UNIVERSITY OF LEICESTER

An Integrative Framework for Asset Orchestration

Thesis submitted for the degree of

Doctor of Philosophy

at the University of Leicester

By

Hamdan O. Mansoor

2018

Co-Supervisors

Professor Steven King and Professor Peter Jackson

An Integrative Framework for Asset Orchestration

Hamdan O. Mansoor

Abstract

Sustained competitive responses are required by firms that must prosper in dynamic business environments. However making any sustained competitive response will usually require the firm to possess a capability to continuously orchestrate its assets; such that collectively those assets remain aligned to changing market needs. But Asset Orchestration (AO) is known to require collective management, engineering and financial decisions to be taken, in addition to associated collective management, engineering and financial actions. Typically it follows that AO needs to be supported by suitable AO concepts, methods and technology. With this set of business requirements in mind this thesis proposes and tests the use of an 'Integrative Framework for AO' which: conceptualises the context for multi-level AO management decision and AO action making; and which can be deployed to systematically underpin practical examples of AO, leading to the firms sustainability.

Very little of the current management literature describes the practical applications of emergent AO concepts. Hence, this research study has conducted an inductive multiple case study approach primarily utilizing semi-structured interviews and an online questionnaire. Thus, the thesis conceived, developed and used a unique semi-generic "Asset Orchestration Reference Model" (AO-RM) to capture actual AO data within two case study firms. Data analysis shows how AO theory can be deployed to direct strategic decision making towards the sustainable configuration and deployments of a firms' resource portfolio. The study suggests that the AO-RM is highly applicable to the case study examples and that middle management can be shown to have a significant influence on organizational change through the integration of top and lower-level management. The study contributes to current knowledge by proposing and using an AO-RM that acts as a road map by which to guide managers during change projects. Therefore, we suggest the future study of AO in more detailed, specific forms of change projects.

Dedication

In loving memory of my brother Ahmed, who toiled and waited for this moment, but passed away without getting the chance to share a word of farewell or see the end of this work. This one is for you, Brother.

To my father, mother, family and the precious tears of my daughter Aayat, who I have left once a day “to my study” even though she was in desperate need of a caring father figure in the home.

Acknowledgment

I gladly give thanks to Allah Almighty for the grace He offered me to be able to accomplish this Journey.

First and foremost, I wish to express my sincere gratitude to my mentors and supervisors, Professors Steve King and Peter Jackson. I appreciate all their valuable contributions of time and mentoring, making my Ph.D. experience productive and stimulating.

Many thanks also to my sponsor, the Iraqi Cultural Attaché "the representor of Ministry of Higher education/Iraq" who have made the funding for my studies possible, in addition to providing me all kinds of help and support. Also, I would to thank Dr. Hamdi al-Kubaisi, the Head of Management Department in Fallujah University.

I acknowledge the support of all the staff at the University of Leicester who have done so much for me: Dr Carol Beardmore, Annegret Hagenberg, Dr Geoff Monks, Dr Kim Price, Sudra Nita and Alex Archibald, deserve my appreciation for their administrative support.

I am also indebted to Professor Paul Foley and the staff of Tech4i2, whom give me their time and support during the practical study.

I would also like to express my sincere appreciation to my wife, Um-Mohannad, my daughters; Shams, Aayat and Amal, my sons; Mohannad, Osama, Hudaifah, and Mohammed for their encouragement, support and cooperation during my absence for four and half years. Special thanks to Mohannad "you are really a gentleman".

Thank you too to my colleagues at the University of Leicester, Dr Mazin Alwadi, Dr Bader Almaskari, Anna Zsubori, Lidia Salvatori, Mirjam Twigt, Osama Shtewi, Ali Makki, Dr Rohana Abdullah, Andreas Anastasiou, Omar Altaee, Numan Salman, Diyana Kasimon, and Dr Mazin Al Isawi.

To all my friends, I could not have done this without your loving support. To my friend, Bilal Al-Isawi, thank you for listening to my many phone calls and encouraging me through the process. To my brothers and friends, Ibrahim Mansoor Omar Mansoor, Likaa Azawi, Hayder Al-Qaisy, Abdul Wahid al-Mashkour, Saadoun Mansoor, Salam Ali, Akram Mahmood, Yaser Ali, Mohammed Mahmood, Abdul Rahim Ayed, Mr. Hussain A. Yaseen, Elena Gomez, Mr. Barre Cooper and Mss. Norma Cooper, and Lorraina and Derek - hopefully you have witnessed that anything is possible with hard work and determination.

Table of Contents

Tables

Figures

Abbreviations

The Terms	**Abbreviation**
Resource Based-View	RBV
Asset Orchestration	AO
Dynamic Capabilities	DC
Dynamic Managerial Capabilities	DMC
Reference Model	RM
Asset Orchestration Reference Model	AO-RM
Method of Utilising the Reference Model	MU-RM
Industry Organization	IO
The Structure-Conduct-Performance	SCP
Valuable, Rare, Inimitable and Non-Substitutable	VRIN

Chapter 1 Introduction

This chapter introduces the research conducted in this thesis. It begins with the research overview, followed by the research aims, objectives and questions. Then, the study methodology is presented. Later, the research significance is highlighted, and the chapter ends with a visual map (Table 1.1) of the remaining thesis chapters to follow.

1.1 Research Overview

Understanding the source of a firm's competitive advantage is at the heart of strategic management (Grant, 2010). As such, the Resource-Based View of strategy (RBV) is the latest theoretical framework used to identify and investigate the basis of a firm's competitive advantage (Barney, 1991). RBV literature has attracted considerable attention amongst scholars of strategic management. However, it has been widely criticized because it is 'ignorant' of the role of the managerial capabilities to create, extend, and modify a firm's resources base. Leading academics have therefore called for further investigation into the role of managerial capabilities to adapt to strategic change. Thus, attention has been increasingly orientated towards the role of managers acting individually and in teams (Adner and Helfat, 2003, Helfat et al., 2007).

Against this backdrop, the "Asset Orchestration" (AO) concept was advanced in order to provide a framework within which firms compete and adapt in changing market environments. According to the literature, one of the vital functions of managers is AO, which indicates "the managerial ability to selection, configuration, alignment, and modification of tangible and intangible firm assets" (Helfat et al., 2007, Helfat and Martin, 2015b). Thus, the AO concept argues that organisations whose managers have superior managerial capabilities, such as "search and selection, configuration and deployment", can adapt to change more effectively than organizations whose managers have fewer managerial dynamic capabilities (Helfat et al., 2007, Sirmon et al., 2011).

However, there is very limited evidence as to the ways in which managers face environmental change through the mechanisms of AO. Scholars go on to assert that

previous research on AO has not accounted for managerial actions that must traverse the multiple levels of any organizational hierarchy within a given firm (Sirmon et al., 2011). Accordingly, the current study considers the managerial role in resource orchestration in detail, and will further suggest a theoretical and practical "applicable" reference model that could help managers to fully integrate the AO processes of "search, selection, configuration and deployment".

1.2 The Research Questions

The research questions were derived from the gaps that were identified in the literature review (Chapter 2); **the fundamental research questions are:**

1- How can asset orchestration mechanisms be mapped onto common organising structures used by firms, thereby enabling a management that is more effective in sustaining competitive responses?
2- To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses?

1.3 The Research Aims and Objectives

The study will attempt to address two aims: ***firstly,*** to study the processes of AO in firms in terms of asset orchestration actions, namely "search and selection, configuration and deployment". ***Secondly,*** to propose an integrative framework approach to the application and the deployment of emergent AO concepts in business.

The research objectives were designed to satisfy and answer the research questions and aims, and include:

1- Review the emergent concept of asset orchestration and other previously proposed methods in terms of their application, and to further review remaining weakness within those applications.

2- Conceive a new reference model of the mechanisms of asset orchestration and apply this reference model in selected case study firms that have been subjected to specific kinds of change (e.g., Brexit).
3- Conceive of and test a systematic method of applying the reference model, where that method encompasses multi-stakeholder decision making in support of change projects in several case study examples.

1.4 Research Methodology

Based on the explorative nature of this study, an inductive case study approach has been chosen as the study methodology. To achieve the research objectives and answer the research questions, the study employed two data collection strategies: qualitative interviews; “semi-structured interviews”, and an open-ended survey, “online questionnaire”. The purpose behind the interview process was to apply the study reference model in the case of the firms selected because they have been subjected to some form of business change. The purpose of the online questionnaire was to increase the applicability of the study reference model, as well as to generalise both the findings and the utility of the reference model in order to enhance its support for AO project design.

Initially the study derived the reference model from the emergent literature, which suffers from a lack of specific case examples pertaining to AO. Since then, the study has developed examples of the uses of the reference model in two case study companies “Tech4i2” and “GMS”. To achieve this, the study proposed systemic methods into the more generally applicable tools of the study reference model, which further offered a proposed approach with which to deal with integrating thinking about dynamic change in the selected case study firms.

1.5 Research Significance

Drawing on economic theory, the main functions that can be assigned to the role of managers are the coordination of a firm’s assets, adaptation to market change, and the design of business models (Helfat et al., 2007, Teece, 2007). In rapidly changing

environments, firms' operations are particularly strongly based on the knowledge and skills of particular people (e.g., the team of executives). Hence, these managerial capabilities are essential for sustaining firms' performance (Teece, 2012). However, Helfat et al. (2007) argue that economic theory says little about the core functions of managers; in addition, their roles in enhancing firm performance have been widely neglected. Thus, the mechanisms by which managers perform asset orchestration need to be investigated in depth. Resource orchestration mechanisms include managerial actions and processes that include search, selection, configuration and deployment of a firm's assets (Sirmon et al., 2011). The effects of such a resource deployment mechanism are therefore a function of a firm's managerial ability to coordinate specialized assets, provide vision, and nurture innovation.

Building on the preceding discussion, the research that has been conducted on asset orchestration is extensive. The latest studies have asserted that the managerial role is to enhance alignment between their firm's core assets to achieve and sustain competitive advantage (Basile and Faraci, 2015 P: 44). Consequently, the research problem addressed here is critical. Without real case examples of asset orchestration mechanisms, discussion of such a phenomenon will always be in the abstract at the theoretical stage (Helfat et al., 2007). Developing and conceiving a new asset orchestration reference model will constitute the agenda of the eight chapters of this research study.

1.6 Thesis Structure

To answer the research questions and meet the study aims and objectives, the thesis has adopted a systematic approach through eight chapters; each chapter will meet a specific goals. Chapter 1 provides us with an overview of the research and states the study aims, objectives and research questions. In addition, it briefly discusses the significance of the study. The chapter also delivers an outline of the study structure.

Chapter 2 provides an overview of the relevant literature in the context of strategic management; the chapter hence reviews remaining weakness in emergent AO theories from an application respective, which lead to identify the current knowledge gaps. The

aim of gaining a better understanding the theoretical underpinnings and logical relationships resulting from determining the research aims and in shaping the research questions of the thesis will allow us to conceive and develop the study reference model in Chapter 3, as well as allow the firm case studies to contribute to our understanding of how asset orchestration concepts contribute to a firm's successful adaption to market change.

Chapter 3 provides a simple and visual illustration of current strategic management thinking and the detail of the mechanistic aspects of emergent asset orchestration theories. Consequently, it conceives and develops a new Asset Orchestration Reference Model (AO-RM). Furthermore, to more completely understand the basis for performance differences amongst firms, the proposed model supports the need for greater clarity on the drivers that differentiate managerial strategic decision making, as well as on the impact these decisions have on the composition and configuration of the firm's resource portfolio. Lastly, to achieve the study aims and objectives and fill the associated gap in the literature, the chapter considers three uses of AO-RM, where "each use will be presented in a specific chapter of this thesis".

Chapter 4 builds a unique road map of the application of the study reference model, which will include the determination of the correct combinations on which to build the research study methodology. Henceforth, this chapter address the research methodology and providing background on theory-building via a case study approach. Notably, to express the basic motivation through which to transfer experience and understanding from one dynamic situation to another, this chapter will also conceive of and develop a 'Method of Utilising the study Reference Model' (MU-RM). Accordingly, this chapter will justify the logic behind using the case study approach, as well as synergise the use of the system dynamic model within the context of social science.

Chapter 5: tests the use of asset orchestration theory in actual examples of case firms that have been subjected to business change and assesses any benefits delivered. In this sense, this chapter shifts the study away from the theory perspective derived from

the existing literature to practical solutions through in-depth case study analyses. In this chapter, the first use of the AO-RM will be conducted, as intended to elucidate our two case examples “Tech4i2” and “GMS” to populate the AO reference model, hence showing how these AO processes needed to be adopted and achieved in order to support the firms’ adaptability to market changes.

Chapter 6: offers a visual guide to the execution of the AO perspective through mapping the AO processes used in the case study firm onto the reference model. These methods provide the firm's managers with a scenario for conceiving and dealing with future changes. Accordingly, the chapter shows how the reference model, when populated with case data, can guide the thinking of senior management teams as they conceive change projects and test alternative strategic futures.

Chapter 7: This chapter guides the design of an online questionnaire with a view to eliciting a number of additional specific case populations of the AO reference model, with a view to seeking commonality between AO processing at multiple levels. The analysis will show how AO-RM provides an integrating framework through which to develop the AO processes across the three managerial levels. In addition, the chapter generalises the findings and the utility of the reference model to enhance its support for asset orchestration project design.

Finally, Chapter 8 compares and contrasts the benefits derived from the case study firms’ applications. It also suggests possible future avenues for the study of asset orchestration phenomena. In addition, the chapter aims to bring together all the study chapters under a single picture in light of the study’s literature review, reference model, empirical case studies and the proposed road maps. The chapter exams whether appropriate lessons have been learned from the preceding chapters and states the essential contribution the study makes to the existing knowledge, and indeed any potential contribution this thesis might be able to make in the future.

To provide more detail regarding the study structure, Table 1.1 offers a visual map of this structure.

Table 1.1 A visual map of the thesis structure.

Chapter title	Chapter objectives	Chapter description
Chapter 1 : introduction	Setting out the study research introduction; study significant, research aims, objectives and questions, in addition to outline the study structure.	This chapter will introduce the whole thesis. The chapter reviews the study aims and objectives, the study methodology and the research significant and the thesis structure.
Chapter 2: Literature Review and Examination.	Review emergent resource-based view, dynamic capabilities and resource orchestration theories. Review previously proposed methods of their applications. Review remaining weakness in emergent asset orchestration theories from an application respective. Identify gaps in the current knowledge, thereby setting the study research questions.	The chapter will provide a chronological review context that traced the influential theoretical paradigms within the frame of strategic management, which has dominated since the 1970s. Also, the study research will identify the gaps in the literature through observing the gaps in the current AO literature, which currently limits its systematic and practical application within different firms. The study's research question, will be illustrated.
Chapter 3: Conceptual framework.	Understand mechanistic aspects of emergent AO theories in further detail. Conceive a new reference model of mechanistic aspects of AO that formulate initial understanding and explanation of the phenomenon of AO in a relevant world context.	This chapter presents the process of developing the conceptual model, which will be called the "Asset Orchestration Reference Model" (AO-RM). In so doing, study offers a chronological explanation of AO phenomena as they were drawn and developed from existing literature, and thereby how this informed the identification and subsequent design of model-based relationships between asset orchestration actions and resource base changes at different managerial levels.
Chapter 4: Study methodology	Clarifying the use of the theory-building process from case study as the ultimate methodological approach to this research study. Setting data collection and analysing method "interview-based data and questionnaire- based data"	This thesis has been influenced by the approach of building theories from case study research. The study aims to collect two kinds of data; interview-based data and questionnaire-based data. Then, the study will develop a unique

	Perceiving systemic tools to applying the study reference model.	"Method of Utilising the Reference Model", which will support the application of AO in change situations
Chapter 5: Use 1 of AO-RM; The Applicability of asset orchestration mechanisms	Apply the reference model in the selected case study firms that have undergone a significant business change and assess any benefits delivered by applying a practical application of the reference model in these case examples. Based on the above objective, we present the results of field research, hence the findings of this case analysis are used to develop answers to the study research questions.	The chapter is shifting the research from the theory perspective derived from the existing literature to practical solutions through an in-depth case study analyses. The applications of the reference model will exemplify the multi-level mapping of key AO processes
Chapter 6: Use 2 of AO-RM; Systematic tools for developing and applying the study reference model	Offers a visual guide during the execution of AO perspective, through mapping the AO processes used in the case study firm onto the reference model. Based on above, the chapter shows how the reference model, when populated with case data, can guide the thinking of senior management teams as they conceive change projects and test alternative strategic futures.	This chapter shifts the study from understanding an existing case study to conceiving future proposed scenarios that guide managers when seeking to enhance a firm ability to adapt to change. Further, this chapter provides ready guides as to the understanding of how AO ideas can be widely applied in a variety of different firms by using the AO Road Map. This Road Map provides a guide for decision making and action taking at the structural level of firms.
Chapter 7: Use 3 of AO-RM; About the general applicability of the study reference model.	To examine typical AO processes used in various firms to realise business change. To consider the applicability of the study's reference model in terms of representing the natures of different firms, such as differences in size, business sector and/or relative position in their market(s). To generalise findings and thereby to appraise the utility of the reference model in terms of its ability to provide generic support for AO project design.	This chapter uses an online questionnaire-based analysis to test the usefulness and applicability of the study reference model. Also, it elicits numerous additional case populations of the AO-RM with a view to seeking commonality between AO processing at multiple levels.
Chapter 8: Discussion and Conclusion.	Compare and contrast delivered benefits within the case study firms' applications. Suggestions as to possible future avenues for the study of AO phenomena.	This chapter will highlight the study conclusion, outcomes, and state the research contributions for the knowledge.

