the context of PM and PPM, explores the use of PM as a strategic resource and explains how to sustain it as a source of competitive advantage by providing some case studies. It also explores the area of dynamic capabilities as an important extension to the resource-based theory area. The future research recommendations were also well addressed and presented. On the other hand, the research did not go into much detail about the main critiques of strategic management theories, and did not explore the disadvantages of using those theories in the PM and PPM context, which leaves a gap yet to be filled.

Another useful related study was undertaken by Ghapanchi et al. (2014), in which the authors explain the effect of open source software's strategic resources in the defect fixing process using resource-based theory, suggesting that organizations with OSS projects gain competitive advantage. Five strategic resources found in OSS projects meet Barney's (1991) VIRO framework. Those resources are: developer interest, user contribution, frequent release, project popularity and organizational communication. Each one of these resources is found to be strongly and positively in direct relation to the defect fixing process. OSS projects are part of modern life, having changed the way that software is developed, deployed and perceived. Hence, they are very important to many public users. However, many OSS projects fail at the early stage of development for several reasons. This paper contributes to the

literature by aiming to reduce the gap and shed some light on the strategic resources that help one of the most important processes of OSS projects, which is the defect fixing process to achieve competitive advantage and better OSS performance. This paper is important to the literature review because it uses resource-based theory (the thesis main theory) in the project level context and applies the VIRO framework of resource-based theory to extract the strategic resources that might affect the defect fixing process. In addition, the paper is a good example of how to use interview transcripts in citation by analyzing them using NVivo, which is the same software intended to be used for the current thesis. The authors used qualitative and quantitative methods in two stages to help them achieve their goals. The qualitative interview was used for the first stage to obtain the strategic resources, followed by a quantitative approach and collecting data from the project defect data system, using surveys to explain the relationships and accept/reject the proposed hypothesis. Another study in the same domain of open source project was conducted by Ghapanchi and Aurum (2012) two years earlier, in which they studied the impact of project capabilities on OSS project performance. They argue that the traditional way to measure the performance of projects is to look at time, budget and satisfaction with specifications, so for OSS projects it is also important to include capabilities as a vital factor to measure OSS project performance. Empirical research on OSS projects, looking at capabilities to predict project performance is limited, and this paper tries to fill the gap using dynamic capability theory.

3.1.2 Capabilities and project performance

According to project success literature, project performance is a combination of effectiveness (ability to produce a result or effect) and efficiency (ability to produce results without wasting material, time and energy, or getting the most of out the input to produce the output, = output/input (Crawford and Bryce, 2003; Serrador and Turner, 2015; Maqbool, 2018).

Ghapanchi and Aurum (2012) found that defect-removal and functionality-enhancement, as project capabilities, are positively related to project efficiency and effectiveness, which represent project performance in this study. Furthermore, the study defines project performance as a combination of efficiency and effectiveness, and efficiency as how much output is created from the amount of input = $\text{output}/\text{input}$, whereas effectiveness is the capability to produce a result (the discussion on this and project success will be more detailed later on in 3.4). Those definitions, along with project performance definition are important to the thesis, and will also be presented and studied. The study gives a good example of how capabilities can impact the project performance and provides good analysis in terms of data, with reasonable results supporting the objective. On the other hand, the study did not criticize dynamic capability usage and its pros and cons. Also, the study uses the words dynamic capability and capability interchangeably, without differentiating between operational capability and dynamic capability at project level. In addition, the literature on dynamic capability was not sufficiently comprehensive. Furthermore, the authors claim that this study is unique in its scope of work in looking for such capabilities, but did not give enough recommendations for future research to complete the study limitations. While the research sheds some light on project capabilities and their effect on performance, this thesis is mainly on resource management, using resource-based theory, in which dynamic capabilities are an important factor. Hence this paper gives an idea on how to investigate the effect of dynamic capabilities at project level. More recent work on project capabilities was performed by Davies and Brady (2016), in which they introduce the notion of project capabilities, and examine the relationship between project operational capabilities and strategic capabilities. On the definition of project capabilities, they stated that “the concept refers to the distinctive managerial knowledge, experience and skills, which are located within a single organization

(a firm) and required to establish, coordinate and execute projects". Project capability as a concept is vital to this thesis as a factor needed for the strategic recourse to be exploited. The concept of project capabilities was initiated in the late 1990s, when project-based firms started to move to more innovative products and services, being the first of their kind (Davies and Brady, 2016). Companies moved from being manufacturers of a product to be more in the realm of integrator and service provider, examples of which are the mobile communications companies. One of the main challenges for organizations is to find the right personnel (Werbel and Johnson, 2001) with the right skills and knowledge for each project, while keeping the collective skills, knowledge and resources to manage other projects (Davies and Brady, 2016). "In its original formulation, project capabilities described the knowledge, tasks and structures that firms require to design and produce complex products and systems as one-offs or in small tailored batches to address the requirements of large business, government and institutional clients" (Davies and Brady, 2016). The importance of strategy implementation in the context of RBV is discussed in the strategic management literature, as one main characteristic to gain competitive advantage in the market using RBV is the ability of an organization to create and implement unique strategies which cannot be copied by competitors. The next section explains the area of strategy and its implementation.

3.2 Strategy and strategy implementation

It is agreed now that the resource-based view/theory is a useful theory and common theme in the strategic management literature. In fact, many researchers have published in this area, such as Barney (1991, 1995, 2001, 2003, 2011), Hitt et al. (2015, 2016) and Bromiley and Rau (2016). Others relate RBV to other concepts, such as Teece et al. (1997), on dynamic capabilities (as explained in the last section); and Ambrosini and Bowman (2009), Kogut and Zander (1992), Cabrera-Suárez et al. (2001), Bosch-Mauchand et al. (2013) and Valtakoski

(2017), on the knowledge-based view and its relation to RBV. Both the application of RBV alone or along with other theories requires the implementation of unique strategies that are not available to other competitors. In order to define strategy and strategy implementation in the context of project management, one should understand the concept of strategic project management (Jugdev, 2003; Patanakul and Shenhar, 2012), which implies that projects are created to achieve business results (Pennypacker and Dye, 2002; Mir and Pinnington, 2014). The implementation of project management needs always to be aligned with organizational strategy (Alexander Lord, 1993; Artto et al., 2008; Young et al., 2012), so that all parties, such as top managers, project teams and managers need to concentrate on achieving more profit and better market share, although top managers are also responsible for setting the strategy and guidelines on what projects to execute in addition to their main role (Williams and Samset, 2012; Zwikael and Meredith, 2018). In fact, strategy involvement and strategy, as recent perspectives of project management, are one of the main trends for understanding project management into the future (Artto et al., 2008; Morris et al., 2011; Budayan et al., 2014). In addition, the area of PM strategy has become a research subject trend of top management and business journals (Kwak and Anbari, 2009). This view of strategic project management is not to limit or eliminate the old project management view (budget, time, quality, resource management and scope) (Atkinson, 1999), but rather supports it and expands the view to achieve more productive outcomes (Patanakul and Shenhar, 2011; Chawla et al., 2018). Indeed, it was found that even if managers were following project management procedures, there could be still unsuccessful results (Williams, 2005). Today, business can be characterized as rapidly changing and complex (Chernobai et al., 2018); accordingly, organizations are struggling to implement their strategies and so sustain competitive advantage. Today, one in three companies might be out of business compared

with less than 40 years ago (Project Management Institute, 2016), so it requires hard work and evolutionary practice to stay in the market (Snihur and Tarzijan, 2018). Many organizations are still working based on the old project management style, which include managing scope, time and budget (Babu and Suresh, 1996), without concentrating on how it is that a particular project helps to achieve the organizational goal. This creates a gap between strategy and project management (Milosevic and Srivannaboon, 2006; Project Management Institute, 2016). To close this gap, a concept known as benefit realization management (BRM) might be used (Bradley, 2010). PMI found that organizations with a mature and dynamic BRM system are three times better at meeting their targets, and 1.6 times better in realizing project objective. BRM should always be connected to good management of project portfolios, active engagement with effective communication systems, and hiring the right project team (with the right skills, including technical, business management, strategic management and leadership), with full support and active engagement from top management (Project Management Institute, 2016). In order for BRM to be effective, there needs to be a dynamic plan (medium to long term) to get the best out of the system and to address the process of project value creation (Laursen and Svejvig, 2016). Therefore, several things need to be considered. First, the organization needs to create an approach to define the linkage between strategy and projects, by, for example, defining the strategic outcomes, close monitoring of those outcomes during the execution phase and maintaining those outcomes after project closure. Second, the project shareholders should be linked to outcomes and outputs by monitoring KPIs (such as meeting time and budget targets) and then updating those KPIs in order to include the link to strategic outcomes, such as customer satisfaction, better financial performance and faster time to market. Finally, there need to be training and development of executive and project managers to improve their skills and build their capabilities (Project

Management Institute, 2016). Doing all this should help the organization with its strategy development and project management, insuring the useful link between individual project outcomes and strategic objectives. In addition, there is an association between project management and strategic management in the area of value creation (Normann, 2007), where strategy can be seen as the art of creating value, in which the project is the means of implementation (Laursen and Svejvig, 2016). Value creation is an important aspect in the achievement of better performance and to make sure that projects are not only providing products, but also the value created for the organization as a whole (Lee-Kelley and Sankey, 2008; Winter et al., 2006). “Value creation depends on the relative amount of value that is subjectively realized by a target user (or buyer) who is the focus of value creation — whether an individual, organization, or society” (Lepak et al., 2007; Smyth et al., 2018). Organizations differ on dealing with the role of project managers. Some of them create Project management office (PMO) to get the best use of project managers as resources; others choose to make a small corporate group in which project managers have more responsibilities; whereas some organizations choose to centralize the work of project managers by providing them all with guidelines through the PMO unit (Williams and Samset, 2012). The role of project managers as leaders in the process of project success is vital (Zwikael and Meredith, 2018), and failing to acquire such capability or knowledge normally leads to project failure, such as what happened to NASA in the 1980s, when many project managers were about to retire, which raised the issue of the knowledge transfer process. Accordingly, NASA initiated a knowledge management system to cover this gap (Williams and Samset, 2012). So, to summarize, senior management need not limit their role to the setting of strategy, but can go beyond that to decide the Project management system to be used, and be part of the execution process to align strategy with project outcomes (Williams and

Samset, 2012). From the theoretical point of view, what has been said above is formulated into a contingency perspective, which means that project management efficiency in practice depends largely on the strategic, environmental context in which the management of projects takes place (Shenhar and Dvir, 2008). Therefore, to many scholars, strategy implementation by itself is both a source and a factor of competitive advantage (Barney and Hansen, 1994; Hansen et al., 2000; Anwar et al., 2018), and that the strategy implementation depends on the non-rent resources, which are not a source of competitive advantage, but are a strategic complement to other valuable, rare, non-imitable and non-substitutable resources controlled by a firm (Barney, 1997). So, the exposure of any strategic resources should include the unique strategical implementation of those resources to achieve better performance compared with competitors. Accordingly, in this research the role of strategic resources management to gain competitive advantage in the context of project management is the main issue. There needs to be a definition of what the strategy is, and also what the project strategy is, because today a view of project objective should include not only the outcome as a product or service, but more than that, should include ways to make such outcomes stand out in the area of dynamic competition, giving an organization the privilege of competitive advantage (Patanakul and Shenhar, 2011; Ashrafi and Mueller, 2015; Anwar et al., 2018). Strategy definitions are many and have evolved over the years. One definition of strategy is "top management's plans to attain outcomes consistent with the organization's missions and goals" (Wright et al., 1992: 3), while Mintzberg, for example, offers five statements to define strategy. In their book, *Strategy Safari*, Mintzberg et al. (2002) describe strategy as a plan (intended strategy) and a pattern (realized strategy), which could become emergent strategy. In addition, Porter (2008) talks about the unique position that strategy can give to an organization, differentiating it from operational effectiveness. He stated that "Strategy is the

creation of a unique and valuable position, involving a different set of activities". As far as this research is concerned, Porter's definition is more related to and consistent with the idea of managing strategic resources. The link comes from the idea that Porter's definition of strategy is about valuable and unique location, and strategic resource are those whose value give an organization a competitive advantage and better market share. Strategic resources are always part of any strategy and strategy implementation, and knowing how to execute the strategy successfully is directly related to the effect of strategic resources on organizational and project performance. In summary, defining the strategic resources of any organization or organizational projects, along with the right strategy execution plan, helps to give competitive advantage. This research looks into the management of strategic resource in projects which could lead to competitive advantage; accordingly, the project strategy needs to be defined and explained. Project process, practices and resources are the link in helping to move from corporate strategy to execute projects in a more systematic way (Morris and Jamieson, 2005). The project strategy in some instances refers to plans and goals which are not always helpful in all cases (Artto et al., 2008). Artto et al. (2008) identified three tracks to define project strategy. The first is "projects are viewed as subordinate to the parent organization", which means that the project strategy is driven from the parent organization; the second track is "projects have been considered as autonomous organizations connected loosely or tightly to a parent organization", which means that the project strategy is developed independently, away from the parent organization; and the third track is "projects have been considered as organizations that are not subjected to clearly defined governance or authority setting in relation to their surrounding organizations or stakeholder organizations". Based on those tracks and an analysis of the literature, Artto et al. (2008) defined project strategy as follows: "Project strategy is a direction in a project that contributes to success of the project in its

environment”, where the word ‘direction’ means the particular project strategy elements, the word ‘contributes’ explains that direction has an effect, the word ‘success’ obviously means that the project is achieving the required goals, and ‘environment’ refers to anything outside the project that could be affected, such as the parent organization and stakeholders. Patanakul and Shenhar (2011) also attempted to define project strategy and identify its elements. They defined strategy as “the project perspective, position, and guidelines for what to do and how to do it, to achieve the highest competitive advantage and the best value from the project”. Patanakul and Shenhar (2011) argue that the three major parts of their definition - perspective, position and plan - allow it to look at strategy in a broader view than that of Artto et al. (2008). This later definition combines project success with achieving competitive advantage, and is linked with this research aiming to empirically test it by linking strategic resources and their relationship with project success, and project success with the achievement of competitive advantage. Figure 7 below gives more detail on the definition and its components.

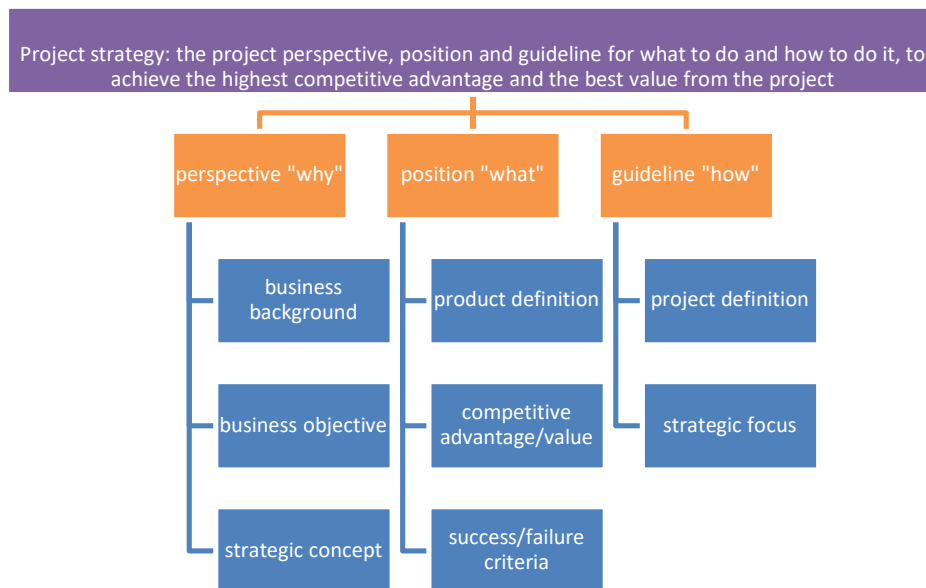


Figure 7: Definition of project strategy and its elements, adapted from Patanakul and Shenhar (2011)

Strategy implementation is a different issue, “making strategy work more difficult than strategy making” Hrebiniak (2006). The execution or implementation of a strategy is the difficult part, and knowing the obstacles that affect that strategy implementation is important (Hrebiniak, 2006). According to Hrebiniak (2006), there are many obstacles to the implementation of strategy that need to be taken into consideration to execute the strategy in a successful way. One factor is the managers responsible for the execution, the main obstacle being that those managers may be trained to formulate strategy, but not to implement it (Noble, 1999; Kohtamäki et al., 2012; Speculand, 2014). Hrebiniak (2006) suggests that the right way to deal with this obstacle is through on-the-job experience, but more structured training is also needed to give guidance and systematic ways of doing things (Speculand, 2014). The second obstacle is the way most organizations deal with strategy implementation, top management being of the opinion that the execution is down to the lower level managers, and in cases of failure this is the fault of those particular executors, which is quite not true (Kohtamäki et al., 2012). The top management who formulate a strategy should have their role in the execution as well; being the ones who planned it, they are the ones who know best how to execute it. Strategy implementation is the responsibility of all management levels, so each should have a part in it (Engert and Baumgartner, 2016). This takes us to the third obstacle identified by Hrebiniak (2006), which is the interdependence of planning and execution of strategy. These two should not be dealt with separately, but there should always be collaboration between planning personnel and their role in execution. Although both phases seem separate when formulating strategy, in the end, both are connected. A view of the simultaneous work of planning and execution is important, and managers should think of the process of execution even while they are planning the

strategy (Ahearne et al., 2013). The fourth obstacle is the fact that the time needed to implement a strategy is more than the time taken to plan it, and that might bring many challenges, such as managers losing interest and focus; some personnel might leave the organization; and customers might expect change. All these issues might be factors to withstand the strategy implementation, so the connection of both phases (planning and execution) is vital to demonstrate, anticipating such issues and designing solutions earlier. To overcome the long execution period in an effective way, there must be some tactics built in, such as defining short-term objectives, control of the execution process by dealing effectively with feedback and the possible need for change, and keeping the execution process dynamic and flowing smoothly without a stop (Hrebiniak, 2006). Furthermore, managers should always think about what makes the execution process follow more smoothly than always doing things in faster time. Sometimes attempting to solve issues quickly takes one away from the whole execution process. In addition, if managers understand that strategy formulation requires less in the area of human resources than execution, they need to give a great deal more consideration to the challenge of communication between all related parties that are responsible for implementation (Noble, 1999). The challenge is to link the strategy plan into the daily tasks of all personnel related to implementation (Engert and Baumgartner, 2016). Hrebiniak (2006), in his study based on a survey of 243 individuals on the Gartner E-Panel database (research organization), found five main obstacles to the implementation of strategy. The first was the difficulties that managers face in managing change effectively; the second obstacle was the ambiguity of the strategy itself, which led to another obstacle of not having a process or guide to follow in order to execute the strategy. Furthermore, such a guide should include the role, responsibility and accountability, greater knowledge-sharing and transfer between all parties, especially when the strategy is complicated and needs greater

coordination and communication effort. Finally, the last obstacle lay in working against the power structure (Hrebiniak, 2006). Furthermore, Noble (1991) added that personality differences, politics and the struggle for power are also important obstacles to the implementation of strategy. Having listed all these obstacles, there needs to be solution to overcome them. Hrebiniak (2006) suggested a way of doing so, by developing a model to execute strategy successfully (see Figure 8 below). The model starts with corporate strategy focus, which concerns the whole organization in the role of financial and strategic support. After that the model suggests that corporate structure should be derived from corporate strategy and should deal with the degree of centralization and decentralization in the organization. Going down to business level, the strategy implementation model focuses on the services offered, quality of the products and competing in the market, including business structure and reward system.

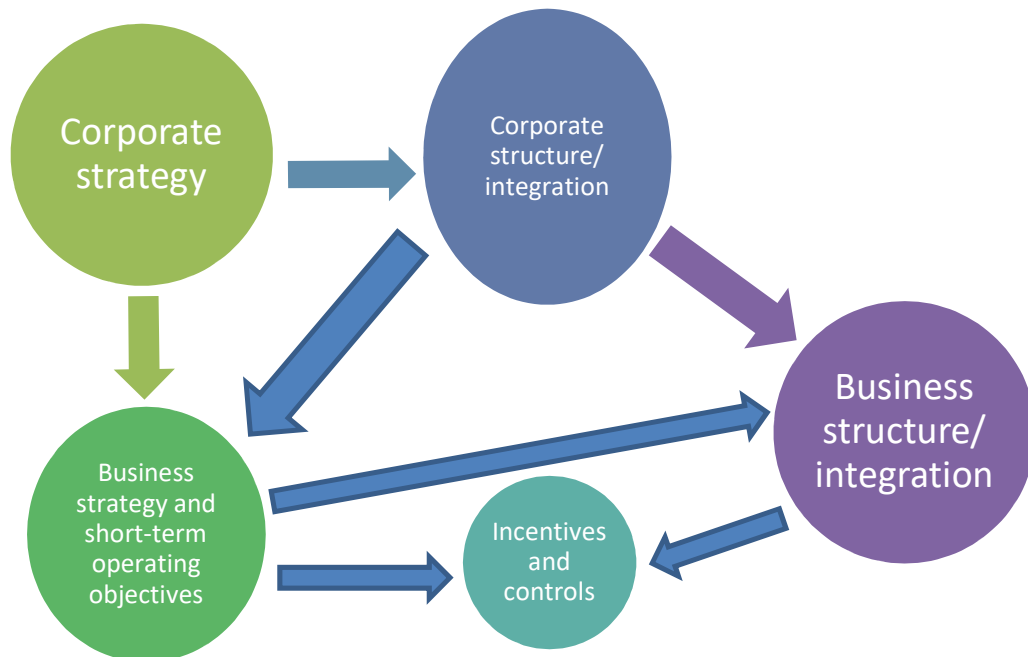


Figure 8: Implementing strategy: key decisions and actions, adapted from Hrebiniak (2006)

Noble (1999) suggested another way to implement strategy, starting with the stages of strategy implementation, which are: pre-implementation, organizing the effort, dynamic management of the process and maximizing cross-functional performance. By taking into consideration the challenges that could be faced at each stage, senior management could overcome these to produce better understanding and hence take the right decisions for better performance (Kohtamäki et al., 2012). Table 5 below gives more detail on managerial duties at each stage of the implementation, based on different levels.

| Levels | Stages | | | |
|---------------------------------|---|--|--|---|
| | Pre-implementation | Organizing the implementation effort | Managing the implementation process | Maximizing cross-functional performance |
| Goals | Managerial awareness of organizational goals | Introduce goals of the strategy implemented | Maintain flexibility to adopt goals | Develop and focus on common goals |
| Organizational structure | Ensure that functional areas have the slack resources needed for implementation | Establish formal implementation unit | Ensure equal representation by all affected functional areas | Direct implementation team to focus on implementation effort |
| Leadership | Develop employees' knowledge in different functional areas | Choose a champion who can lead with authority and disciplinary knowledge | Ensure leaders have equal follow-up to all functions | Balance visible and charismatic leadership with maintenance of autonomy for functional level implementation efforts |
| Communications | Maintain regular cross-functional communication | Discuss and resolve implementation details | Update implementation team on progress | Communicate implementation process across the organization |
| Incentives | Reward the development of cross-functional skills | Develop time and performance-based incentives | Adjust incentives as needed | Establish visible and consistent cross-functional reward for successful implementation effort |

Table 5: Managers' duties for each lever and stage of implementation, adapted from Noble (1991)

In summary, it can be said that the last part of the literature review started with RBV characteristics and applications in organizational and project management with discussion on

strategy implementation. The following section is basically part of the expected output or outcome after implementing RBV strategies at project level, addressing firm performance and its relationship to the application of RBV.

3.3 Firm performance and survival

In simple terms, firm survival can be defined as an organization's ability to grow and remain in the market (Mobley and Frech, 1994; Musso and Schiavo, 2008) in the long term (Josefy et al., 2017). The literature shows that 20% of companies survive in the first year, and 50% of companies survive for up to four years (Portugal and Mata, 1994). Mahmood and Audretsch (1995) suggested that the survival rate of an organization is influenced by the size of the organization, number of years of business, technology and technological strategies (Bayus and Agarwal, 2007), industry growth (Portugal and Mata, 1994), developing dynamic capabilities (Esteve-Pérez and Mañez-Castillejo, 2006) and innovation activities. The most critical aspect for a firm's survival, according to Bridges and Guariglia (2008), is its financial condition, because this determines how much the organization needs to invest. Furthermore, organizations survive in fast-growing industries where less innovation and fewer R&D researchers are needed (Portugal and Mata, 1994). On the other hand, there are many reasons and factors for an organization to fail, such as bankruptcy, retirement from business, and merging with another firm, or the need to reorganize the company due to financial problems (Josefy et al., 2017). The body of knowledge is increasing in the areas of entry, growth and exit of firms, many researchers studying the success and failure of firms and the contributory factors for both (Josefy et al., 2017). Yet even with this large body of knowledge, there is still a lack of consensus on definitions for firm success and failure. Some researchers argue that bankruptcy is the key indicator of failure (Benedettini et al., 2015), while others argue that failure is directly related to a firm's inability to deliver the required goals of the

stakeholders (Manjón-Antolín and Arauzo-Carod, 2007). Apart from that, many studies investigate firm performance after they have entered their specified industry market, because that affects the probability that they will survive (Mata and Portugal, 1994; Dowell and Swaminathan, 2006; Bayus and Agarwal, 2007; Zachary et al., 2014). A study by Phillips and Kirchhoff (1989) explored the survival and growth of firms in the US, while Mata and Portugal (1994) investigated the situation in European countries. More recent works in the same area include those of Amezcua et al. (2013), Bardsley et al. (2013), Christie and Sjoquist (2012) and Zachary et al. (2014). Sapienza et al. (2006) developed a framework and concluded that the earlier firms internationalize, the stronger they are in gaining international opportunities in the global market. In similar vein, Dowell and Swaminathan (2006) examined the effects of entry timing on the speed of choice for initial product technology, and how firms can quickly change technologies towards the dominant design. A current study is exploring another success factor for firm survival - innovation experience. The experience of a firm in introducing innovative ideas, products and services was found to be positively related to the firm's performance and competitive advantage (Talay et al., 2013). Furthermore, the same subject has been more recently studied by Bardsley et al. (2013), Christie and Sjoquists (2012) and Ebert et al. 2018). Many aspects of firm survival are considered in the literature. For example, Sapienza et al. (2006) developed a framework in which they argued that the earlier firms internationalize, the deeper they imprint their capabilities for more international opportunities in the global market (Zachary et al., 2014). Dowell and Swaminathan (2006) studied firm survival from another perspective by examining the effects of entry timing on how fast firms choose their initial product technology, and how quickly they could change technologies towards the dominant design. Dominant design is a technology management concept introduced by Utterback and Abernathy (1975). The researchers address many

aspects of firm survival, the most important perspective being the factors affecting survival (Vinogradov and Isaksen, 2008). The factors that affect a firm's survival can be summarized according to three main aspects: the personal characteristics of the founder, the attributes and characteristics of the structure and strategies of the firm, and the characteristics of the environment (Bruderl et al., 1992). Furthermore, a firm's resources have always been a factor affecting its survival, and the ability of the firm to manage its resources in a professional way should lead to competitive advantage (Barney, 1991), while - more importantly - success in managing resources will probably increase the chance of the firm's survival (Coleman et al., 2013).

3.3.1 Resources and performance

The term, competitive advantage is different from performance. Competitive advantage can be defined as unique strategies implementation by organizations which are not used or implemented by other competitors, the goal of which is to achieve cost reduction, respond to market opportunities and neutralize threats (Ma, 2000; Agha et al., 2011; Saeidi et al., 2015). On the other hand, performance is the resulting value that organizations get from the implementation of those unique strategies (Newbert 2008). It is argued by Peteraf and Barney (2003) that an organization that achieves competitive advantage gains more economic value (the difference between profit and resource-capability- exploitation cost). That economic value is normally more than that of competitors in market (Newbert 2008). Peteraf and Barney (2003) suggested that economic value is gained in two ways, either by having more benefits compared with competitors at the same cost, or having the same benefits as others but exploiting resources at lower cost. The former is called differentiation competitive advantage and the latter efficiency-based competitive advantage. In all cases, the organization that succeeds in reaching the highest level of competitive advantage will have

more ability to improve its performance compared with its competitors (Dereli, 2015). It should be understood that attaining superior performance is a result of many factors, and not only because of having competitive advantage from a resource-based theory standpoint. There are other factors in the literature supporting this claim, and more importantly there are cases where high performance is achieved even with no implementation of the resource-based theory concept (Newbert 2008). In summary, the logic of resource-based theory is a factor and antecedent to gain better performance, and its application should help an organization acquire a unique market position. Performance comes in three types in the strategy literature: objective financial performance, subjective financial performance and subjective non-financial performance. The thesis will use the performance scale of Delaney and Huselid (1996), which is widely accepted and used in strategy literature. The scale uses both financial and non-financial indicators, such as profitability, sales, market share and marketing (Newbert, 2008). There are many factors affecting firm profitability level which also affect firm performance, but the major determinants are the type of industry (Eom and Lee, 2010), the position of the firm compared to competitors (Songling et al., 2018) and the quality and quantity of the firm resources (Hansen and Wernerfelt, 1989; Aryee et al., 2013). The last determinant on the quality of firm resources could be aligned with Barney's (1991,1995) VIRO framework for strategic resource characteristics in which he stated that if a resource is valuable, hard to copy, rare and supported by the organization then it will be strategic, will add value to the firm and provide competitive advantage. Hansen and Wernerfelt (1989) examined the determinants of firm performance from three perspectives: economic, organizational and the integration of both. They found that both economic and organizational factors independently affected firm performance, with organizational factors affecting it twice as much as economic factors. The economic factors are related to profitability rates,

size and market share, while the organizational factors lie more in human resources and goal accomplishment. The relationship between human resources and performance exists (Fu et al., 2015; (Vanacker et al., 2016) more specifically between human capital attributes or capabilities (such as knowledge, experience and productivity) and the firm performance as a whole, its attributes being competitiveness, growth and profitability (Samagaio and Rodrigues, 2016). This relationship strengthens the argument made by this research about the direct relationship between strategic resources, competitive advantage and performance of the firm. The positive relationship between firm resources and firm performance is acknowledged and examined in much research (Barney,1991; Hansen and Wernerfelt, 1989; Ndofor et al., 2011; Fu et al., 2015; Vanacker et al., 2016; Bendickson and Chandler, 2019) along with factors that could mediate between resources and performance, such as competitive actions (Ndofor et al., 2011; Carnes et al., 2018), decision-making processes (Kunc and Morecroft, 2010) and environmental dynamism or the rate of change in the environment (Ringov, 2017). Environmental dynamism directly affects the relationship between dynamic capabilities and performance. The breadth of a firm's technological resources, and the deviance and complexity of competitive behavior are examples of the actions that mediate between resources and performance. Resources alone do not promote firm performance, but, instead, competitive actions are needed to drive resources for better firm performance. Moreover, those actions should be clear and need to be driven, as they do not happen automatically (Carnes et al., 2018).

In their research, Kunc and Morecroft (2010) investigate the effect of decision-making processes on firm performance by differentiating between two stages of decision-making, which are the conceptualization of resources and resource development in a highly complex and dynamic industry, assuming the resources are homogenous. They suggest that the

decision-making process starts with resource conceptualization, the next stage being the development of resources which lead to firm performance. Their results show that high and positive firm performance can be achieved if the firm is able to create a heterogeneous environment of accumulated resource positions compared with its competitors. This follows along the same line as Barney's (1995) VIRO framework, where relationships between resources are assumed to be heterogeneous. Having said that, Kunc and Morecroft (2010) suggested that with highly competitive industries which have many competitors using similar finite resources, performance might be reduced. Firms could avoid this by developing new differentiation strategies such as entering new segments or product lines, and probably creating innovative ideas by deploying similar resources. If a firm cannot do this, then it needs to identify its strategic resources through, for example, VIRO (value, rare, inimitable and organizationally supported) framework (Barney, 1995, 2001). This research suggested that for a firm to achieve high performance, heterogeneity is assumed and the identification of strategic resources is a must. Increased firm performance can be achieved by having strategic resources which need to be deployed using dynamic capabilities and the execution of helping factors that bond both the dynamically employed strategic resources and the outcome results. This should answer one of the main questions of this research about what factors are involved between strategic resources and competitive advantage, and hence project/firm performance. Factors such as the breadth of technological resources, which can be defined as the "scope of the firm's knowledge related to technological advancement" (Nesta and Saviotti, 2005) are one type of factor, in addition to decision-making and environmental dynamism. Furthermore, and as per the resource-based view, firm survival is increased and further enhanced by its ability to create capabilities helping the firm to adjust and perform in a highly dynamic and changing environment (Esteve-Pérez and Mañez-Castillejo, 2006).

3.3.2 Factors affecting firm survival

Coleman et al. (2013) used the framework proposed by Barney (1991) to construct their theoretical model, in which they explore the factors affecting the new firm's survival, and constructed a hypothesis based on the model proposed by Barney. They investigated the effect of five resources on firm survival: entrepreneurial experience, age of the entrepreneur, entrepreneur's level of education, intellectual property and R&D activities, and startup capital. The study adds three things to the knowledge. First, it focuses more on service firms, while other studies concentrate on other areas, such as manufacturing. Second, the paper differentiates between the exit of a firm towards permanent closure and termination through merger and acquisition (M&A). Third, (p.2) they "apply duration (survival) analysis with competing risks to test the hypotheses using the enclave version of the KFS, the largest longitudinal data set of newly established firms in the United States". The findings of the research are: first, that service and non-service firms shared the same factors that affect their survival, which are education, work and life experience and adequate levels of startup financial capital; and second, the results show that entrepreneurs are more likely to choose to exit through merger and acquisition rather than permanent closure, so that those with intangible work experience will be able to use old firm resources to start new firms. Furthermore, other factors that affect survival are firm size, growth, quality of services, market competition and firm-specific resources and capabilities (Mobley and Frech 1994). Another important factor also affecting business sustainability is innovation. Innovation has been defined as "the process of bringing new and improved products and processes to market; developing, adopting and adapting manufacturing processes to enhance productivity and product quality; and developing, adopting and adapting business practices to enhance the performance of the firm" (Morton and Burns, 2008: 3070). Many studies have addressed

the relationship between innovation and firm performance (Danneels, 2004; Bayus et al., 2003; Coad et al., 2013; Wadho and Chaudhry, 2018), but the results remain contradictory and are not inclusive (Zhang et al., 2018). For example, it is suggested that more profitability can be achieved with innovation (Bayus et al., 2003), and that the rate of survival of a firm will increase (Danneels, 2004). On the other hand, Geroski et al. (1993) argued that innovation has a negative effect on performance. All in all, however, more and more studies are addressing the importance of innovation and innovation experience for better market share and firm survival (Cefis, 2005; Talay et al., 2013; Zhang et al., 2018). The researchers argue that the sooner firms internationalize, the deeper they imprint their capabilities for more international opportunities in the global market. They look at early internationalization as a strategic goal for startup firms. The researcher's framework is based on three contingencies: firm age, managerial experience and resource fungibility (the ability of something to be substituted in place of another). From a firm's age perspective, they believe that at the early stage of internationalization, a firm's dynamic capabilities may cause a reduction in the probability of survival, but will enhance the company's probability to grow. They also found that at that stage, firms can have learning advantages, and may reduce internationalization costs by hiring managers with good internationalization experience. In addition, they found that resource fungibility was important for capability development. Furthermore, the entry timing of a firm in the local market plays a role in their chance of survival (Dowell and Swaminathan, 2006). In their research, Dowell and Swaminathan (2006) address two main aspects: first they examine the effects of entry timing on how quickly firms choose their initial product technology, and how soon they change technologies towards the dominant design (dominant design is a technology management concept introduced by Utterback and Abernathy in 1975, identifying key technological features that become a de facto standard).

The paper's results show that early entrance will lead to the firm's survival until the dominant design emerges. The second paper discusses the effect of that change on the transition to survival or mortality. The study concludes by confirming the propositions and adding the above-mentioned factors to those affecting firm survival. The above factors can be identified as the general factors affecting the ability to survive and sustain the business, although there are other internal factors which also contribute to sustainability. Combs et al. (2010) suggested that managers can devise strategic ways of using strategic resources, which could affect performance. Accordingly, it could be assumed that project managers have a good opportunity to use their power and apply certain actions in order to increase performance, using the RBV criteria of strategic resources to exploit them and gain competitive advantage. The connection between RBV and project management is implied, but still lacking in empirical testing, which is what this thesis aims to achieve.