Chapter 2 Literature Review and Examination: Developing the Asset Orchestration Concept

2.1 Introduction

This chapter provides an overview of the relevant literature in the context of strategic management, whilst keeping in mind the aim of better understanding the theoretical underpinnings and logical relationships that resulted from determining the research aims and in shaping the research questions of the thesis. This will allow us to conceive and develop the study reference model in the next chapter, as well as helping the firm case studies to contribute to our understanding of how asset orchestration concepts contribute to the successful adaption of a firm to market change.

Henceforth, drawing on the thesis objectives and structure, this chapter will address the following objectives.

1- Review emergent resource-based view, dynamic capabilities and resource orchestration theories.
2- Review previously proposed methods for their respective application.
3- Review remaining weaknesses in emergent asset orchestration theories from an application perspective.
4- Identify gaps in the current knowledge, thus setting the study research questions.

To approach the current chapter, various central themes will be developed in this regard. ***First,*** to provide a chronological context that will trace the influential theoretical paradigms of strategic management that have dominated since the 1960s, that is, when the concept of strategic management originally emerged, through to the present. This review is intended to reposition and contrast different approaches, as well as to classify the different competitive environments from which each approach has emerged. The intention is to gain an objective appraisal of the theoretical assumptions that determine the competitive environment which gives each paradigm

its strength and ability to dominate for a given period. Correspondingly, we will trace and illustrate the limitations that led to a shift from one paradigm to another.

Second, this review will deepen our understanding of the theoretical foundations and the main characteristics of a resources-based view (RBV) of the reference framework in the current study as the dominant paradigm in the Strategic Management Framework. We will identify the fundamental forces which led to its development, and also illuminate the characteristics of the 1990s' business environment that led to the academic shift and "extension" from RBV towards dynamic capabilities and, subsequently, asset orchestration perspectives. This review will therefore explain managers' roles to search, select and configure firm assets so as to be able adapt to changes in the business environment.

Finally, the chapter will review any remaining weaknesses in the emergent resource "asset" orchestration theory; in particular, the lack of practical studies in this regard. Identifying gaps in the current knowledge, and setting the study research questions.

2.2 Strategy, Resources and Firm Performance: an Overview

Historically, the term 'strategy' has been widely used in reference to military and political issues in terms of giving direction, synchronising the processes of decision making and ensuring the effective use of resources to meet goals (Grant, 2010). According to Grant, these decisions must have three characteristics to have strategic sense; its significant "strategic decisions", its use of "strategic" resources, and it being difficult to change.

In the modern era, especially after the Second World War, firms have faced a new business environment which has increased the needs for proper resource allocation because of intense competition with rivals (Schendel and Hatten, 1972). Consequently, both scholars and practitioners needed new models by which to understand business activities such as planning, coordination and integration. In this context, the early development of the concept of strategic management has been broadly influenced by the seminal works of Alfred Chandler "Strategy and Structure, 1960", Igor Ansoff

"Corporate Strategy, 1962" and the Harvard textbook "Business Policy 1965" (Rumelt et al., 1994).

Over time, the development of strategic management has been dictated by practical requirements more than by the evolution of theoretical models. Hence, Grant determined three phenomena that have influenced business environment changes since the 1970s until the present day; (i) failure of a diversification strategy to achieve the expected synergies, (ii) the oil crises 1974 - 1979, and (iii) the most important reason, that of simultaneously increased local and global competition accompanied by increases in environmental uncertainty. These phenomena have shifted the focus from corporate planning to strategic management. In these terms, the concept of business strategy can be defined as:

1- A means of selecting and exploiting resources to gain a unique advantage (Quinn, 1980).
2- A means to determine the long-term goals and objectives of firms and adopt unique courses of action to facilitate the carrying out of these goals (Chandler, 1962).
3- A means to find a position according to business environment conditions (Porter, 1985).
4- A means by which firms can determine their direction(s) (Grant, 2002).
5- A means by which firms can deal with market change "technology and customer need" to improve their performance accordingly (Faulkner and Campbell, 2006).

Building on these concepts, the emergence of strategic management as a practical and academic concept can be correlated with related themes: ***first,*** increased competition among rivals as the main character of the business environment; ***secondly,*** the heart of strategic management is about building and sustaining competitive advantage (Porter, 1985); and ***finally,*** strategy is about the quest for performance (Barney, 1991, Grant, 2010). Consequently, this has directed attention towards a firm's external environment as a source of rents, from the "business product market", or alternatively towards the internal environment (the firm's resources) (Foss, 1997, Wang and Ahmed, 2007).

2.2.1 Strategy is About a Pursuit for Competitive Advantage

Based on the above discussion, it could be concluded that strategy is about a pursuit for superior performance (Faulkner and Campbell, 2006). This could be achieved through focussing attention on the basis of competitive advantage by searching for, and exploiting, resources and capabilities in a firm's external environment. Consequently, we can discern three key fundamental elements of a firm's strategy (Grant, 2002 PP: 11-13).

1- Clear insight into its competitive position through vital linking of the firm to its internal and external business environment;
2- Setting long-term measurable objectives;
3- Exploitation, and superior use, of firm's resources.

However, the relationship between strategy, resources, business environment, and firms' performances is not always clear. Therefore, to gain a full understanding of the relationship between these variables, the following sections will seek to position the study in such a way as to show the similarities with, and deviations from, previous theoretical perspectives. Such views have been used to consider the relationship between a firm and its external environment on the one hand, and the relationship between the firm and its internal environment (resources) on the other.

2.3 Influential Strategy Paradigms: an Overview

To understand firms' pursuit of superior performance, we should trace the chronological evolution of the theoretical paradigms that have shaped how strategic management can be used as a tool to build competitive advantage. Two dominate. ***Firstly,*** the Industry Organization (IO) paradigm which, as a framework, dominated throughout the 1970s and 1980s. This approach used an economic framework and was then adopted by Porter (1985), who pioneered the Market Five Forces Model (see Figure 2.1). The IO paradigm focussed attention on business market structure (the external environment) and considered the industry structure as a significant factor in terms of influencing firm profitability (Grant, 2002).

The second structured paradigm is a resource-based view "from the late 1980s to the present time" (Wernerfelt, 1984). The essence of a resource-based perspective is grounded on the firm's underlying assets instead of a product-based model. To be more precise, it aims to connect the firm's resources and capabilities with good performance (Dutta et al., 2005). This paradigm intrinsically focusses upon the internal environment where valuable, rare, and unique resources and capabilities have an essential role in gaining the superior performance that allows a firm to achieve and sustain its competitive advantage (Barney, 1991). The next section highlights the characteristics of the IO paradigm in more detail and with particular reference to Table 2.1, which depicts the theoretical approaches of firm performance in Section 2.4.1.

2.3.1 Industrial Organization Approach

The IO theory has its intellectual roots in the writing of Mason (1939, 1949) and Bain (1956 and, 1968, cited from (Grant, 2002). The underlying IO theory provides a rich insight into how market structure promotes rivalry and determines the intensity of competition and industry performance (Grant, 2002). This approach was an attempt to illustrate and predict an industry's performance. Industry is defined as *"the sellers of particular product, one side of the market in which buyers and sellers arrange their transactions"* (Caves, 1964 P: 6). The IO approach relates to the field of strategic management through considering market position as means by which to influence and gain competitive advantage (Porter, 1985). To gain a better understanding of IO literature, and for the purposes of this section, we will briefly highlight two relative models. These models arise from the IO paradigm: Structure-conduct-performance (SCP) and Porter's five forces.

2.3.1.1 Structure-Conduct-Performance

The Structure-Conduct-Performance (SCP) model has its origins in the IO paradigm. The SCP perspective claims that a firm builds its competitive advantage by responding to the market conditions when the attraction of the market structure might enhance

its superior rents (Grant, 2002). Initially, the SCP model was concerned with the market behaviour (conduct) of enterprises (organizations). Market conduct refers to *"the patterns of behaviour which enterprises follow in adapting or adjusting to market in which they sell or buy"* (Bain, 1959 P: 9). The SCP model assumes that the market structure will affect firm conduct (behaviour); consequently, firm behaviour will influence economic performance (Pickering, 1974, P: 28). The essence of SCP theory is that of the causal relationship between market structure, firm conduct and economic performance.

The works of Bain (1959) and Mason (1948) are considered to constitute the underpinnings of the theoretical foundation of this paradigm as we have seen. During this period, scholars were concerned with the problem of explaining the factors that define competition frameworks "What is a suitable test of effective competition?" In other words, industry structure conditions may lead to superior performance with respect to valuable use of firms' resources (Mason, 1948 P: 1268 and Table 2.1 in Section 2.4.1).

Later, the SCP model was used in the strategic management field to examine the effects of industry dynamics on firms' performances (Panagiotou, 2006). Hence, Porter pointed out that those firms' strategies should be shaped according to the industry dynamics that affect firms' behaviour and, ultimately, firms' performances (Porter, 1979). Mintzberg et al. (1998) have also applied the ideas of SCP to business, as they asserted the notion that strategy should be shaped according to the market structure of the environment in which enterprises are operating. Moreover, managers might be able to improve firms' conduct in response to market conditions by obtaining market information (e.g., demand and supply). This analysis of strategy can be utilised as a useful tool through which to increase firms' profitability (Ralston et al., 2015).

Many scholars have studied the IO model; Michael Porter conducted one of the seminal works in this regard. During the 1980s, Porter derived the ideas of SCP and applied them in the field of strategic management (Thomas and Pollock, 1999). The next section will illustrate the main features of Porter's five forces model. Then, we will

illustrate the changes in the business environment that led to the shift towards a focus on the internal environment instead of considering the industry (IO) environment. These changes subsequently led to the emergence of new thinking based on firms' resources as sources through which to gain competitive advantage.

2.3.1.2 Porter's Five Forces Model

Porter's five competitive forces has been widely accepted as the most influential model to emerge within the field of strategic management. Porter's model highlighted the key role of strategic management to the core of the management agenda (Grundy, 2006). To gain competitive advantage, the notion of Porter's model is to link the firm to its environment, particularly the industry's environment. In essence, Porter's model asserts the key role of positioning strategy that firms can take to create strong entry barriers against competitors. Porter defines a positioning strategy as "*Performing different activities from rivals, or performing similar activates in a different way*". Therefore, high rents are a consequence of this strategy (Porter, 2008 P: 62).

Porter's new perspective defined the five explanatory competitive forces, the "competition framework" which formulated firms' competitive strategies and explains superior performance. Hence, he asserts that the five forces drive industry's long-term profitability: "*Awareness of the five forces can help a company understand the structure of its industry and stake out a position that is more profitable and less vulnerable to attack*" (Porter, 2008 P: 1). The five industry-level forces are, please see Figure 2.1: (i) the bargaining power of the buyers, (ii) the bargaining power of the suppliers, (iii) entry barriers, (iv) substitute products, and (v) competition among rivals.

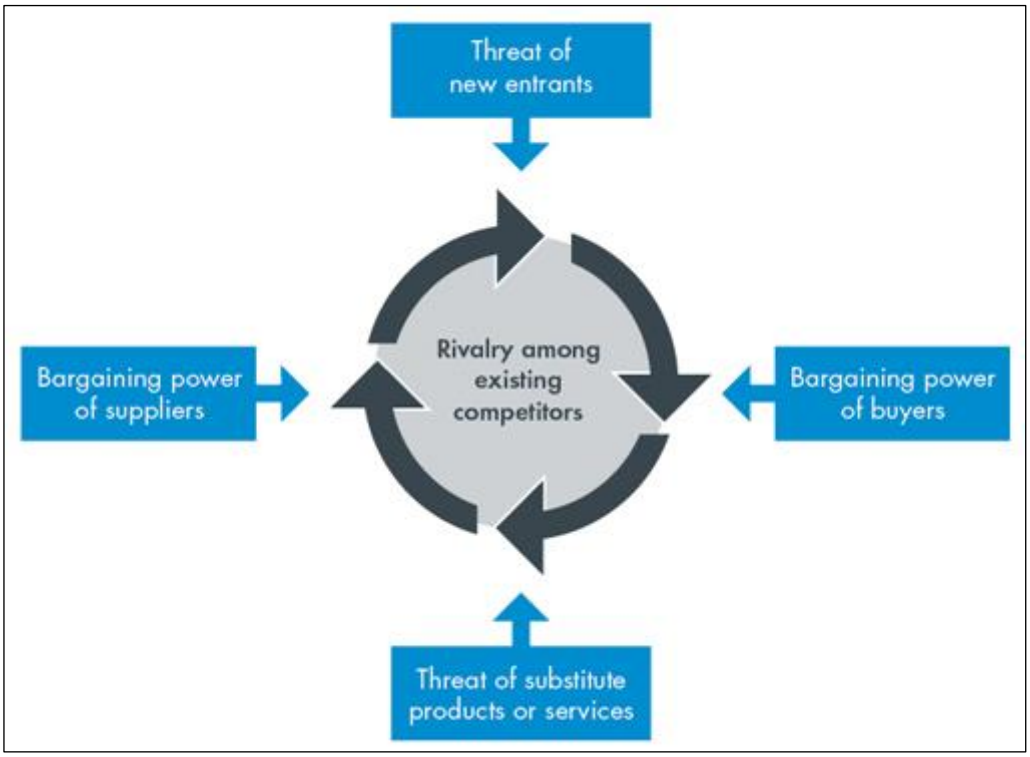


Figure 2.1 Porter's five forces model.

Source: adopted from Porter (2008).

The main contributions of Porter's model are with regards to sustaining competitive advantage (long-term profitability). This can be achieved through realising the mechanism by which industry structure drives rivalry. According to Porter's model, achieving competitive advantage requires two dimensions: ***firstly,*** predicting industry's profitability through understanding its environment and its fundamental causes (Porter, 2008 P: 3). Therefore, understanding the past influences of industry's structure on firms' performance can help to identify current business environment trends and allow forecasts as to how this will affect firms' future profitability. ***Secondly,*** changes in industry structure can be seen by identifying the features that have the greatest influence on industry profitability. Consequently, choosing a good strategic position can enhance a firm's ability to outperform competitors, and direct strategic responses to competitive behaviour (Grant, 2002).

2.3.2 Limitation of IO Paradigm

The IO approach, including SCP and the five forces model, has been, and continues to be, influential within the field of strategic management. However, the IO paradigm has certain inherent limitations, and the theory of industry organization has been widely criticised. Firstly, it regards the industry as a "homogeneous unit". Hence, firms in a particular industry are assumed to have the same importance in terms of their dimensions, regardless of their size (Porter, 1979). The issue of sharing the resources and assets built within a particular industry or "strategic group" has been strongly criticised. Furthermore, the IO paradigm failed to explain the role of managers and how they build strategy for their firms, whether they share the same strategies to deploy the firm's resources or share a similar cognition of the competitive environment (Thomas and Pollock, 1999). Moreover, the approach disregarded the new environment of competition; it ignored the managers' and other employees' skills and capabilities as essential to industry dynamism (Teece et al., 1997).

Secondly, according to rapid changes in the 1990's business environments, which were characterized by product differentiation, global perception and technological innovation, industry boundaries did not exist (Thomas and Venkatraman, 1988). Another key issue raised was the lack of use of current industry analysis for future forecasting. Due to rapid environmental change, it is difficult to predict the nature of the market. Moreover, (Porter, 1996) showed that the positioning strategy could be rejected because it was being too static to apply to the modern dynamic business environment.