3.4 Project success

Today's project managers are evaluated based on their management of projects and the outcomes. The performance of projects leading to expected results affect both the organization and the project manager's career as well (Ika, 2009). Accordingly, the subject of project success is still a central issue in project management literature (Cooke-Davies, 2002). Although the subject of project success is popular in the literature, there is no general consensus among scholars on - for example - its definition, or ways of measuring success (Ika, 2009). This is probably because of difficulties in defining and measuring it, especially the soft success criteria of projects, such as customer and organization satisfaction. Since the early days, scholars such as Baker et al. (1974) came to the conclusion that absolute success is not possible in project management; there is only what can be called perceived success, and the evaluation of any project actually changes with time. Furthermore, project success and

project failure are not necessarily contradicting or opposing terms (Ika, 2009). The literature on project success is still trying to figure out ways to define and evaluate success for different projects and applications (Turner and Zolin, 2012).

3.4.1 What is project success?

The term project success is hard to define (Ika, 2009). There are trials in the literature to define it, but no one definition that can be applied to all projects at all times (Van Niekerk and Steyn, 2011). Project success means different things to different people and different groups of stakeholders (Williams, 2015; Węgrzyn, 2016) over different timescales (Turner and Zolin, 2012), as can be seen from the table 6 below that shows Turner and Zolin’s (2012) model of project success.

| Results / timescale | Project output / end of project | Project outcome / plus months | Impact / plus years |
|--|--|--|---|
| Investor or owner | Time, cost, feature, performance | Performance, profit, reputation, customer loyalty | Whole life value, new technology, new capability, new competence, new class |
| Project executor or project sponsor | Time, cost, feature, performance | Performance, benefit, reputation, relationship, investor loyalty | Feature project new technology, new capability, new class |
| Consumers | Time, price of benefits, feature | Benefit, price of product, feature, development | Competitive advantage, price of product, feature, developments |
| Operators / users | Feature, performance, documentation, training | Usability, convenience, availability, reliability, maintainability | New technology, new capability, new competence, new class |
| Project manager and project team | Time, cost, performance, learning, camaraderie, retention, well-being | Repetition, relationship, repeat business | Job security, feature projects, new technology, new competence |
| Senior supplier (design and/or management) | Completed work, time, cost, performance, profit from work, safety record, risk record, client appreciation | Performance, repetition, relationship, repeat business | Feature business, new technology, new competence |
| Other suppliers (goods, materials, works, or services) | Time, cost, client appreciation | Repetition, relationship, repeat business | Feature business, new technology, new competence |
| Public | Environmental impact | Social cost, social benefit, environmental impact | Whole life social cost-benefit ratio |

Table 6: Model of project success (Turner and Zolin, 2012)

The term 'project success' can be viewed from different angles, so to measure success and have a success criterion, there is still no indication of any emergent features in the area of project management literature. Instead different success criteria have been built to fit different application fields (Albert et al., 2017). In the body of knowledge on project management, project success is related to completing the project with the agreed constraints agreed by senior and project managers. Those constraints are time, cost, performance or the iron triangle (Westerveld, 2003; Węgrzyn, 2016), in addition to scope, resource, risk and quality (Project Management Institute, 2013; Albert et al., 2017). In the 1980s and 1990s, the focus on success criteria was more in the area of client organization and soft criteria, whereas nowadays the focus is more on stakeholders' roles (Węgrzyn, 2016; Turner and Zolin, 2012) in addition to the traditional hard success criteria of the iron triangle. Many articles combine both in one broad view (Williams; 2015). The role of stakeholders is becoming more important, and their judgment on project outcomes in relation to the achievement of project objectives is mandatory not only during the normal life cycle of a project, but months, or even years after the project has ended. Judgments from stakeholders rarely touch the cost, time and quality success criteria, but go beyond that to the soft, subjective and hard to measure success criteria, such as the achievement of objectives, the impact of projects and the performance of outcomes (Turner and Zolin, 2012). The Canadian Oxford Dictionary (1998) defines project success as "the accomplishment of an aim; a favorable outcome." In addition, project success for some authors, such as Peter Drucker, is more about efficiency "doing things right" and effectiveness "doing the right things". Drucker believes that effectiveness is more important than efficiency (Ika, 2009), so project success is about both efficiency and effectiveness (Belout, 1998). Furthermore, Williams (2015) provides a broader view of the concept of project success when analyzing cases from the construction industry, including the

traditional iron triangle way of looking into cost and budget and other criteria, such as efficiency. Williams’ view of project success from the construction industry is based on four pillars, namely, product (quality of final output), delivery objectives, stakeholders and project management, as can be seen from Table 7 below. One good framework for defining project

| | |
|---|---|
| <p>Was the final product good?</p> <ol style="list-style-type: none"> 1. Zero defects 2. Low defects in use 3. Better FM services and resultant increased lifecycle performance of the facility <p>Were the stakeholders satisfied with the project?</p> <ol style="list-style-type: none"> 4. Happy customers 5. Happy users 6. Happy subcontractors 7. Happy team 8. Good community relationships | <p>Did the project meet its delivery objectives?</p> <ol style="list-style-type: none"> 9. On time 10. On budget 11. Production of legacy not just a building <p>Was project management successful?</p> <ol style="list-style-type: none"> 12. Good HSE record 13. Projects set up better and better contracts 14. Fewer changes 15. Fewer disputes 16. Smooth clean tidy site 17. Predictability and control of cost, time, quality and risk |
|---|---|

Table 7 :Project success, adapted from Williams, 2015

success is the one developed by the U.S. Agency for International Development, then the United Nations and OECD. It contains five different ways to define project success, namely, efficiency, effectiveness, relevance, impact and sustainability. Here efficiency is about better ways to produce the outcomes and better management of the project; effectiveness deals with goal achievement; relevance looks at the alignment of the project and project output with organizational goals and strategy; impact is the extent to which the goals affect the organizational purpose and are suitable; and finally sustainability looks at project impact on sustaining competitive advantage over time (Volden and Samset, 2017). Based on the findings from the literature, the goal- achieving aspect can be used as a success criterion for projects, along with the iron triangle aspects of cost, time and quality, mentioned before. The

assessment of project success is important to increase the likelihood of better performance, and to allow an organization to choose projects that are more likely to succeed in future (Piscopo et al., 2010). Uncertainty on the success criteria of projects raises the need for distinction between project success and project management success, in which the project management objectives of time, cost and quality are different from project objectives. Hence project management success is different from project success (de Wit, 1988). At the same time, project success can still be considered within the triangle of time, cost and quality (Project Management Institute, 2013), and there are many projects that are considered successful by meeting those constraints. Furthermore, those constraints (time, cost and quality) can be used as criteria for measuring success (Jang and Lee, 1998). However other constraints have also been identified in the literature. The reason why there should be an assessment of project management success is in order to ensure and audit project team performance during a project. In addition, the developed product success should be also assessed, to make sure the customer is satisfied and the organizational goals are reached. Moreover, there needs to be an assessment of projects' consistency, making sure that projects are done in the right sequence in order to bring competitive advantage to an organization (Albert et al., 2017). Those three aspects of success, namely project success, product success and project management success are summarized in Table 8 below.

| | |
|--|--|
| <ul style="list-style-type: none"> • Customer satisfaction with the product • achievement of the company goals • achievement of project purpose • usability of project product by end-users • project product provides value to end-users <p>Project management success</p> | <ul style="list-style-type: none"> • Customer satisfaction • efficient and effective use of PM methods • time • budget • performance <p>Product success</p> |
| <ul style="list-style-type: none"> • ideal project selection processing and processing sequence <p>Consistent project success</p> | |

Table 8: Project success adapted from Albert et al., 2017

The basis of project success assessment could be rooted in Barnes' 'iron triangle' criteria in the 1970s. Barnes found that the collaboration between his engineers responsible for monitoring cost and management impacted performance (Albert et al., 2017). The criticism given to iron triangle or the hard criteria of project success is that although cost, time and quality are objective and easily measured - except for quality - sometimes projects are completed within those constraints yet are still considered as a failure (Ika, 2009). An example of this is Terminal 5 of London Heathrow Airport, which was completed within time and budget, but still a year after commissioning, could not meet requirements (Albert et al., 2017). Likewise, "... the second generation of the Ford Taurus car that was completed on time in 1995 but turned out to be a disappointing business experience" (Ika, 2009) and Samset's (2009) Norwegian off-shore torpedo battery project, which was also completed on time and to budget, but was closed weeks after opening. This can be deemed successful in efficiency, but not in effectiveness (Williams, 2016: 99). The quality of any project, as part of the iron triangle traditional view of project success is not easily measured, and although it appears a lot in the literature, it has always been hard to define and assess (Basu, 2014). This unclear realization of quality has proven to be a main cause of the lack of success of many major projects in the final output. Examples of that are many. For example, the Millennium Dome in London suffered from poor quality in project delivery among other things; a similar problem was found in the case of Wembley Stadium which was both over budget and years over time, delays having been caused by poor project quality - in fact, there were eight litigations on project quality and three on the project quality definition (Basu, 2014). Accordingly, there needs to be a definition of quality for projects, in order for project management teams and organizations to be able to measure and evaluate it, and accordingly help in improving project

performance as a main pillar of the iron triangle. Indeed, “Quality is the consistent conformance [services] to customer expectations” Basu (2014)

Based on that definition of quality and the importance of the other iron triangle pillars of cost and time to project success, this research uses time, cost, quality and expectations as fundamental success criteria when attempting to define the relationship between project strategic resources, competitive advantage and project performance. In addition, other success criteria, such as senior management support, will be discussed later in this section (Van Niekerk and Steyn, 2011). One main criticism of the iron triangle is that it neglects the importance of customer satisfaction (Morris, 2013) and other human factors, so called the soft criteria of project success, which is unlike the hard criteria, as it is subjective and hard to evaluate. However, soft criteria are becoming more and more important, and are a vital part of project success (Albert et al., 2017). There have been projects that were over budget and late, but are considered successful, such as the first Microsoft Windows operating system. It was launched over budget and late, but now most computers worldwide are using it as an operating system (Shenhar et al., 2001). Fulmar North Sea Oil project, the Thames Barrier, Concorde, the first generation of the Ford Taurus car, and the Sydney Opera House are all projects that might not be considered efficient, but they are effective. Both hard and soft criteria should be taken into account when attempting to assess project success, because both are necessary components, and hold almost equal importance (Müller and Jugdev, 2012). To summarize, time, cost and quality constraints were always considered as successful criteria for projects, and are still considered important (Albert et al., 2017) either alone during the early stages (1960s-1980s), or along with other aspects (post 1980s), such as client satisfaction, benefits of stakeholders and project personnel, strategic objectives of organizations and end-user satisfaction (Ika, 2009). More recent work goes along with the

previous finding on the importance of soft success criteria in addition to the traditional triangle criteria, and elaborates further to add different success criteria for different industries, or what they call ‘fields of applications’, as shown in the figure below, which is based on the work of Ika (2009). In addition to this, Albert et al. (2017) added more success criteria of stakeholder satisfaction, such as end-user satisfaction (the individual who used the end product), the managers of the organization executing the project (line manager satisfaction) and supplier satisfaction, as shown in Table 9 below.

| Research Focus | 1960s – 1980s | 1980s-2000s | 21st Century |
|------------------|-------------------------------------|---|--|
| Success criteria | Time, cost, quality (iron triangle) | Iron triangle client satisfaction benefit to organization end-user satisfaction benefit to stakeholders benefit to project personnel | Iron triangle Strategy objective and business success End-user satisfaction benefit to stakeholders benefit to project personnel and symbolic and rhetorical evaluation of success and failure |
| Success factors | Anecdotic list | CSF | More inclusive CSF list and symbolic and rhetorical success factors |
| Emphasis | PM success | Project/product success | Project/product, portfolio, programme success and narrative of success and failure |

Table 9: Project success criteria assessment over time, adapted from Ika (2009)

On other hand, in a super high technology complex project, these iron triangle criteria, although they need to be controlled, seem to be less important (Van Niekerk and Steyn, 2011).

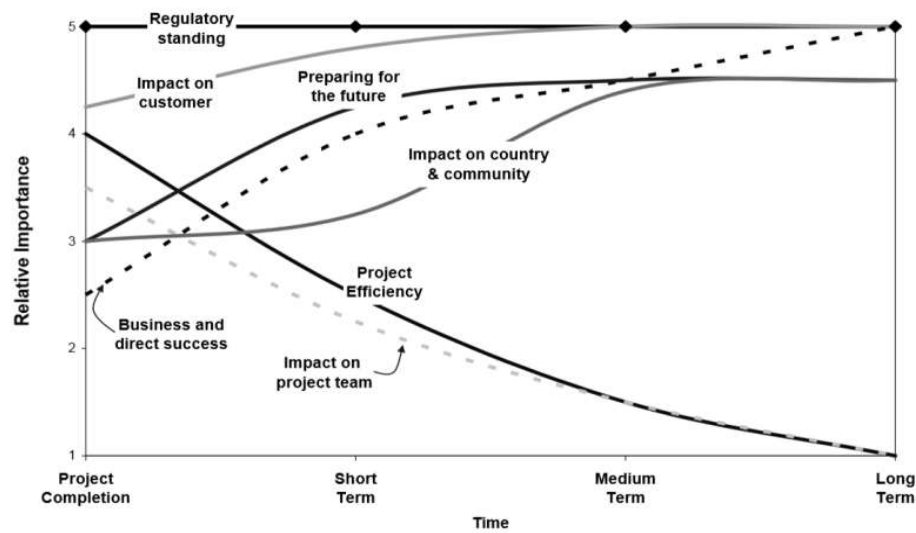
3.4.2 Success criteria in the research

Accordingly, the iron triangle is a main success criterion used in this research, in the data collection section, either in the semi-structured interview or the questionnaire. However, in areas of super high technology and complexity, such as nuclear power plant projects, the definition of project success takes different directions (Van Niekerk and Steyn, 2011). Although many project success factors are identified in the literature, it is very unusual to find

general consensus among authors (Fortune and White, 2006; Albert et al., 2017). In addition, as there are many articles discussing the critical success factors, resulting in a long list of CSFs, there needs to be prioritization when discussing them, to rank the most critical ones and evaluate their effect on project performance (Węgrzyn, 2016). One of the main success factors used in this research is that of top management support, which has proved to be a main factor in any project success (Van Niekerk and Steyn, 2011) Furthermore, having reviewed over 60 articles and finding three CSFs in the area of project success, namely support from senior management, clear objectives and effective plan, they found that over 80% of the articles used one of the three main factors, but only 17% used them all. Having said that, in the area of project management, there needs to be consideration of the uniqueness of each project in terms of novelty, technology, complexity and pace when trying to find a project management methodology to lead a project; likewise, there needs to be consideration when evaluating the area of project success (Van Niekerk and Steyn, 2011); and project success criteria should be selected on a project-by-project basis (Albert et al., 2017). Following the good work done by Atkinson (1999) on project success criteria, in which he suggested four dimensions for project success, Shenhar et al. (2001) presented a new model which includes five dimensions, taking into consideration the time-span of a project (before, at and after project). Those dimensions are: project efficiency, which is basically doing the project within time and budget, impact of team and customer; business and direct success, and preparation for the future. Furthermore, for high technology and highly complex projects, two more dimensions are added, which are impact on the country and the community, and regulatory standing, with their relative importance over time as shown in Figure 9 below (Van Niekerk and Steyn, 2011). This clearly shows that each project success criterion needs to be considered for each type of project, and that agreement on one model or criterion is not valid

for all projects. Williams (2015) studied the importance of success factors and investigates how those success factors actually lead to success. In particular, he examines the drivers for the success factors in projects leading to success in the construction industry. Moreover, Węgrzyn (2016) studied the critical success factors affecting the public-private partnerships (PPP) at different times during a project and with different groups of stakeholders, comparing the critical success factors of the public sector to those in the private sector. He found some differences, and that both parties did not necessarily share the same CSFs. The influence of stakeholders on a project is vital and is a main factor of project success (Węgrzyn, 2016; Turner and Zolin, 2012). In the area of PPP, O'Flynn and Wanna (2008) investigated what could make PPP successful, and found five main types of PPP success which are: outcome achievement, having work processes, reaching emergent milestones, recognition of others, and finally “acknowledging personal pride in championing a partnership”. In summary, project success depends more on the view of the project stakeholders, and defining the project success criteria should always include hard success criteria (iron triangle of time, cost, quality) and soft criteria (mainly the listed ones as per the literature above). However, it should be made clear that each project is a unique entity, and that top management within the project team should craft the success criteria they need to use on their project taking into consideration all other project stakeholders. For the purpose of this research, the author combines both hard and soft project success criteria in the methodology (survey), as appropriate to the organizations selected for the research; those criteria are chosen mainly based on the literature. The preceding semi-structured interviews also help to some degree in choosing the appropriate success criteria to be used in the survey, based on the interviewees’ point of view. Figure 9 below explains the relative importance of the success dimensions over time. Regularity standing for example is constant over time as it represents

the standards and regulations that is needed all the time for project success. But looking for



other

Figure 9: Relative importance of seven success dimensions over time from Van Niekerk and Steyn, 2011

success dimension like project efficiency, it is very important at right after project completion

but its importance is reducing with time and so on.

3.5 Literature Summary

The topic of this research is the extension of resource-based theory and its application in project management. This topic is important because there is a gap in the literature addressing the possible application of the resource-based theory in project management, and how that application could help in contributing to knowledge. It could also help organizations to appreciate the strategic resources available in project that might be positively related to competitive advantage, and accordingly to project and organizational performance. This thesis is related to past researches in many ways. First of all, it is a piece of research that will gather information from many management fields, such as strategic management and operations management. The main theories relevant to this topic are the resource-based theory and dynamic capabilities. Resource-based theory is the idea of looking inside an organization's resources and identifying which of those resources are rare inimitable, organizationally supported and valuable, and accordingly those which the firm could use in a way to gain competitive advantage and increase performance with the aid of firm capabilities. According to Barney (1991), for any organization to achieve sustained competitive advantage, it needs to apply RBV through the VIRO framework, along with the dynamic capability to expose its strategic resources. Project management on its own can be viewed as a strategic organizational capability that can lead an organization to sustained competitive advantage (Killen et al., 2012). Although the literature is rich in research focusing on RBV and its applications in organizations, there is still a gap in the area addressing the usefulness of RBV in projects, and the expected effect strategic resources might have in increasing project success rates. Furthermore, there is still a gap in addressing RBV empirically at both organization and project levels. Accordingly, this research is an attempt to fill part of that gap in the knowledge by studying how organizations can increase their performance and

sustain their business in the long term by managing effectively their strategic resources at project management level, using organizational strategic theories. In summary, determining the gap in the research from the literature review leads into three areas of concern. First is a general idea about the theory of resource-based value and how it is developed, including the positive elements and critiques of the theory. Second, the literature gives detailed information about the resource-based theory in those fields related to project management and to project management itself, such as strategic management and operations management. Accordingly, it provides a link between those fields applying the resource-based theory and the application of resource-based theory in project management. Finally, the literature summarizes the gap that exists in the project management area regarding the application and testing of the resource theory, and how this research will go on to fill part of that gap. The thesis applies the resource-based theory to identify strategic resources and test them against the resource-based theory assumptions and characteristics in the context of project management, followed by examining the perceived relationship with long-term survival and firm performance. Furthermore, the study explores the factors between strategic resources and competitive advantage that help explain the relationship between those two aspects at project management level. Accordingly, the thesis aims to extend the understanding of the resource-based theory at project level by addressing the influences of applying the theory to overall project performance, and how that affects the long-term survival of an organization. After identifying the strategic resources, the obvious question is how to use them to achieve better performance and sustained competitive advantage. Then the study explores the perceived relationships between those strategic resources, project management best practices and sustained competitive advantage, overall performance and survival. In the area of firm survival, some studies investigate the duration of firm survival

after entrance to the market, for example in Europe (Mata and Portugal, 1994) and the USA (Phillips and Kirchhoff, 1989). The entry time to markets is an important survival factor, suggested by Dowell and Swaminathan (2006), who examined the effects of entry timing on how fast a firm selects its initial product technology and how quickly it could change technologies in response to dominant designs. Other researchers, such as Sapienza et al. (2006) discussed the early internationalization process of new firms as a factor affecting growth and survival. In general, the factors affecting firm survival are divided into two main groups: *internal* which are firm-specific; and *external* which are factors relating to the environment outside the firm (Manjón-Antolín and Arauzo-Carod, 2007). One of the main examples of internal factors is the effect of resources (Esteve-Pérez and Mañez-Castillejo, 2006; Barney, 1991). Besides resources, the concept of innovation is known to be a factor in firm survival. Innovation has been defined as a process that creates, develops or reinvents ideas, objects and practices that are new and novel to the unit of adoption (Rogers, 2003). Many studies have addressed the relationship between innovation and firm performance, but the results remain contradictory. For example, it is suggested that more profitability can be achieved through innovation (Bayus et al., 2003), and that the rate of firm survival will increase (Danneels, 2004). The literature also explores the project success definitions and the main factors or criteria that make projects succeed, and how these criteria are used in the methodology of this thesis to test project performance. The framework of this thesis can be seen having as two major parts. The first part is the input, which includes the importance of RBV and explanations of its components, the application of which increases the chance of better market position for firms, along with its subsidiary theory of dynamic and project capabilities. The second part is the outcome, which includes the firm and project performance achieved by applying RBV. Having said that, there must be a process connecting both inputs

and outputs, which in this case is the methodology, with the objective of testing the success factors which, when implemented, enable the expected outcomes to be met. The methodology used in this thesis is cases studies, using semi-structured interviews and surveys as the design strategies, full details of which are allocated to the next chapter, entitled Methodology.

3.5.1 The research Map

The research map is a formatted table used to give an overview of the research up to this point. It gives details about the research aim, research problem, research objective and research questions. These data arise from Chapter One, the introduction chapter, while the research rationale is a combination of data emanating from the introduction chapter and the literature review chapter. Finally, the underlying theory is gathered from the literature review. It is appropriate now to give a summarized view of the main aspects of the research so far. By the end of the next chapter, the Methodology chapter, more details will have been added to the research map. The research structure, data collection techniques and data analysis procedure will be added to the research map. The research map will then be updated at the end of the discussion chapter to show the main finding across each research question addressed in the research map. Following this, the final conclusion and recommendations across each research finding will be presented, giving a full, high level summary of the research. Table 10 below shows the updated research map so far.

| Current Research Chapter | Research Aim (Purpose) | Research Problem | Research Objectives | Research Questions | Research Rationale | Underlying Theory |
|--------------------------|--|---|--|--|---|---|
| Literature Review | To provide a theoretical framework to help explain how projects strategic resources identification and utilization could lead to achieve a sustained business for the organization | How can organizations increase their performance and sustain their business by managing effectively their strategic resources at project level? | Identifying the available strategic resources at project level | What are the strategic resources and capabilities available in the organization's projects? | Extend the understanding of resource-based theory to project management literature by identifying and explaining the strategic resource availability and characteristics at project level | Resource-based theory: (Barney, 1991,1995,2002,2011); dynamic capabilities (Teece 1997) |
| | | | Investigate the relationships between strategic resources and competitive advantage | How do the project strategic resources and capabilities provide competitive advantage? How can the role of resource-based theory and dynamic capabilities be better understood at project level? | Explore the relationships between strategic resources, competitive advantage, organization performance and project performance | Bowman and Ambrosini (2003); Ashrafi and Mueller (2015) |
| | | | Examine the factors between strategic resources and competitive advantage that help explain the perceived positive relationships between them at project level | What are the factors affecting the relationship between strategic resources and competitive advantage in projects? | Provide the project management literature with an empirical study showing some dimensions of project management that could lead to or contribute to a competitive advantage through the strategic resources | (Newbert, 2008) |

Table 10: The Research Map: Second revision

4 Methodology

In last chapter, the past literature relating to the study was reviewed to gain greater knowledge and insights on the area and, furthermore, to identify, evaluate and synthesize the work done by other researchers (Fink, 2010). In this chapter, the methodology utilized to achieve the research aim is explained. In addition, the research classification, the methods used in the research and the paradigm are explained. This chapter also states the research design and the choice of approach. This section and the following sub-sections will present the research philosophy, describing the approaches to ontology (nature of reality) and epistemology (theory of knowledge), and how these are important in such research, including explanations of the different types of approaches to ontology and epistemology. The approach used for this research will then be described, together with the implications of holding one or more views of those types. In addition, the research methodology, data collection and data analysis will be presented. Figure 10 below summarizes the chapter in a flow chart.

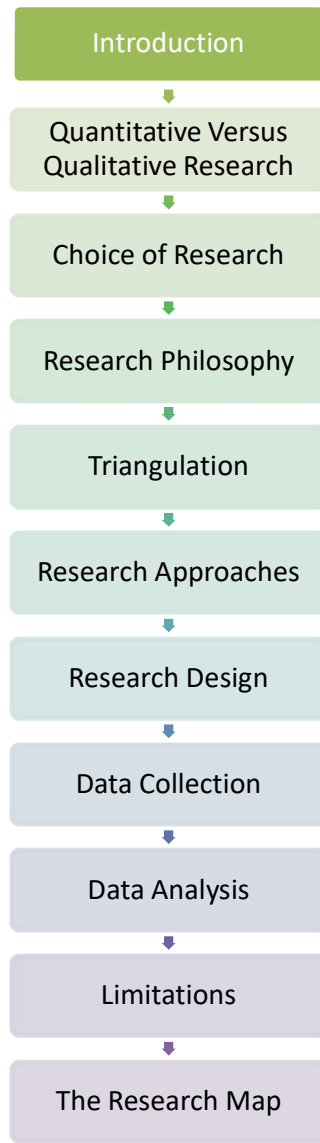


Figure 10: Chapter 4 Flow chart

4.1 Introduction

The strategy of the research is to use a qualitative approach during the first and second stages where the availability and identification of the strategic resources in the project are explored and explained. The study aims to identify the available strategic resources in projects, which should answer the first question of the research: “What are the strategic resources and capabilities available in an organization's projects?” Furthermore, their perceived link to

organizational competitive advantage is explained to answer the second question: “How do the project strategic resources and capabilities provide competitive advantage and sustained competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level?” These questions of what and how are better addressed using qualitative approaches. The nature of the questions at these two stages required rich qualitative data. ‘How?’ and ‘what?’ questions are very suitable for qualitative, (Venkatesh et al., 2013; Voss et al., 2002; Stuart et al., 2002; Handfield, 1998). At the final stage of the research, where the aim is to find the relationship between strategic resources utilization and project performance in addition to organizational performance, more supportive quantitative data are needed to generate the perceived relationships and to confirm the findings from the first two stages. The final stage, which answers the last question: “What are the factors affecting the relationship between strategic resources and competitive advantage in projects?” hence needs a more quantitative method (Stuart et al., 2002; Handfield, 1998) to examine the relationship between the factors and competitive advantage and project performance. Accordingly, mixed method is used in this research.

Table 11 below summarize the data collection stages used in this thesis.

| Data collection phase | Objective | Method used | Type of approach | No. of Participants |
|-----------------------|------------------|--------------|----------------------------|---------------------|
| Pilot Qualitative | Answering RQ-1&2 | Qualitative | Focus group | 4 |
| Qualitative | Answering RQ-1&2 | Qualitative | Semi-structured interviews | 30 |
| Pilot quantitative | Answering RQ-3 | quantitative | Questionnaire | 30 |
| Quantitative | Answering RQ-3 | quantitative | Questionnaire | 400 |

Table 11: Summary of research data collection stages

The debate on using different research methods, and which one is the best to use is not new (Amaratunga et al, 2002). Research methodology classifications mainly derive from two

major and opposing schools of thoughts: positivism and interpretivism. Many categories or perspectives come out of those two schools of thoughts, such as qualitative versus quantitative, deductive versus inductive, and objective versus subjective (Luthans and Davis, 1982; Myers and Avison, 1997; Amaratunga et al, 2002; Bennett, 2007; Boyer and Swink, 2008). Positivism is more related to research using quantitative data and experiments (Hibberd, 2010). Questionnaires aiming for hypothesis testing and deductive generation are part of that (Clay Whybark, 1997). On the other hand, interpretivism is associated with more qualitative data usage and inductive methods to understand the human experience and interaction with the phenomenon (Amaratunga et al., 2002; Agee, 2009).

4.2 Quantitative Versus Qualitative Research

Quantitative research methods concentrate on the usage of numbers to generate conclusions on concepts or opinions, whereas qualitative methods are more into words and human interactions in life situations (Currall et al., 1999; Amaratunga et al., 2002; Agee, 2009). The quantitative approach is used when the researcher determines the study-related questions and hypotheses, collects numerical data from participants, and then analyses the numbers using statistics, conducting the enquiry in an unbiased, objective manner (Mahomed, 2009). It has been shown that there are many quantitative methods studies supporting the testing of theory (Echambadi et al., 2006). In the context of this research, as stated earlier, the use of quantitative method was important in the final stage of the research. Furthermore, there is a good deal of quantitative research in the same areas as this. For example, in the area of resource-based theory, Coleman et al. (2013) drew their hypothesis based on the resource-based theory, using questionnaires to investigate the factors affecting the exit routes of new firms, firm survival and firm performance. Gita et al. (2013, 2014) developed a survey to examine the use of the resource-based theory at project management level. Brouthers et al.

(2009) studied the key factors affecting small firms' superior performance, using surveys to gather data from over 300 firms. However, there are some issues and problems when using quantitative approaches, and the researcher should be able to overcome those issues in order to guarantee the quality of the work (Echambadi et al., 2006). One main issue is the limitations of the survey-based research; for example, the approach can be used to test theory (Shah and Corley, 2006). Other issues include measurement error, confusion between formative/reflective measures, use of weak instruments, not showing causality, not accounting for indignity, and many more (Echambadi et al., 2006). All of these issues will be addressed when covering the final questionnaire and analysis in the last stage of this research. Qualitative methods are data collection and analysis techniques used to test theory, build theory or generate description (Van Maanen, 1979). Theory building, for example, requires a rich knowledge, which can be provided by qualitative methods (Minzberg, 1973; Shah and Corley, 2006). The focus of such methods is on developing an understanding of specific phenomena from an individual point of view. In social science these methods have existed since the 1900s, and were then used in different areas. The use of qualitative methods in different areas of management is wide, as evidenced by Chandler (1962), Eccles and Crane (1988), and Dutton and Dukerich (1991). However, it is worth mentioning that qualitative research goes far beyond the concept of doing a few interviews or undertaking short-term observation - in fact the researcher should use different formal and systematic methods to guarantee a good quality of study (Shah and Corley, 2006). Qualitative methods allow the researcher to find new relationships and understand complex processes. A lot of qualitative research has been done in this area of the literature, such as the work of Voss et al. (1997), Williams et al. (2012) and Van Helden and Tillema (2005) in the field of benchmarking; Kozlenkova et al. (2013), Barney (1991) and Grant (1991) on resource-based theory; and

Andersen (2006), Jugdev (2004) and Gita et al. (2013, 2014) on project management from a resource-based theory perspective. The first stage of the research deals with questions concerning the available tangible and intangible resources at project level in petroleum organizations, and how such resources become competing and valuable resources based on the resource-based view. From this, it can be seen that the study at this stage needed more systematic methods and involvement between the researcher and those organizations, in addition to the interaction and communication with the practitioner. Such issues and research questions perfectly fit the qualitative approach (Yin, 2009). Although many researchers raise concerns about qualitative methods, mostly about the quality assurance of the research work, some of the top journals show more interest in qualitative research generating a higher quality of work (Shah and Corley, 2006). Lincoln and Guba (1985) studied the techniques that qualitative researchers should use to ensure a high-quality study. They recommended alternative criteria to judge the rigour of qualitative research through Credibility, Transferability and Dependability, in addition to Conformability (Shah and Corley, 2006), as shown in Table 12 below. This thesis complies with those criteria to ensure the quality of the work.

| Traditional criteria | Trustworthiness criteria | Methods for meeting trustworthiness criteria |
|-----------------------------|---------------------------------|--|
| Internal validity | Credibility | Extended engagement in the field Triangulation of data types Peer debriefing Member checks |
| External validity | Transferability | Detailed descriptions of: <ul style="list-style-type: none"> • concepts and categories in the grounded theory • structures and processes related to processes revealed in the data |
| Reliability | Dependability | <ul style="list-style-type: none"> • Purposive and theoretical sampling |

| | | |
|--------------------|----------------|---|
| | | <ul style="list-style-type: none"> • Informant confidentiality protected • Inquiry audit of data collection, management and analysis process |
| Objectivity | Confirmability | <p>Explicit separation of first and second order finding meticulous data management and recording:</p> <ul style="list-style-type: none"> • Verbatim transcription of interviews • Careful note of observations • Clear notes of theoretical and methodological decisions • Accurate records of contacts and interviews |

Table 12: Techniques to ensure the trustworthiness of qualitative research, based on Lincoln and Guba (1985), adapted from Shah and Corley (2006)

4.3 Choice of Research Method

The decision of using qualitative or quantitative method should be based on prior understanding of their positives and negatives. The literature shows that using a quantitative approach is recommended for fast or time-saving situations and theory testing (Clay Whybark, 1997; Forza, 2002); however, it is not recommended for studies in the area of policy decisions, process explanation and theory building (Amaratunga et al, 2002; Rungtusanatham et al., 2003). On the other hand, the qualitative method requires more time to be performed, and more resources for the data collection part, analysis and interpretation (Barratt et al., 2011; Stuart et al., 2002). The main advantage of using qualitative over quantitative method is gathering data based on close observation and interaction with the phenomenon. In this case, the researcher will have more engagement with the study participants, and accordingly gaining their opinion of reality (Stuart et al., 2002; Voss et al., 2002). The aim of the current study includes research questions that need explanation and interaction with participants, in addition to theory testing, which directed the researcher to the use of a mixed method approach. The idea of using mixed methods is available in many contexts (Jick, 1979; Currall

et al., 1999; Elsbach, 2000). The mixed method helps in addressing the confirmatory and exploratory research questions (Teddlie and Tashakkori, 2003), and accordingly gives a more complete picture of the issues under study. The use of mixed methods can work in both directions, meaning that the researcher can build the theoretical background and framework, then later use the quantitative method to test and extend the theoretical framework (Shah and Corley, 2006). This was the flow of work in this thesis, which started with building the theoretical foundation from different theories and models in the first and second stages, and then tested the generated framework using a quantitative approach in the final stage of the research. The opposite direction can also be valid, where the researcher starts with the quantitative approach and then uses the qualitative approach (Mahoney, 2006; Shah and Corley, 2006). In the context of this research, the mixed method was the most appropriate approach to tackle the issue. As explained before, the first and second stages require building the theoretical foundation and testing it, and later the developed theoretical framework draws up a different issue-related hypothesis which needs to be tested using the quantitative approach. Using the qualitative approach would limit the outcome of this research, and accordingly the usefulness of the statistical evidence in relating the resource-based view to firm survival and performance would be lost. Likewise, depending only on the quantitative research would not address the exploratory questions, and accordingly would raise difficulty in explaining the relationships under discussion (Shah and Corley, 2006). A good comparison of the pros and cons of mixed methods was summarized by Easterby-Smith et al. (2013: 97) and appears in Table 13 below.

| Positives | Negatives |
|--|---|
| Increase confidence and credibility of results | Replication might be difficult |
| Increase validity | Research design must align with research question |
| Stimulate creative methods | Fail to be useful if wrong question were asked |
| Can uncover deviant dimensions | More resources will be needed |
| Helps on integration of theory | Needs competent overall design |
| May serve as good test of competing theory | Researcher must be skilled to use both |
| Can combine confirmatory and exploratory research at same time | It will not help if one method will be simply providing window dressing for the other |
| Present greater diversity of views | |
| Provide better inferences | |

Table 13: Pros and cons of mixed methods, adapted from Easterby-Smith et al. (2013: 97)

4.4 Research Philosophy

An understanding of the philosophical issues is important and helpful in management research (Wilson, 2003; Holden and Lynch, 2004). First, the researcher should understand the basic issue of the theory of knowledge in order to make a contribution to the field. In addition, knowing the philosophical perspective helps to create the research design, which should help the researcher collect, analyse and answer the research questions, even if that research design is outside the researcher's past experience (Easterby-Smith et al., 2015). The main debate on the philosophical perspective is essentially about ontology and epistemology (Boykin and Schoenhofer, 1991; Easterby-Smith et al., 2015), where ontology is about the reality of nature and truth, and epistemology is about the theory of knowledge and the ways to understand the world of reality and nature. Going forward, the philosophical debate between ontology and epistemology produces different perspectives. In this section, four main perspectives will be explained, which are realism and relativism, as two main ontologies, and positivism versus social constructionism on the epistemological side. Realism and relativism as ontologies have one main difference, which is to what extent we can agree and

assume the objective of the reality (Hunt, 2005; Patomäki, 2006). Realism assumes that there is only one truth, and that single truth exists and can be measured using experiments based on numbers and facts (Fleetwood, 2005; Easterby-Smith et al., 2015). On the other hand, relativism, just from its name, gives a relative viewpoint of the truth, which produces many facts based on the viewpoint of the observer or researcher. Moreover, relativism assumes no objective reality, and we only get reality through the involvement and interpretation of people in a social way (Johnson and Onwuegbuzie, 2004). The evaluation of relativism as a framework of study or research will need more wording and rich data to be collected. Epistemology, on the other hand, has many different perspectives, but can be mainly described in two types, which are positivism and social constructionism (Easterby-Smith et al., 2015). Positivism assumes that the social world exists and that fact building can be measured using objective methods such as experiments and surveys, rather than interpreting those facts using people's intuitions and reflections (Easterby-Smith et al., 2015). See Table 14 below.

| Ontologies | Realism | Relativism |
|-------------------------|----------------------------|--------------------------------|
| Epistemology | Strong positivism | Constructionism |
| Methodology | | |
| Aim | Discovery | Convergence |
| Starting points | Hypothesis | Questions |
| Design | Experiments | Cases and surveys |
| Data type | Numbers and facts | Mainly words with some numbers |
| Analysis/interpretation | Verification/falsification | Triangulation and comparison |
| Outcomes | Conformation of theories | Theory generation |

Table 14: Methodological implications of different epistemologies, adopted from Easterby-Smith et al. (2013: 54)

Relativism with constructionism is a philosophy that suits the current type of research, for two reasons. First due to the nature of this research, it looks at how projects can help to achieve long-term success and performance for project-based organizations by utilizing strategic resources. The concepts of success and performance are socially constructed and are better addressed using a relativism viewpoint where there can be more than one truth. Furthermore, the design of the research, using cases studies supported by surveys, enhances this. Second, the research questions are of an exploratory type, of how and what, needing interpretation through words and cases rather than numbers and facts. Having said that, it does not mean that the research ignores the advantage of numbers; in fact, the research design used a questionnaire to achieve triangulation and comparison as part of the research philosophy. The first research question is: “What are the strategic resources and capabilities available in an organization's projects?” which can only be answered after connecting and conducting interviews with project management practitioners, because there will more sub-

questions and discussions to be had to fully answer the question. The same goes for the third question: “How do the project strategic resources and capabilities provide competitive advantage and sustained competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level?” The nature of the questions drives the research to be more relative and socially constructed. The relativist/constructionist perspective adopted in this study allows the study aim to be achieved by direct involvement of the researcher in collecting and analyzing the data. In addition, the researcher’s interpretation of the data is heightened by understanding the phenomenon from the real environment and by more enhanced involvement (Orlikowski and Baroudi, 1991). The researcher is assumed to be placed somewhere in between the constructionist and engaged quadrant of Easterby-Smith’s (2015) epistemology and research style, in which the researcher engages with the research cases and participants, and the truth and reality is based on the observation of people’s interactions and interpretation of the researcher (Orlikowski and Baroudi, 1991).