There was growing doubt that the IO framework was the only determining factor of firm performance. Thus, numerous studies have been conducted to examine the statistical relationship between market structure (industry forces) and market performance, which usually highlight some of the limitations to this association. Rumelt (1991) examined the rather substantial point that there are weak, though statistically significant, impacts of industrial factors on firm performance (1991, P: 168). Moreover, a large number of studies have stated that the classical theoretical

attention on industry factors as a major determinant of firms' profitability is not sufficient since these factors are too heterogeneous to support classical industry organization theory (Bain, 1959, Hansen and Wernerfelt, 1989, Rumelt, 1991)

Other limitations illustrated the effect of internal factors on firm performance, such as valuable assets, positions and managerial skills. Such that scholars come to understand the crucial importance of studying the internal environment and sources of profits instead of the purely external environment. For example, Rumelt (1991) showed that only 8% of the variance in profit was due to industry effects (P: 168). Another study revealed that organizational (internal) factors explain firms' profitability about twice as well as economic factors (Hansen and Wernerfelt, 1989 P: 399).

Taking all of these issues together, there is a clear need to develop new concepts. Since the 1990s, scholars have begun to explore new perspectives (Teece et al., 1997). Consequently, the focus has shifted from studying the external industry "market-based view" to focus on the internal environment "resource-based View", which represents the dynamic aspects of the business environment (Thomas and Pollock, 1999). Grounded on previous discussions, the next section will examine the resource-based view as a new paradigm that considers the crucial role of firms' resources and capabilities in achieving superior performance.

2.4 From Market-Based View to Resource-Based View

2.4.1 An Overview

To gain a clear insight into the theoretical development of the structured framework of the resource-based view, we illustrate the four phases of the emergence of this approach (Table 2.1). Over the last twenty years, RBV *"is widely acknowledged as one of the most prominent and powerful theories for describing, explaining, and predicting organizational relationships"*. Accordingly, the RBV has developed from introduction, growth, to the mature stages of its "life cycle" (Barney et al., 2011 P: 1300). It should be borne in mind that these phases were theoretically and historically consolidated with the IO paradigm, in particular that the current paradigm was developed because

of the failures of the previous (IO) model. However, the essence of these two models is to shape a firm's strategy towards achieving superior performance.

The first phase was the establishment of the RBV model (Barney, 1991, Wernerfelt, 1984). In his pursuit to understand competitive advantage, Wernerfelt shifted attention towards firms' resource side instead of products side: *"for the firm, resources and products are two sides of the same coin"* (Wernerfelt, 1984 P: 171). Scholars started to highlight this during the "late 1980s and up to 1997". ***The second stage*** is the Dynamic Capabilities Perspective, "1997 - 2007" which was pioneered by Teece et al. (1997). The dynamic capabilities perspective suggested the best solutions by which to adapt to rapid environmental change, by considering the external and internal environment as sources of competitive advantage (Barney, 1991, Grant, 2010).

The third phase is that of Dynamic Managerial Capabilities, which was pioneered by Adner and Helfat (2003). Drawing on the absence of any explicit managerial roles in the previous models, this perspective highlighted the underlying factors of dynamic managerial capabilities which are "human capital, social capital and cognitive capabilities". ***Lastly,*** over recent decades, scholars, under the framework of the resource-based view, have asserted the need for applicable managerial strategies to cope with business change. Hence the AO perspective has been suggested as a new mechanism by which firms might adapt to business change (Helfat et al., 2007 and please see Table 2.1).

Table 2.1 the theoretical approaches to firm performance and lifecycle of resource-based view.

Timeframe	Approach characteristics	Limitations	Seminal works
IO: SCP and Porter's five forces. 1970s-1980s	Industry's competitive forces as primary units of analyses. Superior performance through strategic position taken in consideration of market forces (Porte five forces).	Focus on external industry forces. Firms' internal resources are widely neglected. Weak statistical significance of industrial factors on firm performance.	(Bain, 1959, Caves, 1964, Mason, 1948, Porter, 1985)

The introductory stage: Resource-Based View late 1980s- 1997	Theorized about how a firm's resources influence its growth; in particular, growth is constrained when resources are inadequate. Emphasized the value of focussing on firms' resources rather than on their products. Presented a detailed definition of firm resources. Articulated the full set of characteristics that make a resource a potential source of competitive advantage "Valuable, rare, inimitable, and non-substitutable".	A lack in empirical studies (conceptual). RBV failed to adequately explain how firms maintain their competitive advantage in a rapidly changing environment. Influence of external factors has been neglected.	(Barney, 1991, Penrose, 1959, Rumelt, 1984, Wernerfelt, 1984)
The growth stage: Dynamic Capabilities approach 1997 – 2003	Built on RBV ideas to introduce the concept of DC; in particular, it explained competitive advantage as arising from the confluence of assets, processes, and evolutionary paths. Applied a comprehensive external and internal dynamic environment analysis of firm performance. To adapt to rapid changes in the market, firms' resources and capabilities have to be considered in a more dynamic sense.	Lack of clear intellectual foundation. Lack of measurement issues. Tautological and vague concept.	(Eisenhardt and Martin, 2000, Teece et al., 1997, Zollo and Winte, 2002)
The maturity stage: Dynamic Managerial Capabilities 2003-2007	The concept of DMC was introduced to underpin findings related to heterogeneity in managerial decisions and firm performance in the face of changing external conditions. The underpinnings of DMC are social capital, human capital, and cognitive capabilities.	Shortage of any description of the managerial processes which managers should help their companies cope with business change.	(Adner and Helfat, 2003, Helfat and Martin, 2015b, Helfat and Peteraf, 2015)
Asset Orchestration: 2007 - to date	AO processes support managerial pursuit to adapt to business change. Clear measurement of variables affecting firm performance. Specified the nature and micro-foundations of the capabilities necessary to sustain superior enterprise performance in an open economy with rapid innovation and globally dispersed sources of innovation and manufacturing capability.	The approach is still under development. More conceptual and empirical studies are needed.	(Helfat et al., 2007, Sirmon et al., 2008, Sirmon and Hitt, 2009, Sirmon et al., 2011)
Source: partially adapted from the ideas of Barney et al. (2011).			

To approach this review and examination, the current section aims to conduct a critical review of RBV, and will trace all of the above aspects, to yield some insights into the limitations of these perspectives "knowledge gaps". To fulfil this purpose, this section is organized as follows: the first part will summarise the theoretical foundations of RBV; the second part will provide a brief overview of some of the terminology and definitions used in RBV, and will then illustrate the relationship between RBV and firm performance. Then, a critical evaluation of the resource-based perspective will be conducted. In the last part, a newly developed theoretical model will be suggested as an alternative extended model to RBV.

2.4.2 Resource – Based View

The central question in the strategic management field is that of understanding the sources of competitive advantage (Barney, 1991). RBV is one of the more valuable perspectives in explaining the role of a firm's internal resources and capabilities in achieving and sustaining competitive advantage. Therefore, the literature on strategic management widely reflects this insight (Foss, 1997).

Many of the underpinnings of RBV originate from the work of Penrose (1959), where the notion of firm resource functionality was first suggested, subsequently leading to developments in establishing the relationship between resources and a firm's long-term performance. The focus on resources started when Penrose considered "productive resources"; she argued that firms possess valuable internal and external resources that help them gain their competitive positions through exploiting valuable services. According to Eisenhardt and Martin (2000), firms could be conceived of as 'bundles of resources'. Hence, by determining the nature of these resource bundles, it should be possible to shape an optimal matrix of activities that achieves high performance (Wernerfelt, 1984). According to (Foss, 1997 P: 4), RBV starts from two basic generalizations:

1- There are systematic differences across firms in terms of the extent to which they control resources that are necessary for implementing strategies. Hence, differences in firm's resources result in associated performance differences.

2- These differences are relatively stable.

During the development of RBV, scholars endeavoured to identify the specific attributes of resources that had the potential to become sources of sustainable competitive advantage.

Barney (1991 P: 101) defined firms' resources as: tangible and intangible assets (internal strengths) which are managed by firms to conceive and derive value–creation strategies. According to Barney, these assets require four characteristics in order to be considered sources of sustainable competitive advantage (VRIN attributes); it should be borne in mind that the first two features are sources of competitive advantage whilst the last two sustain these advantages:

(a) The "bundle of resources" should be valuable – resource are valuable when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness. Resource are valuable when they exploit opportunities and/or neutralise threats in a firm's environment.

(b) The "bundle of resources" should be rare – a valuable resource or a bundle of resources should not be possessed by a firm's current and potential rivals as a possible source of competitive advantage. If the firm's resources are not rare, then competitors will be able to conceive of and copy the strategies in question, which means the resources will not remain a base of the firm's competitive advantage in the longer term.

(c) The "bundle of resources" should be imperfectly imitable – there are three sources of imperfect imitability: (i) as related to an inimitable historical condition, (ii) causal ambiguity links the firm and its unique "valuable, rare" resource; and (iii) socially complex resources (e.g., interpersonal relationships, culture, and reputation).

(d) The "bundle of resources" should be non-substitutable – substitutability means that there cannot be strategically equivalent substitutes for this resource that are also valuable but neither rare nor imperfectly imitable.

According to Barney (1991), valuable resources enhance a firm's ability to improve its efficiency and effectiveness. However, valuable resources will not be a source of competitive advantage when other competitors possess them; rather, they should be unique resources. Moreover, valuable and scarce resources might not be sufficient to sustain a competitive advantage; they should be inimitable "firm-specific assets". Indeed, these resources have to be difficult for competitors to duplicate because of transaction costs and associated implicit knowledge (Teece et al. (1997), otherwise they will not remain a source of long-term competitive advantage.

Wernerfelt (1984) considered the firm's internal variables to be "strength and weakness" in terms of a firm's resources, which consisted of all the tangible and intangible assets controlled by a given firm. Penrose defines resources as a bundle of possible services, which can be classified into two types: physical resources, which are the 'touchable' things that are under firms' control, and produced, bought or rented out; and human resources, including skilled and non-skilled workers, working as long- and/or short-term employees. Lastly, Barney (1991) added the notion of organizational resources, which include the firms' values, internal relationships, structures and managerial processes.

2.4.3 Resource-Based View and Firm Performance

The essence of the RBV is grounded in the firm's underlying assets, as compared to the products-based "IO" model. Specifically, it aims to connect the firm's resources and capabilities with high performance (Dutta et al., 2005). The intellectual foundations of sustained firm performance within the framework of RBV have emerged as per two hypotheses: ***the first*** is that the fundamental (VRIN attributes) resources are heterogeneously distributed across firms, or in other words that divergences in any firm's tangible and intangible assets lead to a performance differential; ***the second*** is that of resource immobility, which indicates that these differences persist over time (Barney, 1991 and Figure 2.2).

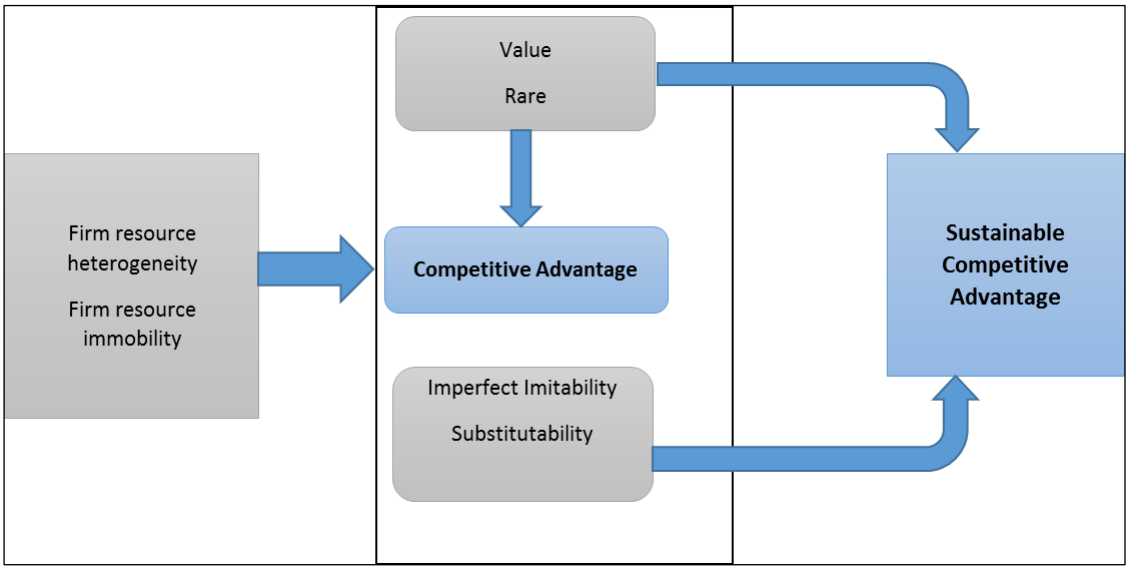


Figure 2.2 Barney's Model of Competitive Advantage.

Source: Adapted from (Barney, 1991).

It has been argued that the resource-based perspective has allowed for breakthroughs in both academic and practicable strategic management thinking by changing the focus of strategic planning from questions of "*What are our objectives, mission and vision*" to those of *"What are our valuable resources and capabilities"* that can help management to "*enhance our unique bundle of these resources to secure new core competences"* (Foss, 1997 P: 3). Notably, RBV does not focus entirely on a firm's competitive position "like IO approach" where attention was focussed on the current competitors in a specific industry. Instead, in the RBV model a firm's competition also includes the current and the potential "in time and markets" rivals (Barney, 1991).

Barney (1986) asserts that firms can obtain greater than normal rents by possessing valuable resources that are significant in terms of market demand. Moreover, Pralhad and Hamel (1990) revealed that firms may gain higher returns, not because of the resources and capabilities they possess, but through making better use of their valuable assets. They call these resources core competencies, "the collective learning in the organization". Hence, Prahalad and Hamel connected financial yield with optimal use of distinctive resources and capabilities. Teece et al. (1997) presented further evidence that there are substantial differences in firms' performances, even

when these firms are in the same sector and have adopted essentially the same strategies. Thus, some scholars attributed the reasons for the above to the importance of “firm-specific factors”.

In this context, Teece et al. (1997) illustrated three logical causes of firms' resource-sticky knowledge, or ‘heterogeneity’: (a) the complexity of the business processes’ improvement - to duplicate strategies of development, rivals requires new skills and additional time; (b) many resources and capabilities, quite simply, are not freely bought or rented by competitors, such as tacit knowledge and good relationships with stakeholders; (c) purchasing of new resources and capabilities by competitors may result in them facing barriers to entry such as high prices and lack of experience (Teece et al., 1997 P: 514). The points most worthy of emphasis here are the notions of specific resources and capabilities. There is a reasonable consensus that these assets are a source of sustainable competitive advantage which can lead to superior performance.

2.4.4 Resource-Based View Limitations

Twenty years since its inception, RBV remains widely acknowledged as one of the most prominent and powerful theories for describing, explaining, and predicting organizational relationships (Barney et al., 2011). However, RBV has been widely criticised for ‘lacking maturity’ (Rugman and Verbeke, 2000). Generally, RBV does not explain the best future strategies for resource deployment in order to reach the required effectiveness (Gruber et al., 2010). Moreover, the resource-based perspective has also been criticised for a lack of supporting empirical studies. In particular, most of the work in this field is considered to comprise conceptual studies which have focussed on RBV attributes only. Hence, the relationship between resources and wealth creation has been largely neglected. More widely, RBV has focused on the internal environment, whereas the influence of external factors has been neglected (Aragón-Correa and Sharma, 2003). Furthermore, RBV is described as being an ambiguous perspective because it lacks clarity, so is often considered tautological and static (Eisenhardt and Martin, 2000). Additionally, during the last decade of the 20th century,

firms began to face new challenges in terms of 'high-velocity' markets. RBV failed to explain how firms could compete in a business environment characterised by rapid technological innovation, short production life cycles, and a rapid change in consumer demand (Teece et al., 1997). Consequently, scholars assert that RBV requires in-depth examination in order to extend the theory's premises towards new dynamic business environments (Sirmon et al., 2011).

Under these circumstances, the resource-based perspective has failed to adequately explain how firms maintain their competitive advantage. In this regard, it is necessary to consider resources in a more dynamic sense. Therefore, more recently, studies have extended the resource-based approach to include a dynamic perspective that considers how to maintain competitive advantage (Eisenhardt and Martin, 2000, Medina-Garrido and Ruiz-Navarro, 2003). This will be discussed in the following section.

2.5 Dynamic Capabilities Approach

2.5.1 An Overview

Since the beginning of the 21st century, business environment conditions have begun to change. Hence, scholars have enlarged the resource-based perspective to cover dynamic markets, since which time the DC insight has emerged and which also suggests the need for a dynamic view of business environments (Bharadwaj, 2000). Thus, in their seminal article, Dynamic Capabilities and Strategic Management, Teece et al. (1997) stated that under conditions of change *"the fundamental question in the field of strategic management is how firms achieve and sustain competitive advantage"* (p. 509). Since then, the research into dynamic capabilities has gained increasing attention and is now considered as one of the most active research areas in the field of strategy (Di Stefano et al., 2014). To highlight the development of DC, meaningful theoretical explanations are required. The section will begin this review by defining the theoretical essence of dynamic capabilities based on highly cited and influential theoretical contributions.

2.5.2 Definition of Dynamic Capabilities Approach

Although there is no widely accepted and common definition of DC, according to Di Stefano et al. (2014), Laaksonen and Peltoniemi (2018), Peteraf et al. (2013), the field of DC has developed under the strong influence of the two formative papers: "Dynamic capabilities and strategic management" by Teece et al. (1997), and "Dynamic capabilities: what are they" by Eisenhardt and Martin (2000).

Teece et al. (1997) define DC as "*the firm's **ability** to integrate, build, and reconfigure internal and external competence to address rapidly changing environments"* (1997 P: 516). Eisenhardt and Martin (2000) define DC as "*the firm's **processes** that use resources – specifically the processes required to integrate, reconfigure, gain and release resources- to match and even create market change"* (P:1107). Table 2.2 illustrates the most influential definitions of DC phenomena. Furthermore, Winter (2003) considered the concept of DC to be routine when he defined it as *"An organizational capability is high-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management the asset of decision options for producing significant outputs for particle type"* (P: 991).

We may note that these definitions explicitly denote DC as a process, and consider it to be an ability that enables firms to align with their business change (adapt, exploit, and/or create the change).

2.5.3 The Essence of Dynamic Capabilities

So far, we have highlighted the most cited and most influential papers that define the concept of DC; the next step is to review and determine the essence of the DC construct. Drawing on Table 2.2, the definitions explicitly refer to a variety of DC-related terms, such as competences, collective skills, capacity, capabilities, processes, resources, "complex" routines, best practices or organisational capabilities, and the ability to sense and shape opportunities and cope with threats, as well as to maintain competitiveness, and to be able to reconfigure assets with the aim of achieving sustainable competitive advantage.

Table 2.2 DC definitions.

Scholar(s)	Definition
(Teece and Pisano, 1994)	The subset of the competences and capabilities that allow the firm to create new products and processes and respond to changing market circumstances
(Eisenhardt and Martin, 2000)	The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change; dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die.
(Teece, 2000)	The ability to sense and then seize opportunities quickly and proficiently
(Zollo and Winter, 2002)	A dynamic capability is a learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness.
(Winter, 2003)	Those [capabilities] that operate to extend, modify or create ordinary capabilities.
(Helfat et al., 2007)	The capacity of an organisation to purposefully create, extend, or modify its resource base.
(Teece, 2007)	Dynamic capabilities can be disaggregated into the capacity (a) to sense and shape opportunities and threats, (b) to seize opportunities, and (c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets.
(Wang and Ahmed, 2007)	A firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage.
(Barreto, 2010)	A dynamic capability is the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-oriented decisions, and to change its resource base.
(Zahra et al., 2006)	The abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s).
(Teece, 2012)	Dynamic capabilities are higher-level competences that determine the firm's ability to integrate, build, and reconfigure internal and external resources/competences to address, and possibly shape, rapidly changing business environment.
Source: Adapted from Barreto (2010: 260) and modified with additional definitions.	

At this point, we need to examine the core ideas that have been derived from the updated DC literature. Consequently, we here abstract the latest academic debate in this regard, as well as evaluate the approach by highlighting its strengths and illustrating its weaknesses and limitations. Broadly;

1- Most of the literature has reflected on and cited these two papers: “Dynamic capabilities and strategic management” by Teece et al. (1997), and “Dynamic capabilities: what are they” by (Eisenhardt and Martin, 2000).
2- As DC was derived from the RBV approach, it hence shares the same assumptions (heterogeneity) and main attributes, which are (VRIN) attributes (Arend and Bromiley, 2009).
3- Scholars define five *“key structural components”* that describe dynamic capabilities, who include Di Stefano et al. (2014), Laaksonen and Peltoniemi (2018), and Peteraf et al. (2013); please see Table 2.3.
    a. The nature of DC, which concerns the question “what DC fundamentally are”. In this regard, the literature has considered DC as a latent action, such as an ability or capacity, or in terms of constituent elements, as in a process, routine, or pattern.
    b. The object of DC, namely “what is the object of the action of DC”. This is a question as to whether DC can be considered to be competences, resources, or opportunities.
    c. The agent of DC, “who exerts the DC action”. With respect to the issue of agency, the literature demonstrations that the research is divided as to whether the focus of DC is on the role of the manager or on the organization. Basically, the earlier literature focus on the firm (Teece et al., 1997), while more recent work has asserted managers’ roles as being the actors of DC (Adner and Helfat, 2003).
    d. The action of DC, “what do they do”. Whether it acts upon existing capabilities, or develops new ones.
    e. The aim of DC, “what is the outcome of DC”. The literature focusses either on adapting to changing business conditions, “moderated factor”, or achieving and sustaining a firm’s competitive advantage, “output” (Helfat and Martin, 2015b).
4- The purpose of DC research is to explain the sources of a firm’s performance (Teece et al., 1997, Teece, 2007). This indicates that a firm’s long-term

performance, “sustainable competitive advantage”, is a key component of the approach and is usually seen as the final aim of DC.

5- Laaksonen and Peltoniemi (2018), asserted that the essence of the DC construct consists of the difference between ordinary and dynamic capabilities. Helfat et al. (2007) define ordinary capabilities (also called operational capabilities) as those that can be used by firms to earn a living, whereas dynamic capabilities enable the firm to cope with market change (Teece et al., 1997). Moreover, ordinary capabilities enable a firm to proceed efficiently and effectively (Helfat and Winter, 2011), whereas dynamic capabilities enable the search for, and selection of, new market opportunities (Helfat et al., 2007, Teece, 2007). To gain more insightful ideas about DC and further explanation of its components, Table 2.3 reports the core structural mechanisms of DC.

Table 2.3 Key structural components of dynamic capabilities.

Domain	**Teece’s approach**	**Supported papers**	**Eisenhardt’s approach**	**Supported papers**
Nature	Ability/capacity /enabling device	(Teece et al., 1997, Zahra and Nielsen, 2002); (Zahra and George, 2002).	Process/ routine	(Eisenhardt and Martin, 2000).
Agent	Organizations	(Teece et al., 1997); (Amit and Zott, 2001).	Organizations	(Eisenhardt and Martin, 2000); (Amit and Zott, 2001).
Agent	Was not considered		Manager	(Santos and Eisenhardt, 2005); (Zahra et al., 2006).
Action	Change existing	(Teece et al., 1997); (Eisenhardt and Martin, 2000); (Zahra and George, 2002); (Zollo and Winte, 2002); (Winter, 2003).	Develop new	(Eisenhardt and Martin, 2000); (Aragón-Correa and Sharma, 2003); (Benner and Tushman, 2003); (Teece, 2007).
Object of the action	Competences/ resources	(Eisenhardt and Martin, 2000); (Zahra and George, 2002); (Winter, 2003); Zahra (Zahra et al., 2006).	Opportunities	(Teece, 2000); (Zollo and Winte, 2002); (Santos and Eisenhardt, 2005); (Teece, 2007).
Aim	Achieve a Competitive Advantage/ Performance	(Teece, 2000); (Zahra and George, 2002); (Zollo and Winte, 2002); (Teece, 2007).	Adapt to changing conditions	(Teece et al., 1997); (Eisenhardt and Martin, 2000); (Benner and Tushman, 2003).
Source: Adapted from (Di Stefano et al., 2014, Laaksonen and Peltoniemi, 2018).				

2.5.4 Evaluation of Dynamic Capabilities Perspective

Although the DC approach is a highly active area of study, as can be seen in Table 2.3, the concept itself suffers from a lack of clear intellectual foundation. To evaluate the DC perspective, scholars refer to two significant issues. The first point concerns the theoretical foundation of the concept, while the second is concerned with the affects and consequences of DC "its outcomes" (Helfat and Martin, 2015b). The definitions of DC are characterized as being general; furthermore, the empirical models of DC are still confusing. For instance, some scholars directly connect DC with competitive advantage while others connect DC to changing business environments; (see Table 2.3). Hence, many scholars consider DC to be purely a tautological and vague concept (e.g., routines of routines and best practice) (Eisenhardt and Martin, 2000). Below we abstract the limitations of the approach and various scholars' suggestions for forwarded extension towards a focus on managerial roles to shape a firm's resource base (Helfat et al., 2007).

Firstly, there is no consensus as to a rigorous definition of DC and there remain many points of contention regarding the relationship between DC and its outcomes "i.e., firm performance, business environment change". Hence, to overcome this limitation, several scholars have suggested that dynamic capabilities should be observed by the changes they effect on a firm's resource base, rather than directly through firm performance (Helfat and Peteraf, 2015, Sirmon et al., 2011) and (Helfat and Martin, 2015b). ***The second*** lack of consensus is with respect to the issue of agency; the research is divided over whether the focus of dynamic capabilities is on the role of the manager or on that of the organization. Consequently, micro-level analysis has been proposed as a means by which to reveal how firms tackle the challenge of developing DC (Adner and Helfat, 2003, Laaksonen and Peltoniemi, 2018). ***Thirdly,*** due to the various criticisms of the dynamic capabilities perspective and to address the above limitations, new conceptual and practical models (dynamic managerial capabilities and asset orchestration) have been suggested. Scholars have extended the concept of DC towards emphasising managers' roles regarding strategic change (Helfat and Martin, 2015b).

In concluding this section, the DC approach has attracted particular consideration within the field of strategic management (Barreto, 2010). The latest literature suggests that the significant contributions of the dynamic capabilities approach must be adapted, shaped, and reshaped to focus on business environments (Arend and Bromiley, 2009 P: 76). The essence of a firm's dynamic capabilities is therefore inherent in their (i) tacit knowledge, (ii) organisational processes, and (iii) managerial skills (Helfat et al., 2007). As the business environment becomes more competitive, creating, adapting to, and exploiting market change requires basic managerial skills. Consequently, studying the organizational and managerial processes is essential to an examination of how firms identify and respond to the need for change (Helfat et al., 2007). Hence, top level management leadership skills are required to sustain a firm's dynamic capabilities. A core managerial function is that of achieving continuous resource orchestration and business renewal (Teece, 2007). Accordingly, the managerial framework of Teece focusses on how firms can extend or modify their asset base as they engage in detecting, seizing, and reconfiguring internal and external capabilities to face technological and market change (Teece, 2007, Teece et al., 1997).

2.6 Dynamic Managerial Capabilities and Asset Orchestration: The Direction of Future Research

2.6.1 An Overview

As noted in Table 2.3, most research into DC has focussed on organisational factors that enable a firm to adapt to change, rather than managerial factors (Adner and Helfat, 2003). Castanias and Helfat. (2001) suggested differences in managerial skills lead to different strategic decisions, thus resulting in different performances (P: 667). Hence, more recently, scholars in strategic management have acknowledged the important role of managerial capability. Following the seminal article on dynamic capabilities by Teece et al. (1997), scholars have argued that top-level managers may have dynamic capabilities that can aid strategic change. Accordingly, Adner and Helfat (2003) introduced the concept of 'Dynamic Managerial Capabilities' (DMC) to help explain how a firm can achieve adaptation to strategic change.

In addition, to study the association between the capacity of managerial decisions with strategic change and firm performance Helfat and Martin, (2015b), Adner and Helfat (2003) asserted that under changing environmental conditions, managers of different firms will make different decisions even though they are working in the same industry sector. This leads them to ask the question as to what makes managers different in terms of their decision making, instead of the question as to what makes their firm different in terms of its performance (2003, P: 1013).

2.6.2 Dynamic Managerial Capabilities Definition

- Adner and Helfat (2003) consider the DMC concept to be a "direct analogy to more general dynamic capabilities" when they define DMC as *"the capabilities with which managers build, integrate, and reconfigure organizational resources and competences"* (P: 1012).
- Helfat et al. then used the term DMC to refer to *"the capacity of managers to create, extend, or modify the resource base of the organization"* (Helfat et al., 2007 P: 24).
- Helfat and Martin defined DMC as *"the capabilities with which managers create, extend, and modify the ways in which firms make a living"* (Helfat and Martin, 2015b P: 1281).

Against this backdrop, heterogeneity in differential outcomes will likely be strongly linked to variations in managerial decisions. Consequently, superior DMC could shape/reshape firms more effectively than those that have no DMC (Helfat and Martin, 2015b). Further, reconfiguration of the firm's resource base will influence its capacity to respond to a changing external business environment.

2.6.3 The Underpinning Factors of Dynamic Managerial Capabilities

The literature on DMC has reflected three key underpinning attributes which are: (i) managerial human capital, which refers to learned skills; (ii) managerial social capital, which indicates the mangers' social relationships; and (iii) managerial cognation, which

relates to managerial belief systems (Adner and Helfat, 2003 P: 1020). More details of these underpinnings will be illustrated in the following sections.

2.6.3.1 Managerial Human Capital

Holcomb et al. (2009 P: 459) define managerial ability as *"the knowledge, skills, and experience, which is often tacit, residing with and utilized by managers".* Managerial human capital refers to learned skills, which can be defined as "Learning skills and knowledge that individuals developed through their prior experience, training, and education" (Helfat and Martin, 2015b P: 1286). Castanias and Helfat. (2001) use the term "skills" to refer to human "capital" and consider managerial skills to be an instinctive and learned capacity, previous work, and experience and knowledge (P:662). More recently, Helfat and Peteraf (2015) have extended this concept to include psychological features such as intelligence, attitudes, personality and values. Managers, as firm resources, have a bundle of skills; these skills differ from manger to manager in terms of the types of skills and the degrees of proficiency that each possess.

Accordingly, differences in managerial skills are an indicator of heterogeneity in managerial resources (Castanias and Helfat, 2001). Hence, we could conclude that a manager with rare, valuable, inimitable and non-substitutable skills might represent a source of competitive advantage. Moreover, Helfat and Peteraf (2015) assert that differences in managerial learned experience might lead to variations in managers' investments and of the manner in which decision making is deployed. Applying the same logic, variance in human capital capacities will result in differences in resource configuration decisions, and consequently managerial human capital may enhance a firm's ability to achieve improved performance.

2.6.3.2 Managerial Social Capital

Managerial social capital indicates the mangers' social relationship, which can be defined as "*The relationship between individuals and organization that facilitate action and thereby create value"* (Hitt et al., 2002 P: 354). Social relationships can provide

control and power through the external and internal network ties that management can use to obtain resources and information. Thus, providing access to information and external resources will enhance mangers' capabilities in decision-making processes, and firm performance as a consequence (Adner and Helfat, 2003). According to Hitt et al. (2002), managerial social capital could be helpful in exploiting and leveraging firms' knowledge. Moreover, social capital network ties can probably improve managerial capacity by allowing greater access to external recourses and information. This will support DMC when searching for, selecting and configuration firms' resources (Helfat and Martin, 2015b).

2.6.3.3 Managerial Cognition Capabilities

Managerial cognition rooted in mental model and beliefs is considered to be the basis of decision making (Adner and Helfat, 2003). Thus, managerial cognition is referred to as "knowledge structure", and the managerial cognition base for decision making enhances managerial perceptions of the future. Moreover, managerial knowledge structure might affect the managerial capacity for shaping strategic decisions and outcomes by understanding the alternatives and consequences of its use. Hence, managerial cognition capabilities will enhance firms' abilities to respond to changes in their external environments (Adner and Helfat, 2003, Helfat and Peteraf, 2015).

More recently, Helfat and Peteraf (2015) explored the factors that enable strategic change. They developed a managerial cognition model and introduced the concept of "managerial cognition capabilities" which can be defined as *"The capacity of an individual manager to perform one or more of the mental activities that comprise cognition"* (P: 835). According to Helfat and Martin (2015b), this includes fiscal abilities such as language and sound, and attention and perception, and also mental capacities such as reasoning and problem solving. Helfat and Peteraf (2015b) further argue that cognitive capacity might underpin DMC in searching for, selecting, and then deploying and configuring, as this might have a positive effect on firms' strategic changes. Moreover, they assert that the heterogeneity of cognitive capabilities for managers may enhance firms' performance in the face of a changing business environment.