4.5 Triangulation

Triangulation means that the researcher uses more than one source of data, research methods and data analysis method (Thurmond, 2001) to enhance the validity of the research findings. The idea of triangulation is that it does not always imply using two research methods such as qualitative and quantitative; instead, there is what called within methods triangulation (Modell, 2005). Triangulation comes in four types: data, investigator, theoretical and methodological triangulation (Denzin, 1970). Data triangulation means using different strategies of data sampling; investigator triangulation means the use of more than one investigator to collect and analyse the data; theoretical triangulation means the use more of than one theoretical perspective to interpret the data and data analysis; and finally,

methodological triangulation means using a combination of methods to collect the data. Triangulation in this study was mainly employed in the data collection methods, where different sources of data were used to gather the information. Both qualitative (by interviews) and quantitative (questionnaires) were used to collect the information needed to complete the study. Such triangulation helps to increase external validity, giving the ability to generalize the empirical findings of a study (Eisenhardt, 1989). Triangulation also enhances the internal validity: “the credibility of the causal relationships between independent and dependent variables inferred from data” (Modell, 2005). In line with the above, the researcher chose to adopt triangulation in this study to benefit from all its positive advantages. At the same time, the researcher believes that triangulation does not validate poor input of findings, so caution should always be taken on the quality of data collection (Thurmond, 2001).

4.6 Research Approaches

The previous sections addressed the philosophical outlook of this research from a range of perspectives. In this section, the research approaches are presented, providing guidance to achieve the desired goals and objectives of the study. This thesis investigates the issue of the availability of strategic resources in project-based organizations, testing the proposed framework of the resource-based view against organizational resources, and finally examining the relationship between those tested resources and competitive advantage with firm survival and performance. The strategy of the research was to use the qualitative approach during the first and second stages because the questions asked at those stages required rich qualitative data, such as “What are the strategic resources and capabilities available in an organization's projects?” or “How do the project strategic resources and capabilities provide competitive advantage and sustained competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level”? ‘How’

and 'what' questions are particularly suitable for qualitative, (Stuart et al., 2002; Voss et al., 2002; Yin, 2009), which is the right method to be used in such research, including this thesis. The later stage of the research was to test the framework and generate the perceived relationships between strategic resources and competitive advantage, and between competitive advantage and project performance, and, accordingly, organizational long-term survival. In this later stage a quantitative research approach was more appropriate (Echambadi et al., 2006). The choice of the research methodology is driven by the idea that suggests that research predominantly commences with a phenomenon, in this case 'competitiveness'. A review of literature surrounding the phenomenon will then be undertaken (Stuart et al., 2002).

4.6.1 Case Study:

The case study is widely referred to and applied within social research (Tight, 2010; Radley, 2012; Gringeri et al., 2013), and is frequently employed in business research (Zivkovic et al., 2012), operations management research (Barratt et al., 2011; Ketokivi and Choi, 2014) and more specifically, research in project (operations) management (de Weerd-Nederhof, 2001; Shenhar and Dvir, 2007; Killen et al., 2008; Lückmann and Färber, 2016).

Case study has been used widely in the literature as a research strategy. For example, in the area of benchmarking, Ramabadron et al. (1997) built a model for corporate benchmarking at project level to be used for teamwork process and information transfer techniques. Dedehayir et al. (2014) used the case study strategy in the area of innovation, and more specifically in the domain of linking innovation and firm survival, as done by Jensen et al. (2008). Furthermore, in the area of resource-based theory and dynamic capabilities, Eltigani (2013) used case studies to develop a new perspective for dynamic capabilities in organizations in order to investigate the change in activity configurations with time, and the

effect of that change on the social structure of an organization, resulting in outcomes for developing new capabilities.

Yin (2008) states that: “The case study method allows investigators to retain the holistic and meaningful characteristics of real-life events – such as individual life cycles, small group behavior, organizational and managerial processes, neighborhood change, school performance, international relations, and the maturation of industries”. Case study appears the recommended method to answer how, why and what questions addressed in this thesis (Barratt et al., 2011).

Handfield and Melnyk (1998; pp. 324-325) provide specific guidance on the matching of research strategy with theory-building activities. They point to studies focused on theory validation (testing) to encompass the triangulation of qualitative (interviews) with quantitative (surveys) data collection techniques. Under such circumstances, triangulation serves as an example of data analysis procedures (Handfield and Melnyk, 1998; p. 325).

Case selection should be based on replication logic rather than sampling logic, but when selecting the particular cases, there should be a rationale to choose either cases that provide similar results or contrary results, for predicted reasons (Handfield, 1998). To select a case, there need to be few tests, such as the research question relativity, and whether the chosen case enhances the generalization of the results, in addition to the feasibility of doing the study, and finally the ethical consideration, and whether it is ethical to proceed with the case or not (Eisenhardt, 1989; Voss et al., 2002). Punch (2005) believed that the use of case studies needs to focus on one objective, which is the understanding of the case, as deeply as possible; in fact, he considers that the case study is more a strategy than a method. Case studies have a good deal of strength, which enables the researcher to use them to examine business

studies and obtain the same level of validity and robustness as quantitative data receives in business research (Zivkovic et al., 2012).

One of the strengths of case studies is that they are multi-perspective analyses, which means that researchers can take into consideration the interaction between groups inside an organization as well as between individuals in the same organization (Tellis, 1997). Franz and Robey (1984) and Stone (1978) addressed the strength of the case study in business, in which any fact relevant to the process or the phenomenon is a potential source of data because of the ultimate role of context and situation.

Case study approaches are applied in both single and multiple cases. Single case studies encompass the intrinsic and instrumental styles. The intrinsic case study deals with unique phenomena with limited transferability, while instrumental case studies are done to gain insight and general understanding of a phenomenon using a particular case (Stake, 1995; Yin, 2003; Baxter and Jack, 2008). The collective case study is a multiple case study approach which applies the use of a number of instrumental case studies to provide a general understanding of a phenomenon (Harling, 2002). A collective case study approach is employed in this study. It will be used to provide analytical generalizations of the phenomenon in context, as opposed to statistical generalizations (Yin, 1994). The evidence in this type of study is robust and reliable and can be used to predict results for replication (Crabtree and Miller, 1999; Yin, 2003). The research set-up will provide detailed descriptions of each case, followed by illustration of the analysis across the cases. The concluding interpretative phase will involve reporting the analysis on the lessons learnt, and subsequently developing a management framework (Harling, 2002). According to the above, and based on the research questions asked, the method used in this thesis is the case study design.

The researcher employ multiple case studies to generalize the conclusions of the thesis (McCutcheon and Meredith, 1993; Meredith, 1998), as the study is trying to explore in general the strategic resources that give competitive advantage to projects.

4.7 Research design

As discussed in the previous section, a mixed-method approach was deemed most appropriate for use in this research area. A qualitative approach using semi-structured interviews was used to answer the first two research questions (mentioned above). Based on the analysis of the outcomes from interviews, survey questions were used to support the interview outcomes, and establish an answer to the third research question. The next step was identification of the research design and strategy. Owing to the mixed methods approach, the research design was based on using case studies with semi-structured interviews for the qualitative part of the study. In addition, archival and other organizational documentation was reviewed as part of the data collection sources. The use of case studies in a research area such as strategic management is recommended (Glesne, 2011) and increasingly used by researchers (Salvato, 2003; Johnson et al., 2007). On the other hand, the triangulation of research methods by adding questionnaire technique was recommended to increase the study validity. Furthermore, the quantitative method is also recommended for this type of investigation (Echambadi et al., 2006). The following sections elaborate more on the areas of research approach strategies, data collection, data analysis, project management and risk analysis.

4.7.1 Level of Involvement

Part of the decision on what research method to use is based on the degree to which the researcher is engaged in the research (Easterby-Smith., 2015). In general, there are two types of involvement - 'outside' and 'involved'. The outside style means that the researcher collects the data (either surveys or interviews) without direct involvement in the field action; whereas the involved style means that the researcher will be observing the phenomenon and taking notes while working out in the research field (Walsham, 1995). This distinction between the two styles does not imply that the researcher should be at the extreme end of either. Instead, Easterby-Smith's (2015) chart elaborated further in the area of involvement, producing a four quadrants chart, similar to the coordinate system, where north represents detached researcher style, south represents engaged researcher style, west represents realism and east represents conventionalism. Such a chart gives a more flexible and applicable way to decide to what extent the researcher should be involved in the data collection, based on the research approach used. According to Easterby-Smith's (2015) chart, the researcher's position is more engaged or detached based on the philosophical perspective of the study - relativist or constructionist.

4.7.2 Ethical Issues

In any academic research, the researcher should be aware of ethical considerations in order to overcome or avoid them for the purpose of better-quality research. These ethical considerations arise from the difference in thinking between personal behavior and professional procedures. In fact, a top management journal such as the *Academy of Management* has its own code of ethics for its members, to be used as guidance for everyday professional activities. Even though this code of ethics is not enforced outside the Academy of Management, it can still be regarded as valid practice for professionals. Some useful

general principles are: responsibility towards others and society, integrity in promoting accuracy, honesty, truthfulness and human rights (Academy of Management: Code of Ethics, 2008). Other ethical issues include self-plagiarism which is increasingly prevalent in recent research (Andreescu, 2012), in addition to data-reporting errors (Retraction Watch, 2012). For the purposes of this research, the researcher's intention was to avoid self-plagiarism by using quality proven software at different stages of the research, and furthermore to ensure the anonymity of interviewees and organizations as part of information confidentiality (Weerd-Nederhof 2001). Moreover, at the stage of data collection, the consent of the survey participants/interviewees was ensured, and a summary of the research given to them before gathering the data (Kavale, 2008). Furthermore, invasion of privacy and deception can be issues (Bryman, 2004), so actions were taken in this study to mitigate them. Such issues include data confidentiality, employment of the researcher by the case organizations and the reporting of data (Walsham, 2006). Data confidentiality means that the information collected from participants should not be misused or used without the participant's approval (Wilson, 2004). The participant's identity should remain unknown, and should not be presented at any stage of the research (Moore, 2012). Here, confidentiality includes the information that participants give to the researchers to understand the discussion more clearly, but which they did not intend to share or have presented in the thesis (Wilson, 2004). Such confidentiality should be respected, and cannot be shared by the researcher. Another important issue in ethical consideration is the reporting. One of the challenges lies in the reporting of negative information about the organization under study (Walsham, 2006). It is not normally on the agenda of any organization to report negative data, so the researcher should be careful about such data, especially because confidentiality terms have already been agreed with the participants (Bryman, 2004). If an organization does not want to report such data, the

researcher should take that into consideration. The researcher of the current study did not, however, expect to collect confidential data at any stage of the research.

4.8 Data Collection

The data collection process for this research consisted of two phases. The first phase included the case studies design, in which data were gathered using structured and semi-structured interviews, focus groups and document reviews. The second phase was the quantitative part, with data being collected using a developed questionnaire. The language used to conduct the semi-structured interviews and questionnaire is English including interview protocol, the survey and any communication emails or arrangements. Some details are addressed in the last section, and others are discussed in the following sections. For such research where the data collection is large and in two stages, a data collection plan is needed to save time and effort. The proposed plan should include, but not be limited to, the name of the organization, the list of questions to be asked, the time allocated for each phase (case studies and questionnaire) and any related expenses expected (Stake, 1995). A list of the main topics covered by both (case studies and surveys) is addressed in the following section, along with the expected archival data review needed for this study. The cases selected for this research were from the petroleum industry in the UAE and Oman, the researcher obtaining all the necessary approval to start the data collection process through interviews, focus groups, surveys and organizational documentation, which were the main data collection tools for the case study design (Barratt et al., 2011; Glesne, 2011). The interviews were planned as shown in Table 15 below, justifications for the interview time and number of interviewees being presented next on in the interview section. It is worth mentioning that out of four, three pilot interviews were done. Regarding the semi structure interviews, out of the planned thirty interviews, twenty-four is actually conducted. The response rate is considerably high on the

interview side. The main reason why not all interviews are conducted was due to cancellation from interviewees (for two and three ties). The other reason is the approval for the interviews takes long time and in some cases no responses from the interviewees despite several reminders given.

| Organization | No. of interviews | Interview time |
|--------------|-------------------|--------------------|
| Pilot | 4 | 40 mins – one hour |
| A | 30 | 40 mins – one hour |

Table 15: Case Studies details

4.8.1 Interviews

Interviewing enables a researcher to become aware of the world view of the interviewees. This can be done through open-ended questions, and although they are open-ended, they should be in a structured or semi-structured format (Thomas, 2008). That same view was expressed by Kvale (2008:1) when defining the interview as “attempts to understand the world from the subject's points of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations”. Generally, there are two major types of interviews: structured and semi-structured interviews (Barratt et al., 2011). Structured interviews are those in which “the interview tool remains fixed”, while semi-structured interviews are those with the tool updated based on emerging data (Barratt et al., 2011). Structured interviews give more coded answers, which can be analysed faster. The main research questions asked in the current study, especially the first and second questions, required more structured interviews. The first question concerned the naming of strategic resources in projects, and the second question explored the relationship between those resources and the organization’s unique position in the market. Both the methodology and theoretical framework supported the choice of such data management and analysis; furthermore, the NVivo package software was used to help in the management and analysis

of the qualitative data. The use of such software is still popular in the literature and was proven to be suitable for this research domain (Fade and Swift, 2010). The sites of study for this research were petroleum organizations in Oman and the UAE. Oman has a reserve of about 5.5 billion barrels of oil, and is considered the 25th largest oil reserve in the world, while UAE has almost 98 billion barrels of reserves (arabianindustry, 2019). Both countries are known for their large projects in the oil and gas area, with a proven success rate (Oman Observer, 2019). The large oil and gas organizations in both countries have a full dedicated team looking after projects with individually proven records in managing large projects in the oil and gas sector (Al Riyami, 2019; Sen, 2019). Accordingly, both countries were selected as appropriate for this study. The approved participation of these organizations was guaranteed, as the researcher has many business connections at different managerial levels. Communication between the researcher and the chosen organizations was established with very positive results. Approval for data access was mostly guaranteed and a backup plan put in place in case of loss of data. In-depth interviews allow for more information regarding personal narratives, and enable one to investigate different perspectives (Thomas, 2008). In case study research, the main objectives are to provide description and interpretation, and those two objectives can be achieved by using interviews (Stake, 1995). The structured interview aims to provide a description of the world as lived by the interviewees, so that the researcher is able to interpret the meaning of the issues under study (Kvale, 2008). The aim here was to conduct 36 structured interviews for the qualitative part of the investigation. Choosing the sample size was not arbitrary, but was in fact based on past studies (Eltigani, 2013; Marshall et al., 2013; Galvin, 2014). Based on Marshall et al. (2013), for the single case study, the recommended number of interviews should be between 15 and 30. The authors also concluded that for grounded theory interviews, the numbers should be between 20 and

30. Furthermore, they added that the multiple case studies sample size should range between 20 and 50 interviews. In fact, there are studies showing more than 50 interviews, as shown in Figure 11 below.

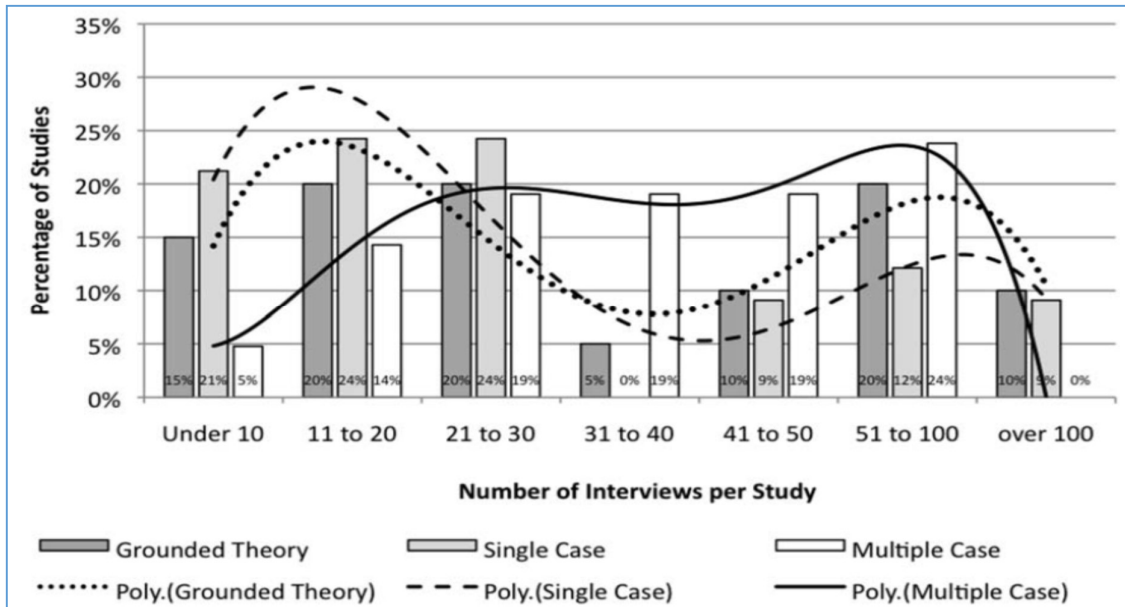


Figure 11: Interviews per Study by Research Design from Marshall et al. (2013)

In this research, the interviews included questions relating to different subjects, and were planned in two stages. The first stage explored the strategic resource availability, in which the main question was: What are the strategic resources and capabilities available in the organization's projects? This main area produced more sub-questions relating to tangible and intangible resources, including knowledge, experience, equipment and infrastructure, in addition to organizational dynamic capabilities. Along with this area, the researcher asked the question: What type of valuable, rare, inimitable resources did the organizations have, and how did those affect the projects in terms of overall performance? In addition, Questions 5, 6 and 7 of the interviews aimed to focus more on the effect of the strategic resources and their utilization in gaining their organization a unique market position. In the second stage, as explained above, the plan was to conduct the interviews in person over a time span of

between 40 minutes and one hour. All the interviews needed interviewee approval, and had the interview's purpose and topics explained to them. Furthermore, the interviews were tape-recorded whenever possible and approved by the interviewees.

The researchers aimed perform pilot studies for both the qualitative case studies and quantitative surveys, because that serves many objectives, such as testing the instruments used and analysis techniques. Furthermore, the pilot study is a good chance to test the rigour of the theoretical framework, and is also a good opportunity for the researcher to hone some skills before starting the main analysis (Eltigani, 2013).

4.8.2 Focus Groups

The focus group can be defined as a collection of individuals who are gathered together to discuss the same topic. From the definition, it is clear that such a technique allows the researcher to collect data on different aspects of a topic from many interviewees at the same time, and allows for better interaction between them (Boddy, 2005). Focus groups also allow researchers to ask participants to compare their views and experiences, which increases communication between participants, thus helping the study (Thomas, 2008). In addition, focus groups can be used for quantitative studies, and should save time for the researcher conducting a mixed-methods approach (House et al., 2004). Those advantages are valid and would be helpful in this research, especially during stages one and two, where more insight from the interviewees was needed to answer the first two questions of this research. On the other hand, the researcher should avoid excessive interference of interviewees, and allow their interaction whilst taking notes; the researcher should lead the group, but not interrupt any valuable interactions between participants (Thomas, 2008). This study involved companies based in The Gulf, and there was concern over whether or not the focus group was culturally appropriate in the area. A study by Thomas (2008) raised this issue and

advocated that cultural differences should be taken into consideration. He concluded that there are many Arab characteristics which match with the ethos of the focus group, such as consultation, in-group membership consensus (within what he called 'majlis') and communication. In this study, the researcher's objective in conducting focus groups was to gain an in-depth understanding of the strategic resources, and the participants' understanding of a resource's value, in addition to exploring the link between strategic resources and competitive advantage that an organization might gain by using those project resources. The proposed number of participants was between six and ten, a number based on recommendations in the literature (Oates, 2000). The recommended number of focus groups was between three and four (Halcomb et al., 2007). The research chose to use focus groups in this study because more insight and interaction was needed from the interviews, especially at stage two to answer the second question of the research on project strategic resources, competitive advantage and dynamic capabilities. The researcher planned to have four sets of focus groups, one for the pilot study and three for the first two stages of data collection. Each focus group would consist of 3-6 participants. The researcher planned to send invitations to potential participants, suggesting the time and place of meeting. The data collection would either be written down or recorded, if approved. Table 16 summarizes that. The actual conducted focus groups are two out of the planned fours. The main reason was the difficulties to get responses from the interviewees and agreed on a fixed time despite several reminders which took long time to conduct only two of them.

| Organization | No. of focus groups / No. of participants | Interviewees managerial level | Interview time |
|--------------|---|-------------------------------|----------------|
| Pilot | 1 / 3 | Project Participant | 2 -3 hours |
| A | 2 / 6 each | Project Participant | 2 -3 hours |
| B | 2 / 6 each | Project Participant | 2 -3 hours |
| C | 2 / 6 each | Project Participant | 2 -3 hours |

Table 16: Focus groups details

4.8.3 Interview Protocol:

This research followed Kvale's (2008) model of interviewing, in which there are seven stages: thermalizing an interview, designing, interviewing, transcribing, analyzing, verifying and reporting. Those stages would be followed in the research, the first three amounting to the interview protocol, with detailed protocol appearing in the appendix. In summary, the protocol includes the instruments to be used and the general procedure on crafting an interview, such as who is to be interviewed and from where the data are to be collected, together with a list of the subjects to be discussed and questions to be asked. Funnel model would be used while conducting the interviews, in which general and open questions are asked first, followed by more detailed ones. The researcher would send an outline of the interviews to interviewees beforehand (Voss et al., 2002). In general, the interviewing procedure would follow three stages: before, during and after interview. Before the interview, the researcher should make sure that the interviewees are identified, that access to them is granted and that paperwork from the university was provided. Then the interview questions should be prepared and finalized, and should be time-bounded. Questions were to be sent to interviewees ahead of time, with the necessary covering letter and introduction on the interviewer and the conducted research. The covering letter should include the request

for interview, along with informing interviewees that a transcript would be provided for clarification and any necessary amendment. The researcher also planned to ask permission from interviewees to tape record the interviews. A letter regarding recording permission and confidentiality should be signed by each interviewee at the end of the interview. The main advantage of tape recording is to reduce personal bias towards the data collected (Voss et al., 2002). General questions were to be asked first, followed by more specific ones. The researcher planned to take notes on important issues during the interviews, even though the interviews were tape recorded. At the end, the researcher would ask interviewees for their permission regarding any future follow-up questions. The aim of the interviews was to answer the first two research questions. Interview questions 1-3 were designed to answer research question one, and interview questions 4-7 contributed to the setting up of the new Phase 2 of the data collection plan, where the research question looked into how the utilization of strategic resources contributed to competitive advantage. After the interview, the researcher would write up the interview contextual notes as soon as possible to ensure that he could add his other notes and start analyzing. More detail on the protocol and list of interview questions are to be found in Appendix 2.

4.8.4 Surveys

In the final stage of the research, the researcher used a survey to collect the data for the quantitative approach. As a reliable research tool, the survey analysis allows a researcher to examine the cause and effect of the proposed research hypothesis (Page and Meyer, 2000 in Mir, 2012). The questionnaire was developed based on the literature review-related work in the same domain as the study (Newbert, 2008). In the previous literature, many researchers used questionnaires in similar areas of research, namely, Coleman et al. (2013) on research-based theory, Brouthers et al. (2009) in the area of firm survival, and Adebajo et al. (2010)

in benchmarking. Samples and description of these surveys have been covered above (see Table 16). The survey would be distributed by email and handed to the selected organizations from UAE and Oman. It was found in the literature that the response emailed surveys is low, so accordingly the use of forced answering was recommended, which does not allow the respondent to proceed to the next question unless he/she gives a response to the current one. However, such a technique is quite risky, and might reduce the response percentage. What might be a better idea is to include a 'prefer not to answer' (PNA) if the researcher decides to use forced answering (Albaum et al., 2011). A pilot questionnaire was developed, according to the literature, to be distributed via email to other petroleum organizations in both countries (the UAE and Oman) using Dillman's (1978) total design method. At the same time, the original questionnaire would be developed, with questions on several areas - strategic resources, firm survival, and firm and project performance.

4.8.4.1 Sample size and description

Quantitative techniques allow the researcher to analyse and investigate different aspects that could not easily be explained by using qualitative techniques, such as the identification of general propositions that are reasonably held (Page and Meyer, 2000 in Mir, 2012). It is worth explaining the definitions of some quantitative-related terms. The *unit of analysis* is the phenomenon under study for which the data is collected (Mitchell, 2002). In this study, the unit of analysis is the three organizations in UAE and Oman from which data were collected, using structured interviews and questionnaires. *Study variables* are the parameters of the phenomena that need to be addressed, and which are tested to obtain two main values (Mitchell, 2002), either significant or non-significant, in the relationship, using different software techniques (Echambadi et al., 2006). In this study, the variables were the strategic

resources, factors, competitive advantage and performance. Referring to Mitchell (2002: 60), other main definitions are: dependent variables (DVs) - those whose variation we seek to explain. Explanatory or independent variables (IVs) are those whose variation we look to as possible explanations of the variation in the DV, based on theoretical claims regarding their causal influence on that DV. Control variables (CVs) are IVs believed to influence the DV that are included in an analysis in order to separate their influence on the DV from that of the primary IV of interest. The sample size of the quantitative research is an important factor, and needs to be carefully measured (Forza, 2002; Malhotra, 1998). Studies show that "...more observations are needed to distinguish real effects from random variation of the IV and DV, with at least 5 (and preferably 20) times as many observations as IVs usually recommended" (Mitchell 2002: 60). A good rule is that regression analysis using about eight IVs needs a sample of 107 to show the medium effect size, while it takes over 700 samples to indicate a small effect size (Mitchell, 2002). Another way of choosing sample size depends on the number of items surveyed (Malhotra, 1998). Although a sample size of 100 is desirable, a good rule is that the sample size should be five times the number of items. Accordingly, for the quantitative part of the study, data would be collected from about 400 full-time employees working in petroleum organizations in Oman and the UAE. The researcher intended to use a combination of convenience sampling and random sampling for the purpose of increasing the generalization ability of the relationship proposed between the competing resources and a firm's overall performance and survival. According to the above, the sample size, with description of the focus groups, semi-structured interviews and questionnaires are summarized in Table 17 below:

| Data collection phase | Objective | Type of approach | No. of Participants | Comments |
|-----------------------|------------------|----------------------------|---------------------|------------------------------|
| Pilot Qualitative | Answering RQ-1&2 | Focus group | 4 | From one organization |
| Qualitative | Answering RQ-1&2 | Semi-structured interviews | 30 | From different organizations |
| Pilot quantitative | Answering RQ-3 | Questionnaire | 30 | From one organization |
| Quantitative | Answering RQ-3 | Questionnaire | 400 | From different organizations |

Table 17: Summary of data collection process

The response rate for the focus groups and interviews were discussed above. Regarding the response rate from the questionnaire, in general it is reasonable and suitable to carry out with the analysis. Literature shows that normally the responses to the surveys are low in at around 7% to 10% only (Mitchell, 2002). In this thesis, the response rate was around 35% which could be considered very reasonable and suitable.

4.8.5 Review of Documents

Another source of data is documentation, such as annual reports and minutes of meetings (Stake, 1995), in addition to other documents relating to the area of study, such as company procedures and policies (Bowen, 2009). Another documentation type is archival data, which includes pre-existing documents, emails, audio and video recordings and any other related data (Jones, 2010). It was the intention of the researcher to explore data from the organizations mentioned, especially from those which had websites containing reports in areas pertinent to this research, and the documentation of their project management departments. The usefulness of documentation to this study is that it would give more detail about the roles and resources available in the projects, which would help answer the first question of this research about the availability of strategic resources in company projects. Furthermore, the financial reports at project level and organizational level should give some

insights and understanding about the perceived relationships between strategic resources and project performance, which the second research question is all about.

4.9 Data Analysis

The analysis of this research consists of two parts, because the research follows a mixed-methods approach. The first part is the qualitative multi-case studies analysis, and the second part is the quantitative survey analysis. The qualitative part is based on multi-case studies, in which it is recommended that the analysis starts with a single-case analysis, followed by cross-case analysis (Eisenhardt, 1989). The cross-case analysis is important for a better and more powerful explanation, and more generalizations from the results (Kvale and Brinkmann, 2009; Yin, 2009). The second part of the analysis is the quantitative data analysis, in which the statistics software package (SPSS) is used to analyse the results for interpretation by the researcher. At this stage, the starting point could be having the data displayed in a systematic way. Furthermore, having the sequence of events analysis would be a good addition. This display might be in arrays format, but needs to be connected to events and accidents with a time order view. Doing this should take each case as a single unit, which allows for patterns to be generated from each case before having a general cross-case conclusion.

4.9.1 Single case analysis

There are three possible modes of analysis that can be used to analyse data for case studies: focus on meaning, focus on language, or general analysis (Kvale and Brinkmann, 2009). This research follows the general analysis, because it allows the use of different tools and techniques (Eltigani, 2013). The single case analysis includes preparation of the data, development of the coding structure, magnitude coding and analysis, episodic coding and analysis, and analysis of archival material. A good starting point is to construct a display for

the data in a systematic way so that the reader can draw a conclusion easily. The simple array display is good, but it has to include the events, and issues around the phenomenon, the main idea being to deal with each case as a separate entity, and to allow any pattern to emerge in each case before going on to the cross- case analysis and conclusion. After constructing the data array, the next step is to search for causality on the data, using causal network method in which all dependent and independent variables are listed, and the relationships between them are explained (Voss et al., 2002). In this thesis, the variables would be identified, and once the data were collected and coded, the network analyses method would be used. The dependent and independent variables need to be discussed, describing the meaning of the connection, and building a reasonable set of evidences to discover what relationships are explained, what variables are connected, and which ones are not. At this stage the drafts of causal network need to be amended and tested against the data gathered from the interviews to have the most reliable network against data collected.

4.9.2 Cross-case analysis

After single-case analysis, it is important to perform a cross-case analysis. The cross-case analysis allows for generalization of the results, which can be done by comparing case results to identify which factors affect which results, which gives a deeper explanation (Miles and Huberman, 1994). This research uses the cross-case analysis, along with single-case analysis. To do that and produce a good conclusion from the comparison, there is a simple method to construct an array in the same way as in single case analysis, but this time it needs to be bigger and more detailed. From that array the researcher should identify categories and look for similarities and differences. More detailed tables present extreme cases and/ or two variable matrices. The goal is for well coded data to be analysed and displayed using graphs, arrays or more statistical tests if needed. In summary, the cross-case analysis is a good way to in reach

inside the validity and analysis to get more insight and generalization of the data. Validity means having the correct measures for the concept studied, getting causal relationships (internal validity) and the ability to generalize the study outcomes beyond the case studied (external validity), whereas reliability is the ability to get the same results by repeating the study operations/procedure.

4.9.3 Pilot case study

The researcher's intention was to perform pilot studies for both qualitative case studies and quantitative surveys, because that serves many objectives, such as testing the instruments used and analysis techniques. Furthermore, a pilot study is a good chance to test the rigour of a theoretical framework, and is also a good opportunity for the researcher to practice some skills before starting on the main analysis (Eltigani, 2013). The use of the above data management and analysis guidelines is congruent with the research questions and objectives. Both the methodology and theoretical framework support the choice of such data management and analysis; furthermore, the NVivo package software would be used to help in the management and analysis of the qualitative data. The use of such software is still popular in the literature, and proved suitable for this research domain (Fade and Swift, 2010). The sites of study for this research were petroleum organizations in Oman and the UAE, which were deemed appropriate for the study. Approval of their participation was likely to be guaranteed, as the researcher has many business connections at different managerial levels. In addition, the researcher has started the process of getting the official letters if needed. Communication between the researcher and those organizations had already been established and the results were very positive. Approval for data access was mostly guaranteed and a backup plan put in place in case of loss of data. The chart below is a suggested road map for the data collection process.

4.9.4 Data Coding

The first step in data coding is the transcription of tape recordings, which needs to be done as soon as possible to maximize the data by recalling what happened in the interviews when it is still fresh. Furthermore, it helps to fill any gaps in the data, and to rectify them as soon as possible (Voss et al., 2002). In addition, any idea or event occurring during the interview process needs to be addressed after the transcript and placed in the right group. The researcher planned to use software to help with transcription, and later in coding of the data. The purpose of data coding is to minimize the data collected from interview transcripts into categories. Each category contains incidents/insights of the phenomenon, so that those incidents can be compared to each other, and so that the researcher can develop theoretical properties of the category and dimensions of those properties (Partington, 2000). According to Strauss and Corbin (1990), data coding consists of three stages, which are open, axial and selective coding. Open coding means that data are taken apart and separated. At this stage, the properties and dimensions of concepts are identified and developed. Sub-categories are created based on the events or ideas from the data, and these can then be grouped into categories. Axial coding follows up the open coding stage by rationally grouping and connecting the categories to each other. Finally, selective coding can then be done, in which one main category is identified that relates to the other categories (Voss et al., 2002). Below Figure 12 is a road map for the data collection and data analysis stags.