Even more, recent work has extended our understanding of DMC by explicitly addressing the concepts of asset orchestration (Sirmon et al., 2011). The following section will illustrate the concept of asset orchestration in more detail.

2.7 Asset Orchestration

2.7.1 An Overview

By drawing upon Helfat and Martin (2015b), the vital function of dynamic managerial capabilities is that of AO. This is expected to affect search, selection, configuration, alignment, and modification of tangible and intangible assets, and may include assembling and configuration of co-specialized assets (Helfat et al., 2007, Teece, 2007). Scholars have asserted that the bundling and development of resources and capabilities will enhance firms' abilities to adapt to strategic change. AO therefore directly affects firms' abilities to adapt to changing conditions in their industry environments. Hence, firms could build value through the AO mechanism (Helfat and Martin, 2015b, Sirmon and Hitt, 2009).

AO is assumed to consist of two primary processes: search and selection, and configuration and deployment. The search and selection process requires managers to be involved in specific activities such as identifying core assets and investing in them. Within the configuration and deployment processes, managers will likely engage in, or perform, activities such as redesigning organizational structures as well as re-innovating business models. Managers might be also engaged within activities such as coordinating specialized and co-specialized assets, providing a vision for those assets, and deploying such assets to gain value extraction (Helfat et al., 2007). The fit between these processes is vital to realizing the potential of the firm to adapt to strategic change (Sirmon et al., 2010). Henceforth, achieving alignment "integration" between resource investment and deployment is considered one of the key functions through which managers are expected to enhance a firm's performance (Helfat et al., 2007, Sirmon and Hitt, 2009).

A key strategic function of management is to find new value-enhancing combinations inside firms and or within their immediate supply chains. Many of the most valuable assets contained inside any firm are knowledge-related "intangible assets", which typically have "no tradable value". The coordination and integration of such assets is concerned with creating value that cannot be replicated in the markets (Helfat et al., 2007). In a dynamic situation, the essence of critical managerial functions is therefore likely to involve activities such as orchestrating complementary and co-specialized assets. These are particularly important managerial functions that create value (which may or may not be tradable), and are therefore key strategic activities to be performed by executives (Helfat et al., 2007).

2.7.2 Asset Orchestration Definition

There are two seminal publications that established the AO concept: the first is the book published by Helfat et al. (2007), "Dynamic capabilities; Understanding strategic change in organizations"; whilst the second is the article published by Sirmon et al. (2011), "Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects".

Since we are analysing an emergent phenomenon – indeed, one that was first noted as recently as 2007 – this concept might well be considered to still be in its infancy. Consequently, it is difficult to find many associated definitions. In the following, we have attempted to find the most common definitions of AO.

- *"Managerial search, selection, and configuration/coordination of resources and capabilities"* (Helfat et al., 2007 P: 121).
- Asset orchestration has two sub-dimensions: first, resources investment (search/selection) which is defined as *"determine[ing] how the firm invests to acquire and develop resources"*. Second, resource deployment and configuration are defined by "*determine[ing] the specific market segment(s) in which to engage those investments"* (Sirmon and Hitt, 2009 P: 1376).

- O'Reilly and Tushman (2008) argue that dynamic managerial capabilities are critical and emphasize the capacity of *"senior managers to ensure learning, integration, and, when required, reconfiguration and transformation—all aimed at sensing and seizing opportunities as markets evolve"* (P: 189).
- Teece (2007 P: 1319) asserted that the distinct skills, processes, procedures, organizational structures, decision rules, and disciplines which underpin enterprise-level sensing, seizing, and reconfiguring capacities which are difficult to develop and deploy.
- Asset orchestration: "involves identifying the critical assets and investing in them (search/selection), and then developing a governance system along with a means for their effective use identified. The second part of asset orchestration involves the coordination of co-specialized assets and their use in productive ways configuration and deployment" (Augier and Teece, 2013).

2.7.3 Asset Orchestration Significance

According to Helfat et al. (2007), AO is of critical importance, especially in a "thin market" where resource allocation is needed within firms because there are no specific markets for this kind of asset, "such intangible assets". Hence, different kinds of firms' resources need to be shaped/reshaped inside a company instead of purchased from external markets. Moreover, other resources have a complementary nature, "co-specialized", which means they are strongly linked to their firm because they are bundled together.

Predicting future demand in rapidly changing markets adds further difficulties. Consequently, it is very difficult to gain these kinds of assets from outsourcing in the particular configuration(s) that fit with firms' requirements (Helfat et al., 2007). The coordinated adaption of firms' asset "enrichment, modification, acquisition, and alignment" might help firms to adapt to the change. This synchronized adaption indicates managers' roles in investment and deployment of firm assets; in addition, it indicates the possible influence of AO on adaption of strategic change (Helfat et al., 2007, Helfat and Peteraf, 2015).

2.7.4 Asset Orchestration Underpinnings

Building on Helfat et al., (2007) and Sirmon and Hitt, (2009) suggested that asset orchestration comprises two key underpinning processes: (i) search and selection; and (ii) configuration and deployment.

2.7.4.1 Search and Selection Processes: The Role of Top Level Management

Chadwick et al. (2015) emphasised that to ensure effective resources, management activities at all levels of a firm must be carefully orchestrated and be supported by top management. Search processes are required to detect and shape opportunities, as firms must continually scan, search, and explore for new prospects (Teece, 2009). Search selection describes the situation where *"managers look for new information and knowledge and thus determines the kind of information available for managers to notice and concentrate"* (Li et al., 2013 P: 896). These processes provide the ability to recognize opportunities in terms of technological or market innovation, whether in a local or global business environment. Accordingly, Teece (2009 P: 1322) emphasises that sensing new opportunities is "a scanning, creation, learning, and interpretive activity". Hence, investment in research and related activities is usually a necessary complement to this activity. When an opportunity is first seen, executives must determine how to interpret new events and developments, which technologies to utilize, and which market segments to target (O'Reilly and Tushman, 2008).

The ability to identify opportunities depends in part on individual managerial capabilities. This requires specific knowledge, innovative activity, and the capacity to appreciate customer needs and market demand. The role of top managers is to assess how technologies will evolve and how and when rivals, suppliers, and customers will respond (Teece, 2009). Once an opportunity is discovered, exploiting it will require access to information and an ability to recognize, sense, and shape developments.

Selecting an opportunity is "about achieving the right decision and execution, with reference to strategic insight and strategic execution" (O'Reilly and Tushman, 2008 P: 17). Asset-selecting processes are related to the fitting of organizational structure and

the type of resource deployment. This requires managers who have the ability to set out a vision and strategy, secure organizational fits, and ensure resource allocation (O'Reilly and Tushman, 2008). Asset selecting processes involve managerial decisions that are related to the size of the investment needed. Once a new opportunity has been identified, this should not be achieved purely through developing new products, processes, or services, but also the organizations must decide when, where, and how much to invest in its pursuit. Furthermore, firms must also select or create a particular business model that defines its commercialization strategy and investment priorities (Teece, 2009).

2.7.4.2 Asset Configuration and Deployment: The Role of Middle- and Low-Level Management

Scholars have emphasised that in order for top managers' asset orchestration efforts to enhance firm responsiveness, they must be operationalized by middle-level managers through the processes of asset configuration (Chadwick et al., 2015). Reconfiguration, generally speaking, refers to *"the redesign of certain elements or components of a system"* (Karim, 2006). According to O'Reilly and Tushman (2008), to meet the requirements of any long-time growth, managers should conceive and direct processes of allocation, reallocation, recombination and reconfiguration of assets, which are needed as markets and technologies change. Asset reconfiguration can therefore be defined as *"the managerial ability to conceive and direct asset alignment, co-alignment, realignment, and redeployment, as well as to create, adjust, and, if necessary, replace models"* (Teece, 2009 P: 133).

One of the vital functions of the configuration process, which is mostly run by middle management, is the use of "co-specialized assets". According to Teece (2009), the key dimension in the asset orchestration approach emphasised the integration of complementary assets. Co-specialized assets are defined as *"a particular class of complementary assets where the value of an asset is a function of its use in conjunction with other particular assets"* (Teece, 2009 P: 1338). In fluid situation, the essence of critical managerial functions is likely to involve activities such as orchestrating

complementary and co-specialized assets. These are particularly important managerial functions that create value (which may or may not be tradable) and therefore are key strategic activities that need to be performed by executives (Helfat et al., 2007). Consequently, seizing the benefits of co-specialization may require middle-managerial skills through integrated operations of configuration, reconfiguration, and deployment of firm resources (Teece, 2009). Taylor and Helfat (2009) thus argue that due to their operational roles, middle managers are crucial to the success or failure of technological changes.

Predicting future demand in rapidly changing markets adds further complexity. It is very difficult to gain these kinds of assets “co-specialized” from outsourcing in a particular configuration that fits with a firm’s requirements (Helfat et al., 2007). The coordinated adaptation of firms’ assets “enrichment, modification, acquisition, and alignment” might help firms to adapt to the change. This synchronized adaption indicates managers' roles in investment and deployment of firm assets, which indicates the possible influence of AO on responding to strategic change (Helfat et al., 2007, Helfat and Peteraf, 2015). According to Karim (2006), it is important to study this phenomenon because reconfiguring structures and their resources makes it possible for firms to use resources in new combinations and improve the effectiveness of the use of such assets “in different compensation, or different market”. Furthermore, scholars have found evidence that asset reconfiguration processes empower a firm to sustain the value of their resources (Chakrabarti et al., 2011). The preceding discussion highlights the significant importance of AO processes. Hence, the following section will examine what has been done and what needs to be done to apply the AO theories, and whether we have sufficient real-world case examples of, and practical guides to, these studies.

2.7.5 Conceptual and Empirical Studies of Asset Orchestration

Although some previous references to the concept of AO can be found in the DC and DMC literature, it was only after the publication of Helfat et al. (2007) that the asset orchestration view generated an increasing flow of research as we have seen. Building

on Tranfield et al. (2003), researchers frequently measure journal quality by referring to a ranking system such as the Social Science Citation Index (SSCI). Accordingly, I used the SSCI website to review and later examine the body of academic publications from an AO perspective. A journal ranking is proposed against systematic criteria of publications, where the use of such a system as a search boundary is adopted in this thesis. Consequently, the list of sources searched in the course of the literature review was initially set as the top-ranked management journals as determined by the impact factor suggested by the SSCI. I found number of publications in the following leading management journals: "Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Management, Journal of Management Studies, Management Science, Organization Science, Strategic Management Journal, Strategic Entrepreneurship Journal and MIS Quarterly" that mentioned "asset orchestration, resource orchestration" in their title, key words and/or their abstracts.

From 2007 to 2017, I found 23 theoretical and empirical works in which asset orchestration played a central or supporting role (Table 2.4). I also found more than 50 additional relevant empirical and theoretical studies from the literature on dynamic managerial capabilities, asset deployment, and asset configuration. These studies substantially enhance our understanding of asset orchestration, even though they were not originally framed in this manner. Despite the fact that the DC, DMC and AO literature represents a growing body of research (Di Stefano et al., 2014), it is significant that of the 70 studies that focussed on AO from 2007 to 2017 and that appeared in top management journals, only a few dealt specifically with AO, even though other studies referenced them in this regard. Table 2.4 illustrates these works and highlights the nature of each study and its main conclusions.

Table 2.4 AO seminal literature 2007-2017.

Author(s) and Journal	Article title	Sample/ Data Source	Results/ Conclusions
(Augier and Teece, 2009) Organization science.	Dynamic Capabilities and the Role of Managers in Business Strategy and Economic Performance	A conceptual framework	There is a role for managers and leaders not just in managing the business enterprise, but also in the theory of a properly functioning economic system and in industrial leadership. The emerging paradigm of asset orchestration helps explicate the role (strategic) managers and management play in a market economy. The dynamic capabilities framework can be used as a foundation for understanding the processes of opportunity sensing and seizing, as well as the processes of strategic renewal.
(Baert et al., 2016) Strategic Entrepreneurship Journal	Portfolio Entrepreneurship and Resource Orchestration	A single case study approach	The study examines the role of resource orchestration for the exploration and exploitation of opportunities through portfolio entrepreneurship. The study identified three distinctive resource orchestration processes that enable the development and exploitation of a set of resources and capabilities across a portfolio of ventures: sharing, transforming, and harmonizing.
(Chadwick et al., 2015) Strategic Management Journal	Resource Orchestration in Practice: CEO Emphasis on SHRM Commitment-based HR Systems, and Firm Performance	Sample of 190 Korean firms	Managers at all levels of the firm must engage in resource management activities, and these efforts are synchronized and orchestrated by top management. This study's findings underscore the importance of middle managers in operationalizing top management's strategic emphasis, lending empirical support to a fundamental tenet of resource orchestration arguments.
(Chirico et al., 2011), Strategic	Resource Orchestration in Family Firms:	A survey of 199 Swiss family firms	Drawing on the process of resource orchestration, the study argues a co-alignment of multiple factors is

Entrepreneurship Journal	Investigating how Entrepreneurial Orientation, Generational Involvement, and Participative Strategy Affect Performance		needed for family firms to increase performance through entrepreneurship. In order for entrepreneurship to be successful in family firms, the unique resources of such firms must be effectively leveraged, which requires the synchronization of mobilization and coordination mechanisms.
(Girod and Whittington, 2017) Strategic Management Journal	Reconfiguration, Restructuring and Firm Performance: Dynamic Capabilities and Environmental ynamism.	A study examining a set of large U.S. corporations, namely the "top 50 publicly listed industrial firms ranked in 1985 in the U.S.", tracking them through until 2004.	The study introduces two dynamic managerial capabilities; restructurings "involve fundamental change in organizational principles and are typically irregular", and reconfigurations "involve incremental change and are frequent". The study argues that firms need these two types of dynamic capability in order to adapt to change. The study concludes that the relative frequency of reconfigurations helps adaptation in dynamic environments. Further, managers should choose forms of reorganization according to the rate of environmental change.
(Helfat and Campo-Rembado, 2016) Organization Science	Integrative Capabilities, Vertical Integration, and Innovation Over Successive Technology Lifecycles	Empirical study	The integrative managerial capabilities of vertically integrated firms play a key role by enabling them to adapt to change. The interaction of firm-level integrative capabilities and technological evolution may explain both firms' vertical integration decisions and industry evolution over time. The study presented the role of managerial internal integrative capabilities in communication and coordination across stages of production to minimize costs.
(Helfat and Martin, 2015b) Journal of Management	Dynamic Managerial Capabilities: Review and Assessment of Managerial Impact on Strategic Change	A conceptual framework	The study redefines the concept of DMC—the capabilities with which managers create, extend, and modify the ways in which firms make a living. The study illustrated that the main functions of dynamic managerial capabilities include "asset

			orchestration". The study concludes that differences in managerial impact on strategic change and firm performance and that differences in managerial cognition, social capital, and human capital lead to different outcomes.
(Helfat and Peteraf, 2015) Strategic Management Journal	Managerial Cognitive Capabilities and the Microfoundations of Dynamic Capabilities	A conceptual framework	The study focusses on microfoundations at the level of the individual manager. The study introduces the concept of "managerial cognitive capability. A study identifies specific types of cognitive capabilities that are likely to underpin dynamic managerial capabilities for sensing, seizing, and reconfiguring, and explain their potential impact on strategic change of organizations.
(Helfat et al., 2007), Book.	Dynamic capabilities: Understanding Strategic Change in Organizations	A conceptual and practical framework	The authors present and defined the concept of asset orchestration, The book introduces the "evolutionary fitness" Evolutionary fitness; this refers to how well dynamic capabilities enable an organization to make a living by creating, extending, or modifying its resource base. Evolutionary fitness includes technical fitness (P: 121).
(Hitt et al., 2011), The Academy of Management Perspectives	Strategic Entrepreneurship: Creating Value for Individuals, Organizations, and Society	A conceptual and practical framework	The study explores the resource orchestration processes that are important for strategic entrepreneurship and the outcomes, including creating value for customers, building wealth for stockholders, and creating benefits for other.
(Holcomb et al., 2009)	Making the Most of What You Have: Managerial Ability as a Source of Resource Value Creation	A case study of sports teams that Competed in the NFL from the 1980 season through the 2000 season.	These study results contribute to our understanding of resource management and provide empirical evidence for the importance of managerial ability in the resource-based view. As managers are a potential source of value creation for the firm.
(Kor and Mesko,	Dynamic Managerial	A conceptual	Underscores the criticality of the two