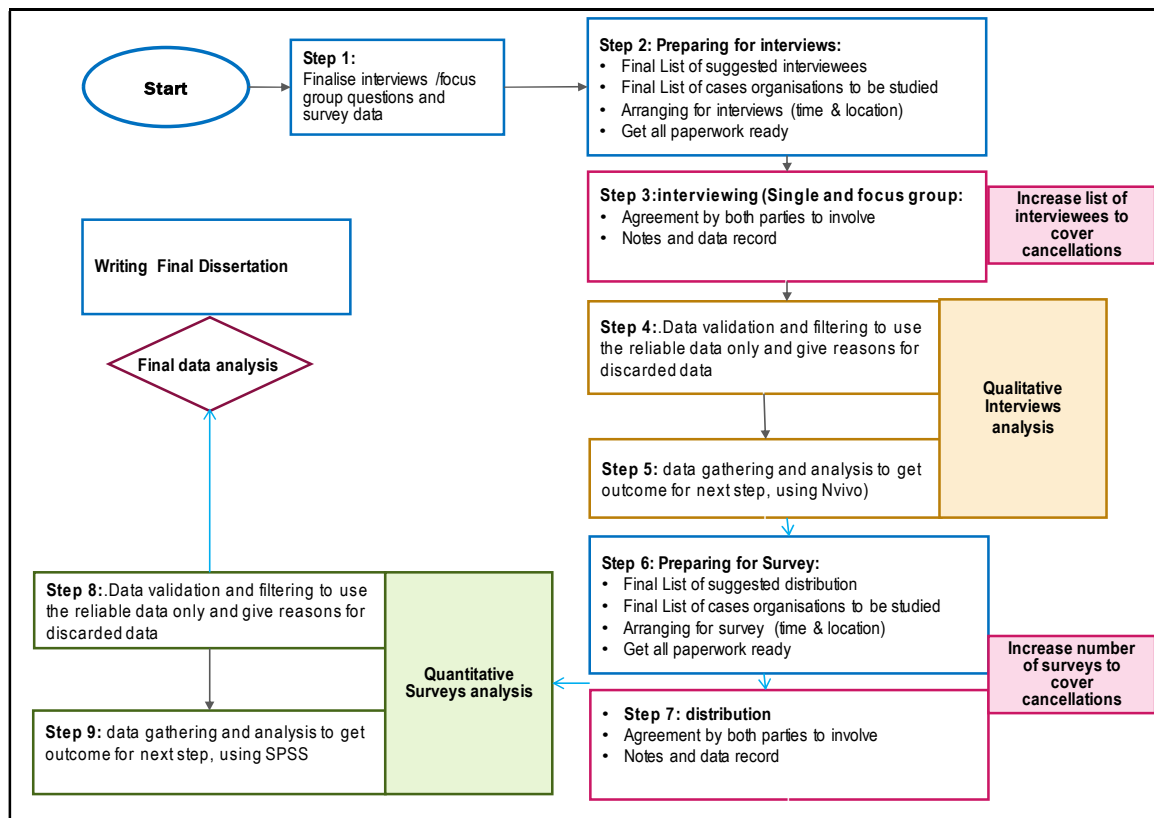


Figure 12: Data Collection and data analysis Road Map

4.9.5 Data description

There was one focus group interview conducted as a pilot, and two semi-structured interviews conducted as pilots as well as shown in the table below. A further 20 semi-structured interviews were conducted after that, along with one more focus group interview (see Tables 15&16). The interviews were both semi-structured, one-to-one and focus group interviews, with two to three participants. All interviews were tape-recorded, as agreed with the interviewees. Participants ranged across different management levels, senior, middle and lower level of management being interviewed, as described in the table below. The pilot interviews were conducted to test the questions for the formal interviews and to check if any additions or deductions were needed in the format. The outcome of the pilot interviews was

good, with one question being subsequently added. Furthermore, the researcher judged it important to give a brief definition of the theoretical meaning of strategic resources according to the literature, before going ahead with the interviews. An introduction to the study and issue of confidentiality was also given to the interviewees for their information. The analysis of the individual and focus group interviews used the same techniques, the purpose of having focus group interviews being to discuss the differences and agreements such workshops might bring to the research, especially in the area of availability and importance of strategic resources in projects. Senior managers and middle managers were interviewed to answer the first two questions. All managers were involved in organizational strategy, including projects strategy, planning and execution. All participants were heavily involved in projects planning, execution and performance reporting. See Table 18 below summarizing pilot interviews information.

| # | Purpose | Position | Interview type | # of participants | Time (mis.) |
|---|----------------|-----------------------------|---------------------------|-------------------|-------------|
| 1 | Answering Q1&2 | Project Team Leader | Semi-structured interview | 1 | 41 |
| 2 | Answering Q1&2 | Sr. Project Engineers | Focus group | 2 | 113 |
| 3 | Answering Q1&3 | Project Engineering manager | Semi-structured interview | 1 | 43 |

Table 18: Pilot interviews

Confidentiality was assured before starting and recording the interviews, confirming that the outcome from each interview would only be used for the purpose of the research, and would not be disclosed outside the context of academic use. No objections to recorded interviews were encountered, most taking place at each organization’s location, normally in a closed meeting room. The arrangement of all interviews was via emails, followed by phone calls to

decide on the timing and place of each interview. The original plan was to have over 40 interviews, but that number could not be met for two reasons. First, it was a struggle for many managers to be involved in any kind of work-related interviews in which they were afraid to give any information that might be confidential, although there was a big stress on confidentiality in the invitation email. Second, there was a long chain of approval in some organizations to allow interviews to take place with their employees. It took a long time to get approval, and in many cases, no feedback on approval was sent to the researcher, despite reminders being sent. Eventually, the number of interviews and participants involved were suitable to achieve the necessary outcome that served the objective of the research and the research questions. Almost half of the interviews were conducted in one organization for two main reasons, the first reason being that this organization had a well-established central project management team, managing multi-billion projects all over the country of Oman. The second reason is that this organization was the biggest and oldest oil and gas provider in the country. Accordingly, it had a long history of oil and gas projects, demonstrating how such projects had been affected by oil prices over the years and how the organization tackled the issue before and after. The rest of the interviews were also gathered from the oil and gas industry, and from bigger oil and gas organizations. Tables 19 and 20 below provide a summary of the focus groups and semi-structured interviews. The titles of all interviewees were stated, but no names were revealed, due to the confidentiality agreement. However, their identities can be revealed during a viva if needed or requested by the examiner/s.

| Interview # | Interview code | Interviewee Position | Time (hrs./Sec.) | Comments/organization |
|--------------------|-----------------------|-----------------------------|-------------------------|------------------------------|
| 2 | F.G.I-2 | Project Team Leaders | 57:52 | Focus Group interview |

Table 19: Focus Group interview

| Interview # | Interview code | Interviewee Position | Time (hrs./Sec.) |
|-------------|----------------|-------------------------------------|------------------|
| 1 | S.S.I-1 | Projects commercial officer | 46.44 |
| 2 | S.S.I-2 | General manager - projects | 77.51 |
| 3 | S.S.I-3 | Senior development manager-projects | 32.58 |
| 4 | S.S.I-4 | Senior project manager | 24:29 |
| 5 | S.S.I-5 | General manager operations | 40:24 |
| 6 | S.S.I-6 | General manager maintenance | 40:21 |
| 7 | S.S.I-7 | Projects manager | 39:09 |
| 8 | S.S.I-8 | Project manager | 37.15 |
| 9 | S.S.I-9 | Project construction manager | 37:05 |
| 10 | S.S.I-10 | Development team leader | 34:31 |
| 11 | S.S.I-11 | Project manager | 30:10 |
| 12 | S.S.I-12 | Project manager | 24.29 |
| 13 | S.S.I-13 | Project manager | 18.46 |
| 14 | S.S.I-14 | Project team leader | 22.39 |
| 15 | S.S.I-15 | Project manager | 43.43 |
| 16 | S.S.I-16 | Operation readiness lead | 50.55 |
| 17 | S.S.I-17 | Project director | 31.53 |
| 18 | S.S.I-18 | Project manager | 39.26 |
| 19 | S.S.I-19 | Project director | 30.31 |
| 20 | S.S.I-20 | Project lead | 27.37 |

Table 20: Semi-structured interviews description

4.10 Limitations

Brutus et al. (2010: 920) stated that “the acknowledgment of limitations is inherently evaluative; an analysis of the content of self-reported limitations lends itself well to a state-of-science exercise”. In their study they found that the concept of adding limitations to social and industrial and organizational psychology is common. In fact, it was found that, for example, 87% of empirical articles published in *Leadership Quarterly* contained at least one limitation, compared with about 75% in *I-O Psychology*. Any good research should include and

address its limitations (Price and Murnan, 2004). Accordingly, the limitations of this research can be listed as following:

- Although the context of this thesis involves two Gulf countries in which oil and gas is the number-one source of income, more Gulf organizations from other countries will need to be considered in future research for a better understanding, and for the possibility of making better generalizations.
- The planned number of cases in this research was suitable according to the literature, but more cases are also recommended.

At the end of the last chapter, the research map was introduced with information about the questions, objectives and underlining theories; this is now the right place to include an updated version, including the data collection and data analysis information. Below is the complete version of the research map.

4.11 The research Map

The research map concept was initiated at the end of the last chapter (literature review), and was to be updated in this chapter, based on the outcome. The research map shown in Table 21 below shows information from the previous chapter, with the objectives, research problem, aim, research questions, rationale and underlying theory. Based on the outcome of this methodology chapter, the research structure was added, in which one of the methodology strategies was in-depth case studies based on the data collection techniques of semi-structured interviews and questionnaires. Finally, the research map includes the high-level method of data analysis procedures. The research map is summarized below, giving a one-page summary of the research main inputs and the methodology to produce the output. This research map is updated again at the end of the discussion chapter, addressing the main

outcomes, the final update appearing at the end of the conclusion and recommendation chapter.

| Current Research Chapter | Research Aim (Purpose) | Research Problem | Research Objectives | Research Questions | Research Rationale | Underlying Theory | Research Structure | Examples of Data Collection Techniques | Examples of Data Analysis Procedures |
|--------------------------|--|---|--|--|---|--|---|--|--|
| | | | | | | | <i>Taken from Handfield and Melnyk (1998); Voss et al. (2002); Stuart et al. (2002)</i> | | |
| Literature Review | To provide a theoretical framework to help explain how projects strategic resources identification and utilization could lead to achieve sustained business for the organization | How can organizations increase their performance and sustain their business by managing effectively their strategic resources at project level? | Identifying the available strategic resources at project level | What are the strategic resources and capabilities available in the organization's projects? | Extend the understanding of resource-based theory to project management literature by identifying and explaining the strategic resource availability and characteristics at project level | Resource-based theory: (Barney, 1991, 1995, 2002, 2011) | Qualitative | Interviews and focus groups | Categorization and insights |
| | | | Investigate the relationships between strategic resources and competitive advantage | How do the project strategic resources and capabilities provide competitive advantage? How can the role of resource-based theory and dynamic capabilities be better understood at project level? | Explore the relationships between strategic resources, competitive advantage, organizational performance and project performance | Bowman and Ambrosini (2003); (Ashrafi and Mueller, 2015) | Qualitative and quantitative | Interviews and focus groups | Categorization insights and Multiple comparison procedures |
| | | | Examine the factors between strategic resources and competitive advantage that help explain the perceived positive relationships between them at project level | What are the factors affecting the relationship between strategic resources and competitive advantage in projects? | Provide the project management literature with an empirical study showing some dimensions of project management that | (Newbert, 2008) | Large scale sample of population, Qualitative and quantitative | Surveys | Multiple comparison procedures |

| Current Research Chapter | Research Aim (Purpose) | Research Problem | Research Objectives | Research Questions | Research Rationale | Underlying Theory | Research Structure | Examples of Data Collection Techniques | Examples of Data Analysis Procedures |
|---|------------------------|------------------|---------------------|--------------------|--|-------------------|--------------------|--|--------------------------------------|
| <i>Taken from Handfield and Melnyk (1998); Voss et al. (2002); Stuart et al. (2002)</i> | | | | | | | | | |
| | | | | | could lead to or contribute to competitive advantage through the strategic resources | | | | |

Table 21: The Research Map: Third revision

5 Results

This chapter will address the results from different organizations in the oil and gas industry sector. The objective of the chapter is to have a representation of the results that support the research aim and objectives, and answers the questions proposed earlier in the thesis. The first part involves the exploration and analysis of the strategic resource's availability in oil and gas organizations projects by qualitatively addressing the interviews. Secondly, the link between strategic resources and competitive advantage is explained, and quantitative analysis is provided on the relationship of factors affecting project and organizational performance.

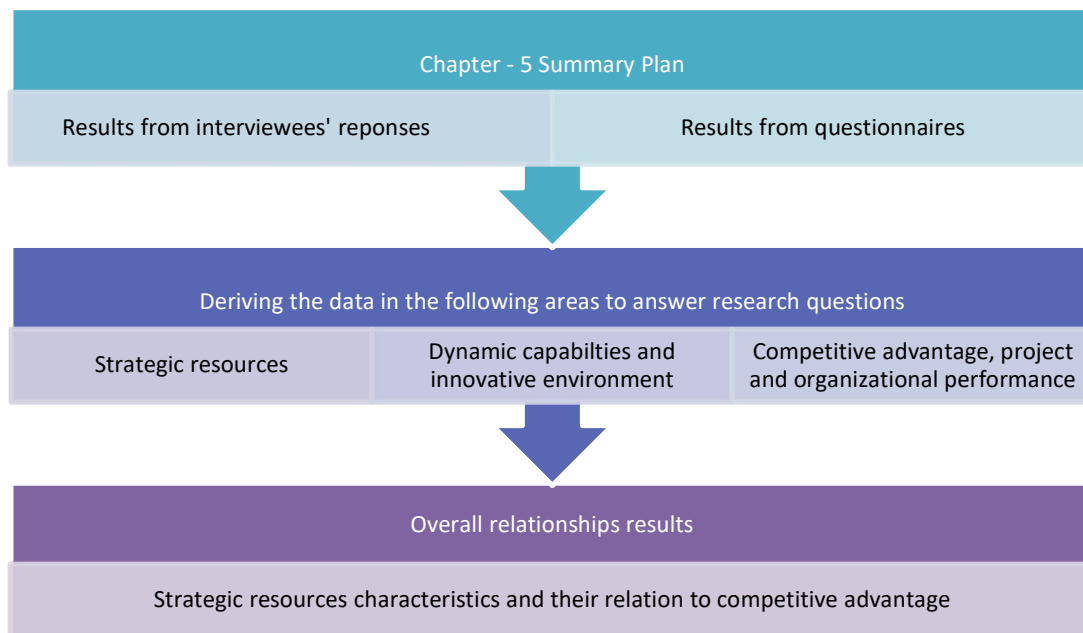


Figure 13: Chapter 5 Plan forward

The above Figure 13 presents the plan forward for this chapter as follows. The chapter starts by addressing the data from interviewees and questions different areas again. The areas of discussion are chosen in relation to the research questions. Finally, an overall summary of the relationships will be presented and discussed. It should be noticed that, the results around

research question one is totally based on the outcome of the interviews, and accordingly lists of resources and capabilities will be presented. Those lists are derived based on three main criteria: first, the importance of those capabilities and resources to project success; second, the number of times those capabilities and resources are mentioned in interviewees' responses; and finally, based on the implicit understanding of the information extracted from interviewees, and how this converts to an understanding of resources and capability. Based on those three criteria, the valuable, rare, inimitable and organizationally supported resources in projects are listed. In addition, the capabilities relating to them are also listed again, based on the same criteria. The results representing research question two and three are from both the interviews and questionnaires. This means that the results from the interviews and questionnaires are interspersed for this part. Same goes with the results about the contribution to theory proposal presented at the end of the chapter, they also from the interviews and questionnaires.

5.1 Strategic resource availability in projects

This section is an attempt to answer the first research question, which asks: What are the strategic resources and capabilities available in an organization's projects which give competitive advantage? First, the strategic resource availability in the project is tested, the idea being to check the managers' views regarding their resources, and to consider what definition of strategic resources the company should have. Furthermore, the first four questions in the interviews are trying to check what strategic resource characteristics (valuable, rareness, inimitable and organizationally supported) are available in projects, and accordingly answer the first research question about resources - whether they are strategic and available in the projects. The first research question is: What are the strategic resources and capabilities available in an organization's projects that give competitive advantage? The

first interview question is about the value of strategic resources: How do you define valuable resources and, if possible, give some examples? The aim of the question is firstly to understand how project managers and senior managers define valuable resources, and accordingly through examples, to discover how they perceive the advantage such resources add to their projects.

5.1.1 Strategic resources availability: the valuable characteristic

This section describes the availability of strategic resources in organizations, and especially in projects. To answer the first research question, there are five main sub-questions to be answered. The first research question asked what strategic resources and capabilities were available in an organization's projects that gave competitive advantage. The five main interview sub-questions were: What is the definition of the strategic valuable resource in the organization? Is the strategic resource valuable? Is the strategic resource rare? Is the strategic resource inimitable? Does the strategic resource have the necessary organizational support, and finally how does the strategic resource impact and affect the competitive advantage of the project? The first interview question invited a quick and short answer about the availability and definition of strategic resources and what they are, whereas the answers to the rest of the questions would test to what extent the resource-based theory is correct in terms of what the characteristics of strategic resources in the real world are.

5.1.1.1 Definition and types of valuable resources in projects

In this section, the first interview question was proposed to give insight on the definition of valuable resource and identify the valuable resources in projects. The interviewees were given an introduction to the study and then asked the first question. The majority mentioned human resources as the most valuable resource for any project, but they had different views

on what capabilities that valuable resource should have. In projects, resources are always related to the project phase, what you need today might not be important tomorrow, or what is strategic at the planning stage might not be strategic on execution. That view was expressed by several managers:

“...in projects we are trying to go from A to B, and sometimes from A to Z, and in certain cases the valuable resources are the one helps you to move along that journey; Sometime some resources will not help you to reach all the way, one resource might take you from A to B and another resource help you to go all the way, so that is what we consider as valuable resource” (S.S.I-1)

The feedback on the phase of projects and valuable resources is worth mentioning. For the project manager, the time spent acquiring resources mattered as much as the experience of performing the task. Interviewee-14 stated:

“The valuable resources are to have the right resource at the right time, because what we saw as a success factor in project is to have a valuable resource, but you should have it in the right time, because sometimes you got the resources at later stage of the project which will not be helpful to the project anymore” (S.S.I-14)

Another interviewee (a project director) expressed the same idea of the importance of certain resources at certain times during the project:

“...any project at execution phase requires certain capabilities to execute, including engineers, procurement, fabrication phase or construction phase, and that the type of resources that we need varies at different phase of the project, so to start with when we require certain type of the concept engineer and at the end when you are looking at execution phase require different type of engineers, so the discipline and the nature of resources varies all the time” (S.S.I-17)

For the majority, the most valuable resources were related to the human element, and, more specifically, to their capabilities. However, the time factor also matters in projects (Project Management Institute, 2013). The interviewees were asked to define valuable resources under the question: How do you define valuable resources and what are the types of valuable resources that you have? Their definitions ranged from saying that everything was valuable to more specifically saying that the project manager, talented employee or visionary leader

were valuable resources. In between those two answers, almost all agreed that human was their number one valuable resource. Other interviewees (Interviewees-14 & 18) did not specify an exact definition, but agreed around the area of valuable resources. Below, one project director expressed his definition of a valuable resource:

“Everything is valuable resource for us” (S.S.I-14)

“For me a resource that fit in the project is a valuable resource, anybody that is required to first in a project or a project team is a valuable resource, so regardless of what or how critical that activity is, everybody in that project is a valuable resource” (S.S.I-18)

Most of the interviewees’ thoughts revolved around the general concept of the human being as the most valuable resource; but few gave a clear definition on what a valuable resource actually is:

“Valuable resources are the ones that brings positive outcome and results when used correctly. And their impact is noticeable” (S.S.I-11)

However, all gave examples about what valuable resources were in their own projects, and what skills were involved. In a more detail, three themes that can be seen as evolving from the semi-structured interviews regarding the availability and the type of strategic resources a project has, or should have. These are: human resources only, human resources with other types of resources, and human resources with a specifically named function. The interviewees stating that human resources were the most strategic and valuable relied on the idea that, for example, other resources were easier to obtain than human, other interviewees (Interviewee-2, 4, 6, 7, 8, 9, 11, 13, 14, 15 & 17) stating this in different ways:

“...so, projects can have the needed budget and physical resource but what differentiate one successful project from a failed one is the people.” (S.S.I-2)

“Valuable resources for me is to the one to do with man power, that is first thing click in my mind, because if you do not have the resource you need you will not be able to do your task” (S.S.I-4)

“Let me say that strategic resource is the one has visionary thinkers, who will bring the strategic and visionary thinking, and those visionary thinkers are very rare, and that is a main resource for any project, it brings SUCCESS to projects, they will bring quality perspective. And they are looking into the big picture and so they have an important impact to the return in investment” (S.S.I-6)

“See basically resource wise first think is human, because human is driving the things, if you talking about strategic is someone who can foresee and look ahead so this kind of foresight is comes with experience, education only will be helpful alone and there need to be skills related and experience” (S.S.I-7)

“I think in my project the main strategic resources are human, in order to execute any project, you need to have people who have the required skills to drive the project forwards” (S.S.I-8)

“Wells, the talent, those are the talent people those who can decide shell we do for this project or this technology, in our case shell we do horizontal drilling or deviated shell we use this type of technology such as rotary steerable system RSS or not, so the decision talent is the most needed strategic and valuable asset and everybody is fighting for it” (S.S.I-9)

“Well, if we look around there are not much of strategic resources like human, people are the only force you may call strategic from my point of view, so that comes first, all other resources are actually managed by human to achieve his/her goals” (S.S.I-11)

“I more deal with human resources, I am not a project manager, I am head of design section, definition of resources depends on the scope of project and that what will define which project will be available in the project” (S.S.I-13)

“The valuable resources are to have the right resource at the right time, because what we saw as a success factor in project is to have a skilled resource yes, but you should have it in the right time, because sometimes you got the resources at later stage of the project which will not be helpful to the project anymore” (S.S.I-14)

“Well, it depends on the type of the project and the scale of the project, and when I said the scale of the project, I am talking about the CAPEX the capital plus the complexity, so in majority you will need an engineering team and project management team and you need the quality team” (S.S.I-15)

“Well, any project at execution phase requires certain capabilities to execute, including engineers, procurement, fabrication phase or construction phase, and that the type of resources that we need varies at different phase of the project, so to start with when we require certain type of the concept engineer and at the end when you are looking at execution phase require different type of engineers” (S.S.I-17)

Extracts from Interviewees-1, 3, 5, 12, 16, 18, 19 & 21) stated that in addition to human resources, there were other resources that should also be considered as valuable:

“...an office is a valuable resource because without it you cannot function the computer, so that is the hard ware, the most important resource is of course is the human capital in any ideas and the intellectual capability in the subject you are trying to define or the project you are trying to take forward” (S.S.I-1)

“I think the most valuable resource in our industry is first to have access to financial cash flow from the shareholder who are investing on the projects we are doing, second you need to have people with enough experience in different areas, also you have to have the area of the raw material itself, in this case the oil” (S.S.I-3)

“In Orpic we have two main valuable resources, talented human and the process to develop them” (S.S.I-5)

“If you look at it, to me the resources are one of the main input to any project, for example when you do a technical evaluation of a contractor, one of the main issues which we are screen them against are the resources and the resources, are not only people, its people, facility, experience, ability of mobilizing resources, so it’s very important and it’s one of the main element in the evaluation” (S.S.I-12)

“for me a resource that fit in the project is a valuable resource, anybody that is required to first in a project or a project team is a valuable resource, so regardless of what or how critical that activity is, everybody in that project is a valuable resource” (S.S.I-18)

“in any project, small or big, the selection of key resources or personnel is very important, this is coming from project manager, commercial manager and project services, quality of the project and also the site construction team also have very important, same as safety people, these are key personnel for us, so if you want to have a successful project then you need to have a good selection of the team” (S.S.I-19)

“I guess I can see two things in valuable, I see that there is a people component, well there is a number of things people bring value as do physical resources so maybe lets first talk about people you certainly have to provide the strategic people at the right time to support project and then phasing those people we certainly do not want to be late in bringing the strategic resources to the project as far as the man power staffing that required and the knowledge come with those people at the right time” (S.S.I-16)

“Culture, the positive environment in the organization and the good relation between the team... ..Human resources, the company attract the best in market and the company is good on keeping the employees and that increase

loyalty...Government support, the company and employees feels safe about future” (S.S.I-21)

It is interesting to see that few interviewees thought that a particular position was a valuable resource. One said a good project manager was a valuable resource, yet not the only valuable resource. The extracts below are examples of such opinions. The extract from Interviewee-2 suggests that positions such as those of project manager and project director are the most valuable resource for a project. Any other resources are available and easy to get:

“The problem now on how many project directors are out there that they know how to manage and control projects, if you study all projects, cost variance 30-50 % is very common, time variance 100% is very common, once you have a four-year project and you do it in 8 years, then you kill the project, and if someone else can do in 4 years then the only difference is the management, because everything else is same, money, contractor, equipment, the difference is quality of people” (S.S.I-2)

Another project team lead (Interviewee-20) thought that his CEO was one of the main strategic resources of the organization, the reason being:

*“the resource must be valuable to be strategic, again one example is the company CEO, he is not only a leader but basically technically strong and helps a lot in providing his experience available whenever its needed. In an addition the value added by the team work and the amount of experience is high. Although the company is insignificant compared to large organizations but still the cooperation between people is high which brings lots of values to get the project done.
” (S.S.I-20)*

while a general manager (Interviewee-6) thought that a visionary thinker like himself was the main strategic resource in an organization:

“Let me say that strategic resource is the one have visionary thinkers, who will bring the strategic and visionary thinking, and those visionary thinkers are very rare, and that is a main resource for any project” (S.S.I-6)

A summary of the above is shown in Table 22 below:

| Type of valuable resources | Human only | Human with other resources | Specific positions or skilled human |
|----------------------------|------------|----------------------------|-------------------------------------|
| No. | 11 | 8 | 3 |

Table 22: Resource availability summary

The table describes the three main themes concerning valuable resources. As can be seen from the following, 11 out of 22 thought that only human resources were valuable in projects, and 8 of the 22 believed that human was the main valuable resource, but there were other resources such as physical and financial, which could also be considered valuable in projects. Three out of 22 thought that not only was human the most valuable resource, but within human resources there were more specific positions or roles considered as valuable, such as those of project manager and technical safety engineers (see Appendix I for more detail on the answers of each interviewee).

5.1.1.2 Capabilities

This section aims to explore the capabilities needed for valuable resources to become strategic, and the main capabilities and skills that project resources should have to increase the performance of their projects. The answers are interviewees' responses to the interview questions regarding the capabilities needed to support the resources, and also on resources as a source of competitive advantage. The interview questions were set up mainly to answer the second research question on how strategic resources and capabilities provide competitive advantage. The relationship between valuable resources and capabilities was clear in most of the interviewees' answers about the human factor, and the skills, experience, knowledge, exposure to work, etc. Many capabilities were reiterated across the interviews regarding the

skills and competencies that project workers should have. Working in a team and the ability to communicate with other disciplines was important to one project commercial director (Interviewee-1), along with leadership style, especially for those in higher management positions. He stated that:

“first, multiple kind of skills, ok, can they work in a team, are they able to see beyond their own areas, that is very important for me as a manager, because if have people who is working are insiders (not looking above their duties) I will not deliver a project, individual do not deliver a project, team is delivering a project. And when you have team you need people who can look above their shoulders and talk to each other, people who are abler to talk, so people who have cross discipline skills, because their understanding will be more valuable for us, then I am looking in leadership skills especially for people in leadership positions, people who can manage their team and manage their resources. Also making sure that a smallest level of management is between the leader and the engineer or staff executing the project” (S.S.I-1)

A plant project director (Interviewee-2) listed many capabilities which he considered important for a good project manager, and which he believed to be among the main strategic resources in any project. Fairness to all disciplines, communication, encouragement, project control system and helping employees over personnel issues were the main capabilities a project manager should have, while being technically strong was not mandatory in his opinion. Directly managing onsite/offsite all project activities should lead to the elimination of all unnecessary changes:

“First Project manager should be fair with all disciplines, second he needs to be a good communicator and if he can communicate with all people in the project if possible. Third thing he has to encourage the below average group of people, 80% of people in the project is below average and if you neglect them then you are only managing 20% of the project force...the fourth skill is the project manager should have a believe about a project control system, the planning and schedule, that is a huge part of controlling a project, there are thousands of activities to do and control so you must believe on project control system. The fifth skill is to connect with people about their personnel issues and problems, if you are approached by them do your best, the sixth one is he should be with the team inside the project in the construction area...then as project manager should limit and reject any unnecessary changes in the project. People comes with all sort of ideas and lots of them are good but the timing is bad, if you consider every good idea you will end up running behind time and over budget” (S.S.I-2)

Although the above project directors did not explicitly state the need for experience, one senior development manager (Interviewee-3) stated clearly the importance of this, as along with many other interviewees, he believed that the main valuable resource, capability, amounted to relevant experience in the same area of work, and that if the experience was in the same geographical area it would be even better:

“Well, it depends, for the key things, we state it clearly that we need people with an experience in specific areas for example 10 years in north Oman as a reservoir engineer, and normally Omanis are not available and you need to look for expats. But for non-key positions we take graduates or train our own people” (S.S.I-3)

Experience, along with qualifications was a main capability for a head of project design, along with management and effective communication with all stakeholders. Sharing a similar view, project managers (Interviewees-4 & 8) from a large oil and gas organization offered more explicit statements on leadership capability, both being in agreement about risk management as an important skill, along with other project management skills:

“There are certain skills we need to look at, for example having certain experience and qualifications... you need somebody who have very good communication skills within the organization, within the shareholders, within all the stakeholder, contractors, venders, etc., there also need to be a level of experience in managing the risk within the project, and how he is going to mitigate those risks, also he have to have skills on how he manage the contractors, contract management and venders, is he have that capability of management such an international contractor for example, also local contractors, for bigger projects we use to deal with international contractors and those guys are have like organization they have legal, finance department which is unlike you know when you are having small projects, you know, half a million, you will have a local contractor who understand also the risk and the project within the country and he know ow he is associated with that, the culture and everything so the project manager have to have that knowledge of dealing with such situations of contractors and contractors communities, so that is it” (S.S.I-4)

“Also, your people who already have experience they have the history of projects knows the challenges and lesson learned. From other side you need people who have management skills, planning, risk management, stakeholder ect, and they should have the leadership style” (S.S.I-8)

Interviewee-6 believed that the valuable resource should have what he called “innovative leadership quality”, with the ability to follow objectives and take action accordingly. He shared the same view as the construction manager from another oil organization, but with different wording, emphasizing the taking of decisions. This respondent assumed the resource was human:

“First of all, thinking outside the box, should have innovative leadership quality. Leadership should have thought on strategic objectives and follow to implement and take actions to implement, if you see when bill gate started, he started from a basement and then he develops the systems and believes on him self’s” (S.S.I-6)

“Actually, the guy should be able to make decision that will affect the spending of money, so the more the decision is affecting the amount of money spend the more that resource is needed. In a positive way of course. Second thing is the team leads and project managers that fits the projects are mandatory, and affecting the project, I gave you an example, recently they changed the management here. Now the projects are finished faster, cost is reduced around 7 million and also the design is customized” (S.S.I-9)

The necessary capability, as one project manager opined (Interviewee-13), was related to the official technical authority of a leader, technical authority meaning to what level, managerially

or financially, the leader is allowed to take actions and approve bills. People with the authority are known, and previously tested and trusted that they have all the necessary technical capabilities, so that they can use their authority to make decisions faster, and accordingly save time, and probably cost.

“...you need the resource who have the technical authority this is important that this resource is certified to take decision to a certain limit (money wise), we called it technical authority, you need to make sure that this person works with similar projects before and he is not coming with you to learn, because sometimes function are asking to send people for training in the projects so you need to be careful of what you got from function, and that is fine but as an additional to the experienced people and even for those trainees you need to be involved in their choice to be part of your project, because if this trainee has a good understanding and attitude to learn fast you could use them as a full stuff and give them tasks to do, and that makes the work executed better. Also, the communication skills are there, especially how to deal with outside stakeholders like vendors/ contractors, those are the things that we are looking at when hiring a resource for a project” (S.S.I-13)

One main feature that some managers (Interviewee-14) raised is the project phase for which the resources are needed. During the planning phase the resources needed are different, or may not be as critical during a different phase such as execution. A project team leader saw this as an important issue, to be raised, discussed and agreed on up-front, the justification being that having the right resource at right time would always be advantageous to save time and reduce change, hence saving money. For instance, in some phases, you will not need an experienced engineer, which can balance your need for more experienced engineers later on:

“It really depends on project phase, for some critical phases you will need resources with special skills, for example number of years of experiences and capability and that is way in the initial phase you need to take all the lesson learnings and avoid changes in the later stage, and that decision really needs a competent engineer with the right experience, so you will not have many changes that affect the progress, Now for example in construction phase you do not really want very experience resources there, because they will be mainly implementing whatever decisions are taken already in earlier stages by other resources, also there is one important role in our projects recently start seeing it, the role of information management engineer, his role is very important as he helps the project manager to deliver the project in the right format and deliverables, so even if some of the resources are not need at the early stage, but having them from beginning will really insure a smooth implementation/execution and handover later on and also some projects are being executed outside the company vicinity so the communication in a main skill and role in those projects as well” (S.S.I-14)

For a project director (Interviewee-17) from a large oil and gas organization, the project valuable resource should have the capability of self-motivation and being self-driven, which, together with risk management capability and focus, was mandatory:

“well its combinations of skills but the main thing is they need to be self-driven and motivated and they do not need to be supervised at all times, they are risk focused, they are very energies, and they are able to integrate different aspects of the project, and not only focused on their areas of specialization, so when needed he can look to one thing and said ok but this need to be integrated to other things and then optimize to find out a solution that still control cost, time, quality and scope, so looking for the big picture” (S.S.I-17)

Some project directors and managers (Interviewees-18 & 19) focused mainly on project management skills as the main skills needed, so the ability to manage project phases, control projects and manage people were the main requirements, along with exposure to a multi-cultural environment:

“a project is judged how successful you execute your schedule, money you have used, quality of what you deliver, how safe you did the work these are the criteria of successful project. so, to me one of the most successful criteria of a project manager is how he managed his people. if you managed your people well you get the best out of them, if you give support, you give them space to operate you are not on top of them all the time, you act as a leader other than a manger you do not do micro-managing, you steer them and coach then but let them do the work, give them responsibility to take decision, and you need to know when to intervene

and help them, but you need to be clear on what you expected from them and what you need them to do” (S.S.I-18)

“For me the most of almost is experience of the people we look extensively to their CVs and we go through his soft skills, and one main this is has he worked at multi-culture environment, we look also on what he achieved, the achievement of the candidate, the personal achievement and the business related achievement in projects, so that are the areas we looking for” (S.S.I-19)

The following Table 23 is based on the interviewees’ responses on the valuable resources in projects, and then after that Table 24 summarizes the capabilities in projects.

| No. | Strategic valuable resources in projects |
|-----|---|
| 1 | Skilled, talented and capable human resources that fit the project |
| 2 | IT application and computation knowledge |
| 3 | The access to financial cash flow |
| 4 | The process to select and develop talented human resources |
| 5 | The ability to exploit resources |
| 6 | Positive culture that motivates, supports and keeps human resources |
| 7 | Project manager / Director / Leader |

Table 23: Strategic valuable resources in projects

| Capability | Interviewee response |
|-------------------------------|---|
| Relevant Experience | We need people with an experience in specific areas |
| | People who already have experience and have the history of projects know the challenges and lesson learned |
| | Need to make sure that this person works with similar projects before and he is not coming with you to learn |
| | You will need resources with special skills, for example number of years of experience |
| | For the experience of the people we look extensively at their CVs |
| | For example, having certain experience |
| Relevant Communication | People who can look over their shoulders and talk to each other, people who are abler to talk |
| | He needs to be a good communicator and if he can communicate with all people in the project if possible |
| | You need somebody who has very good communication skills within the organization, within all the stakeholders |

| | |
|---------------------------|---|
| | Also, the communication skills are there, especially how to deal with outside stakeholders like vendors/ contractors |
| | Worked in multi-culture environments |
| Leadership | Then I am looking at leadership skills especially for people in leadership positions |
| | For example on the last few years' collaboration, leadership was one of the main areas, we measured ourselves department against a department |
| | Should have innovative leadership quality |
| | Well, first of all - in the leading positions - is the leadership skills |
| | And they should have the leadership style |
| | Who also have leadership capabilities in project management |
| | Self-driven and motivated |
| Multidisciplinary | So, people who have cross discipline skills |
| | My team is multi-disciplinary and multinational |
| | Not only focused on their areas of specialization |
| Project management | Believe in project control system |
| | Strong involvement with project team at construction location |
| | Limit and reject any unnecessary changes, decision maker, risk focused, information management knowledge |
| | Managing people, integrating different aspects of the project |
| | Project management skills (contract, finance, planning, risk, stakeholders) |

Table 24: Project dynamic capabilities

The above two tables (23 & 24) list both the valuable resources in projects, and their associated capabilities. Both were combined and retrieved from the interviewees' responses. The valuable resources are listed based on the frequency of the respondents mentioning a resource either explicitly or implicitly, and on focusing more on the high managerial level interviewees from different organizations. The same thing goes for capabilities, similar ideas and sentences representing one theme. The researcher first collected all the above-mentioned capabilities and then grouped them into more specific categories, fine-tuning the title of each category to represent all responses.

5.1.2 Strategic resources availability: the rare characteristic

This section aims to investigate if rare resources exist, and what could be a good example of such resources in projects. The interviewees were asked to respond to the question asking

about rare resources and their availability, and to give examples from their projects. The interview questions were set up to answer the first research question about the availability of strategic resources in projects. A main characteristic of strategic resources is their rareness. The answers were different and mainly ranged from a response stating there were no rare resources, to agreeing that there were rare resources, or somewhere in between. Some interviewees raised conditions or cases in which we could call a resource rare. The following quotes give a more detailed view in that area. The responses of the interviewees can be easily separated into three main streams: the interviewees who agreed that rare resources existed and gave real examples; the second stream are the interviewees who agreed that there could be rare resources, but it depended on certain factors and conditions, which gathered the majority of responses; and the interviewees that thought there were no rare resources. Five project managers from different organizations agreed that rare resources existed, four of them giving examples, such as talented project manager (see extracts from Interviewees-2 & 8), employee development programme (see Interviewees- 5) and good cost estimators (see Interviewee-18). Their statements appear below in more detail:

“Well, yes, the good project manager is defiantly rare, you might have for example 9 mega projects running in this country and yet only one is successful, why, everything is same like other projects but only the human the management can be different” (S.S.I-2)

“About rare resources, the one rare resource Orpic have is the program that they have to grow people in addition to the idea that the company expanding, and employees knows that the priorities on those chances are for them mainly, so each employee focusing on completing their tasks and work assigned to grow up. Then the idea is how to select the right guy, the best way is the direct contact with them and the continuous communications. In addition, employees are having some skills more shining then others, so you place the right guy with right skills to the needed right project” (S.S.I-5)

“Yes, indeed, having a good people for example in project management with the skills needed is rare, having the smooth process to plan and execute projects is rare, not all organizations have that for sure. In our organization we are trying to

do things faster and so far, we succeeded on that, we are executing project much faster than PDO. So, you can add the way of doing things here is rare and strategic” (S.S.I-8)

“Yes, I would agree, I mean I can give example, a good cost estimator can save you millions, I saw both types, there are cost estimator who can save you money and there is other cost estimator who are doing cost estimating only not saving any money, so he will give an estimate to that item then that it, but you have other who will go an extra mile and challenge the contractor to say this is not right, do not pay this and then he save you cost” (S.S.I-18)

The second stream, as shown below, agreed with the concept of rare resources but under certain conditions, such as highly technical people with particular experience was a very specific area, or the key positions in projects when there was a peak in running projects in the country or globally, so the time factor played a role. Some rare resources – as per some interviews – were daily physical resources such as project IT and control systems but were important because of the way those resources were executed and managed. One might say that the process or roles defining a process are rare, and accordingly that makes the execution rare. In similar vein, rare resources sometimes involve communication and the way it is used to support a project, together with the shared knowledge between different parties. These rare resources and the explanations by interviewees are explained below in detail, using their own wording:

“I think it depends on the market and the experience you are looking at, for people its quit hard to find people who have over 10 years of experience is specific areas because all organizations are looking and projects are picking up, but you always can find people with 6-7 years of experience they are available, so for example finding a good project manager for major project is difficult, so sometimes we need to rely on head hunting, in physical resources there are technology that is rarely used but it do not last rare too long. When it comes to financial resources, we are non-profit organization, so the financial resources are always available, the only thing is that when we need a budget for a project we have to raise a request with justifications to the shareholders and then if justified we get the money” (S.S.I-3)

interviewee-3 thought that there were no rare resources as such, but some good human or new technology might be hard to get. Also, rareness was always related to time. So rare resources could be rare, but that rareness is only valid for a short period of time.

“Well, I would say it depends, if we talk about human in a key positions then yes, they are relatively rare, as said before we changed the GM in here and things are driven faster now, so this new guy is not same as that guy plus he did a great job in a short period of time so this kind of leadership is rare. So let say valuable resource who also have leadership capabilities in project management is rare” (S.S.I-9)

This project manager (Interviewee-9) and Interviewee-18 thought that there were relatively rare resources, the condition being the skills in project management and leadership style.

“ ok, it basically depends on what time you come, if you come at the peak , then yes everybody will start hiring the good people then getting the qualified staff is difficult, then at the time it’s how lucky you are to cover the area needed in the project, for us our project comes at the oil price reduction period, and there are not many projects are running and will be executed by our company so we found what we are looking for in term of resources, but if we are talking in the period before 2012 then the company was so busy with projects and at the same time other organizations are picking up in projects and start attracting people to join them and our company was the main source for good engineers and people in the market so we lose many good people and it was hard finding excellent candidates for our projects. so yes, it depends on the timing and external and internal factors” (S.S.I-15)

“It’s difficult, well when oil prices are down there was lot of resources but now what we seeing the market is hitting again, so it’s difficult to get the competent resource with the right attitude and skills” (S.S.I-18)

According to the above extracts, good resources could be rare, depending on the operation time and the internal and external market demands.

“I would say typically they are rare roles, typically the resource is available for you somewhere globally, you need to understand first which rare resource you need and you need to identify that quickly and then try to get it, so there are few of them but not one, and if you really need them then you need to considers them from beginning, so yes strategic resources rare quit rare, so nowadays with the oil price down more resources are available so what was considered rare before is not necessary rare today, so Sulphur recovery technique experts in the past was a western experience and only there you may found those technical resources but now with that technique is used especially in UAE, those resources are more and

more are available now and local engineers are getting trained and exposure to that experience. but in general yes there are some specific positions rare around the world and to get them it's a matter of money" (S.S.I-16)

The above Interviewee-16 agreed that there are rare resources, but the main condition was money and how much a company was willing to pay to obtain such resources. Interviewee-17 below addressed the same idea:

"well, yes, it depends, for example you could find project engineers relatively easily, process engineers in certain areas are more difficult to find, good strong commissioning engineers and construction managers are also difficult to find so yes, there are rare strategic resources, one main reason why those roles are rare is that most of the people do not like to spend their career in site so they move to office positions and we lost them as good field staff" (S.S.I-17)

Another interviewee thought that there were rare resources, but mainly because the good experienced people onsite do not like to spend their whole career there, so to find good people for site position was quite hard. The rest of the extracts below mainly address rare resources as communication and the way organizations find and develop talent. Interviewees from focus group-2 and interviewee-14 believed that communication was a main skill that any project practitioner should have:

"Rare resources could be also the communication especially with the local community. specific side of knowledge, specialized employees, they are existing but rare" (F.G-1)

"comparing both companies working with, the current company have this project control system and team. The system in Orpic is to have project-based organization, each major project is dependent in human, financial, ect... Agreed with Musabah that Orpic and SRIP project, it's a normal way of doing things to get people knows what others do. The synergy between all parties" (F.G-2)

"project control system is rare, the communication with other departments will not make employees doing less in their jobs but helps on seeing the big picture of the project" (F.G-2)

"the communication way in project is rare, all taking the same language. People are interacting from different departments, so everybody is aware on what others doing. Example is doing presentations every month discussing various aspects from different departments" (F.G-2)

“it has factors really, it basically depends on number of projects going on at one time, so when many projects are executed then the good resources are limited. sometime the planning is not proper to recognize from the beginning the needed resources. so you need really to start from the early stage, when you have a forecast on what you need you then can get a good resource, so that you informing the functions you are getting the resources from in advance so they also can plan for a replacement.so the selection first by roles then we select by names, some engineers come directly and some will come through a matching panel which decided if that resource is actually fit the position” (S.S.I-14)

The final stream in this area of rare resources were responses from interviewees who believed that all necessary resources were available to them and their competitors, and there were actually no rare resources. The justification for this is either that the organization was large, had all it needed in the area of resources and if there were any limited positions needed from outside, then the shareholders would support it. The possibility of finding a genuinely rare resource that was difficult to acquire was very limited. Interviewees-13, 4, 1 & 7 agreed that resources were available, as long as good budgets and support from their organizations were forthcoming:

“In our projects, people are available because we have a full CPD team and you may also choose from functions, for example in our current project we get very experience people and sometimes with big roles, because this is a large project and needs more experts and experience personnel, and the company supported us to get what we need look for. Sometimes in limited roles we did a recruitment campaign and we get engineers from outside the company. A good attraction to such projects is the expose that people will get and the experience they will gain so people are willing to join the team, that is also helps” (S.S.I-13)

“Yes, but if you are looking to CPD we have for the key positions they are Omanis we have almost no experts, and all the discipline leads are Omanis, we have resources coming from outside only when we do not have the needed skills, so we got resource of those skills from outside company. At the beginning when we created CPD we recruit the people that we do not have internally” (S.S.I-4)

“it depends on the market, there is nothing called rare resources, everybody is available and things being done, but there are certain skills in the project, sometimes you have unique project maybe one or two three project in the world, it is very hard to find the people with the needed experience in that case you can call it rare strategic resources, but off the mill projects there is enough people to

take it forward, but there is a competitive market so there is a competition for the resources then all of the sudden the resource become strategic because there is so much competition for it” (S.S.I-1)

“If look at my organization is nothing rare all is very well placed” (S.S.I-7)

The following Table 25 summarizes the rare resources in projects, based on the interviewees’ responses.

| No. | Strategic rare resources in projects |
|-----|--|
| 1 | Skilled, talented and capable cost estimator that fits the project |
| 2 | Well defined project control system, including IT/logistics |
| 3 | The way of executing communication |
| 4 | The process to select and develop talented human resources |
| 5 | Skilled, talented and capable project leader who fits the project |

Table 25: Strategic rare resources in projects

Table 25 above represents the rare resources available in projects according to the responses of interviewees. As can be seen when comparing Table 25 with Table 23, some project resources have both characteristics of being valuable and rare, such as talented human resources in general, and project leaders specifically and the way of selecting and developing talented human and IT applications.

5.1.3 Strategic resources availability: the inimitable characteristic

This section describes the characteristic of inimitability in strategic resources and its existence in the project area. Inimitability means difficulty of competitors in copying a resource. The question asked in the interview was about the possibility of having inimitable resources in projects, and if those resources were available, then what they actually were. These interview questions were set up to answer the first research question about the availability of strategic resources. According to resource-based theory, one of the characteristics of strategic resources is inimitability. The responses from the interviewees followed two clear streams.

The first stream was the rejected party, where interviewees did not think that there were resources that could be copied. The second stream either accepted that resources could be copied, albeit only a few, and others were not really sure, or did not give a clear answer in this regard. The following project manager believed that human strategic resources could not be copied, because a good project practitioner had different skills and experience that made him unique. Likewise, a project manager from another organization (see extracts from Interviewees-7, 8 & 17) shared the same view that human resources cannot be copied.

“Well, if you look at strategic resources from human point of view you cannot really said that they can be copied, so the skills ,experience, competencies they have along with all exposure to different projects is performing a unique characteristic so the copying is not there, when you talk about physical resources then nothing almost strategic because things are well placed and what we used in our projects like equipment’s and technology is also used in similar projects, the only thing is the way of using those resources which come back again to human” (S.S.I-7)

“Well, there is no way you can copy a resource, especially a human, you can have same skills up to certain limit but exactly same no, and the real question is how can you share experience to have similar resource. I think with a proper on job training you can get good resources that sometimes become better than you own strategic resources at same area” (S.S.I-8)

“Well, skills can be learned by class, a good planning engineer for example is having 20 years of experience exposed to large projects and faced all sort of issues and challenges and that is extremely hard to copy, (S.S.I-17)

Interviewee-3 stated that only physical resources could be copied, but not human resources, and that the copying of those physical resources was not easy. That view was partly shared by the development manager (Interviewee-6) from another organization, who thought that some resources cannot be copied, giving their tendering process as an example:

“I think yes, there are some resources, in Daleel for example, the tendering process we have is unique and hard to be found elsewhere, that process unable us to reduce cost of the project and yet have a very qualified contractor to produce a quality work at the end. The whole idea is to reduce the operating cost we are concentrating on that more, because when you look at it capital cost is almost similar with all operators, the tools, rigs, etc. are the same, but the way to save cost is in the expenditure. So it is actually the way that our resources are executed

along with their skills and capabilities enable us to have such unique process” (S.S.I-3)

“well the norms environment is different. So, I come from BP but still I cannot just implement what I did there and copy it here, it depends on how you adapt to organization actually. So, copying strategic resource, no I do not think so, you can share knowledge, train, build skills but not copying. But trying to implement same norms from others that will normally fail” (S.S.I-6)

A project leader in Focus Group -1 from two major oil organizations thought that the process their organization followed to execute projects was inimitable (see extract from Focus Group -1); furthermore, three project leaders from other large oil plant organizations shared the exact same view, and stated that the method of doing projects in their organization was unique and could not be copied (see extract from Focus Group -2):

“process of doing the project is unique in ORPIC, (gating process) where the project practitioner needs to defend his idea. example if you have an idea to reduce cost for example, you need to discuss first with the technical people and should pass them, then for gate one you need to convince a committee from GM’s level, then you go to gate two and before that you should build your case with the financial expectations with more accurate numbers. Then if agreed then going to gate three where you need to develop complete scope of work including commercial study, then if agreed go to tendering. In case you failed in any gate you still have a chance to back with more reasons to convince the committee. One actual example is ALPIC the new 30 million dollars’ project. The process is maybe long but it controls the cases that can be considered. Oman oil (another company) is asking for their experience on this particular way of doing it” (F.G-2)

“technology if the organization has developed them but again many other organizations have but with different format” One resource that cannot be copied is the knowledge of how to exploit resources. The way of doing things, the kind of project capabilities. One Example of such resource is Mukhaizina heavy oil field, PDO and Oxy both work on a plan on how to explore and develop the field to produce that heavy oil and both are hiring complete team to do that study from different department making it as a project “Mukhaizina study project”; both companies then showed their outcomes and expected oil production, MOG then choose Oxy plan over PDO. Where initially this project is awarded to PDO to develop but they failed to convince government to keep it” (F.G-1)

For a construction manager (Interviewee-9) from an oil organization, the only resource that could be copied was the physical resource, and even that could be executed differently by different parties, so saying was completely copied was not accurate:

“Well, I cannot see a resource that can be fully copied other than physical and even though your execution of it is different than mine usage is different and outcome is different sometimes so even physical in a way they cannot be fully copied, human of Course no way and same goes to intellectual” (S.S.I-9)

The next three project managers/directors (Interviewees-18, 19 & 20) from the same organization believed that you could not copy experience; when it comes to education, you can send people to college, but eventually they have to be exposed to the project to gain the necessary experience, so making copies of the human experience resource was not possible:

“I will tell you what, you can never pay experience, you cannot send somebody to school to learn experience, you sending people to have a degree but you have to go and do work to own that experience.” (S.S.I-18)

“You know Moosa, you can go to university to accrue your degree, but when you come to the company and the real work its completely different story. You will have the academic know how, but the reality is different, you have to expose yourself, you have to understand the dynamic of the work and culture and the requirement of the work in projects, and then you have to let yourself fit into that work. My experience I been in this company since 42 years I started when I was 17, this is the only place I work with and know. This is my family. So I see a lot, basically through the time you will build your experience.” (S.S.I-19)

“What they did now because of the internet they go and google but that is not enough you need to get your hands dirty and gain the experience. I keep saying to the Omani do not just read go and understand why people are doing what they are doing, go and ask the execution team what they doing, the design team etc. So it takes time, but when you have open minded and accept the challenges then you can get really good engineers, but to copy and make duplicates just like that it’s not possible, the strategic resources are so hard to be copied.” (S.S.I-20)

The following first four interviewees (Interviewees-15, 1, 14, 4) stressed their organization’s uniqueness in developing people, since it was the oldest and largest oil and gas producer in the country, and had developed people and spread them across the country, sharing them

with other organizations, which in itself was a resource that could not be copied. One employee development manager from other organization shared a similar idea about the inimitable resource, stating that a unique resource that could not be copied was the development programme created by his organization (See also extract from Interviewee-10):

“well when it comes to PDO, it is well known in the country the PDO is like a university, with people they produce, PDO have a very well established program for the engineers from day one, there is a path, and the exposure is high from all functions, we have 7500 employees so you have a lot of experience around you all the time, that is why people comes from PDO are strong and it’s hard to have the same capabilities on other companies people, the people in PDO have more chances to grow to higher positions unlike other organization like Oman oil where most of the people movement is lateral because the top is narrow and crowded. and that limit the encouragement for the people to improve. but in PDO any one of the major projects here is like an organization by itself so people have a chance to grow and get better roles and benefits.” (S.S.I-15)

“no, the way PDO develop people is different, you get certain skills certain period of time, hardly any organization in Oman developing their stuff like PDO this is why if you are looking now to most of other organizations CEOs and the top guys are Omanis coming with a PDO background, and the market is picking up and there are other organizations but before PDO people are the one that have the needed skills due to the exposure they got and the training and we get this feedback as well about Omanis engineers from PDO when we go to any conference or meeting outside Oman.”. (S.S.I-1)

“What I can see in market, PDO is the organization basically transfer experience people to outside, because of the big exposure, issues, experience they are getting here, PDO is considered the first and largest organization in oil and gas industry in Oman, so the learning is high. So what I have seen is the quality of people coming from outside PDO is not at the same level as our employees. But in project management normally getting good project engineers from other organization is easy and available with good quality, the only thing is they need some time to adjust to the new system in PDO.” (S.S.I-13)

“in PDO, is has been in business since 40 years in oil and gas, so we build up the human requirement and we have great level of experience within PDO, these resources some operators internally they do not have it, for example BP in their new project in Duqm most of their key position personnel are coming from PDO, so we actually we transfer expertise to other organization, another example is ORPIC, so PDO produce experience to the country, that is good for Oman, fully trained” (S.S.I-4)

“The one inimitable resource is the acquisition of talent personnel to get them trained and studied outside in the top 20 universities in the world which is a very high target and challenge. And then while their study they will do internship in summer in the company and then making their succession plan to tell them where to be placed. Also, a leadership frame work is so unique in Orpic for example (Riada program) get certified by CMI and got training from top institutions” (S.S.I-10)

The following four interviewees were responding with unclear ideas, some actually talking about different issues:

“Well, let me tell you something when the project is over the good project manager should not be left, so that will be the company strategy how to retain that good manager so he can help other resources to be good projects managers as well and then you might say yes you actually bring good manager, not a complete copy of course but when it comes to skills and capabilities then similar ones that makes the project succeed. For example, in my case, after being a project manager in one company when the project finished they put me on procurement function and gained a lot after a year they bring me back to projects and so one, once I was IT manager and after that I learned a lot, so getting more expose to functions makes you a good project manager” (S.S.I-2)

Interviewee-2 was talking about the resources retained, and his expertise in multi-disciplinary functions.

“I think there is no harm on supporting each other, PDO is one of shell sub companies and this cross posting is one of the skim to share knowledge and get support” (S.S.I-11)

“as a manger when you are evaluating an employee what are the skills and competencies that you are looking for? Or on other way let say you have an opening in some area, how what are the skills and competencies that you are looking for” (S.S.I-12)

“I have not being on other organization so I cannot really know, but I can only compare what we have to what our contractors have, in PDO we have enough resources in term of minimum requirement, I can tell you a difference between us and contractors in some resources, contractors did not consider operations engineers as part of projects, we in PDO we have a team and engineers called operation readiness engineers part of project team, those will be the link between the project team and the asset so later on we have a smooth transition, and also we are ready with expectation from client side, from contractor side I have seen a proper expeditors for the procurement which we do not have it, because we are moving from EPC mode of contract into more EP + C where we are managing the

procurement ourselves. so we are doing engineering design and procurement and contractors only executing, so we transfer the risk to the project” (S.S.I-14)

Based on interviewees’ responses, the following Table 26 summarizes- the inimitable resources in projects.

| No. | Strategic inimitable resources in projects |
|-----|--|
| 1 | Skilled, talented and capable human that fits the project |
| 2 | The process of tendering and executing projects |
| 3 | The process of selecting and developing talented human resources |

Table 26: Strategic inimitable resources in projects

Table 26 above shows the inimitable resources based on interviewees' responses. Two resources had both the inimitable characteristic and the valuable rare characteristic as well, those resources being the talented human, and the way of selecting and developing talented humans.

5.1.4 Strategic resources availability: the organizational support characteristic

This section describes organizational support as a characteristic of strategic resources. The question asked in the interviews was about the level of support that project resources received from top management. The questions for interviewees were set up to answer the first research question on the availability of strategic resources in projects. Organizational support is one of the characteristics that strategic resources should have to be a source of competitive advantage. The responses were mainly about senior management support for resources on projects, and also what project managers and directors gave their resources in terms of support. All interviewees, without exception believed that top management support was mandatory for resources, and helped to expose strategic resources in a better way. The majority of respondents stated that they received the necessary support as long as their business cases were justified. Furthermore, some stated that the only time top management did not support them was when it was beyond their capability and authority to do so. Most respondents shared the same idea, the difference only being in the method or type of support.

The following extracts from the interviews give more detail about the support that organizations gave and the satisfaction of the employees. Many other extracts are also available, with almost the same idea. In general, the outcome from the results regarding organizational support in the oil companies was that it was felt to be generally satisfactory. The extracts below are from Interviewees-1, 2, 4, 6, 7, 8, 12, 13, 14. Basically the majority of the interviewees gave positive comments about the support they received from top management in almost every aspect. The support lay in different areas: the human resources support, by providing the right people; decision-making support, for financial and physical resources; training, innovation environment and reward support, as intellectual resources:

“here senior manager is always looking to support the lower level” (S.S.I-1)

“Well my approach is there are only two, you cannot have a watch man and Gard to look into everybody, what is needed is to believe on him and support his decision, because if you start questioning your employees it will come back to you and if he failed he will put all the things back to you” (S.S.I-2)

“in term of top management support, it’s not a one-man role, we have a team when it comes to decision making or an issue, we meet around the table and decide” (S.S.I-4)

“It’s very important one think I have learned is visionary people will do the support, by charismatic leadership, they tend to go by their own, so it’s very important to keep a balance, yes you can do things but still you need a support from top management.” (S.S.I-6)

“Well, since I came I got all the support I need, yes you may find one or two people are not supporting but the overall management is supporting, when it comes to decision they are discussing hard and raised their issues and sometimes rejected our proposals for revisit but once you get their approval they then support you all day long” (S.S.I-7)

“Well, the top management is asking us for example to execute projects in a fast track, so our feedback was then we need more support and actually that is what we got, they are not only taking decision faster but also help on discussion and welcoming any new ideas to fasten the process” (S.S.I-8)

“to be honest, talking about myself I have excellent support, getting the right resources and getting the right resources needed, getting the physical resources and logistics along with helping and supporting making the decision faster” (S.S.I-12)

“Within PDO now we have CPD so they have all project in one pole which helps a lot to get the company support for it, when you need a decision it can happen in no time, so the support is high.” (S.S.I-13)

“we are getting the full support, there is no such a barrier but if we asked for a support and there are limitations, they will explain to us those limitations and they will help proposing different support paths, and also from our side we will anticipate the risk and work accordingly” (S.S.I-14)

“the authority and giving trust that is the main support we got from top management, if you made a mistake they will not say it in front of another stakeholder, in one meeting the contractor top management was complaining about me and they recommended to change me and not to go to their site anymore because i was harsh and delaying their work, project director commented that Khalid is the assigned personnel for your site and his word is my word.” (F.G-2)

To summarize the outcome from the above sections, the following table is a simple resume of the findings from the responses of the interviewees. As can be seen, all interviewees thought that the valuable and organizational support characteristics were available in the project resources, and all agreed that strategic resources were accordingly available as well. In addition, the majority thought that the inimitable characteristic was available in the strategic resources they had in their projects, but that the rare characteristic was not available for the majority of interviewees. Furthermore, all responses showed positive agreement with regards to the relationship between strategic resource and competitive advantage. More detailed results on this area appear in the next section.

| Question | Yes | No |
|--|-----|----|
| Are strategic resources and capabilities available in projects? | 24 | 0 |
| Are valuable resources and capabilities available in projects? | 24 | 0 |
| Are rare resources and capabilities available in projects? | 5 | 19 |
| Are inimitable resources and capabilities available in projects? | 20 | 4 |
| Are resources and capabilities supported by organizational management in projects? | 24 | 0 |
| Do strategic resources provide competitive advantage in projects | 24 | 0 |

Table 27: Resources availability in projects

As it can be shown from Table 27 above; the rare resources and capabilities in projects did not have a majority consent. Instead, only five respondents thought that the strategic resources were rare and existed in projects. The majority thought that there were no rare resources in projects, and the necessary strategic resources could be found in the market, provided they held the right attraction. This finding deserves more detailed discussion, which takes place in the next chapter. In summary, this section and the subsections also included represent the results from the semi-structured interviews to answer the first research question: What are the strategic resources and capabilities available in an organization's projects that give competitive advantage? The results show the available strategic resources and dynamic capabilities in projects that can produce competitive advantage. More results and details on how strategic resources give competitive advantage appear in the next section. The next section will combine results from the responses to the semi-structured interviews and questionnaires.

5.2 Strategic resources and competitive advantage in projects

This section describes the relationship between strategic resources and dynamic capabilities in projects, and the possibility of strategic resources to increase project performance, and accordingly competitive advantage. It is an attempt to answer the second research question:

How do the project strategic resources and capabilities provide competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level? The results are first shown in the responses from interviewees, based on their wordings and statements on responding to the interview questions. Moreover, the results from the questionnaires describe statistically the relationship between different characteristics of strategic resources to better project performance, and accordingly to better competitive advantage. In the interviews, the relationship between strategic resources and project performance was gathered by asking questions about how strategic resources affected the performance of projects in terms of cost, time, schedule and quality, which were the traditional internal success criteria for the projects. In addition, in order to gather information about the effect of strategic resources on competitive advantage, the questionnaire placed a direct relationship between each characteristic of the strategic resource and the reduction of costs, exploitation of targeted market opportunities and/or defending competitive threats, which are essentially the main factors forming competitive advantage and which might affect the success of projects as well. The following two sections are present the results of the first relationship, between strategic resources and project performance. After that results are presented for the relationship between strategic resources/project performance and competitive advantage.

5.2.1 Strategic resources and project performance

Project performance was tested in the research by several factors, such as cost, time, scope and quality. The responses from interviewees to the interview questions form the main result part shown in this section. The responses from the interviewees showed that the existence or loss of a strategic resource created a high impact on projects. In addition, they stressed the idea that such human resources had to be strategic and equipped with the right capabilities

in order to deliver and enhance the main pillars of the project, which are reducing cost, completing the project on schedule, and within quality boundaries. The following respondent (Interviewee-8) mentioned human resources and his project team as effective instruments enabling projects to be completed successfully.

“I see my team is doing a good job, they are relatively young but yet have what it takes to do things the right way. And I can say we have learning curve now where we are executing most of the project within time and cost and quality needed” (S.S.I-8)

The following respondents (Interviewees-9 & 12) shared similar ideas on the importance of human resources, adding to that the importance of the leader, and the availability of that leader in the right position, which had an impact on their project work and success:

“Well, actually the human has a big impact, having the right leader in the right position is important, those right people in our company makes 2017 year a profitable year compared to previous unprofitable years before, which make a huge impact to our financial, reputation and the satisfaction of oil ministry. Another example, a good project manager manages to save one full year of time, so good strategic resource is a key to run projects more effective” (S.S.I-9)

“When I look to the value drivers to achieve (cost, scope, time and quality) to me the resources are the main value drivers, resources are the main player” (S.S.I-12)

Furthermore, for this project manager (Interviewee-13), it was important for the strategic resource supposed to add value to be competent, with the right experience, and not one who came to learn from the project. The ready resource with full capabilities was the one giving value and enhancing project success:

“If you have people who are competent and know what they are doing and do not take a learning curve then yes, they are a help, because people who come to learn is basically affecting the work and delay the progress of the project. For example, I might take one new learning guy as a technical assistant other than letting him review a technical report. Because that learning guy will need to review a report and make correction by his manager maybe 5-7 times compared to a guy who have the experience who can do that in one or maximum two revisions till he approved it so that all come as a time and cost to the project. So there are key resources needed in the project with strong technical background” (S.S.I-13)

A similar view was shared by the following respondent (Interviewee-14), where the ready resource who knew the project and the scope was the one to add value and increase project success:

“it’s very crucial for the strategic resources to understand the project scope because that will really identify the critical positions needed in the project, strategic resources are a main factor of any project success” (S.S.I-14)

The following technical design project head (Interviewee-15) stressed that not only were human resources with skills and capabilities needed, but more than that, resources who had so called technical authority also had the ability to take technical and financial decisions without going up the chain for further approval. This technical authority is the certification such a resource has to acquire, which involves a lengthy process. Having such resource ‘in house’ will save time and costs, will make projects run faster, and will help to achieving project targets better than those resources without such authority. This idea of technical authority was addressed by Interviewee-15, having been implemented in his organization:

“I do not know if you came across it, in PDO we have system called technical authority, where there are certain people with certain financial authorities, that is important, you need such resources with that authority in your team for the project to run smooth, to get that technical authority you need to be assessed by shell our partner and if you pass then you will get a certificate for four years, there are different technical limits of approvals, so when you have a review or approval to a document then it will be known that only an employee with technical authority level 2 can approve for example and so on, so this is the way we control the project with such resources or strategic resources in this case” (S.S.I-15)

The following project director (Interviewee-17) thought that many strategic resources were to be found in large projects, and could think of at least 30 project positions where strategic resources added value and helped to increase project performance:

“Yeah so they clearly very specific value to add to the project, where every one of them know his role and play it correctly and at the same time work with others to achieve the project targets, all of them have contributed to the success each at different phases I think I can say in such large project we have strategic resources, we have at least 30 roles and positions can be considered strategic and that is only from human side. all of them being equally important, well for physical resource, once you do to contraction those resources are playing the role” (S.S.I-17)

Again, the following two interviewees (Interviewees-19 & from Focus Group-2) were of the opinion that resources with the right skills and capabilities were also the ones that made projects more successful and helped elevate project performance:

“It’s important because we have a project do CTR (cost time resource) catalog, so it is important because we estimate the manpower we needed and we then define activities, of course if you are experienced competent and skilled and you have the mind set you will be able to do that activity easily and much more efficient than the one who do not have the experience or competent, so the CTR is important to us, we monitor our cost we make sure the cost is staying within and even reducing, we are looking to ways to improve our activities and performance, CTR is a tracking tool and it’s a key to better efficiency” (S.S.I-19)

“Strategic resources have significant impact on terms of performance, last project is done within budget and quality, but the timing was not, it gets late by one year (it’s a 3-year project), we believed the delay is not from the company but contractor” (F.G-2)

It is worth mentioning that the surveys combined strategic resource characteristics along with capabilities in the questions asked of the participants, the results shown in the tables hence representing both the dynamic capability and the characteristic of each strategic resource. It should be pointed out that only the organizationally supported characteristic of strategic resources was positively related to project performance, other characteristics showing no significant relationship. In summary, this section represents the results from semi-structured interviews, and questionnaires to answer the first part of research question two: How do the project strategic resources and capabilities provide competitive advantage? This part deals with the relationship between strategic resources and project performance. The outcome shows a positive relationship between strategic resource and project performance from the

interviewees' point of view. From a questionnaire point of view, only organizationally supported resources were positively related to better project performance.

5.2.2 Strategic resources and competitive advantage

This section will represent more the relationships between strategic resources and competitive advantage. Most of the responses were essentially around human resources, being the main strategic resource in any organization or project; the effect of their absence or presence was the main response area from many interviewees. First, the results from interviews will be addressed and summarized, and then the same will be done for the results from questionnaires. The following response was from a senior project manager (Interviewee-4), giving an example on how the absence of one valuable resource could cost millions:

“The key resources, skills, experiences will affect the project, for example a something like a valve that need inspection with a good inspector otherwise will have issues and cost, you lost money, we had a situation where a small task like these cost millions because it delayed the completion date. So actually the solid technical resources are the key and strategic ones that affect directly the project success” (S.S.I-4)

Sharing a similar view, the general manager – operations (Interviewee-5) agreed that basically strategic resources were the most important, their absence exerting a negatively high impact:

“The strategic resources have more impact on the project more than anything else, if you got the wrong people for example the loss will be high, that happened before in the company and the results where catastrophic. In terms of financial the project is funded by loans and if the project gets delayed the banks will need their money and to delay you will need to pay more money to the bank which will make the project stopped and more lose are there” (S.S.I-5)

Although the general manager – maintenance (Interviewee-6) agreed with his colleagues above, he also stressed the high impact that a physical resource might have positively or negatively, and gave an example in that regard, in which the scope needed for completion with the necessary quality was due to the presence of the strategic resource:

“Well as long as you have right people o right position then their affect and impact is high, the way the strategic resources control cost and deliver quality is important and you can tell the difference between good resource and bad one, and that is goes to physical as well, in one example, we have a plug not as per specification and it takes us 6 days to get the right one which delay the time as well, so the way that those strategic resources are doing the job with their capabilities and skills makes a huge difference in achieving project targets. And the strategic resources are helping also accordingly to the organization performance” (S.S.I-6)

The results from the interviewees’ responses above answered the first part of research question two. The following paragraph and results are from the questionnaires conducted, one part of which tested the strategic resource characteristics (valuable, rareness, organizationally supported) against competitive advantage (ability to reduce costs, exploit opportunities and defend against threats. The valuable, rareness and organizationally supported characteristics are statistically related, and the correlation significance high and within the standard. Table-29 below shows the relationship between valuable strategic resources and competitive advantage. Responses were given from 155 participants, with the Sig. (2-tailed) showing 0.000. Table 30 examines the relationship between rare resources and competitive advantage, showing similar results. Table 28 relates organizationally supported resources to competitive advantage, and again similar results are shown. All three show a positive relationship.

| Correlations | | | |
|--|---------------------|-----------------------|---|
| | | Competitive advantage | Strategic organizationally supported resource |
| Competitive advantage | Pearson Correlation | 1 | .343** |
| | Sig. (2-tailed) | | .000 |
| | N | 155 | 155 |
| Strategic organizationally supported | Pearson Correlation | .343** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | 155 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 28: Statistical evidence relationship

All of the following responses addressed almost the same idea, with different wording and different examples. In summary, human resources were again considered the key to better project performance, and accordingly better competitive advantage.

| Correlations | | | |
|--|---------------------|-----------------------|-----------------------------|
| | | Competitive advantage | Strategic valuable resource |
| Competitive advantage | Pearson Correlation | 1 | .334** |
| | Sig. (2-tailed) | | .000 |
| | N | 155 | 155 |
| Strategic valuable resource | Pearson Correlation | .334** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | 155 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 29: Statistical evidence relationship

| Correlations | | | |
|-------------------------|---------------------|-----------------------|-------------------------|
| | | Competitive advantage | Strategic rare resource |
| Competitive advantage | Pearson Correlation | 1 | .556** |
| | Sig. (2-tailed) | | .000 |
| | N | 155 | 155 |
| Strategic rare resource | Pearson Correlation | .556** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | 155 |

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

Table 30: Statistical evidence relationship

The above tables (28, 29 & 30) test the relationship between the strategic resource characteristics (valuable, rare, organizationally supported) and competitive advantage. Accordingly, the valuable characteristic was positively related to competitive advantage. This means the strategic valuable resource helps to increase competitive advantage. Similar results are shown for the other characteristics of rareness and organizational support. More details and discussion around this area will be given in the next chapter. In summary, the above two sections address the results from interviews and questionnaires about the direct relationships mentioned above. The next section looks in more detail at the relationship between strategic resources and competitive advantage, and the direct drivers of the positive relationship between them.