2013) Strategic Management Journal	Capabilities: Configuration and Orchestration of Top Executives' Capabilities and the Firm's Dominant Logic	framework	key CEO-level functions: configuration and orchestration of senior executive team dynamic capabilities. Developing theory about the interplay between the firm's dominant logic and dynamic managerial capabilities.
(Li et al., 2013) Academy of Management Journal	Top Management Attention to Innovation: The Role of Search Selection and Intensity in New Product Introductions.	An in-depth field study of 61 publicly traded high-technology firms and their top executives	Teams that select locations that contain novel, vivid, and salient information introduce more new products. Search intensity may lead to increases in new product introductions. Level of search intensity must fit the selected location of the search to maximize new product introductions.
(Martin, 2011) Organization Science	Dynamic Managerial Capabilities and the Multibusiness Team: The Role of Episodic Teams in Executive Leadership Groups	An inductive multiple-case study examines general managers (GMs) of six firms in the "dynamic" software industry	The study assessed of executive leadership, researching the relation between business unit GMs, and firm performance. Distinction between an "operational" capability and a "dynamic" one. The former is a capability used to make a "living in the present" and is impacted by a DC. The study showed that executive leadership groups played a critical role in sensing and seizing opportunities and managing threats in a purposeful way.
(O'Reilly and Tushman, 2008), Organizational Behaviour	Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. Research	Conceptual	This paper attempts to specify those competencies and routines and to show how the ability of senior leaders to reconfigure assets to compete in emerging and mature businesses in order to be 'ambidextrous'.
(Sirmon and Hitt, 2009) Strategic Management Journal	Contingencies Within Dynamic Managerial Capabilities: Interdependent Effects of Resource Investment and Deployment on Firm Performance	A sample of the regional banking market within the U.S. financial services industry,	This study examines the contingent nature of resource investment and deployment decisions. The results indicate that firm performance suffers when managers' investment decisions deviate from the norms of rivals for both human and physical capital. Firm performance is optimized by making congruent resource investment and deployment decisions as opposed to maximizing or

			economizing either decision independently. Therefore, resource management via asset orchestration is vital for superior performance.
(Sirmon et al., 2007) Academy of Management Journal	Managing firm resources in dynamic environments to create value: Looking inside the black box.	A conceptual framework	Extend RBV towards resource management model. Components of the resource management model include; resource structuring; resource bundling and resource leveraging.
(Sirmon et al., 2008), Academy of Management Journal	Resource Management in Dyadic Competitive Rivalry: The Effects of Resource Bundling and Deployment	A major league baseball teams during the period 1997-99.	Management must effectively bundle and deploy an organization's resources for an advantage to be realized. The managerial processes of structuring bundling and deployment firm resource will affect competitive outcomes.
(Sirmon et al., 2011) Journal of Management	Resource Orchestration to Create Competitive Advantage: Breadth, Depth, and Life Cycle Effects	A conceptual framework	Extend the understanding of resource-based theory towards the resource orchestration model. Explicitly addressing the role of managers' actions to effectively structure, bundle, and leverage firm resources. Three areas where research on resource orchestration can be used to extend RBV across the firm; (1) breadth (2) life cycle, and (3) depth.
(Stan and Puranam, 2017) Strategic Management Journal	Organizational Adaptation to Interdependence Shifts: The Role of Integrator Structures	The study obtained data for all the 98 IVF clinics in the UK for the period 1992-2003	The study investigate how organizational adaptation to business change is influenced by managers "integrators" through the processes of coordination. The study argues that the integration processes has a potential impact on organizational adaptation. The study suggests a new mechanism which integrators may aid organizational adaptation to business change.
(Taylor and Helfat, 2009) Organization Science,	Organizational Linkages for Surviving Technological Change: Complementary Assets, Middle Management, and Ambidexterity	A conceptual framework	The ability to build and leverage organizational linkages involving the new technology and its complementary assets is essential for a successful technological transition. The framework also highlights the importance of middle management in

			creating and maintaining these linkages, which are critical to dynamic capabilities in technological transitions.
(Teece, 2007) Strategic Management Journal	Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance.	A conceptual framework	Dynamic capabilities can be disaggregated into the capacity "microfoundations": sensing, seizing, and reconfiguring. Enterprises with strong dynamic capability microfoundations are intensely entrepreneurial.
(Wales et al., 2013) Strategic Entrepreneurship Journal	Nonlinear Effects of Entrepreneurial Orientation on Small Firm Performance: The Moderating Role of Resource Orchestration Capabilities.	A sample of 258 Swedish small firms	The ICT capability and network capability help small firms overcome their resource-related 'liabilities of smallness' and observe these capabilities to increase optimal levels and performance-related returns from an entrepreneurial orientation.

2.8 Literature Synthesis with the Knowledge Gap, Research Question, Aims and Objectives

2.8.1 Gap Analysis Based on a More Detailed Literature Review

Table 2.4 shows that various scholars have emphasised the role of managers in resource-orchestrating processes. For example, Holcomb et al. (2009) argued that resource synchronization features prominently in managers' effects on performance. Synchronization involves *"the integration and balancing of interdependent bundles to ensure that activities reinforce and align with the firm's strategic and competitive context"* (Holcomb et al., 2009 P: 264). Holcomb asserted that a firm with resource orchestration that reinforces itself "between departments" has a high degree of synchronization. Hence, because of these synchronization processes, it is generally too difficult for rivals to imitate and copy these strategies.

Furthermore, Chirico et al. (2011) highlighted the fact that without a processes of co-alignment and coordinating mechanisms, the vulnerability to organizational conflict and negative consequences would be considerable. More specifically, scholars emphasise the role of internal integrative capability which refers to *"the capacity for*

effective communication and coordination of activities, resources (including knowledge) and capabilities, investments, and objectives within firms" (Helfat and Campo-Rembado, 2016 P: 252). However, Helfat and Campo-Rembado study concluded that realizing the benefits of entrepreneurship in some types of firm can be a complicated matter, as affected by the synchronization of top managers' orientation, multi-level involvement and participative strategy. Conversely, Taylor and Helfat (2009) further underlined the fact that middle managers are critical to the success or failure of technological transitions due to their roles as organizational mediators between the high and low managerial levels.

The processes of alignment (integration) between asset investment and asset deployment is said to be important in recognizing the crucial role of the firm's resources in enhancing firm performance (Sirmon and Hitt, 2009, Sirmon et al., 2011). Further, Helfat et al. (2007) emphasise the fact that managers play a crucial role in these processes. According to Helfat et al. (2007), what is vital to this undertaking is the recognition that asset orchestration processes relating to investment (search/selection) are intermediary and linked to the shaping, extension, and adaptation of firm resource bases.

Moreover, Helfat and Campo-Rembado (2016) refer to the managerial integrative capability as "*skill in internal integration, such as the capacity for coordination, leadership and organizational routines that ensure efficient communication between organizational subunits"* in the sense that these skills support effective internal communication and coordination of AO processes (Helfat and Campo-Rembado, 2016, cited from Iansiti and Clark, 1994 P: 565). On the other hands, a limited amount of prior research has referred to aspects of integrative capabilities within the firm. The present study also found a distinct lack of detailed insight within the existing literature that shows how firms actually orchestrate assets and resources to cope with change. We could quite distinctly see that the preceding literature suffers from a lack of integrated studies that link the three AO processes within the three managerial levels. In particular, the association between the asset orchestration mechanisms and

different levels of the asset hierarchy of McGee et al. (2005) have not previously been clearly explained (Sirmon et al., 2011).

Similarly, Sirmon et al. (2011) asserted that prior research on resource orchestration has not focussed on managerial actions across a firm's hierarchal levels. For example, Helfat et al. (2007) did not specify the level of executives to which their theoretical research applied. Hence, the notion of the relationship between asset orchestration functions and firms' multi-levels have rarely been investigated, and this clearly requires additional research (Sirmon and Hitt, 2009, Sirmon et al., 2011). Hence, further attention is needed to highlight the managerial integrated processes through the structural levels of the firm.

The issue of integrating these different perspectives in order to gain new insights into the mechanisms by which firms adapt to strategic situations do not, to date, have a sufficiently extensive or detailed body of associated literature. Understanding such core issues requires the development of multi-dimensional structure studies. In particular, the literature has a certain paucity of work regarding real-world case studies or real examples of changes such as Brexit. Building further on this analysis and Table 2.4, we might summarise the knowledge gap in the following way;

1- The current AO literature is overlapped and uses disparate terminology. Hence, common concerns are related to a lack of consensus on basic theoretical elements "a lack of terminology consistency" and empirical work "lack of applied case studies" (Di Stefano et al., 2014). Consequently, to overcome some of these limitations, we need clear, consistent assumptions and clear insight into the variables that comprise AO.
2- The AO literature is weak because it does not really consider specific kinds of change projects and has not considered any real-word AO process case studies over the three managerial levels. In addition, it has not shown how decision making was implemented across these three managerial levels; in particular, however, the literature has not, to date, linked different managerial skills to the realisation of a change project.

3- Drawing on 1 and 2, we have a lack of any well-integrated view of the AO mechanism across the various managerial levels. This lack of integration is linked to the issue of the integration of these different perspectives to gain new insights into the mechanisms by which firms adapt to strategic change.
4- Building on 1, 2 and 3, the literature currently suffers from an absence of practical reference models through which to improve our understanding of natural dependencies in firms between "asset orchestration actions or processes" and related "hierarchical levels of management".

2.8.2 Study Research Questions

To recap briefly, in this study we believe that an improved understanding of natural dependencies in firms between "asset orchestration actions or processes" and related "hierarchical levels of management" is required. We argue here that it seems clear that better and faster integration of our three main AO process groups should in itself be a potential source of sustained competitive response. Some change instances and projects may serve to integrate decision- and action-taking at all three levels of processing, whereas others may focus of on more restricted integrative matters and be achieved in a top-down, bottom-up and/or middle-up-down manner. Hence, our assertion is that such integrative actions across three the main AO process groups or classes should be better understood, and best practice should be suitably reported in the current thesis.

Given the literature review, which has included an overview of the dominant strategic management paradigms including the RBV, DC and AO approaches, and the analysis of the limitations to the literature, the above was followed by the discovery of critical gaps within the literature that will consequently be exploited by the research conducted herein. This is therefore driven by two key research questions, as follows:

1- How can asset orchestration mechanisms be mapped onto the common organising structures used by firms, thereby enabling management that is more effective in sustaining competitive responses?

2- To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses?

2.9 Conclusion

The chapter provides a chronological review that has traced the more influential theoretical paradigms within the framework of strategic management that has dominated since the 1960s until the present time. Therefore, this study research traces and illustrates the limitations that led to the shifts in attention from one paradigm to another.

As shown in Table 2.1, the IO paradigm and RBV have influenced the strategy analysis literature. The IO is grounded on two factors to orient firms' profitability: the industry, and the firms' products as bases for analyses (products-market side), while the RBV focusses on the internal, rather than external, environment. Hence, in the latter case, the firms' resources, rather than their products, are considered to be the basic units of analysis.

As is obvious from the foregoing review, there are four key attributes to describing a resource-based approach: ***firstly,*** the main goal for firms is to gain superior rents compared to their competitors, or in other words achieving and sustaining competitive advantage; ***secondly,*** a "bundle of resources" is generally unique to a given firm, and therefore deployment of different resources leads to significant performance differences. Hence, optimal utilization of a firm's resources and capabilities might achieve systematically superior performance; ***thirdly,*** firms' heterogeneous and imperfectly mobile resources and capabilities lead to superior performance, to the extent that they are "value, scarce, inimitable and non-substitutable"; ***lastly,*** the framework of a DC approach should seek to find better ways by which to study firms' sources and capabilities in dynamic environments.

Two issues have been raised that have helped to develop the RBV theory towards DC and AO: ***firstly,*** the dynamic nature of the business environment through focussing on the processes of integration, building, and reconfiguring internal and external competences to address rapidly changing environments (Teece et al., 1997); **secondly,** the managerial role in search, selection and configuration of a firm's bundles of resources and capabilities (Adner and Helfat, 2003, Helfat et al., 2007). This insight underscores the importance of managing a firm's resources which led Hansen et al. (2004 P: 1280) to empirically conclude that *"what a firm does with its resources is at least as important as which resources it possesses"*. Finally, this chapter provides an overview of the seminal literature describing the market-based and resource-based views and the importance of complementary dynamic managerial capabilities and AO processes. The chapter finally identified the gaps in our understanding of these phenomena through a consideration of the gap in the current AO literature which currently limits its systematic and practical application within different firms.

Chapter 3 Conceptual Framework: Developing the Reference Model

3.1 Introduction

This chapter introduces a conceptual framework to represent and illustrate the development of the key constructs of this study. The conceptual framework is the collection of interrelated concepts which guides this research, determines what it plans to explore, and indicates the predicted relationships that this study is seeking (Miles and Huberman, 1994 P: 18).

The preceding chapter identified the gaps in the current AO literature which limits its systematic and practical application within different firms. In particular, we have seen that the literature suffers from an absence of reference models that illustrate natural dependencies in firms between asset orchestration actions and related hierarchical levels of management. In this context we need to analyse and codify the mechanistic aspects of AO in order to provide a simple and visual illustration – a reference model - of how asset orchestration might be widely applied within a variety of different firms. This will help to simplify AO processes, as many of the critics of this theory have suggested is necessary.

Accordingly, the central purpose of this chapter is to conceive and develop the study reference model, as well as defining its variables and the relations between them. It will therefore have five key aims; ***firstly*** (and in section 3.2), the chapter will focus, in more depth, on the issue of terminology. Because the literature on AO in its broadest extent uses the same terms in very different ways, something already flagged implicitly in Chapter 2, there is a need to trace the conceptual foundations of the language of AO and to justify what terms will be used through the study. ***Secondly,*** after dealing with the terminology issue, the chapter will build on the literature and derive the conceptual model, which will be herein referred to as the "Asset Orchestration Reference Model" (AO-RM, see Figure 3.1). This will be the agenda of Section 3.3.

Building on the preceding section, ***the third aim*** is to precisely define the study's variables, thus also describing the processes and concepts associated with the AO-RM. This aim will be achieved in Section 3.4. In addition, the logic behind the relations between the study variables will be illustrated in section 3.5. Because strategy is about competitive advantage (Grant, 2002) the **fourth** aim of this chapter will be to outline a potential relationship between the AO-RM and a firm's competitiveness. This will be highlighted in Section 3.6. **Lastly,** Section 3.7 will outline some of the uses of the AO-RM.

Two further observations provide context to the analysis in these different sections. ***Firstly,*** because the AO-RM is vital not only for this chapter but also the study as a whole, I visualise it here in Figure 3.1. The rest of the chapter is in effect an explanation of how I arrived at this particular AO-RM from the many variants that might have been constructed. In effect, I provide a "genealogy" of the model. ***Secondly,*** the thinking behind this AO-RM emerges from a subtle but concerted analysis of the similarities and differences between the different strands of research on AO broadly defined. Inevitably, and consciously, then, there will be some overlap between the literatures reviewed relatively briefly in Chapter 2 and those taken up here.

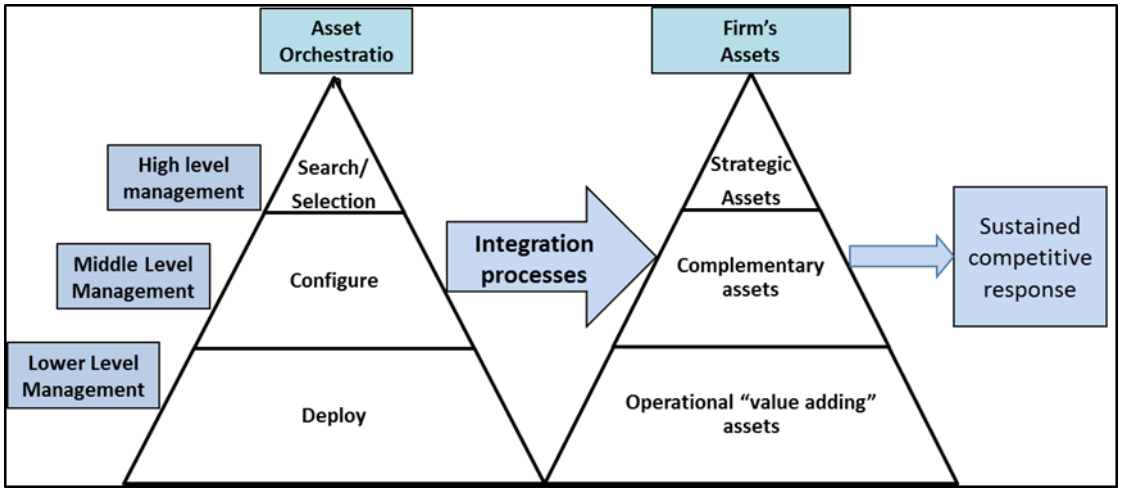


Figure 3.1 The study reference model.