5.3 Factors affecting strategic resources and competitive advantage

This section describes the results that show the factors affecting the relationship between strategic resources and competitive advantage. The interviews and questionnaires were set up to answer the third research question: What are the factors affecting the relationship between strategic resources and competitive advantage in projects? The results are a combination from interviewees' responses and questionnaires. There were mainly two

groups of factors affecting the relationship between strategic resources and competitive advantage, the details of which appear in the following sections.

5.3.1 Dynamic capabilities

The results on dynamic capability as a factor affecting the relationship between strategic resources and competitive advantage are represented in the responses of the interviewees. The questions from both interviews and questionnaires concerned the relationship between dynamic capabilities in combination with strategic resource on the one hand, and competitive advantage on the other. Different dynamic capabilities always came in combination with strategic resources in the responses of most interviewees. Table 31 below shows dynamic capability to be a main accompanying factor along with strategic resource. This table shows the main dynamic capabilities available in projects. Further details on interviewees' responses can be found in Section 5.2.2. The dynamic capabilities affecting the relationship between strategic resources and competitive advantage are: relevant experience, relevant communication, leadership, multidisciplinary experience and project management. The questionnaires represent this relationship in four main ways. The questions asked combined the characteristic of strategic resource with capabilities, and accordingly show the relationship between the dynamic capability of each characteristic with competitive advantage. The table below illustrates that relationship. The significance (2-tailed) is shown as between 0.00 to 0.01 which represents a high correlation between both strategic resource and capability combination on one side, and competitive advantage on the other. Competitive advantage is represented in the questionnaire by three elements: reducing cost, exploiting opportunities and defending against threats.

| | | Valuable resource and capabilities | Rare resource and capabilities | Organizationally supported resource and capabilities |
|-----------------------|---------------------|------------------------------------|--------------------------------|--|
| Competitive advantage | Pearson Correlation | .334** | .556** | .343** |
| | Sig. (2-tailed) | .000 | .000 | .000 |
| | N | 155 | 155 | 155 |

Table 31: Dynamic capabilities and competitive advantage

The above Table 31 gives the outcome of the relationship of dynamic capabilities tested in combination with resources and competitive advantage. The questionnaire questions combine strategic resources with capabilities on one side, and test their impact on competitive advantage on the other. Table 31 above shows positive and direct relationships between the valuable resource/capability's combination and competitive advantage. In addition to the rare resource/capabilities and organizationally supported resource/capabilities combinations, both are related to competitive advantage. All relationships are positive and significant. Dynamic capability (including in particular relevant experience, relevant communication, leadership, multidisciplinary experience and project management), as a factor positively affecting the relationship between strategic resources and competitive advantage, can be concluded from the interviewees' responses and the statistical data above.

5.3.2 Innovative environment

Innovative environment was one of the aspects identified in the research. Both interviews and surveys contain questions related to innovation, and the relation between it and strategic resources on the one hand, and between it and the organizational performance on the other. These interview and questionnaire questions were set up to answer research question number three about the factors affecting the relationship between strategic resources and

competitive advantage. The responses from the majority of interviewees suggested the importance of an innovative environment, and differed only in the ways used to encourage innovation and the timing of innovative ideas in projects. The following project director (Interviewee2) stressed that the way to introduce new ideas was by dialogue, on condition that an idea came at the right time in the project. He suggested that it should not be complicated, provided that there was a resource or an expert who could implement the idea.

“Well, let me tell you that the tools are becoming very complicated, what happen here is that my door is open when there is any new idea and good to implement, we support it big time, but it should come in the right time, and also I make sure that any idea is simple enough to be fast implemented. Also, you need people who are expert to execute the idea” (S.S.I-2)

The following senior development manager (Interviewee-3) from another organization encouraged his employees to go and survey the market and bring new ideas that could be implemented at lower cost, especially those ideas not preferred by other competitors:

“Normally what happen is that our engineers are advised to survey the market at any areas that interested them related to their jobs and bring new ideas that can be implemented in Daleel. There are some ideas other operators are not willing to do because it was not tested before, we are taking a risk to implement them after studying them, so I can say we are more open to new ideas compares to our competitors. For example, if we want to estimate the amount of oil in ground and we need new technologies to implement, so our engineers will go to the market and communicate and find out the possible ways to do so, evaluate them and implement” (S.S.I-3)

Large oil and gas organization like PDO in Oman had a complete system to tackle innovative ideas, and how these could be processed from being an initial idea to be implemented in real work. The following is a summary of many responses coming from different interviewees working at the same organization:

“, so we have a process in place, if you have an idea to reduce cost for example, so we started for example with the concept team, they giving us the preliminary design and then we go and challenge that concept as a project team, and we have something is called competitive scoping, it means we are asking do you really need to have all these things/facilities to produce that amount of oil and gas? So I will challenge our self, and then innovative ideas comes from there, and them all is coming in something called value assurance review so in that one you define what you need to do, so we have control gates in project management system during that process from concept to execution, so we have for example in gate 3 you do to the define by that time you should challenge your concept and you do your value engineering and if you having anything then you raised it there to reducing the cost because the ultimate goal in PDO is to reduce the unit technical cost, so the cost of one barrel of oil it might cost us 10 dollar or 30, so the more easier effective process the less is the cost.”. S.S. I-4

Interviewee-5 from a large oil organization stated that innovation was a culture in their organization, the main driver being how much space and freedom could be given to employees. A similar view was shared by another project leader from a different organization (Interviewee-21):

“for innovation the company culture to support new innovative ideas and the leaders support for it are main factors to keep a steady innovative environment. If you want to be innovative what you required? Best thing is to give the employee a room to innovate and comes up with solution without guiding him to specific way how to do it. You need them to be out of the box and support is always there from us as top management” (S.S.I-5)

“Very strong innovation culture, the team is facing many challenges that needs their input to solve them to be innovative, as the company is young and the team is small, the support from departments such as R&D is not there because there is no such department, so the team itself need to be innovative and the company top management is supporting such innovative culture.” (S.S.I-21)

The following responses on the innovation environment presented below give different views on innovative ideas. Some innovative ideas required dealing with challenges in a limited time (see, for example, the extract from Interviewee-6). Here time was the dominant factor, while sometimes innovative ideas were needed with cost being the dominant factor demanding most concentration (see extracts below from interviewees 8 & 9, and responses from Focus Group-2. A common factor is that the majority of responses gave examples where strategic

human resources were implementing new ideas by exploiting other resources, such as physical, intellectual or financial resources. More details on the responses of interviewees, together with some real examples are given below (see, for example, Interviewees-6 & 20):

“Well, innovation thinking is a key for any program, in our department which maintenance for this project, we can consider it as a 5-years project. innovation is very important, and new ideas are good, for example, we have compressor failure. Now if that is not fixed in 5 days one of our refineries will be down to 60%, if it takes 6 days or more than one of the refineries will be completely down, if it goes beyond 7 days then the complete refinery SRIP will go down, so a major impact within a short time, and this is happen suddenly, so the team came to my office, it’s almost night, they were working extended hours, so innovation is a must here” (S.S.I-6)

“Well, actually because we are as I said before trying to do things faster, we are most of the time thinking outside the box and doing things in a way that welcoming any new ideas and if it doable we go for it, for example I can tell you, normally when we have a construction camp we ask contractor to do it and he asks subcontractor to do and it became more expensive and takes more time. We actually need to do the opposite, reducing time and reducing cost, so what we did, we divided scope into three parts, and we have dealt with subcontractors directly. so we control the scope and do the design and direct deal with contractor, saving time and cost” (S.S.I-8)

“Yes, we defiantly have, we bring new ideas about the type of pipes we should use and concrete in construction these are all welcomed by management and implemented which also prove that it gives better impact. We have what we called now a skid type station, instead of have a concrete unmoved one we have them dynamic and automated. This was an idea only and we get it implemented and supported by management” (S.S.I-9)

“The company as technology or technical side has same resources as other organization and maybe less, so the innovative comes from finding the solutions for any challenges arises which arise basically almost every day. An example of that happened recently when the technical department decided to drill more through the oil reservoir to produce more oil but the production does not increase in fact it decreases so now the team is looking to this situation and try to come up with innovative solution to get back at least to same production if not more” (S.S.I-20)

The following results show the questionnaire outcome in the areas of continuous innovation and organizational performance through the effect of strategic resources. As can be seen

from Table 32 below there was a positive relationship between strategic resources and organizational performance, in which a main item was continuous innovation.

| | | Organizational Performance | |
|---|---------------------|----------------------------|--|
| Strategic valuable resource | Pearson Correlation | .288** | |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | |
| Strategic rare resource | Pearson Correlation | .288** | |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | |
| Strategic organizationally supported resource | Pearson Correlation | .457** | |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | |
| Organizational Performance | Pearson Correlation | 1 | |
| | Sig. (2-tailed) | | |
| | N | 155 | |

Table 32: Questionnaire outcome

Table 32 above represents the relationship between strategic resources and organizational performance. Strategic resources are presented for their characteristic of being valuable, rare and organizationally supported. On the other hand, organizational performance is characterized by goal achieving, quality and exceptions, time and cost control and an innovative environment. The innovative environment was addressed in interviewees' responses above, as one main factor affecting the relationship between strategic resources and competitive advantage. Furthermore, the data from the questionnaires are also presented and show a direct relationship between strategic resources and organizational performance, in which innovative environment was one of the elements that organizational performance aspect was tested against. In summary, this section presents the results from the semi-structured-interviews and questionnaires about the factors affecting strategic resources and competitive advantage, in an attempt to answer the last research question:

What are the factors affecting the relationship between strategic resources and competitive advantage in projects?

5.3.3 Results of overall relationships

This section presents the results from the questionnaires regarding the overall relationships between the main aspects of the research questions. The main aspects are the strategic resource/capabilities combination, competitive advantage, project performance and organizational performance. The results below show the positive or negative relationships, and how each of them was related to the other. This section will give more insights on the main result findings from the questionnaire, answering research question two, concerning strategic resources and capabilities providing competitive advantage and the role of resource-based theory and dynamic capabilities at project level. It also gives answers to research question three, on the factors affecting the relationship between strategic resources, organizational support and project performance. Looking at the results from interviews, the relationship between strategic resources/organizational support and project performance was largely positive. This outcome is consistent with what was gathered from interviewees' responses, detailed in Section 5.2 above.

| Correlations | | | |
|--|---------------------|---|---------------------|
| | | Strategic resource/ organizational support | Project performance |
| Strategic resource organizational support | Pearson Correlation | 1 | -.284** |
| | Sig. (2-tailed) | | .000 |
| | N | 155 | 155 |
| Project performance | Pearson Correlation | -.284** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | 155 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

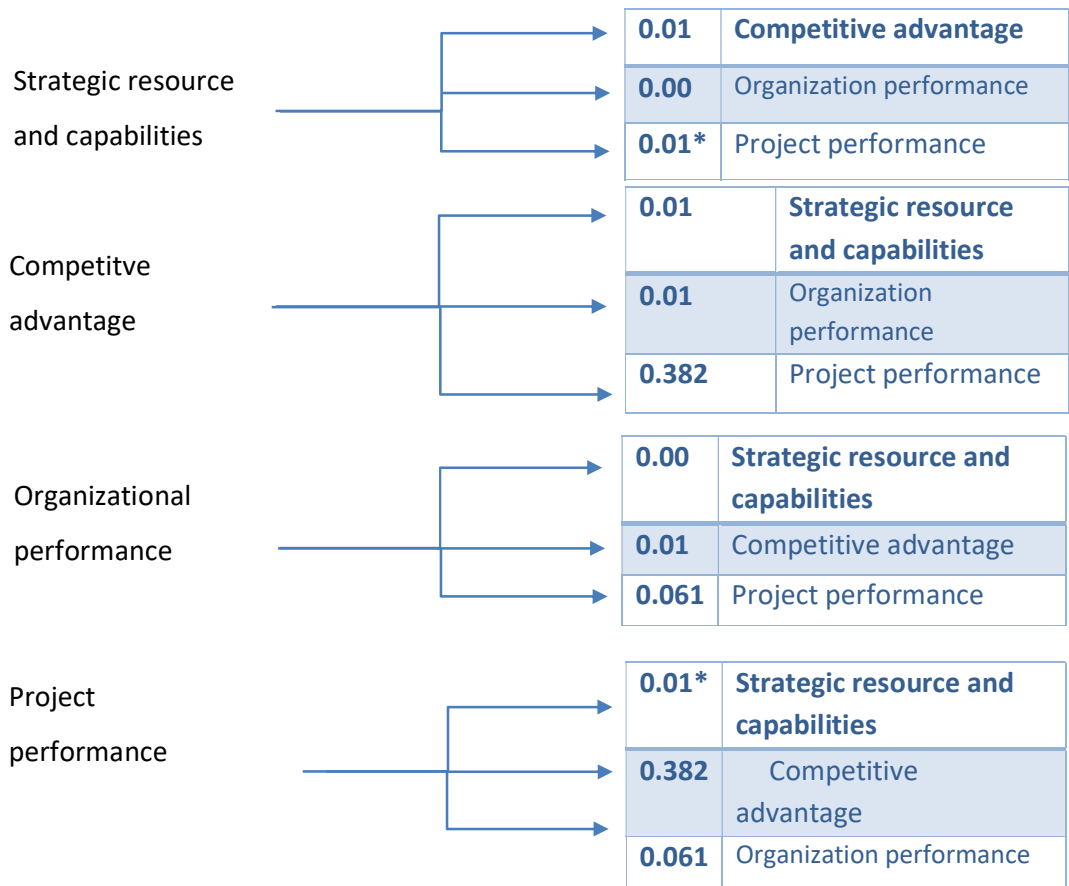
Table 33: Organizational support and project performance

Table 33 presents the significance of the relationship between organizationally supported strategic resources and project performance. Project performance is characterized by goal achieving, quality and expectations, time and cost control and innovational environment. The table shows a positive and significant relationship. A similar result is shown in Table 34 below, relating organizational performance to competitive advantage, and showing the relationship to be positive and significant. So strategic resources affect positively continuous innovation, which is a major part of organizational performance leading to better competitive advantage.

| Correlations | | | |
|--|---------------------|----------------------------|---------------------------------|
| | | Competitive advantage TEST | Organizational performance TEST |
| Competitive advantage TEST | Pearson Correlation | 1 | .419** |
| | Sig. (2-tailed) | | .000 |
| | N | 155 | 155 |
| Organizational performance TEST | Pearson Correlation | .419** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 155 | 155 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 34: Organizational performance and competitive advantage

The four relationships and the outcome significant value are presented below for better visualization and summary of this section. The significant value of 0.01 is only achieved with the strategic resources that have organizational support. Other strategic resources show no significance with project performance.



In summary, this section (5.3) presents the outcome from the interviews and questionnaire, showing the relationship between strategic resources and competitive advantage. In addition, the results from interviews and questionnaires also show the factors affecting the relationship between strategic resources and competitive advantage, which are the dynamic capabilities combined with the resources and the innovative environment.

5.4 Conclusion

This chapter presented the results of the data gathered from the semi-structured interviews, focus groups and survey questionnaire. Three methods of gathering data were used to answer the main three questions in this research:

1. What are the strategic resources and capabilities available in an organization's projects?
2. How do the project strategic resources and capabilities provide competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level?
3. What are the factors affecting the relationship between strategic resources and competitive advantage in projects?

The results answering research question one was mainly obtained from semi-structured interviews and focus groups, due to the nature of the question, which required a more subjective answer. Questions two and three both used the results from semi-structured interviews, focus groups and the survey questionnaire to provide the necessary answers. Research questions two and three needed subjective answers to answer the 'how' and 'what' questions, but also needed objective results to correlate the relationships between different questions' aspects. The results gathered and presented can be directly used to explain the answers to the above three main questions, and show the justification for each question provided. Firstly, in an attempt to answer research question one, the results from interviews and questionnaires confirm the availability of strategic resources in projects, and present the data on agreement or disagreement about the four characteristics of strategic resources. The valuable and organizational support characteristics were proved where all interviewees and the majority of questionnaire respondents agreed that those two characteristics existed in

the strategic resources of projects. The inimitability characteristic also had the majority of respondents agreeing on it, but not all agreed that it was something important to have in the strategic resources of projects. The rareness characteristic did not receive the same support from respondents, demonstrating that the existence of such a characteristic in strategic resources at project level was questionable. More discussion on this area appears in the next chapter. Secondly, in an attempt to answer research question number two, the data from interviewees and survey respondents addressed the relationship between strategic resources and competitive advantage. The relationship was positive and proven. Strategic resources had a direct and positive relationship with project performance, which also confirms the positive relationship between project performance and competitive advantage. The second part of research question two, asking how the role of resource-based theory and dynamic capabilities can be better understood at project level, will be addressed and discussed in the next chapter. Finally, in an attempt to answer the last main research question about the factors affecting the relationship between strategic resources and competitive advantage, the results present two main factors affecting that relationship, which are dynamic capabilities and innovative environment. A more detailed discussion on the results, attempting to answer the main three research questions, is given in the next chapter.

6 Discussion of the results

In the previous chapter, all the results were presented and addressed in an attempt to answer the three main research questions. The research questions are: What are the strategic resources and capabilities available in an organization's projects? How do the project strategic resources and capabilities provide competitive advantage? How can the role of resource-based theory and dynamic capabilities be better understood at project level, and what are the factors affecting the relationship between strategic resources and competitive advantage in projects?

This chapter discusses the results from the interview extracts and the statistical data extracted from surveys. The discussion will follow a similar order to that of the last chapter. The related literature, along with the implications and relationships will be shown. The next three sections will discuss the results answering each of the three main research questions. The fourth section will give an overall summary of the main relationships of the research aspects. Finally, the fifth section will offer a proposal of the characteristics of strategic resources at project level compared with the resource-based theory applied. This proposal will combine both characteristics from the main theory used in this research (resource-based) - rareness and inimitability, and replace them with a new characteristic - uniquely exploited - which is the outcome of this chapter's discussion. Figure 14 below gives the layout of this chapter.

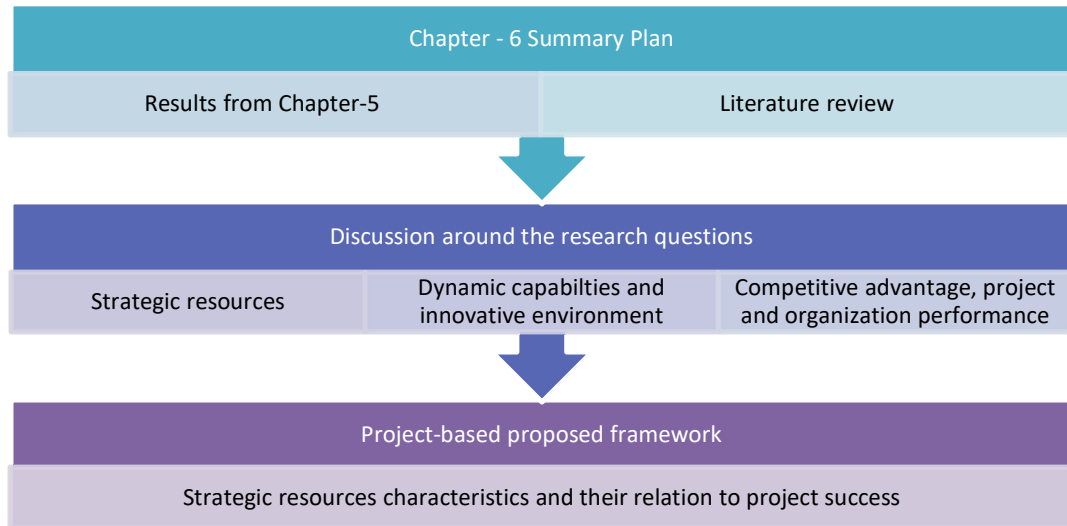


Figure 14: Chapter-6 Plan Forward

The proposal mentioned above is summarized in Figure 15 below. A summary of the proposal is that resource-based theory is slightly adjusted for implementation at project level. The RBT characteristic of rareness and inimitability is replaced by the uniquely exploited characteristic, and one more characteristic is added at project level, which is timely available. The proposal assumes that these characteristics of strategic projects are needed to call a resource strategic. The strategic resources can hence provide better project and organizational performance and achieve competitive advantage with the help of dynamic and project capabilities, and an innovative environment. More details and explanation will be presented at the end of the chapter in Section 6.3 onwards.



Figure 15: Expected outcome proposal of project resource based

6.1 Strategic Resource availability in projects (discussion around research Q-1)

This section addresses the concept of strategic resource availability. The availability of strategic resources in both organizations and projects is examined. In general, the resource-based theory (RBT) lists the characteristics of resources that make those resources strategic (Amit and Schoemaker, 1993) and help organizations to increase competitive advantage (Barney, 1991). The concept of availability is known by default in any organization that has resources meeting those characteristics (Barney, 1991), as long as those resources are factors that meet organizational objectives (Helfat et al., (2007).

This research goes one step further by defining and checking the availability of those resources first in an organization and then in the projects. The definition of resources in general is that they are the tangible and intangible assets (Ross et al., 1996; Werner, 1984) that help an organization to achieve its goals (Helfat et al., (2007). The interviewees were asked to first define valuable resources. Their answers mainly addressed two aspects. The first was that the most valuable resources were human resources. Second was that valuable resources were normally strategic, and those strategic resources enabled the organization to produce better performance and achieve projects targets. A summary of interviewees' responses can be found in Appendix I, with an example given in Table 35 below. This table provides brief answers to the first interview question: How would you define valuable resources, and if you can, give examples? Answers are divided into three main parts, which are define & availability, type of resources, and if there is an example or elaboration of the interviewee's answer.

| Interview question - 1 | Answer code1 Define, availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|----------------------------------|---|
| How would you define valuable resources and if you can, give examples? | The resource must be valuable to be strategic | Mainly human | The company CEO, he is not only a leader but basically technically strong and helps a lot in providing his experience available whenever its needed |

Table 35: First question response summary from interviews

Furthermore, a list of strategic resources that met the criteria was generated from the interviewees' responses, their definition of one main strategic resource characteristic being clear, which was the valuable characteristic. Regarding the availability of strategic resources, all interviewees agreed that such resources should be available, but they had different views about the characteristics, and whether all the characteristics needed to be available for a resource to be called strategic. Referring back to the last chapter, Table 35 indicates that all interviewees without exception thought that strategic resources should be available in projects. A list of strategic resources is given in the next section regarding each characteristic. This answers the first research question on the strategic resources and capabilities available in an organization's projects.

6.1.1 Valuable resources

This section discusses the valuable resource characteristic to answer the first research question about valuable resources in projects. A valuable resource is one of the main characteristics that strategic resources should have in order to gain better performance (Asanuma, 1989) and accordingly become a source of competitive advantage (Barney et al., 2011). Looking at the results in the last chapter, basically all of the interviewees' responses

confirmed that the valuable resource was a main characteristic of resources considered as strategic. The majority of the interviewees also believed that human resources were the most valuable resources to have in any project. A list of valuable resources extracted from the interview respondents is shown in the Table 32 below. The first valuable resource according to the interviews was the skilled and capable human. The literature confirms the same idea that the skilled human is one of the most valuable resources in a project (Zhang et al., 2018). The rest of the valuable resources are shown below in Table 36 below.

It can be seen that all the valuable resources, even the physical ones, are ultimately related to human resources, some interviewees going further to say that a good project manager was a valuable resource in itself. Many quotes from the interviewees' responses referred to human resources as the main strategic resource of any project. Another main outcome from the interviews was when the interviewees talked about projects, the majority of interviewees including the time factor. The time factor means having the valuable resource at the right time and in the right phase of the project; otherwise it cannot be called valuable. The availability of resources at the right time was another important aspect expressed in interviewees' responses. In projects, the entry time for each resource depends on how valuable it is to that phase of the project. For example, a concept engineer is needed more at the initiation stage, when the project concept is formulated and different options of project design are being discussed.

The same resource is less valuable at the execution stage, for example, or during the commissioning stage. In addition, another issue raised was not only the value that a resource may have, but more importantly the ability to exploit the resource. This was also identified in the literature by Barney et al. (2011) and Wilden et al. (2018). They stated that for any organization to increase performance, it needs to have the ability to exploit the resources it

has. The results show a trend in that area many interviewees stressing the importance of on-the-job training and exposure to projects, or the practical experience human resources should have in order to be exploited and used more effectively for the project and the organization. The human resource is a major resource for projects, but what makes that human resource strategic is the amount of skill and knowledge he/she possesses. Accordingly, the usage of that knowledge to create an impact is what differentiates a normal resource from a valuable resource.

The valuable resources listed below are the IT support, access to cash flow, positive culture and the ability to develop talents. These resources are partly related to human resources, but are more related to the support an organization gives for the firm to perform better and execute projects successfully. These resources are also considered as project-related valuable resources. The tables below are similar to those extracted from the interviewees' responses with elements from the literature added to support them.

The derivation of those resources and capabilities listed below is based on three main factors: Firstly, the importance of each of them to the project; secondly, how many times such resources and capabilities were addressed by the interviewees; and thirdly, the general implicit understanding. Sometimes the resources and capabilities were not explicitly mentioned by the interviewees, but an understanding of their response's points to those resources and capabilities. This approach in extracting the resources and capabilities is same for all lists of resources and capabilities in this chapter and in the last chapter as well.

| No. | Strategic valuable resources in projects | Data supporting the Literature |
|-----|---|---|
| 1 | Skilled, talented and capable human resources that fit the project | (Zhang et al., 2018) |
| 2 | IT application and computation knowledge | (Shenhar et al., 2001) |
| 3 | The access to financial cash flow | (Laursen and Svejvig, 2016) |
| 4 | The process to select and develop talented human resources | Kunc and Morecroft (2010) |
| 5 | The ability to exploit resources | (Wilden et al., 2018) |
| 6 | Positive culture that motivates, supports and keeps human resources | (Barney et al., 2011) |
| 7 | Project manager/Director/Leader | (Jugdev, 2004) ; (Zwikael and Meredith, 2018) |

Table 36: Strategic valuable resources extracted from interviews

| Capability | Data supporting the Literature |
|------------------------|--|
| Relevant Experience | Davies and Brady (2016) |
| Relevant Communication | (Noble, 1999) |
| Leadership | (Project Management Institute, 2016) |
| Multidisciplinary | Molloy et al. (2011) |
| Project management | (Nanthagopan, Williams and Page, 2016) |

Table 37: Capabilities in projects extracted from interviews

Table 37 above represents the capabilities mostly available in projects, which, if combined with the strategic resources, help to execute the project in a better manner and also give the organization a unique position in the market. Relevant experience was the main and number one capability that all interviewees mentioned, the literature supporting the same (Davies and Brady, 2016). Relevant experience means having resources with the same area of experience being exposed to similar projects, those who can come and work without needing any training and probably having the authority to make technical and financial decisions where possible. Relevant communication means that the human resource in a project needs to spend a lot of time communicating with the different stakeholders (Asanuma, 1989; Zhang

et al., 2018). Communication as a capability was mentioned as being important by many interviewees in combination with strategic resources. Many interviewees stressed that a good project manager was a valuable resource, and that, as project manager, most of one's time was spent communicating with all the project stockholders and managing their needs.

The interviewees identified communication as a key factor and capability for strategic resources to have in order to ensure project success. In addition, it was needed to properly manage all the project stakeholders. Leadership capability means a strategic resource with the ability to lead, manage and take decisions, adding greater value and having more impact on the achievement of project objectives (Zwikael and Meredith, 2018). Many project managers and directors interviewed in this research put leadership skills as one main factor of human resources to create better impact and bring effective results in projects. People were needed who could lead others and tackle issues and challenges without direct support from their line managers.

So, when leadership capability is accompanied with strategic resources, the outcome impact is noticeably greater (Project Management Institute, 2016). Multidisciplinary capability means that the resources are able to work with different disciplines, and have an active engagement for the best interests of the project. In addition, it means that they have the skills needed to work with different teams and nationalities. Finally, project management capability means that the resource should have the necessary tools, techniques and exposure to be able to deliver the project in a correct and effective way (Nanthagopan et al., 2016). Multidiscipline integration as a capability was extracted from several interviews, interviewees suggesting that the valuable human resource should always have the skills to integrate with other disciplines for the sake of the project. According to interviewees, multidisciplinary skills meant that the resource was able to communicate and coordinate when needed with others,

having the ability to work with other disciplines and get involved in tasks for better planning and execution of projects.

Furthermore, good managers should encourage their engineers to enhance their knowledge about other departments, and find a way to elevate those skills. One way of doing that is to enhance the knowledge-sharing sessions between different departments. For example, one project manager/interviewee encouraged his engineers to do technical presentations every week about their work in different departments, and to raise questions in the presence of all the other engineers. Hence everybody knew what others did, and accordingly the multi-disciplinary skills increased.

Capability is critically important at the same time, because project team members should have knowledge about other departments. If not, they should learn about other departments and increase their knowledge fast, as project time is limited. For the project director or manager, the resource who already has those skills and has worked before in different departments is preferable over the resource who has spent most of his/her career focusing on one department only. Project management as a capability means that the human resource is able to execute projects as per the organization's project management framework and format. The valuable resource should be ready to work from Day one, and knows how to execute his phase of the project. There were comments in interviews about this capability, but in different terms. Similar experience, exposure to company projects, experience in project management and project management skills were all terms used by the interviewees referring to the capability of a resource to understand the requirements of the project from a project management perspective. In summary, the valuable resource by itself does not necessarily give competitive advantage (Baia et al., 2019), but the capabilities of the individual and the organization when used in unique way can exploit the valuable resource, leading to

competitive advantage and better project results in this case. Any valuable resource should be combined with capabilities (Ying et al, 2019) and exploited at the right time and phase of a project to bring the expected results, and, in many cases, outstanding performance and innovative ideas.

6.1.2 Rare resources

The resource-based theory states that for a strategic resource to help in organizational competitive advantage, it has to be rare in nature (Barney and Hesterly, 2012). The rareness characteristic means that other competitors will not have the same resource (Bowman and Ambrosini, 2003). Many extracts from interviewees' responses did not support the availability of rareness characteristic as mandatory among the strategic resource characteristics. Their responses varied from the idea of there being no such thing as a rare resource, to there might be a rare resource but it does not last for long. The idea of a rare resource in projects was not supported as a characteristic. However, there was some agreement on rareness as a characteristic. Some of the interviewees agreed that human resources could sometimes be rare, on with two conditions. The first condition was the specialization of the resource. There are some technical specializations which are rare resources, although rareness here does not mean that such resources are limited worldwide, but rather that those resources are highly paid. So, having such resources possibly depends on an organization's ability to attract them. One example of such resources is technical safety engineers. According to some project managers, such specialization is not easily found compared with other specializations, such as mechanical, electrical, or project engineers. Accordingly, the organization should think of better ways and offers to bring in those resources when needed. It can be noticed that the resource by itself is not rare in projects. All the necessary resources to perform a project may

be available, but the difference that can make an impact is how those resources are exploited, or the way the organization uses them (Newbert, 2008; Barney et al., 2011).

Accordingly, the rareness characteristic is not related to the resource itself, but more to the way the resource is exploited. That is why the list of rare resources identified at the beginning of Chapter 5 mainly contains the process, system and method of execution as rare resources, rather than having a piratical resource. The process or method of exploiting resources is related to the skills and capabilities that the resource has which enable it to give better results (Wilden et al., 2018).

Furthermore, looking at the interviews from a statistical point of view, it was found that 19 interviewees thought that rare resources were neither available nor a necessary characteristic for strategic resources. On the other hand, only five interviewees thought there were some rare resources which were important to an organization. Those resources were mainly related to the way the organization used them, and so the rareness was not made explicit. However, the questionnaire data show that the rare characteristic was actually supported, that rare resources were available, and were a source of competitive advantage for an organization (see Table 25, Chapter 5). According to the above, the results seem contradictory, but it is worth mentioning that the rare characteristic in the questionnaire was always combined with capabilities, for example “My company has a very unique combination of project capabilities and financial resources which when exploited help to reduce the costs further, exploit targeted market opportunities and/or defend competitive threats”. So, the question is all about a combination of the uniqueness of the capability with the resource, and how their exploitation helps with better controlling the project (Fainshmidt et al., 2016).

That result from the survey actually supported what most of the interviewees agreed on about rare resources, which is that the benefit of any rare resource is the way that they are

exploited, or the unique knowledge they bring to a project to produce better performance, but not because the resource itself is unique. The discussion about rare resources brings another very important characteristic to strategic resources from a project perspective, which I have called the uniquely exploited characteristic. The stages or phase modes of projects require resources to be exploited in a unique way to get the most benefit from them. Each phase requires different resources, but most importantly it is the way that resources are exploited and integrated which is the main feature here.

To summarize this section, the rare resource by itself did not contribute much to project performance, but the unique exploitation of rare resources is what makes them rare, brings better performance, and accordingly competitive advantage (Baia et al., 2019). It can be noticed from the results shown in Table 31 that the strategic resources defined in projects were all related to human resources with capabilities. Moreover, it was not only a question of the normal capability of the individual; there should be both organizational supports to create an innovative environment, and the time allotted for those resources to be exploited. For example, in strategic resource number two, the well-defined project control system needed to be available on time and mainly during the planning stage. If such resource is only available at the closure stage, it cannot be called strategic, because the identification of the resource must be in the planning stage, and the exploitation will be in the execution stage. So, in projects, time is an important factor in defining strategic resources.

| No. | Strategic rare resources in projects | Data supporting the Literature |
|-----|--|---|
| 1 | Skilled, talented and capable cost estimator that fits the project | (Zhang et al., 2018) |
| 2 | Well-defined project control system including IT/Logistics | (Shenhar et al., 2001) |
| 3 | The way of executing communication | (Asanuma, 1989; Zhang et al., 2018). |
| 4 | The process to select and develop talented human resource | Kunc and Morecroft (2010) |
| 5 | Skilled, talented and capable project leader that fits the project | (Jugdev, 2004) ; (Zwikael and Meredith, 2018) |

Table 38: Strategic rare resources in projects extracted from interviews

Table 38 above addresses all possible rare resources based on the results from interviewees. Some of the rare resources have not been mentioned before in the literature, such as the talented cost estimator. Good cost estimation is a finite job, and even with good cost estimation, there needs to be an innovative environment and organizational support and capabilities in order to exploit it effectively. The same goes for rare resource number 3 in Table 38 above.

This resource is the way of executing communication. Communication as a capability or resource is well known in the literature (Balachandra, 1996; Welch, 2012). The method of executing is, by itself, a resource which can be called rare. Looking at the Table 34, the main link between most of the resources listed is how they are exploited, which is what gives them their rareness, more than the actual resource itself. In addition, when those resource are exploited within an innovative environment (Talay et al., 2013), the positive impact on the

project will be greater (Volden and Samset, 2017). For example, resource number 5, having a project leader, can be found in all projects and organizations, but the resource equipped with the needed capabilities and skills is the one that gives the competitive advantage. The same is true for the other resources listed in the above table. A more detailed discussion on the strategic resources in projects, and the extension of resource-based theory in projects will be provided later in this chapter.

6.1.3 Inimitable resource

The inimitability characteristic is one of the main pillars of the resource-based theory (Barney and Hesterly, 2012). The meaning of this characteristic is that for a strategic resource to give an organization competitive advantage over its competitors, those resources should be hard to copy (Barney et al., 2011). According to Barney (1995), this meaning is conditional, the condition being that the resource will be more difficult to copy if the organization has a unique history (what Barney called unique historical conditions). In other words, the resources are hard to copy if the history of the organization goes a long way back.