3.2 The Antecedents and Underlying Factors of Asset Orchestration: Resource Management, and Resource Orchestration

This section will provide a coherent outline of how the study reference model was devised. It offers a chronological explanation of AO phenomena as they were drawn and developed from existing literature, and traces how this informed the identification and subsequent design of the model-based relationships between asset orchestration actions and resource base changes at different managerial levels, which are at the core of the empirical chapters of this thesis. There will inevitably, and deliberately, be some overlap between this chapter and that in chapter 2. This is required to achieve two goals: ***firstly,*** to focus largely on the literature which extends the discussion in Chapter 2 towards a more precise understanding of the variables and their relations that underpin the AO concept; and, ***secondly,*** to understand in further detail those mechanistic aspects of emergent AO theories. Both are fundamental to conceiving and developing the study reference model.

Drawing on the literature from the previous chapter, resource-based theory on firms places an emphasis on the notion that each firm encompasses unique packages of resources and capabilities, and each firm bundles their resources in different ways (Barney, 1991). The theory proposes that firms' resources drive value creation from the effective use of these resources (Foss, 1997). Barney (1991), defined firms' resources as tangible and intangible assets, which are run by firms to predict and apply value creation strategies. According to Barney, these assets must have four characteristics in order to be a source of sustainable competitive advantage: valuable, rare, inimitable, and non-substitutable ***"VRIN attributes"***. Barney (1986), asserted that a firm can obtain greater than normal rents by possessing valuable assets that meet market demand. However, many environmental factors have shaped the development of RBV theory. As far as the current chapter is concerned, the following paragraphs analyse the underlying factors and antecedents that have affected the expansion of

theories from RBV toward asset orchestration, and builds upon Chapter 2, where the RBV theory was discussed.

During the last decade of the 20th century, it has been reported that firms have faced new challenges in terms of 'high velocity markets'. Business environments characterised by rapid technological innovation, short production life cycles, and a rapid change in consumer demand are now commonplace (Teece et al., 1997). Under these circumstances, the resource-based perspective has failed to adequately explain how firms can compete and maintain their competitive advantage (Eisenhardt and Martin, 2000). Accordingly, scholars argued that "merely possessing such resources (VRIN attributes) does not guarantee the development of competitive advantages" (Sirmon et al., 2007 P: 273). It turns out that the paradigm of core assets "RBV" that are considered the source of sustainable competitive advantage are rather too static to be widely applicable.

According to Medina-Garrido and Ruiz-Navarro (2003), RBV is no longer fruitful; hence, the essence of this model has broken down, causing some scholars to consider firms' resources in a more dynamic sense as Chapter 2 suggested. Accordingly, scholars have 'enlarged' the resource-based perspective to cover the effects of dynamic markets, which also suggests the need for a dynamic view of a firm's resources and capabilities (Bharadwaj, 2000). In this regard, to cope with the preceding criticisms, it is first necessary to consider resources in more dynamic sense and how these work towards a new dynamic business environment (Teece, 2007). Secondly, the RBV requires further explanation in order to clarify the link between the managerial role of bundling a firm's resource portfolio and the process of value creation (Sirmon et al., 2008).

Subsequently, to examine the effects of a firm's external environment on managing resources, a new research stream has emerged (Sirmon et al., 2007) insofar as the dynamic capabilities perspective offers one significant response to this vital enquiry. Such an approach, as pioneered by Teece et al., (1997), addresses the question **'how can firms successfully survive and prosper within changing business environments?'**

However, the dynamic capabilities perspective has also been criticised because of its 'lack of readily available measurement tools' and 'a lack of understanding of related managers' roles'.

In this regard, Pralhad and Hamel (1990) argued that firms may gain higher returns not just because of the resources and capabilities they possess, but through making better use of their valuable assets. Hence, they connect financial yield with optimal use of distinctive resources and capabilities as we began to see in chapter 2. Furthermore, Hansen et al. (2004) conclude that *"what a firm does with its resources is at least as important as which resources it possesses."* (2004 P: 1280). This in turn implies a key management role in configuring and continuously and effectively deploying a firm's resources and capabilities. Later, Adner and Helfat (2003) posited that the managerial focus has shifted toward a role in *"build, integrate, and reconfigure organizational resources and capabilities"* (P: 1012). In this regard, numerous following scholars considered the concept of Dynamic Managerial Capabilities (DMC) to be analogous to the provision of dynamic organizational capabilities (Helfat and Martin, 2015a).

Scholars have also recently extended our understanding of DMC by explicitly addressing the so-called concepts of asset orchestration (Helfat et al., 2007, Sirmon and Hitt, 2009). It is argued that a vital function of dynamic managerial capabilities is asset orchestration; namely "*a fundamental role of management pertaining to the effective use of key resources of firms in a dynamic setting*" (Helfat and Martin, 2015a). Grounded in such a perspective is an opportunity to gain long–term competitive advantage, implying also that a firm's strategy should involve selecting and coordinating new resources and redesigning its business model through configuring and orchestrating valuable, and inimitable, resources and capabilities (Teece, 2007).

An alternative but closely related way of considering the dynamic capabilities approach is also reported in other similar research streams. Reflecting on the apparent absence of sufficient resource management considerations in the previous RBV theory, other scholars such as Sirmon et al. (2008), and Sirmon et al. (2007), describe a so called

'Resource Management Approach' that outlines the essence of the managerial role when "structuring, bundling and leveraging the firm's resource to build capabilities".

More recently, both of the preceding perspectives "resource management and asset orchestration" have been consolidated together. The concept of "Resource Orchestration" has been suggested by Sirmon et al. (2011). Resource orchestration draws upon the conceptual work of resource management conducted by Sirmon et al. (2011), (Sirmon et al. (2008), Sirmon et al. (2007) and asset orchestration (Helfat et al., 2007). It is theoretically grounded in the resource-based and dynamic capabilities literature (Trahms et al., 2013 P: 1299). In a similar manner to the asset orchestration model, resource orchestration derived its assumptions from the RBV literatures. It focusses on the managerial synchronization processes to effectively utilize a firm's resources through structuring the firm's resource portfolio, bundling resources and capabilities for value creation (Sirmon et al., 2011).

The new concept has combined the previous academic streams "assert orchestration and resource management" in one perspective. Scholars have illustrated that these approaches possess the shared foundations to allow their integration within one framework. Consequently, at this level, the RBV theory has been extended to a "Resource "asset" orchestration theory" by explicitly considering the effects that dynamic managerial capabilities can have on achieving a resource-based competitive advantage (Sirmon et al., 2011). Both of these strands of research have emphasised the importance of the managerial role when aligning a firm's resources to a changing external environment. The two concepts of 'asset orchestration' and 'resource orchestration' are now used interchangeably in the literature (Helfat and Martin, 015a P: 424).

Against this backdrop, the strategic management research community, understand that the terms 'assets' and 'resources' may be used interchangeably. For example, Helfat and Peteraf (2003 P: 999) define organizational resources and capabilities as follows. *"A resource refers to an asset or input to production (tangible or intangible)*

that an organisation owns, controls, or has access to on a semi-permanent basis". Consequently, these two terms will be used interchangeably in the remainder of this thesis. With this broad historiographical and definitional and backdrop in mind (and building on Figure 3.2, which provides a chronological summary of AO theory) the next section will explore the conceptual bases of a new model of AO, one that underpins the rest of the thesis.

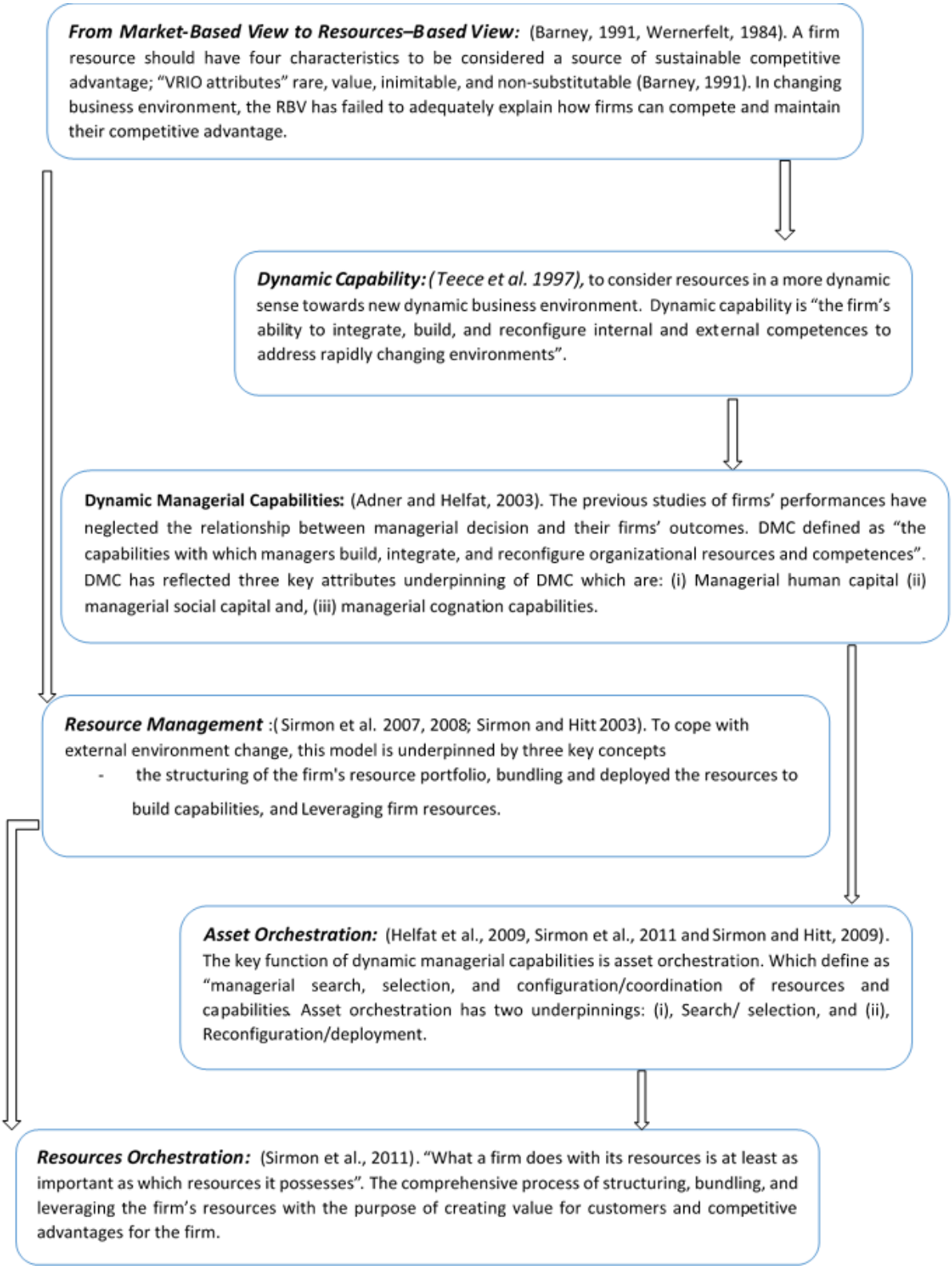


Figure 3.2 Perceived essence of AO through its chronological development

3.3 Conceiving a Study Reference Model of Asset Orchestration

For the purpose of achieving the core study objective "conceive a new reference model for mechanistic aspects of AO" (AO-RM) we will build on the research of Helfat et al. (2007), McGee et al. (2005), Sirmon et al. (2011), Weston (2012). A new reference model for the application of AO processes was conceived. This visual model is shown in Figure 3.1 and was designed with simplicity in mind in order to provide a ready guide as to how the AO perspective can be widely applied across a variety of different firm and by managers in those firms. The reference model exemplifies the multi-level mapping of key AO processes (of search and selection, configuration and deployment) onto the key resources of the firm (namely its strategic, co-specialised and make or buy assets) such that flexible, sustained and competitive change responses can be made with respect to the selected market and related environmental systems.

The study reference model implies the critically important roles played by managers through the depth of organizational hierarchy of the case firms. Top executive teams play a crucial part in achieving congruence between the firm's assets and changing market settings, whereas middle managers have a critical role in linking upper and lower management levels; in so doing, they should organise the use of complementary assets, resulting in their downstream configuration and/or reconfiguration. The decisions taken by top-level managers must be supported by the information, expertise and actions provided by middle-level managers. Accordingly, the integration of the functions of top-, middle- and lower-level managers is a critical aspect of AO though not, as Chapter 2 suggested, an aspect that has achieved significant historiographical traction. Consequently, based on the foundation works of Adner and Helfat (2003), Helfat et al. (2007), Helfat and Peteraf (2015b), Sirmon and Hitt (2009), Sirmon et al. (2011), we present the study reference model; please see Figure 3.1.

Finally, Chapters 5, 6 and 7 will illustrate the practical deployment of this model. Furthermore, in Chapter 6 a practical guide "Methods of Utilizing the Reference

Model" will be developed to apply the AO-RM in the specific case of a "change scenario". The following section illustrates the underpinnings of the AO-RM and building on the perspectives from Chapter 2.

3.4 The Underpinning Variables of the Conceptual Framework

As stated in Chapter 2, the current AO literature is beset with differences of terminology and theoretical perspective. This diversity is characterised in Table 3.1. Thus, Teece (2007) used three unique terminologies, "sensing, seizing, and reconfiguration", while Sirmon et al. (2011) used "Structuring, leveraging and deploying" to describe AO processes. Further, Helfat et al. (2007) used the concepts of "configuration/deployment" interchangeably, while Sirmon et al. (2008) used the concept of configuration to be a sub action of the deployment processes, although Helfat and Martin (2015a P: 424) have previously observed that various concepts associated with asset orchestration have been used imprecisely and interchangeably in the existing literature, Table 3.1. In this study, we build on the literature and seek to achieve improved consistency of definition, but also a more intuitive and hierarchical conceptual model that can be employed by managers themselves.

Table 3.1 AO terminology.

Teece's 2007 Approach " The micro foundation of dynamic capabilities"	**(Sirmon et al., 2008) Resource orchestration**	**Helfat's 2007 approach of asset orchestration**
Sensing (and shaping) new opportunities, is very much a scanning, creation, learning, and interpretive activity. Investment in research and related activities is usually a necessary complement to this activity. Provide the capacity to recognize an opportunity for technological or business model. Seizing: The organization must seize the opportunity by making	Structuring: Involves acquiring, accumulating, and divesting resources to form the firm's resource portfolio. Bundling: which refers to integrating resources to form capabilities, it has three sub processes: (1) stabilizing, or minor incremental improvements to existing capabilities; (2) enriching, which extends current capabilities; and (3) pioneering, which creates new capabilities. Leveraging:	Search/selection: Involves identifying the critical assets and investing in them, and then developing a governance system along with a means for their effective use identified. Configuration/deployment: involves the coordination of specialized and co-specialized assets and their use in productive ways.

investments, such as in plant and equipment. To seize an opportunity, managers must decide on the level of investment needed, the appropriate structure, the type of asset deployment, the personal involved, and so on. Once a new (technological or market) opportunity is sensed, it must be addressed through new products, processes, or services. This usually requires investments in development and commercialization activity. Reconfiguration: The ability to create, adjust, and, if necessary, replace models, including processes (Teece, 2009).	involves a sequence of processes to exploit the firm's capabilities and take advantage of specific market opportunities; it includes (1) mobilizing, which provides a plan or vision for capabilities needed to form requisite capability configurations; (2) coordinating, which involves integrating capability configurations; and (3) deploying, where a resource advantage, market opportunity, or entrepreneurial strategy is used to exploit capability configurations formed by the coordinating sub process.	

To position the current study in a specific frame, variable definitions are needed, as emphasised by (Barreto, 2010). Thus, referring to the firm resources, this study will use the following definition "**A resource"** refers to assets or input to production (tangible or intangible) that an organization owns, controls, or has access to on semi-permanent basis (Helfat and Peteraf, 2003 P: 999). Henceforth, we build on the above definition and use the term **resource and asset interchangeably.** Further, **a capability** refers to *"the capacity to carry out an activity (a set of tasks) on a repeated basis in a reliable fashion"* (Helfat and Campo-Rembado, 2016 P: 252).