The ability of an organization to use such resources depends on its place in time and space. The second condition is the causal ambiguity, meaning that the relationship between the uncopied resource and competitive advantage is not known. Neither the organization, nor its competitors can figure out what makes such a resource increase the competitive advantage of that organization (Barney et al., 2011). The third condition is that the resource creates a socially complex phenomenon, which competing organizations have difficulty in imitating. According to the results from the interviewees' responses, inimitability was another valid characteristic. Clearly, most of the respondents were referring to human resources as being most inimitable, and in particular those with the preferred skills, capabilities and tacit knowledge, as also suggested in the literature (Ying et al., 2019). The noticeable trend from

many interviews' extracts, either explicit or implicit, was that inimitability is not a characteristic that a resource has alone, but is always related directly to the capabilities of the resources. Again, this is supported in the literature (Teece et al., 1997; Schoemaker et al., 2018). The interviewee responses mostly combined the inimitable resource with organizational or individual capability in striving for the necessary results to enhance project performance and accordingly put the organization in a better, unique position compared with competitors. This is shown in the results of inimitable resources in projects (see Table 39 below).

| No. | Strategic Inimitable Resources in Projects | Data supporting the literature |
|-----|--|---|
| 1 | Skilled, talented and capable human resource that fits the project | Kunc and Morecroft (2010); Zhang et al., 2018 |
| 2 | The process of tendering and executing projects | (Wilden et al., 2018) |
| 3 | The process of selecting and developing talented human resource | Kunc and Morecroft (2010) |

Table 39: Strategic inimitable resources in projects extracted from interviews

It is shown from Table 39 above that if a resource is to be called inimitable, it needs to be combined with capabilities (Katkalo et al., 2010). For example, strategic resource number one above is 'skilled, talented and capable human resource that fits the project'; for example the engineer working on the project is not an inimitable resource, but when combined with all the accompanying skills and capabilities, can be called strategic (Teece et al., 1997), providing they fits the project and come at the right time (see Section 6.1.5 for more details). The same justification goes for strategic resources numbers two and three. The uniqueness of exploitation and the right time are the conditions that make such resources strategic. It can

be argued that, again, the inimitable resource in combination with capabilities produces better performance, and that the resource itself does not give the performance to the project. It was mentioned before that inimitable resources alone cannot bring competitive advantage; likewise, dynamic capabilities alone do not automatically provide better performance (Ambrosini and Bowman, 2009). Accordingly, the combination of both is important. The positive effect of the combination of capabilities with resources can be extracted from many interviewees' responses, while at the same time is supported by the literature (Anwar et al., 2018). However, it is not clear from Barney's theory that this combination must be accrued for the performance to be better. The research suggests that this characteristic can also be combined into one characteristic, as suggested earlier, which is called 'uniquely exploited'. The uniquely exploited resource in a project is any resource that has the necessary capabilities and organizational support to exploit it at the right time and for the right purpose. The results from the questionnaire support the same idea from the interviewees. The interview questions combined inimitability with capability, and the results show that this combination is positively related to better competitive advantage and better project success. In summary, the inimitability characteristic for resources is available for human resources only, and conditional on having a combination with capabilities, either individual capability or organizational capability, for the resource to be uniquely exploited.

6.1.4 Organizationally supported resource

One of the main characteristics of the resource-based theory is that the resource can help in increasing organizational performance, and gives an organization competitive advantage, if that resource is supported by the organization (Barney, 1995). This characteristic means that the strategic resource which has top management support will be able to bring more positive results to an organization (Gita et al., 2014). In the project environment, all interviewees

agreed about the importance of organizational support for resources. The interviewees stressed the importance of the management support for the project success, and as far as the organizations used for this study went, support was both available and regarded as important. The interviewees mainly focused on the support that top management gave them in terms of financial fund support, which is also came into the area of faster time, as shown from the interview extracts in the last chapter (refer to Section 5.1.3). They also talked about the encouragement they received from their senior managers. The support also came from being able to bring the necessary resources to a project, and reward performance in different functions. All interviewees were positive about the support they got from the top management, but more importantly, they acknowledged that such support was a main factor in their project success. Furthermore, the organizational support characteristic was also supported by the results from the questionnaires.

The questionnaire defined many areas of support: the ability of employees to have upward communication with top management, both organization management and project management (Welch, 2012); the availability of management at critical phases of a project (Gita et al., 2014); the availability of knowledge-sharing support (Oyemomi et al., 2019); the support for new and innovative ideas (Talay, et al., 2013) and rewarding system availability; fund financial support; training support; equipment and technology availability; and the positive relationships with stakeholders. These support areas showed positive responses from the majority of the survey's respondents, which also goes along with the findings from the interviews. Support from top management is an important characteristic that makes a resource truly strategic and gives the better performance both for the project and the organization (Shou et al., 2019).

Accordingly, in the project's environment, this characteristic is important and comes top compared with the other characteristics of strategic resources. This outcome was supported by the responses of all interviewees and the analysis of the statistical results. The organizationally supported resources that are valuable and uniquely exploited (replacing rare and inimitable characteristics in RBV) are the strategic resources that fit the projects and give them a better chance of success. Such resources help to control and manage time, cost, scope and quality, which are the main pillars in any project and the main yardstick for checking performance (Atkinson, 1999). This discussion about project resources has introduced one more characteristic that must be available in the area of project support. This characteristic is time-related. In the project environment, resources should be bought in at the right time due to the temporary nature of projects (Project Management Institute, 2013). This means that having a concept engineer at the late execution stage, for example, is not feasible and will not add the necessary value; accordingly, although that resource might be valuable, organizationally supported and exploited in a unique way, if it comes in the wrong time, it cannot be called strategic. The researcher introduced the time characteristic to projects, based on the special temporary nature of projects, which was also supported in the interviewees' responses. This time-dependent factor is important in projects, and so accordingly the researcher argues that a main characteristic of a strategic resource in the project environment is the availability of that resource at the right time and in the right project phase. This characteristic can be called 'timely available'. In summary, in the project environment strategic resource characteristics are different. The valuable resource is valid. Rareness and inimitability can be combined into one characteristic called 'uniquely exploited'. Organizationally supported is valid, and timely available is therefore an additional characteristic. The chart below presents this idea in a more visual way.

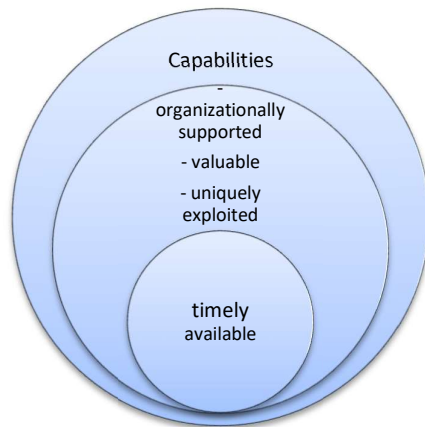


Figure 16: Strategic resources: project-based framework

It can be noticed here in Figure 16 above that capabilities are always a main factor for any resource to give a better performance and help in achieving project goals. The same thing is true for organizations, where capabilities are required for the resources to give the necessary competitive advantage, as shown in Figure 17 below.

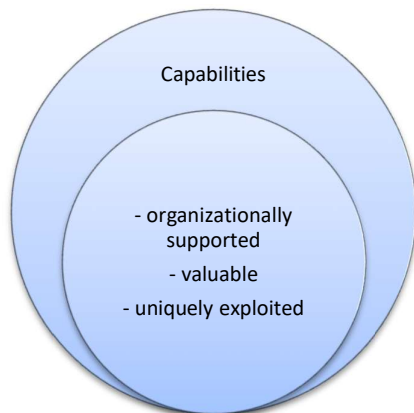


Figure 17: Strategic resources: organization-based framework

The figures above can be used as guidance for an organization to differentiate organizational level from project level. In organizational level, the main focus is on talent and how it can be exploited in an innovative way to increase organizational performance. There is no time factor

involved. At project level, the time factor is important, and needs to be included when managing resources. The choice of resources will be based on the talent, experience and the time when the resource will be needed.

In summary, this section started with a discussion on the importance of organizational support as a main characteristic in resource-based theory. The discussion provided evidence to either support or reject the theoretical claim about this characteristic, and in addition tested the availability and the importance of this characteristic in projects. Both goals were met. The availability of organizational support was necessary in projects and was also a main factor in better project performance. The second part of the section was a discussion around the researcher's suggestion of adding a new characteristic to strategic resources to be specially used in projects. That characteristic was the timely available characteristic. Extracts from the interviewees' responses supported the argument about this characteristic, and also the nature of projects as a main driver for having such a characteristic in projects' strategic resources.

6.1.5 Extension of resource-based theory in projects

This section presents the discussion around the area of resource-based theory and the possible application in projects. It addresses the second part of research question number two, which is "How can the role of resource-based theory and dynamic capabilities be better understood at project level?" The resource-based theory has been applied extensively at the organizational level. However, since resource-based theory mainly looks into how resources and capabilities can be effectively exploited, this is actually what can be called a project management capacity (Nanthagopan et al., 2016).

Accordingly, the link between both the resource-based view and project management exists and can be extended for the better execution of projects, using project management tools

and techniques (Albert et al., 2017). The strategic resources characteristics for an organizational framework were valuable, rare, inimitable and organizationally supported. In the last few sections, the discussion was around answering research question number one which is about the availability of strategic resources and capabilities in projects. The list of available strategic resources and capabilities is shown in Section 6.1.1. Those resources and capabilities bring the discussion to a different level.

It was noticed from the results of the interviews that the rare characteristic and the inimitable characteristic that strategic resources normally have at organizational level was not fully supported by the data gathered from the interviewees' responses. Instead of those two characteristics (rare and inimitable), one combined characteristic was identified as being more appropriate at project level, which is called 'uniquely exploited'. The majority of the interviewees and questionnaire respondents believed that rareness and inimitability were hard to see in projects, but what actually made the resources more strategic was the way those resources were exploited, not only the normal exploitation, where the resource is combined with capability and used as per the standards and processes, but more than that, there was a need for a more innovative method (Talay et al., 2013) to exploit resources for better performance (Coad et al., 2013). The innovative environment in projects allows the resources to have control over the way of doing things, even if that means that procedures and standards will not be followed. The uniquely exploited characteristic in project strategic resources means that the resource will have management support and an innovative environment to revisit standards and apply the method that will lead to the success of the project (Bayus et al., 2003). The resource will have the necessary authority to take decisions and adopt processes when required to make the workflow in the right direction.

Moreover, those strategic resources in projects are controlled by time, which is divided into phases, the combination of which provides the project schedule. According to this, not all resources will be needed at the beginning of each project. The strategic resource that you might need at the start of a project while doing the concept design is different from the one needed at the commissioning stage. So, in the project environment, a strategic resource becomes strategic when it is used at the right time. This characteristic is called timely available. The resource that has value, is supported by the organization with all necessary capabilities, and exploited in an innovative way using its own capability and the organizational capability will only be strategic if that resource is used at the right time in the project.

An example of this was extracted from one of the project directors. He mentioned that a good cost estimating engineer was very difficult to find. Each organization needs such specialized personnel, because of the value they bring, in not only estimating budgets, but most importantly, saving cost. So, they were a valuable characteristic. They were also rare and inimitable, due to the nature of their jobs, and the organization gave them free rein to innovate and work accordingly, so they were also supported by top management and exploited uniquely. None of those characteristics was enough to call them strategic if you received those cost estimators at the project execution stage, however. Their value would be limited, no matter what support you gave or what capabilities they had. But if such resources were available at the concept design stage, then millions of dollars would be saved. The above discussion leads to the possible outcome that in projects, it is not always possible to apply the resource-based theory as it is. The use of the theory is only possible if we can adjust the way we use the strategic resources. The organization should still retain the necessary support and valuable resources, and they should have the capabilities defined earlier. The difference is that those resources should be put in an innovatively supported environment (Wadho and

Chaudhry, 2018), and should be available at the right time. If those factors are available, then the use of strategic resources should result in better performance, and accordingly better competitive advantage for an organization (Zhang et al., 2018). The suggested changes for extending the theory in projects are presented in more detail in Section 6.5.

| Characteristic | Valuable | Rare | Inimitable | Uniquely exploited | Timely available | Organizationally supported |
|----------------|----------|------|------------|--------------------|------------------|----------------------------|
| Organization | √ | √ | √ | | | √ |
| Project-based | √ | | | √ | √ | √ |

Table 40: Organization and projects resources characteristics

The above Table 40 does not mean that the other, unchecked characteristics do not fit organizations or projects. It simply means that for project-based resources, those checked characteristics are more appropriate in comparison with others. Based on the above discussion, rare and inimitable characteristics at project level are replaced by uniquely exploited characteristic.

6.2 Strategic resource, project performance and competitive advantage (discussion around research Q-2)

This section addresses the discussion on the relationships between strategic resources and project performance, and between strategic resources and competitive advantage. Those relationships answer the first part of the second research question, asking “How do the project strategic resources and capabilities provide competitive advantage?”

6.2.1 Strategic resource and project performance

The relationship between strategic resources and project performance, especially in the area of human resources that are equipped with the right capabilities is positive (Almarri and

Gardiner, 2014) and has a high impact on project success when we looking at the main project success criteria, such as time, cost, scope and quality (Babu and Suresh, 1996; Węgrzyn, 2016). The responses from interviewees supported that idea and enhanced the belief in that relationship.

According to the interviewees, the relationship between strategic resources and project performance was positive (Volden and Samset, 2017) (please refer to Section 5.2.1 in Chapter 5). The factors affecting both variables in this relationship could be the capabilities (Schoemaker et al., 2018), as per interviewee S.S.I-3 & 4 and several others. The second factor was the innovative environment (Wadho and Chaudhry, 2018), as per interviewee S.S.I-5. Those two factors affected the relationship in a positive way, and helped to increase the performance of the project and achieved the goals of the project. This relationship was indirectly tested in the questionnaire. The survey questions tested project performance, in terms of time, cost, quality, goal achievement and innovation.

The outcome of that result was tested against each characteristic of the strategic resource, for example, the relationship between project performance and strategic organizationally supported resource. The outcome of the relationships was positive and significant. Table 36 below presents the statistical data. The data follow the discussion and the results came from the interviews. It is worth mentioning that the relationship between project performance and the valuable, inimitable and rare characteristics was not significant in the statistical data. Accordingly, the relationships between those characteristics were not justified.

These results followed the same line as the outcome of this research, especially concerning the characteristics that could increase project performance. This research suggests that rare, inimitable characteristics are not highly supported, and could be replaced by a new characteristic, namely uniquely exploited. The valuable characteristic was also not justified

without taking capabilities into consideration. This outcome from the questionnaire, together with the supporting outcome from the interviews, were evidence that, at project level, other characteristics should be taken into consideration in order for project performance to increase.

| The relationship | Project performance | Result / discussion outcome |
|-----------------------------------|----------------------------|------------------------------------|
| Valuable resource | Negative relation | No significance |
| Rare resource | Negative relation | No significance |
| Inimitable resource | Negative relation | No significance |
| Organizationally supported | Positive relation | High significance |

Table 41: Project performance and strategic resources relationships

The high significance of the relationships between project performance and organizationally supported resources was expected. The results from interviewees' responses were positive, and agreed on the importance of organizational support. In the project environment, organizational support of strategic resources was mandatory for a project to succeed (Gita et al., 2014). Both financial and non-financial support was mentioned by the respondents. Moreover, the ability of an organization to build an innovative environment as part of its support was also needed, and the impact being high on cost saving and time management of the project. Table 41 above summarizes that.

The statistical results regarding the relationship between project performance and organizationally supported resources showed a positive relationship. The project performance tested items were: cost, time, quality, innovation and goal achievement. On the other hand, the organizationally supported survey items included communication, encouragement, reward system, training, etc. Accordingly, the positive relationship was justified. In summary, strategic resources are needed for better project performance, but the resource-based theory characteristics are not necessary the ones that give resources the

ability to increase project performance. There are other characteristics in addition which need to be considered for better project performance, such as uniquely exploited and timely available.

6.2.2 Strategic resource and competitive advantage

This section presents the relationship discussion between strategic resources and competitive advantage. The literature supports the relationship either via Barney's resource-based theory (Barney, 1991, 1995) or other literature, such as Teece et al. (1997), Eltigani (2013) and Wilden et al. (2018), which add dynamic capabilities as a main factor needed to exploit those resources (Salvato and Vassolo, 2017; Choi et al., 2018). Along the same lines, the combination of dynamic capabilities and strategic resources is another main factor for better organizational performance (Slotegraaf et al., 2003; Vorhies and Morgan, 2005; Newbert, 2006; Barney, 2011).

Competitive advantage can be defined as the ability of an organization to develop and create a strategy that other competitors do not currently have, and accordingly gain competitive advantage because of the implementation of that strategy (Barney, 1991). Barney also defined strategic resources as the resources that have value, are rare, inimitable and organizationally support, and need capabilities to be exploited and to be a source of competitive advantage. From the results, the relationship between strategic resources and competitive advantage was positive, and included all strategic resource characteristics - valuable, rare and organizationally supported.

The interviewees' responses confirmed the importance of strategic resources in improving the organizational performance and accordingly putting an organization into a unique position in the market. The positive and direct relationship between strategic resources and competitive advantage was expected, either from the literature point of view or from the

results. The main question to be asked at this point is what are the factors that make strategic resources have such an impact on an organization and elevate its competitive advantage? The answer to that question is given in detail in the next section.

6.3 Factors affecting the relationship between strategic resources and competitive advantage (discussion around research Q-3)

In the last section the relationship between strategic resource and competitive advantage was examined. This relationship was positive and significant. The responses from interviewees and the questionnaire results data all pointed to one trend, which is that the relationship was valid. This section describes in more detail the main factors affecting this positive relationship. Those factors are dynamic capabilities and innovative environment. The next section discusses dynamic capabilities and innovative environment as factors affecting strategic resources and competitive advantage.

6.3.1 Dynamic capabilities and innovative environment

This section discusses dynamic capability and innovative environment as mediating elements in the relationship between strategic resources on the one side and competitive advantage on the other. Dynamic capabilities are the skills, knowledge and tools used by a resource or an organization in order to exploit resources in a more efficient and effective way. The exploitation of both resources and capabilities is a combination that gives better competitive advantage (Schoemaker et al., 2018). According to the interviewees' responses, the capabilities defined in projects are listed in Table 33 earlier.

They are: **relevant experience, relevant communication, leadership, multidisciplinary experience,** and **project management skills and tools.** Those capabilities are needed in projects in order to exploit and use the strategic resources listed in Tables 36,38 & 39, so that

the combination increases the performance of the project and accordingly helps to improve organizational performance and competitive advantage (Slotegraaf et al., 2003; Vorhies and Morgan, 2005; Barney, 2011). The definition of competitive advantage is that it is the ability of an organization to implement a created valuable strategy that is not implemented by other competitors at that time. That competitive advantage becomes sustained when no competitors are able to duplicate the benefits of the strategy (Barney, 1991). According to this definition, for any organization to have a source of competitive advantage, it has to create a unique strategy that other competitors do not have. It may be argued that strategic resources are a tool that can be used to create such a strategy and that dynamic capabilities are the factors that affect the exploitation of the strategy and skills that make such exploitation unique.

This idea of unique strategy is what made the researcher propose a new characteristic for project strategic resources, namely uniquely exploited. Research of the literature suggests that, in order for a strategic resource to be a source of competitive advantage, it has to be combined with a capability, but what the current research suggests is that the combination needs to be uniquely exploited. The unique exploitation of strategic resources needs an innovative environment to host such exploitation. The innovative environment is hence also one of the main factors that enable strategic resources to increase competitive advantage (Wadho and Chaudhry, 2018).

The extracts from interviewees' responses stressed the importance of creating an innovative environment in order for strategic resources to bring new ideas to perform faster and smarter. Interviewees from different organizations gave examples on how such an innovative environment can be enhanced - For example, having an open-door policy for engineers and project members to walk and talk to their line managers about their ideas. In addition, some

organizations encouraged brainstorming sessions as one main route to discuss new ideas, and made them a regular event. Most organizations also had a reward system to encourage employees who came up with good ideas. Furthermore, one organization implemented those good ideas and supported the employees in executing them. The organization did not limit innovative ideas to those related to the technical areas, but instead all ideas were welcomed, no matter how small their impact might be. As long as the idea was justified and applicable, then the organization would support it.

Although the innovative environment is important in an organization, it is conditional on projects, so you need to have the right idea at the right time, and should have the right people to execute it as well. This is where the time factor appears again, which emphasizes the importance of it as a major factor to be considered for any successful project, and for any success in using strategic resources in projects. This idea of time appeared frequently in the interviewees' responses. This concept also supports another important characteristic of strategic resources proposed by the researcher, which is the timely available characteristic. This characteristic will be discussed in detail later in the chapter. New, innovative ideas which come on time in projects, together with the support that an organization gives to the project team to innovate are both important for them to plan and execute projects more efficiently and save more costs. The extracts from the interviews all support the importance of having an innovative environment.

The tool for this is to have a process of talking about those new ideas, and a reward system to accompany it. So far it is clear that an organization gains from supporting new ideas. The responses from interviewees mentioned examples where cost was reduced, standards became more effective and the process of doing things became easier and justified. Accordingly, it can be argued that innovative environment is a main factor which needs to be

available in the vicinity of strategic resources, along with the dynamic capabilities to gain a source of competitive advantage. Figure 18 below explains these terms in a more visual way, and the details of an innovative environment are explained in the next section.

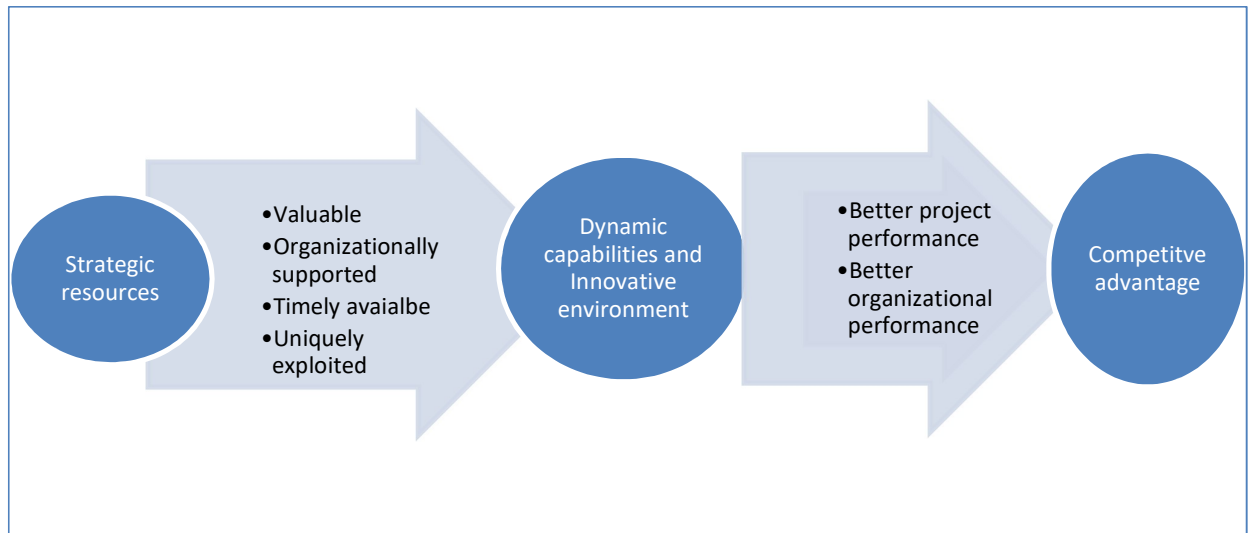


Figure 18: Strategic resource and competitive advantage relationship

The above Figure 18 describes the process of having a better competitive advantage in oil organizations, and what an organization should do to support projects and attain a more successful performance. According to the proposed framework, and based on the results extracted from interviewees' responses, an organization needs to support strategic resources with an innovative environment (Salunke et al., 2011).

Strategic resources with their own capabilities and organizational capabilities will create new unique ways to improve the project process, including generating new ideas to reduce costs, revisiting the standards and specifications, evaluating the tendering process, improving concept design and considering new ways of contracting. The organization will then – via use of the project team - evaluate the way forward: Are all those standards actually needed? Do we need to use this type of contracting? Are we rewarding our resources well? Do the technical specifications require a review? And so on. The process is then reviewed by top

management, and if approved it will be implemented as a unique way of doing projects. This will increase project performance, which will accordingly affect the organizational performance, especially for those organizations in oil and gas where the projects are managed in a central unit. This improvement in project performance and organizational performance will develop a positive relationship with the client which, in this case, is the Ministry of Oil, and accordingly allow the procurement of better concessions, or a better market share. In summary, strategic resources need two main factors to be a source of competitive advantage. Those factors are the dynamic capabilities (Teece et al., 1997) and the innovative environment (Kunc and Morecroft, 2010).

Those two factors have to be managed in a way so that both are uniquely exploited, and the time factor also needs to be considered in terms of when the best time is to use such resources and capabilities, and in what phase they will have maximum impact. If that sequence of doing things in projects is followed, research suggests that project performance will be better in terms of controlling cost, time, scope and quality. The ability of a strategic resource to create new ways of doing things will increase, and the response to outside and inside threats will be handled properly. In addition, organizational performance will be increased, because project performance has increased, and more success will be realized on the project side, which will give the organization a more unique position in the market, which will increase its competitive advantage accordingly.

6.4 Overall relationships and main outcome (General summary overview)

This section will discuss more the shape of the relationships from both interviews and questionnaires. It will look into the strategic resource's availability in projects, and produce a final list of them, considering how they affect projects. It will then describe the findings on strategic resources and competitive advantage in summary, and the final result from both

interviews and questionnaires. The discussion will then be extended to present the final outcome regarding the usage of resource-based theory in the project environment. First of all, the strategic resource as Barney formulated in his theory is already available in projects to some extent. The valuable, rare and inimitable resources, as per interviewees' responses, were the main characteristics that most of them compared the strategic resources against.

The list of valuable, rare and inimitable resources includes the following:

| No. | Strategic valuable resources in projects |
|-----|---|
| 1 | Skilled, talented and capable human resources that fit the project |
| 2 | IT application and computation knowledge |
| 3 | The access to financial cash flow |
| 4 | The process to select and develop talented human resources |
| 5 | The ability to exploit resources |
| 6 | Positive culture that motivates, supports and keeps human resources |
| 7 | Project manager/Director/Leader |

Table 42: Valuable resources in projects

| No. | Strategic rare resources in projects |
|-----|--|
| 1 | Skilled, talented and capable cost estimator that fits the project |
| 2 | Well defined project control system including IT/Logistics |
| 3 | The way of executing communication |
| 4 | The process to select and develop talented human resource |
| 5 | Skilled, talented and capable project leader that fits the project |

Table 43: Rare resources in projects

| No. | Strategic inimitable resources in projects |
|-----|--|
| 1 | Skilled, talented and capable human that fits the project |
| 2 | The process of tendering and executing projects |
| 3 | The process of selecting and developing talented human resources |

Table 44: Inimitable resources in projects

Those tables (42, 43 & 44) are from Chapter 5. As it can be seen from the three tables above, only two or three resources in projects actually have the three main characteristics of Barney's resource-based theory. The skilled, talented and capable human resource fits the project and the process of selecting and developing talented human resource are the only strategic resources that fall into resource-based theory. But according to the interviewees, all of the above resources were valuable, and could be called strategic as well. It can be noticed in the list of those resources that there is one main characteristic that all of those resources have. That characteristic is the exploitation of the strategic resources (Barney et al., 2011; Wilden et al., 2018, along with the capabilities, in a unique process that will give those listed resources strategic value.

According to that list, and based on the new proposed framework from this thesis; the listed resources are strategic because they all have the value characteristic, the uniquely exploited characteristic, the organizationally supported characteristic and the timely available characteristic. So, in the project environment, all those resources are strategic and available. Now since the strategic resources in a project have been listed and their valuable outcome confirmed, the main concern is those strategic resources affect competitive advantage. The answer to that question from results chapter and discussion chapter sections was positive. One main outcome of this thesis is that strategic resources are positively related to better project performance and better organizational performance, so accordingly those strategic resources become a source of competitive advantage (Slotegraaf et al., 2003; Vorhies and Morgan, 2005; Barney, 2011).

This outcome was confirmed by interviewees' responses and by statistical analysis, as described in Chapter 4 and discussed in Sections 5.2 and 5.3 above. According to the above, the strategic resources are defined, and their effect on project performance is confirmed. The

main outcome from this thesis is that there needs to be another close look into the relationship of the capabilities and the innovative environment when exploiting those strategic resources. The high positive impact from a strategic resource is guaranteed when such resources are uniquely exploited with the help of capabilities and innovative environment. This is the first main extension of the theory which needs to be taken into consideration when using resource-based theory in projects. The other main factor is the time factor. Projects are a temporary endeavor with a definite start and end, which means that any resource being used in those projects needs to be available on time, especially strategic resources. So, time availability is mandatory for strategic resources used in projects in order to give expected results. This factor is what is called 'timely available characteristics' in the proposed framework. This thesis proposes that for any strategic resources in project environment, there need to be two more characteristics that are not explicitly addressed in resource-based theory.

Those characteristics are uniquely exploited and timely available. It should be noted that although the thesis proposes these two new characteristics for strategic resources to be used in projects, that does not mean that resource-based theory cannot be used as it is in projects. There is some literature that actually uses the resource-based theory in projects (Jugdev and Mathur, 2006; Jugdev et al., 2007; Mathur et al., 2007, 2013; Almarri and Gardiner, 2014). The application of the theory in projects is available, but this thesis gives more insight into the strategic resources and dynamic capacities exploitation, and to the time of strategic resource availability. Combining resource-based theory with the proposed framework should give the optimum outcome on how to define and exploit strategic resources. At the same time, the thesis offers recommendations to managements on the main factors that could enable their

resources to perform better, and accordingly to increase both the project and organizational performance.

6.5 Project resource-based view (Proposal based on results)

This section addresses the discussion about the resource-based theory application in projects. It proposes a possible extension to the theory, taking into consideration the project environment. The proposal presented here is mainly based on the results from the semi-structured interviews. The questionnaire data also supported some features in the proposal. The proposal agrees with resource-based theory that, for any strategic resource to provide competitive advantage for an organization, it needs to have a combination of capabilities and characteristics. Those characteristics as per resource-based theory are valuable, rare, inimitable and organizationally supported. The project resource-based framework confirms the need for project strategic resources to be valuable and to have organizational support. Rareness and inimitability are valid for organization level but as per this thesis results those two characteristics are not explicitly evolved and accordingly not to be necessary considered at project level. Two other characteristics arose from the project environment. Those characteristics are unique exploitation and timely availability. Details of each of those characteristics and their contribution to the project-based view are discussed in the following subsections.

6.5.1 Valuable

The valuable characteristic is available and confirmed as one of the main characteristics in strategic resources. This confirmation comes from three sources, firstly from the literature (Barney et al., 2011), as valuable is one of the main characteristics in resource-based theory. The valuable characteristic is judged to be important from the fact that it has a positive impact

on an organization and its projects, most notably the ability of the valuable resource to achieve lower costs (De Massis et al., 2017), to affect positively the acquisition of market opportunities and to neutralize threats.

Accordingly, resources with valuable characteristics combined with capabilities will have more potential to be a source of competitive advantage to an organization (Hall, 1993; Newbert, 2008; Sok and O'Cass, 2011). The importance and existence of the characteristics in projects was also confirmed by the interviewees' responses and the survey questionnaires, as described earlier in the Results chapter and in this chapter. Valuable resources were also listed in Chapter 5 Section and discussed in this chapter. In summary, the strategic resources in projects should have the valuable characteristic to have the anticipated impact on project performance and competitive advantage.

6.5.2 Organizationally supported

Organizational support as a characteristic of the strategic resource is also supported by the literature (Barney, 1991; Bowman and Ambrosini, 2003). The organizationally supported characteristic means that an organization needs to exploit the resources in a way to help it to gain competitive advantage (Gita et al., 2014). The extracts from interviews gives similar confirmation to that gained from the literature. The interviewees agreed on the importance and positive impact of organizational support for resources. In the project environment, support from the organization takes mainly two directions: First the support from the dynamic capabilities point of view.

Organizational capabilities help the strategic resource to perform better and give the organization a unique market position (Teece et al., 1997). The capabilities in projects include project management skills and tools, communication capabilities and the exposure or experience that the resource will have in the projects. Such capabilities are the main factors

for better project performance, as per the interviews results. The main aspect that this research adds to capabilities exploitation is the unique process of the exploitation, which can be enhanced in a better way when an organization support an innovative environment in projects. Many ideas which lead to huge savings take place because of the unique exploitation of resources in an innovative environment. The following extracts from interviews reinforce this point.

“in Daleel for example, the tendering process we have is unique and hard to be found elsewhere, that process unable us to reduce cost of the project and yet have a very qualified contractor to produce a quality work at the end” (S.S.I-3)

“the key resources, skills, experiences will affect the project, for example a something like a valve that need inspection with a good inspector otherwise will have issues and cost you lots of money, we had a situation where a small task like this cost million because it delayed the completion date” (S.S.I-4)

“The project leader and his team as strategic resource are the main factor to achieve the project goals in terms of cost quality and schedule, for innovation the company culture to support new innovative ideas and the leaders support for it are main factors to keep a steady innovative environment” (S.S.I-5)

Two things can be noticed from these extracts, (1) that innovative ideas are welcomed and supported in the project area, and that the impact of such an environment is high; and (2) that those innovative ideas should always come at the right time. The time factor in projects is an important condition that any resource should be measured against. The research has developed those new characteristics in order to be able to use the resource-based theory in projects. The following sections describe those two characteristics.

6.5.3 Uniquely exploited

This section describes the new characteristics proposed for a project resource in order to call it strategic. The trend for this characteristic is not new. The antecedents go back to the publications by Barney (1995) and Teece et al. (1997), when they were discussing the importance of the exploitation of strategic resources along with an organization’s dynamic

capabilities (Barney et al., 2011; Wilden et al., 2018). The discussion then evolved in the literature to include project capabilities (Davies and Brady, 2016), which means the skills and knowledge needed from an organization to exploit and explore the resources for better performance.

The above literature did not give a detailed view on the importance of the unique exploitation from an innovation environment point of view. The proposal formulated in this research suggests that there are three main aspects which help organizations to exploit their resources in a unique way to gain better market share, or have a source of competitive advantage. Those three aspects are the organizational support, the capabilities (organization and project) and the innovative environment. The proposal is also confirmed from the results emanating from interviewees' responses where they confirmed the importance of organizational support, capabilities and innovative environment.

When these three aspects (organizational support, capabilities and innovative environment) are available and combined, the resources in a project will be exploited in a way that competitors will find hard to copy and understand, and accordingly create better strategies which allow the organization to perform better. These three aspects have already been discussed in Sections 5.1.4 and 5.3.1 in this chapter. The proposed framework is a trail to understand the complexity relating to strategic resources and competitive advantage. In addition, it helps to answer one of the main research questions about how the role of resource-based theory and dynamic capabilities can be better understood at project level. To do that, the researcher started from the resource-based theory and literature, gathered the data related to the area, and then analysed the results, checking for any trend that would lead to a better view of resources in the project environment.

The results are that with the characteristic of unique exploitation, project resources should be able to have a highly positive impact on performance, and accordingly this resource becomes a source of competitive advantage for an organization. In summary, strategic resources in projects can have more potential of being a source of competitive advantage if they include gets three related things. Organizational support gives the necessary capabilities which allow the project environment to be innovative. According to this combination, the strategic resource will be uniquely exploited. However, this unique exploitation characteristic in a project will have a lower impact if the resource is not available at the right time. The availability of a resource at the right time is another important characteristic in the project environment. The next section presents this characteristic in more detail.

6.5.4 Timely available

This section describes a characteristic that is not mentioned in the resource-based theory. This characteristic is the availability of resources at the right time. The absence of this characteristic in the resource-based theory can be understood, as the theory addresses the exploitation of the resource in general, and not specifically in projects. But since this research is mainly focusing on projects and how the resource-based theory can be used in projects, then the time factor also evolved. In the project environment, time is a mandatory factor because of the nature of projects. By definition, a project is “a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end” (PMBOK, 2013). From the project definition of being temporary, with a definitive start and end, the importance of time in the project environment is clear. A project normally consists of different processes, starting with initiation, and going on to planning, execution, close out, and monitoring and controlling processes. According to the above, and based on the interview extracts, it can be seen that in

projects, each phase or process requires different resources, and that even if a resource is needed in all processes, its outcome and contribution will differ.

The argument is that even where there is new innovative idea which the organization supports, and there are the resources to exploit it in a unique way, that idea still has to come in at the right time. Several other extracts confirmed the importance of time in ensuring that a resource is available to exploit ideas during a particular phase of the project. So according to the above, and the evolution of such an important factor in projects, the time availability of a project resource is a major characteristic that gives it the ability to have higher impact on the success of the project. This characteristic is needed so that the project resource can be called strategic.

In summary, a project resource can be called strategic when that resource is valuable, supported by the organization by building the capabilities and creating an innovative environment, can be uniquely exploited and is available at the right time across the project. The combination of all those characteristics and capabilities will enable the project strategic resource to derive better performance from the project. It is that combination which mediates and explains the relationship between strategic resources and their ability to be sources of competitive advantage. Figure 19 below presents this idea in more visual way.

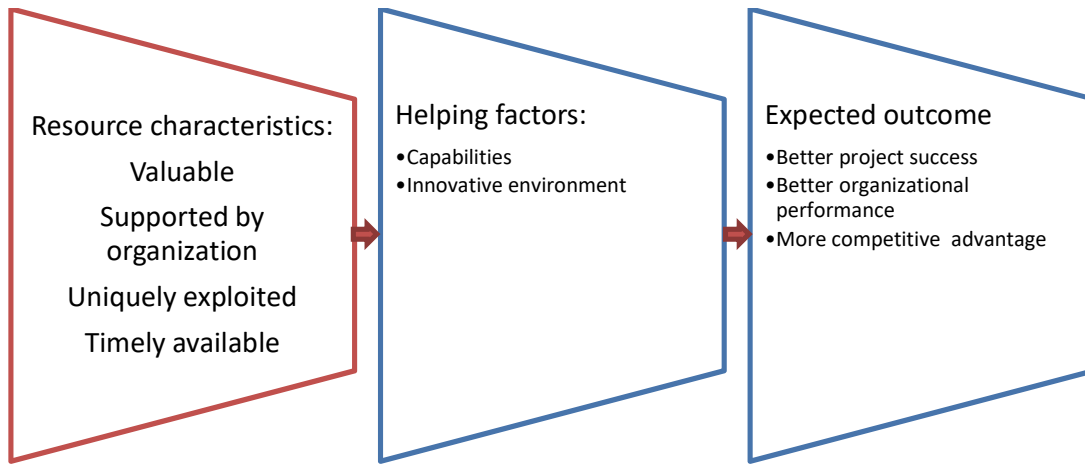


Figure 19: Proposed project-based framework

7 Conclusion and recommendations

This chapter is divided into two parts. The first part is the overall conclusion of the research. The second part addresses the recommendations arising from the research. The conclusion part mainly consists of an introduction about the underlying theory of this research, which is the resource-based theory (RBT) of Barney (1995). After that, an overview of the research problem, aim, objectives and research questions will be presented. Furthermore, a summary of the research methodology and the data collection is given. Finally, the main findings and discussion summary will be shown. The recommendation part of this chapter consists of five main areas.

First, based on the finding's discussion, the new proposed project resource view is presented, and the discussion around how it is driven is also addressed. Second, the measures and recommendations for organizations and their leaders to better exploit their resources are listed and discussed. Third, the lessons learned and recommendations from the data collection part are outlined for the use of academic researchers. Fourth, a discussion around the research limitations and how these can be handled in future is also addressed. Finally, the possible direction of future research based on this research finding is presented. Figure 20 below summarizes both the conclusion and recommendations parts.

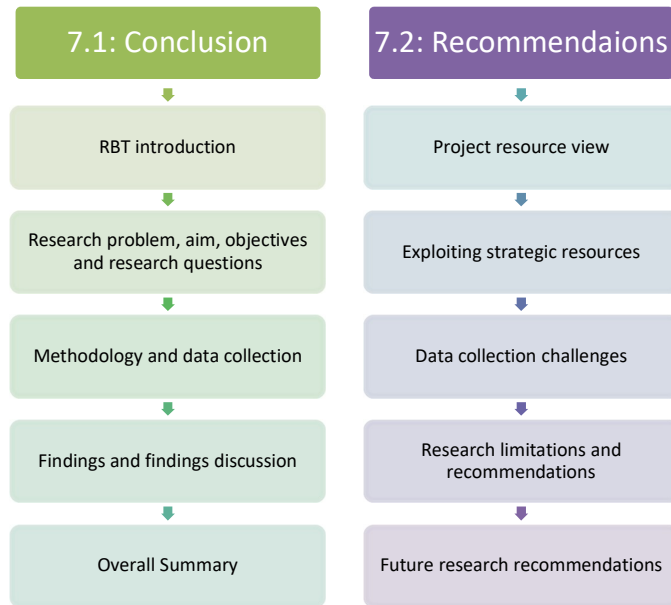


Figure 20: Chapter-7 Flow Chart

7.1 Conclusion

This research was set up to answer the question of how organizations can manage their strategic resources at project level effectively in order to increase project success and accordingly gain competitive advantage. The strategic resources in projects are defined and their relation to competitive advantage is explored. The resources are defined and addressed based on Barney’s (1995) theory of resource. According to the results data and findings, a newly proposed project resource view was seen to evolve. The following summarizes the research.

7.1.1 Resource-based theory in organizations and projects

Resource-based theory is one of the strategic management theories that describe the characteristics of strategic resources and why some organizations gain more competitive advantage than others. According to resource-based theory, the resources should consist of four main characteristics so that they can be called strategic. Those characteristics are valuable, rareness, inimitable and organizationally supported. The history of the theory goes

back to Penrose (1959), when he presented his view about firm resources. Penrose believed that internal firm resources were a main factor for organizational growth. Later on, in the 1980s, Lippman and Rumelt (1982), Wernerfelt (1984) and Barney (1986) further shaped the theory. Barney (1995) formulated the theory in its current shape and format. He stated that for any organization wishing to achieve competitive advantage, the resources exploited needed to have four characteristics (valuable, rareness, inimitable and organizationally supported). In 1997, Teece introduced the dynamic capabilities theory. According to Teece (1997), dynamic capabilities are “the firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments”. Dynamic capabilities could be considered as tools to utilize resources so that an organization gains better competitive advantage (Eltigani, 2013; Choi et al., 2018). The combination of strategic resources and dynamic capabilities could lead to better performance (Helfat et al., 2007).

The above literature on resource-based theory is concerned with the organization level context. The resource-based theory at project level has also received some attention in the literature (Jugdev and Mathur, 2006; Jugdev et al., 2007; Mathur et al., 2007, 2013; Almarri and Gardiner, 2014). The literature suggests that resource utilization is an organizational level decision; but at the same time the accrued benefits from that utilization can only be realized at project level, supported by the organization and exploited using dynamic capabilities and project management methodologies and processes (Mathur et al., 2013). This study explores the relationship between strategic resources and competitive advantage at project level. Furthermore, it addresses the utilization and exploitation of those strategic resources in combination with dynamic capabilities.

7.1.2 Problem, objectives and research questions

The main challenge put forward in this thesis is how organizations can increase performance and sustain their business by managing their strategic resources effectively at project level in general, and in specific situations, such as oil price reduction. The research domain is the oil and gas organizations in the Gulf area generally, and Oman and UAE specifically. During oil price reduction, the oil organization's target is to maintain their operations and production, while cutting costs on different kinds of expenditure. The resources (human, physical, financial and intellectual) are targeted on the cost reduction process. Accordingly, more innovative and effective solutions are required. This thesis studies the identification and effective management of strategic resources in organizations' projects in order to explore the relationship between the project strategic resources and project/organizational performance. The main objectives of the study were to identify the available strategic resources and capabilities of organizations in projects, in addition to exploring the relationships between strategic resources, project success and firm performance. Furthermore, the aim was to examine the factors affecting the relationship between strategic resources and competitive advantage in order to explain this perceived relationship. According to the objectives, the research questions were: What are the strategic resources and capabilities available in an organization's projects? How do the project strategic resources and capabilities provide competitive advantage, and how can the role of resource-based theory and dynamic capabilities be better understood at project level? What are the factors affecting the relationship between strategic resources and competitive advantage in projects?

7.1.3 Methodology and findings

The research strategy was to use both qualitative and quantitative approaches during the collection of the data. The nature of the research questions, being 'how' and 'what' type questions, suggested the use of qualitative, using semi-structured interviews (Voss et al., 2002). The semi-structured interviews were mainly conducted to answer research questions one and two. Four organizations were included, and 24 interviews were conducted with time limit of between 30 mins and one hour. The interviewees were from middle to senior management positions. A quantitative approach was also used to generate validation for the relationships between strategic resources and competitive advantage, and strategic resources and performance. 120 engineers from different organizations were involved in the questionnaire. The main findings from the data collected and results are as follows:

- The strategic resources at project level were identified and listed based on their characteristics, giving a list of valuable resources, a list of rare resources and a list of inimitable resources.
- The relationship between strategic resources and competitive advantage was explored, and the relationship was found to be positive. There was a direct relationship between strategic resources and an organization gaining competitive advantage.
- The relationship between strategic resource and performance was tested and addressed, indicating that there was a direct relationship between them.
- Two factors evolved as affecting the strategic resources and competitive advantage. Those two factors were innovative environment and capabilities (project and dynamic).

7.2 Recommendations and Contributions

This section summarizes the recommendations which evolved from the research. The section will first present the contribution to theory given by the research. The proposal, initiating from the study of strategic resource characteristics at project level, is the main contribution to theory, and will be addressed in Section 7.2.1. Section 7.2.2 will present the research contribution to practice, particularly in the area of management. In addition, Section 7.2.3 will address the research limitations, and Section 7.2.4 will present the way forward for future research. Finally, there are some thoughts about what the researcher has learned personally from doing the PhD, how he has grown as a researcher, and what he would do differently in the light of experience. This will be addressed in Section 7.2.5.

7.2.1 Contribution to theory: Proposal of strategic resources in projects

This section presents the contribution to theory made by this research. The contribution to theory lies in two main areas: first, the application of resource-based theory in the project management literature in the oil and gas industry in the Gulf area which should give senior management of those organization another looks onto their strategic resources and what are the factors affecting those resources and what is needed to do from organization side to support the exploitation of those resources for better performance. Resource-based theory is a strategic management theory, the application of which was seen to be successful and useful in this research. The results from the data collected suggest that the usage of such theory was both possible and recommended. However, to apply the theory in a better way in the project environment, some changes to the theory were suggested. The following paragraph explains those changes in the form of a proposal, which is the second area of contribution to theory. One of the main contributions to theory from this study concerns the proposal for strategic resources in projects.

The proposal looks into the characteristics of strategic resources from a resource-based theory point of view, and checks the suitability of the same in projects. According to the resource-based theory, there are four characteristics that need to be available for a resource to be called strategic. The four characteristics are valuable, rareness, inimitable and organizationally supported. In addition to those characteristics, there need to be dynamic capabilities attached to the resources, so that the utilization of the resources will be at maximum. Therefore, if any resource has those four characteristics along with dynamic capabilities, it can then be a source of competitive advantage. This is true at organization level. At project level, there are a few changes which, if made, could improve the execution and exploitation of the resources.

First, there are two characteristics from resource-based theory at organization level which are also valid at project level. Those are the valuable and organizationally supported characteristics. At project level, the results suggest that the strategic resource still has to be valuable and supported by the organization. However, the other two characteristics (rareness and inimitability) were not raised explicitly in the results of the study. At the same time, two more characteristics evolved from the results, which were uniquely exploited and timely available. The uniquely exploited characteristic could be seen as a replacement for the two other resource-based theory characteristics (rareness and inimitability). This characteristic means that for a resource to be better utilized at project level, it must be exploited in a unique way. The factors helping to exploit the resource in a unique way are capabilities (dynamic and project) and the innovative environment, as per the results of this study. The timely available characteristic evolves logically at project level due to the fact that projects are time-dependent. This characteristic means that project resources are strategic only when they are placed at the right stage of a project. A cost estimator is a strategic resource at the early stage

of the project during initiation and planning, but is not strategic at the late execution or closure stages. Figure 21 below summarizes this proposal and the expected outcomes.

The contribution to theory provided by this research in terms of applying the strategic management theory (resource-based theory) was set up to extend the application of such theories in the context of project management. However, extra care should be taken on applying such theories, and more empirical work is needed to test the applicability of such theories in the project environment. In addition, the proposal suggested by this research as a main contribution to knowledge and theory still needs to be validated. In general, the research is a good example of the possibility of achieving valuable results by applying strategic theories in project management.



Figure 21: Project strategic resource proposal

7.2.2 Contribution to practice: Organization and project leaders

This section presents the contribution to practice provided by this research. It gives high level recommendations for organizations and project leaders on the actions needed for better resource utilization. The findings of this study provides guidelines for managers. Specifically, the findings on the application of the resource-based theory should serve as a practical typology for project management practitioners, facilitating their focus on not simply the identification of resources considered vital to operations, but also factors that should facilitate their use in exploiting and in fact, further exploration of opportunities (when considered from a duality/ambidextrous perspective). This requires identification of valuable resources. It then emerges that the focus on these resources should also form the basis for senior managers to direct their technical and management control systems to not only effective resource allocation, but also resource utilization. In this regard, the typology which we allude to ensures that the various resource priorities of the various heterogeneous project stakeholders in the oil and gas industry are appropriately captured. When this occurs, those responsible for project delivery are able to ensure (or at the very least, structure their monitoring mechanisms) to minimize or preferably, mitigate against potential of undesirable and unintended consequences associated with these resources. One such undesirable consequence may be these resources serving as the platform for unnecessary and detrimental competition between various stakeholders. Our findings also suggest from a practical managerial perspective that project-based organisations may consider two approaches to enhancing efficiencies and effectiveness of their resource systems. They may for example consider enhanced stakeholder engagement which is focused on deep-rooted discussions about the (i) purpose (ii) design and (iii) use of such resources that is focused on the creation of a cohesive set of priorities for their projects and in the process, eliminate possible

contradictions and heterogeneity in resource use and allocation. Secondly, enhance stakeholder engagement and collaboration should also encourage enhanced balance between technical and social elements of resource allocation and use. Doing this ensures a project environment, which is more participative. Within this context, the development of resource allocation and use assessment frameworks may be beneficial as the existence of such frameworks are very likely to encourage effective reconciliation of resource expectations among different stakeholders.

The practical guidance we propose suggest that project-based organizations should have an experienced leader to be able to manage talent and define valuable resources. These project leaders should have a well-established program to explore the strategic resources and then develop them to the leading technical and managerial roles. In a situation like the oil price reduction, many organizations are forced to reduce their resources. The proposed development program will be a helpful tool to decide on what resources to keep and which one to release if needed which should make the cost cutting process more effective and fairer. More importantly, the program will help on developing local resources to make them valuable for future utilization other than depending on the expensive expertise in such leading roles. In addition, the organization should consider creating an innovative environment in the workplace. Major oil and gas organizations in Oman and UAE have many initiatives to build such innovative environments which help to develop talented, valuable resources. The innovative initiatives and systems are varying from having an open-door policy to provide a well-established innovation program takes all ideas in one place to be shared and discussed. It is not necessary to have a sophisticated innovation program but instead some initiatives such as brainstorming meeting, workshops, innovative portals would be good to start with. All those initiatives must be time bonded. At project level, most of the interviewees agreed

on the impact of good new ideas, but also, they all agreed that any new idea should come at the right time. At projects, the right time is at the beginning phases such as initiation/concept design phase or planning/detailed design phase. So, the management should enhance the innovative environment and any initiatives in projects at those stages. Doing so should help organization in managing project more efficiently and helps to save cost as per the outcomes of this thesis results. Moreover, organizational support at project level is mandatory. Financial support was clearly identified as necessary in the results, but other types of support were also needed. For example, from the results, one of the main areas found to be an indicator of good support was the decision-making process. Fast and supportive decision-making from top management makes the work progress better and helps in using resources in an effective way.

Support from the organization should also be in the form of having the valuable resources at the right time in a project. Many interviewees mentioned the harm done to projects by not having resources at the right time, while at the same time referring to the benefits of having them on time. In general, to execute valuable resources effectively, organization and project leaders should support those resources and use the organization's dynamic capabilities in an innovative environment for better project execution and performance. One good tool that oil organizations employ is to enhance their leaders' capabilities, especially in taking decisions, which is the concept of technical authority explained in Chapter 5 in particular in Section 5.2.1. In summary, this is a tool that a leader needs to be qualified for. The qualification depends on an assessment the leader makes, and based on that, earns the authority. Technical authority comes at different levels, depending on the positional hierarchy. The authority is both technical and financial. A leader in possession of this tool can take technical decisions basically approving technical reviews and reporting up to a certain

amount of money. It gives the leader both trust from his organization and enhance his leadership skills and practices. This tool is recommended for implementation to raise capabilities and accordingly execute resources more effectively. The unique execution should result in better project performance.

The top management of any organization needs to take strategic decisions to enhance resource performance and accordingly improve project performance - decisions such as imposing unique talent management and development programmes, creating or enhancing reward systems, building an innovation environment by encouraging brainstorming sessions, knowledge-sharing exercises, introducing innovative portals to the internal web, and allowing for more leadership training programmes that elevate talented employees and enable them perform better.

7.2.3 Research Limitations

This section addresses the research limitations, as the accepted practice for any good piece of research (Price and Murnan, 2004). In this research the limitations lie in three main areas: first, the context of the research. Two Gulf countries (Oman and United Arab Emirates) were chosen for the data collection to gather information from oil and gas organizations based in those two countries. Interviews and questionnaires were collected from those organizations. The two Gulf counties were judged to be suitable for the research, and the results gathered satisfied the research objectives. However, the addition of more Gulf countries is recommended for any future research. For example, adding Saudi Arabia as a major oil producer both in the Gulf and in the world would help in making generalization of the accrued results easier. Having more Gulf countries included in addition to other major oil and gas producers outside the Gulf area is also recommended for future research. Second, the addition of more participants in the interviews and questionnaires is recommended. The

number of interviews (24 interviews) and questionnaires (130 surveys) presented in the research was suitable according to the literature (see Section 4.8 in the Methodology chapter).

However, having more interviewees, especially in top management leadership positions is strongly recommended to understand their views on such a strategic related subject. The research obtained many views from top management in the oil and gas organizations, but adding more interviews could make the results better. Third, one of the main outcomes of the research is the proposal for a project resource-based view, which is essentially the main contribution to theory provided by this research. Although the discussion of the results detailed this proposal, it still needs to be empirically tested in separate research for better validation of the results. The proposal puts forward the researcher's view on what characteristics need to be considered in order for a project resource to become a strategic resource, and accordingly become a source of better project performance and competitive advantage. Addressing the above limitations should help future research to fill those gaps and give more empirical data.

Regarding results generalization, the results of this research can be divided into two major areas. The first area is the strategic resource availability in projects. The results from this area show that strategic resources in projects are available. Their availability is based on the resource characteristics (valuable, rare, inimitable and organizationally supported). The results show that the valuable and organizationally supported resources could be generalized to all projects. Such results are not only relevant to oil and gas project practitioners and organizations, but could also be generalized to countries outside the Gulf. The list of strategic resources at project level (see Sections 6.5.1 to 6.5.4 for more detail) are general and should be available for better execution of projects, and accordingly better project performance.

Unlike the list of rare and inimitable resources, those two lists of resources could be seen as tentative and the generalization of them is not explicitly possible. The second area of the results is the relationship between strategic resources and competitive advantage, and the factors that affect both. The results show that the relationship between strategic resource and competitive advantage can be generalized to all organizations working in large projects, such as oil and gas projects. Essentially, the results suggested that with the help of three factors (dynamic, project capabilities and innovative environment), the exploitation of strategic resources will be unique, and accordingly help to meet project objectives and realize project results with effective time, cost and quality constraints. Accordingly, those resources will increase project performance and help an organization to accrue a more competitive position in the market. Such a relationship result is valid for use in all large projects, and accordingly the generalization of this result is possible. Top management from any industry organization could apply the proposal of providing valuable resources with suitable support. Such support could be in the form of creating an innovative environment system and building their resource capabilities for better resource exploitation. All oil and gas organizations involved in this study had their own unique employee development and innovation programmes which most interviewees considered a factor in their organizational wellbeing and continued improvement. They also believed that such programmes were definitely factors that helped in getting projects finished as per requirements.

7.2.4 Way forward for future research

This section introduces future research recommendations and suggestions. This study presents a possible link between strategic management and project management using one of the strategic management theories. The theory used was the resource-based theory. The results show a valid link in applying resource-based theory to projects. However, the

discussion of the results produced a slightly different proposal to be used at project level compared with the resource-based theory (see Sections 6.5 and 7.2.1). This proposal was based on the interviews and questionnaires gathered from the study. Accordingly, further verification of the proposal is recommended by testing the added characteristics suggested in the proposal (uniquely exploited and timely available). In addition, the study concluded that innovative environment was a main factor for better resource exploitation and utilization. This conclusion also came from a discussion of the results, and also needs further verification and testing independently. Furthermore, the study was set up to extend the resource-based theory to be applied in project management. This area is still not saturated with empirical research, so more research in any aspect is recommended. In addition, the results from analysis of questionnaires suggested that the relationships between project performance and competitive advantage is not significant. Although the data from interview confirms the positive relationships between those two, but still more empirical work in that area is recommended for future research.

The statistical analysis in the thesis suggest that the relationship between strategic resources and competitive advantage is positive. Same as strategic resources and organization performance but not between competitive advantage and project performance. The logical flow is that strategic resources positively related to competitive advantage and competitive advantage is positively related to project and organization performance. But this logical flow is not totally confirmed. The relationship between project performance and competitive advantage needs more investigation. The future investigation could look at and test project performance from many aspects such as the cost, time, scope triangle in addition to stakeholders and shareholder's satisfaction. More aspects to test should have more possibility to confirm the positive relationship between project performance and competitive

advantage. Or otherwise confirm that there is no direct relationship between them. On the other hand, the competitive advantage is this thesis is tested by the ability to reduce cost, acquire opportunities and neutralize threats. The addition of more aspects to be tested is recommended such as the ability of organization to sustain for longer time. This relationship deserves more investigation to accept or reject the positive relationship.

7.2.5 PhD journey

I always have had a passion about accruing knowledge, and transferring and sharing that knowledge with others. Continuing my academic studies (Bachelor, Masters, PhD) was not only an objective I had in life, but more importantly a joy that satisfied my inner peace. I always feel happy going to university, seeing it as a relief from everything else in life. This PhD has been one of the main keystones in my entire life. In doing it, I have learned that good ideas by themselves are not enough; having those ideas in detail and supported by evidence is what really matters. Once you get that, then you have your PhD proposal ready, and you can start digging into the literature.

At the literature stage, it is not what you know; it is actually what you can prove and relate. It is about getting general information at the beginning, and then narrowing down your literature to match the details of your idea. During the PhD I have learned how to take extra care when writing anything down, referring and accordingly giving credit to the scholars who owned those ideas and discussions. I have learned how to logically connect things, so that my collected data and the accrued literature could together form a good discussion of results. If that is not the case, then you will get two different things that do not belong to each other. On my PhD journey, I have come to know that my contribution to knowledge is what really matters in the end, and this has helped me a lot in practicing the life of a researcher. During the data collection part, especially while doing the interviews, skills such as communication,

the ability to ask sub-questions and to interact with interviewees are very important. In the data collection part, gaining access to people and persuading them to accept the invitation to meet you is a long journey all by itself. I would accordingly suggest to new PhD students that they ask for access at least 4-6 months before they need to start collecting data, especially if the data collection is from non-governmental organizations. This at least was a problem I faced when collecting data from UAE and Oman. Gaining access can be difficult and takes time, but once you have gained that access, people can be very helpful, and the process runs smoothly. Another recommendation regarding data collection access is that if you know someone from inside, go and meet him or her, but before you start collecting data, get official approval from the organization. This will make life easier - do not rely only on friendly access. If you do not know anyone inside the organization, getting access will be even harder, and that is why the researcher will need to plan this part early. I really believe that embarking on a PhD with a well-established university automatically provided me with all the skills that a researcher might need. If I knew a few years back what I know now, I would do some things differently. I would start writing on my thesis idea and reading the literature immediately, and not wait until the second year to do so. I would also plan for the data collection part at least six months before executing it. All in all, the journey has had its ups and downs, and things went wrong many times. But getting out of them and achieving what you planned for is worth the struggle - in the end, those difficult times and your response to them is what gives you so-called experience. If there is anything that I am truly happy and satisfied about, it would be the research capabilities that I have now, compared to when I started my PhD. Becoming a researcher was my main reason for embarking on this PhD

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9 Appendix I

For more details of the answers to the first interview question, and a brief view of each interviewee's response, tables and charts with quotes and explanation are given below to demonstrate the idea. The researcher included the main answers of interviewees to each interview question, and added the main comments. The tables relate to the main research question, so that there is consistency in the answers. The first table includes the first main research question for representation only.

| Research question | Interview questions | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|---|--|--|
| 1: What are the strategic resources and capabilities available in an organization's projects that give competitive advantage? | How would you define valuable resources and if you can give examples? | Valuable resources are available, in fact every resource is valuable, | Offices, hardware but the most of all human resource | Cost reduction by assigning less forces for tasks that normally required more forces |

Table 45: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|--|--|---|
| How would you define valuable resources and if you can give examples? | ...is to the one to do with pump out, resources are available (interpolated) | Mainly human | Project manager with multi-million projects are different character than multi-billion. |

Table 46: first question response summary

| Interview questions - 1 | Answer code1 Define, availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|--|---|--|
| How would you define valuable resources and if you can give examples? | Resources are one of the main input to any project, valuable resources are available | Its people, facility, experience, ability of mobilizing resources | You do a technical evaluation of a contractor, one of the main issues which we are screen them against are the resources |

Table 47: first question response summary

| Interview questions - 1 | Answer code1 Define, availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|--|--|
| How would you define valuable resources and if you can give examples? | Definition of (valuable) resources depends on the scope of project, if big or small, critical or non-critical, they are available | Mainly human, | Small projects we hire only 10 direct people to work on the project unlike the big projects where bigger team is needed. |

Table 48: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|--|---|---|
| How would you define valuable resources and if you can give examples? | The valuable resources is to have the right resource at the right time, they are available | Human, physical, intellectual and financial | For some critical phases you will need resources with special skills, for example number of years of experiences and capability and that is way in the initial phase you need to take all the lesson learnings and avoid changes in the later stage |

Table 49: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|--|--|---|
| How would you define valuable resources and if you can give examples? | It depends on the type of the project and the scale of the project, they are available | Mainly human | Will need an engineering team and project management team and you need the quality team, with authority to take financial decisions |

Table 50: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|--|--|--|
| How would you define valuable resources and if you can give examples? | I guess I can see two things in valuable, I see that there is a people component, well there is a number of things people bring value as do physical resources so maybe lets first talk about people | Human, physical | I myself have come to PDO to support yibal Kouf project, yibal Kouf will be a novel project to PDO because we have sulfur recovery it has not being done before at least the process, there are number of resources including myself who comes from Canada to support that |

Table 51: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|---|--|
| How would you define valuable resources and if you can give examples? | None, any project at execution phase requires certain capabilities to execute | Any project at execution phase requires certain capabilities to execute, including engineers, procurement, fabrication phase or construction phase, | For example take process engineer or concept engineer, the sort of process engineer that you need is not the same at each the project, depends on the complexity of each project |

Table 52: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|---|--|
| How would you define valuable resources and if you can give examples? | For me a resource that fit in the project is a valuable resource, anybody that is required to first in a project or a project team is a valuable resource | Mainly human, in different phases of the project different discipline different individuals have impact in the project, one of the valuable resource in a project team will be someone who does a technical safety engineer | If you have 5 mechanicals, 5 civil, 5 electrical for example, then you have to make an assessment to decide if the four can do the work of five and in which discipline, then you choose, now you can do that in each discipline |

Table 53: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|--|--|
| How would you define valuable resources and if you can give examples? | None, the selection of key resources or personnel is very important, valuable resources are available | Mainly Human | We have a project in 2007, it was a 36 month project, a total of 48 with design/engineering/construction, in 2012 is was still not finished, so I was brought in and PDO decided to remove the project manager but when I immediately take over the project and saw there are issues, I saw it was not about not about PDO and a company or the contractor, it was interpersonal issues, and that was the main reason for the delay there was no cooperation and collaboration |

Table 54: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|--|---|--|---|
| How would you define valuable resources and if you can give examples? | None | Culture, human resources, government support | The company encourage employees to be exposed to many challenges and gives them support |

Table 55: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|-------------------------------------|---|--|
| How would you define valuable resources and if you can give examples? | None | human resources, in specific knowledge. The knowledge is the most valuable resource but should be along to the employee capabilities. | Exxon mobile did that, the less 5% of employees on performance will be notified and will be given a year to perform better, if not they will be get fired. |

Table 56: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|---|----------------------------------|--|
| How would you define valuable resources and if you can give examples? | The resource must be valuable to be strategic | Mainly human | One example is the company CEO, he is not only a leader but basically technically strong and helps a lot in providing his experience available whenever its needed |

Table 57: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|---|----------------------------------|--|
| How would you define valuable resources and if you can give examples? | The resource must be valuable to be strategic | Mainly human | One example is the company CEO, he is not only a leader but basically technically strong and helps a lot in providing his experience available whenever its needed |

Table 58: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|--|----------------------------------|--|
| How would you define valuable resources and if you can give examples? | None, valuable resources are developed and available | Mainly human | Learning and development department is consisting four sections: leadership, logistic, capability development and trainee management |

Table 59: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|---|--|--|
| How would you define valuable resources and if you can give examples? | All assets and employees, technology is valuable, | At the end the leader or the project manager is the most valuable resource | One main mistake big organizations did is to hire a project manager with pure technical skills, he should be knowledgeable in different especially managerial skill and leadership |

Table 60: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|-------------------------------------|----------------------------------|---|
| How would you define valuable resources and if you can give examples? | None | Mainly human` | The human resources as strategic resource is the leader of the project, technical, <u>managerial skills</u> and added to that the <u>integration skills</u> to align all parties together |

Table 61: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|-------------------------------------|----------------------------------|--|
| How would you define valuable resources and if you can give examples? | None | Mainly Human | The good <u>leader (the project director)</u> is the first strategic resource, because of that the project got the award of best project supported in middle east. The strategic resource as a project director got supported from top management and that makes the project succeeded |

Table 62: first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|--|---|---|
| How would you define valuable resources and if you can give examples? | None, valuable resources are available | Human resources, in specific <u>knowledge</u> . The knowledge is the most valuable resource but should be along to the <u>employee capabilities</u> | In terms of human the company reduced many experts and hire and develop the graduate to take over. It's a new system to raise the graduate level. But that brings some down back. <u>Knowledge transfer and development</u> is another strategic resource |

Table 63: (Pilot) first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|-------------------------------------|----------------------------------|---|
| How would you define valuable resources and if you can give examples? | None | Mainly Human | An example of why knowledge and capabilities should come along and important is in one of the project the company have, the project team was selected |

Table 64: (Pilot) first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|--|----------------------------------|--|
| How would you define valuable resources and if you can give examples? | None, One main strategic resource is the visionary thinker | Mainly Human | One example is that he makes 20 young leaders, and finds some gaps and accordingly restructure the organization to be more effective and then promoted people to awards them for a decent work |

Table 65:(F.G-1) first question response summary

| Interview questions - 1 | Answer code1 Define availability | Answer code2 Type of resource | Answer codex Example/elaborate |
|---|--|----------------------------------|-----------------------------------|
| How would you define valuable resources and if you can give examples? | The first strategic resource is the human being with strong technical competency, then the communication skills of the personnel | Mainly Human | None |

Table 66:(F.G-2) first question response summary

9.1 Appendix II

Interview Background:

You have been selected to speak with us today because you have been identified as someone who has a great deal to share about project management, strategies and resource management. Our research project focuses on the strategic resources and their availability in projects and putting more attention on how those resources affect the overall project success, performance and organization competitive advantage.

- *To facilitate our note-taking, we would like to audio tape our conversations today. Please sign the release form. For your information, only researchers on the project will be privy to the tapes which will be eventually destroyed after they are transcribed. In addition, you need to sign a form devised to meet our human subject requirements. Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm. Thank you for your agreeing to participate.*
- *We have planned this interview to last no longer than one hour. During this time, we have several questions that we would like to cover. If time begins to run short, it may be necessary to interrupt you to push ahead and complete this line of questioning.*
- **If you choose to answer the question by typing (without face to face interview) then please elaborate as much as you can and give example whenever is possible**
- **Below are few definitions to help you answering the questions.**
 - A. Resources: the tangible or intangible assets a firm possesses or has access to. Important classes of Resources are as follows:
 - B. Financial Resources: capital, cash, equity, retained earnings, etc.
 - C. Human Resources: training, experience, judgment, intelligence, relationships, etc. of individual employees.
 - D. Intellectual Resources: patents, copyrights, trademarks, trade secrets, etc.
 - E. Organizational Resources: relationships with other firms (such as partners, suppliers, buyers, creditors), channels of distribution, corporate culture, etc.
 - F. Physical Resources: physical technology, plant and equipment, geographic location, raw materials, etc.

Interview Questions:

1. Based on the introduction, what do you think are the strategic resources (either human; physical; financial or organizational) you have in your organization?
2. Are those resources valuable resources and why you think they valuable?
3. Are those resource RARE and if yes why you think they are RARE?
4. Can any one of those resources copied by other organization? If yes how and if no, why not?
5. Strategic resources are main factor for:
 - Organization's project Continuous innovation, Agree? Please elaborate more
 - Organization's project goal achieving, Agree? Please elaborate more
 - Organization's project cost control, Agree? Please elaborate more
 - Organization's project time control, Agree? Please elaborate more
 - Organization's project quality and expectations, Agree? Please elaborate more
6. At my organization/project, strategic resources are supported by upper management, if you agree please list the ways that your management supported the strategic resources?
7. Compared to other organizations that do the same kind of work, how would you compare the organization's performance in terms of achieving:
 - Sales targets

- Profitability levels
- Market share
- Customer satisfaction
- Continuous innovation

8. How strategic resources are affecting the organization performance at project level? Please give all details possible,

Your name:

Your position:

Email:

9.2 Appendix III

Hull University Business School
The University of Hull
Hull HU6 7RX
United Kingdom

Date:28-12-2017

Dear,

This letter is an invitation to consider participating in a study we are conducting at Hull University Business School. We would like to provide you with more information about this project and what your involvement would entail if you decide to take part.

The aim of the project is to examine the management of strategic resources in oil and gas organization projects over a period of two years. We would like to include your organisation as one of several organizations to be involved in our study. We believe that because you are actively involved in the management and operation of your organisation, you are best suited to speak to the various issues related to strategic resources management and project performance.

Participation in this study is voluntary. It will involve an interview of approximately 1 hour in length to take place in a mutually agreed upon location. You may decline to answer any of the interview questions if you so wish. Furthermore, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher(s). With your permission, the interview will be audio recorded to facilitate collection of information, and later transcribed for analysis. Shortly after the interview has been completed, we will send you a copy of the transcript to give you an opportunity to confirm the accuracy of our conversation and to add or clarify any points that you wish. All information you provide is considered strictly confidential. Your name and your organisation's name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Data collected during this study will be retained for 1 year in a locked office at the University of Hull. Only researchers associated with this project will have access. There are no known or anticipated risks to you as a participant in this study.

Should you have any concerns about the conduct of this research project, please contact the Secretary, HUBS Research Ethics Committee, University of Hull, Cottingham Road, Hull, HU6 7RX; Tel No (+44) (0)1482 463536.

We hope that the results of our study will be of benefit to the organisations directly involved in the study, other voluntary recreation organizations not directly involved in the study, as well as to the broader research community.

We very much look forward to speaking with you and thank you in advance for your assistance in this project.

Yours Sincerely,

Name of Supervisor and Supervisee
Prof.Terry Williams
Moosa alhanshi