In terms of the definitional basis for asset orchestration, the word *"orchestration"* has the meaning of *"planning or coordination of the elements of a situation to produce a desired effect"* (Oxford Dictionary, 2018), whilst the verb orchestrate has the meaning *"to arrange something carefully,* and sometimes unfairly, to achieve a wanted result" (Cambridge Dictionary, 2018). In this regard, Teece (2007) suggested that the management functions identified are analogous to those of an orchestra conductor. In addition, Teece (2007) indicated that in the strategic management context the meaning of flexibility is surely an element of orchestration. However, the concept

"asset orchestration" implies much more, and following (Helfat et al., 2007, Helfat and Martin, 2015b), this study defines **Asset Orchestration** as **"managers' ability to integrate a firm resource base through the processes of search, selection, configuration and deployment to achieve and sustain a firm competitive response".** We build also on Helfat and Martin (2015b), who asserted that the outcomes of asset orchestration "as part from DMC" are those of adapting to strategic change. Therefore, the study has used the term "competitive responses" to refer to a firm's ability to adapt to business change. Additionally, based on the literature, this study argues that that AO is comprised of three processes, which work through three managerial levels as follows: (i) search and selection processes; (ii) configuration processes; and (iii) deployment processes. By referring to the vertical structure of AO-RM, as per in Figure 3.1, we define the above processes as follows:

At high Level: search and selection processes: Drawing on Li et al. (2013), O'Reilly and Tushman (2008), Sirmon and Hitt (2009), the search process is the top-level managerial ability to search for new resources and identify opportunities which might include customer needs, new information and knowledge, new partners, and supply chain to achieve congruence between the firm's assets and changing market needs. ***Selection Process:*** is the top-level managerial decisions to made to choose the required resource "assets" for future opportunities and the decision as to "how, when and where" to invest in them.

At the middle level: Configuration processes: According to O'Reilly and Tushman (2008) and Teece (2009), configuration is a middle-level managerial processes of co-ordinated firm resources and capabilities to allocate, reallocate and recombine a firm's asset base to meet the desired change.

At the low level: Deployment processes: Capron and Mitchell (1998) define resource deployment "*as the use by a target or acquiring business of the other businesses' resources, which may involve physical transfer of resources to new locations or sharing resources without physical transfer"*. Accordingly, we define **Low-level deployment**

processes as the co-ordinated utilization of firm resource and capabilities to settlement the new or the existent products in the new markets to achieve the desired target and meet customers' expectations.

From the other side, to simplify our model we build on Henry Mintzberg (1993) who has suggested that firms can be organised based on three basic dimensions. We also build on Martin (2011 P: 1254), who defined organizational structure as *"durable organizational relationships that empower and constrain resource actions"*. However, whilst this is a simple model, in real life we might find firms differ in their size, business and markets, and therefore such firms might conduct AO processes in different ways, "e.g., top management doing configuration action". The case example firms "in the following chapters" will reveal more about the generality and applicability of the proposed AO-RM. The following sections will illustrate the AO model relations in more detail.

3.5 The Logic Behind the Relationship of AO-RM Variables

This section describes the relationships within AO-RM, as illustrated in Figure 3.1. To sustain the use of immutable, valuable, rare and non-substitutable firm resources, we consider that there should be a 'managerial depth dimension' along which managerial decisions and actions are realised. For a firm to remain competitive, this in turn implies a need to maintain coherence amongst the decisions and actions taken along this dimension; The logic and the benefits of these relations will be discussed in more detail in the next sections. Herein, parts of the literature might be recapped to focus in more depth on illustrating the relation between the model variables and logic behind these connections.

3.5.1 The Relationships between Asset Orchestration, Managerial Level and Resource Base

The AO-RM illustrated in Figure 3.1 visually depicts the critically important roles played by managers through the depth of organizational hierarchy of the case firms. The

decisions taken by top-level managers must be supported by the information, expertise and actions provided by middle-level managers. Accordingly, the integration of the functions of top, middle and lower managers needs to be a critical aspect of asset orchestration, something that has been identified as acritical fault in existing models, as we saw in Chapter 2.

In Figure 3.1, implicit reference is made to the 'depth' of common decision-making found in firms. Here 'depth' relates to given positions within a firm's levels of organisational management, at which managerial decisions and actions occur. At each primary hierarchical level along the depth dimension in Figure 3.1, simple characterisations are made about common types of AO processes (and hence decisions) that are run (and made) and common actions or outcomes that impact on the main resource types that are characterised. Critically, however, AO processing across the hierarchical levels will need to be congruent, requiring team-based activity amongst managers.

According to McGee et al. (2005 P: 258), firms have three different kinds of assets which typically lie in three different levels within a firm's hierarchy:

1- At the top are the strategic assets, which characterize unique firm-specific resources and capabilities that are necessary to a firm's competitiveness. Strategic assets describe as "*the set of difficult to trade and imitate, scarce, appropriable and specialised resource and capabilities* ***that (underpin) the firm competitive advantage****".* These assets are naturally intangible, such as process and information based assets (McGee et al., 2005 P: 256).

2- At the middle level, are the complementary or "co-specialized assets", which are those that are related to strategic assets and have the sense of uniquely valuable in combination. According to McGee et al., (2005 P: 258), *"complementary assets are those assets that are* ***jointly required with the strategic assets*** *in order to produce and deliver the product or service"*. Teece (1986) introduced the concept of complementary assets, which are resources or capabilities that allow firms to

capture the profits associated with a strategy. He suggested that in order to deploy the design for a new product in a commercial manner, a firm needs access to complementary manufacturing and distribution facilities on favourable terms. It's also defined as *"resources that are required to capture the benefits associated with a strategy, a technology, or an innovation"* (Christmann, 2000 P: 664).

3- At the bottom is the "make-or-buy assets", which have a less essential role in a firm's strategy, which in this study we term "operational assets".

Building on Sirmon et al. (2011) and Taylor and Helfat (2009), this thesis seeks alignment between the preceding insight of McGee et al. (2005), and the asset orchestration perspective of (Helfat et al., 2007). It can be argued that while the top management team plays a key strategic role in search and selection processes, the middle level managers have an essential role in the process of co-specialized assets, which help the firms to find new value-enhancing compensations. In addition, according to the above illustration, we can conclude that the definitions of assets are mainly depend on whether it's strategic, complementary or operational assets.

The AO-RM aims to contribute to the linkage between firms' capability levels that is "search/selection for the top managerial level, reconfiguration for the middle managerial level and deployment for operational level". In doing so, we highlight the importance of managerial ability on asset reconfiguration for the specialized and co-specialized assets and link it with the firm's ability to address the business change. In doing so, we clarify a theoretical and practical model that examines the role asset orchestration plays in identifying, developing, utilizing, and reconfiguring the various combinations of complementary assets.

3.5.2 A Study Reference Model and Strategy as Practice

In the preceding chapter, the literature shows an absence of reference models by which to improve our understanding of AO mechanisms asset "orchestration processes". In other words, we have a lack of practical strategies to apply AO-RM notions in real-world work situations. The notion of AO-RM is linked to the Strategy as

Practice approach (Hendry et al., 2010, Jarzabkowski, 2004, Whittington, 1996). The Strategy as Practice perspective emphasises how strategists really act and interact *"to be an effective strategy practitioner"* (Whittington, 1996). According to the literature, the AO approach and Strategy are the concerns of managerial action at the micro-organizational level. Whittington (1996) suggested that the Strategy as Practise model is aimed at the all managerial levels. Therefore, in order to investigate strategy from an empirical perspective, he suggested finding a unit of analysis that may span these multiple levels of context.

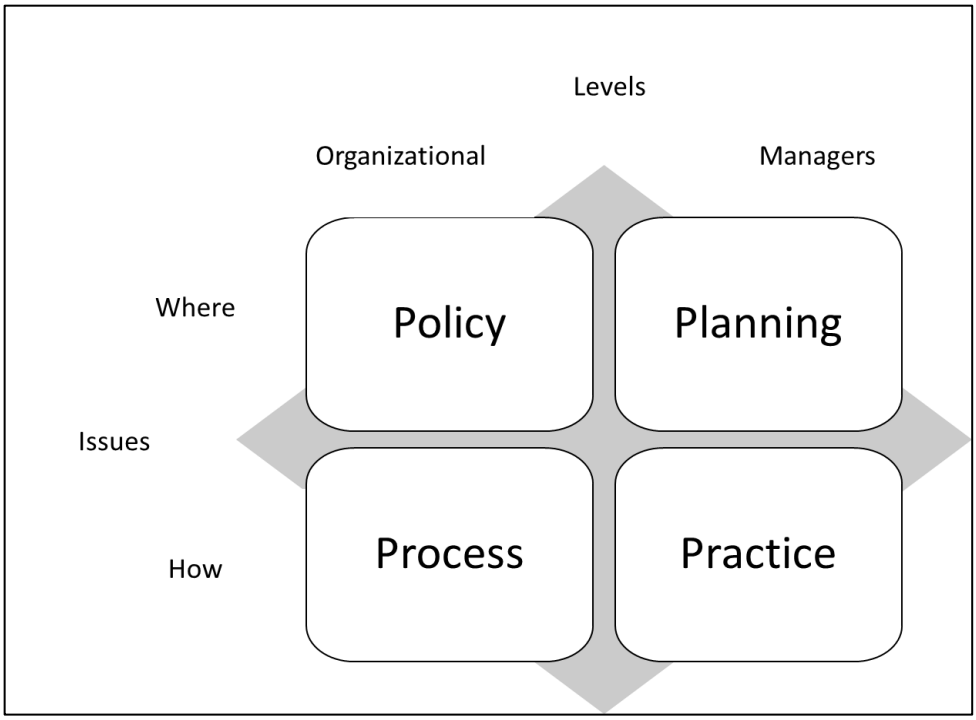


Figure 3.3 Four perspectives on Strategy.

Source: Adopted from (Whittington, 1996).

Figure 3.3 places the Strategy as Practice perspective against other strategy approaches according to their target levels and concerns; strategy as policy, strategy as planning and strategy as process. Attention on strategy is concentrated in organizational units and more concerned about the individual levels of the managers involved in strategy making.

Markedly, the direction of practice perception is concerned with the effectiveness of strategists "top-level managers" Whittington, (1996), and this is the same focus of DMC (Adner and Helfat, 2003). These two perspectives highlight the managerial role in the organizational processes of decision making and implementation strategies, adopting the approach of Jarzabkowski (2004) which states that *"we should examine strategy not as something a firm has, but something a firm does"*. Thus, the current study argues that AO-RM is concerned with managerial activity, or in other words how managers practice strategy. The whole idea of AO-RM is to clarify between search and selection, and configuration and deployment. For example, deployment is about "designing" the system to make products, but one cannot deploy a system until one designs it, and one should not design a system until one has a strategy.

Consequently, we should have practical guides as to how to apply these processes, and this guide should have the feature of being easy to learn and repetitive. Jarzabkowski (2004) emphasised the routinized nature of the practice perspective, which may be related to the operational capability perception that was defined by Winter (2000: 983) as *"a high-level routine (or collection of routines) that, confers upon an organization's management a set of decision options for producing significant outputs of a particular type".* In this definition, the term routine refers to a *"repetitive pattern of activity"* (Nelson and Winter, 1982 P: 97). Such a capability usually involves performing an activity, like using a collection of routines to execute and synchronise the diversity of tasks required to perform the activity (Helfat and Peteraf, 2003 P: 999).

In the next section, the role of managers in gaining competitive advantage within the framework of AO-RM will be discussed, where our discussion will be given in relation to the AO model only.

3.6 Resource-Based Competitive Advantage within the Framework of AO-RM

Research in the field of strategic management has directed thinking towards the need to better understand the sources of a firm's long-term performance, or its so-called competitive advantage. Gaining such a competitive advantage should be the objective of a firm's strategy with the outcome leading to added competitive value. Furthermore, studying the sustainability of competitive advantage is also vital to the field of strategic management (Porter, 1985, Barney, 1991).

The dominant theory in understanding the bases of competitive advantage is the resource-based view, RBV. From the resource-based perspective, it is not only individual assets and capabilities that are required but also key combinations of resources that contribute to a firm's competitive advantage (Conner, 1991, Rumelt, 1984). RBV offers a theoretical explanation of how to gain and sustain a firm's competitive advantage, which is based on the differences in the firm's resources and its capabilities (Barney, 1991, Rumelt, 1984, Wernerfelt, 1984). According to Barney (1991), firms can be perceived as bundles of resources that are heterogeneously distributed and are imperfectly mobile. The differences in resources and capabilities across firms over time thereby allows for a resource-based competitive advantage. However, to sustain such an advantage, firm competences should be inimitable and non-substitutable (Barney, 1991). In this regard, Crook et al. (2008) asserted that possessing strategic resources will ultimately enhance the firm's performance. However, possessing assets alone does not in itself lead to the development of competitive advantage; instead, resources must be managed, bundled, and deployed, meaning that the full value of resources for creating and sustaining competitive advantages is recognised only when resources are orchestrated successfully (Chirico et al., 2011).

Thus, the fundamental suggestion for organizational actions as derived from the preceding view is that of the importance of a manager's role. Via multiple hierarchy

levels, managers select strategies by which to generate rents based upon their firm's resources and capabilities and by synchronizing them with environmental opportunities. The resource orchestration perspective as a "derived concept from RBV" describes and examines *"the roles of managerial actions in the process of structuring a firm's resource portfolio, bundling the resources to build relevant capabilities and leveraging these capabilities to eventually realize a competitive advantage"* (Hitt et al., 2011 P: 61). According to this insight, managers at all levels of the firm must be involved in resource orchestration activities, and these efforts are synchronized to realise "integration" by top-level management. This perspective highlights the need for further research to fully explore the bases of competitive advantage based on the ways in which managers orchestrate a firm's assets. However, the focus of this study will be about how AO can help firms to adapt to market change to maintain their advantages. Hence, the current section presents the managerial role in adapting to such changes. Finally, at this point we placed the AO-RM within the different key concepts and variables and the presumed relationships among them. The next step will be about the proposed uses of this RM.

3.7 The Uses of the Study Reference Model

To this point, the study conceived and developed the AO-RM, which has been derived from the careful examination of, and by highlighting the gaps in, the AO literature, which indicates that there is not enough case information about the types of AO processes that are practically applied in many firms. However, we established the theoretical base of the study reference model in order to make the AO-RM more practicable. As Chapter 2 shows, the study indicates the need for specific cases examples of AO in which we applied the study reference model (instances of AO). The concern here is what the uses of AO-RM might actually be, and how to use it; in other words, "how to investigate the uses and applications of AO-RM". To achieve the study aims and objectives and fill the gap in the literature, this study will consider three uses of AO-RM, where "each use will be presented in a specific chapter of this thesis":

Use 1: to guide "face-to-face" semi-structured interviews, which target the elicitation of specific case populations of the AO reference model; showing how those many AO processes need to be achieved to realise the sustained adaptability of a firm. Two case study firms will be used as examples of use 1, and thereby to show the detailed elicitation of a particular case of AO; this will be reported in Chapter 5.

Use 2: to form a conceptual basis for creating an AO Road Map, which has the potential to be used to structure and support the design of AO change projects. The Road Map provides a framework for decision making at multiple levels and seeks to link team-based decisions and actions via the use of mental models. One example of use 2, and thereby the detailed elicitation of a case of AO, will be reported in Chapter 6.

Use 3: to guide the design of an online questionnaire with a view to eliciting many additional (albeit less detailed) specific case populations of the AO reference model with a view to seeking commonality between AO processing at multiple levels. This second area of use will gather and structure documentation about 17 specific case AO populations from firms operating in different sectors and on different scales, and which will be reported in Chapter 7.

3.8 Conclusion

The study has conceived a new reference model of the mechanistic aspects of AO to provide a simple and visual illustration of current AO thinking, thus making a significant contribution to the AO literature. The model was designed to provide ready guides as to how asset orchestration might be widely applied in a variety of different case example firms. It will be proposed, and later tested within the chapters of this thesis, that the use of a visual guide during the execution of AO projects can help managers to apply such models in their business.

Drawing on the literature, this chapter considers that the firm's overall strategy encompasses managerial decisions regarding the composition of the firm's resource

portfolio, as well as the orchestration and deployment of these resources in particular markets (Beck and Wiersema, 2013). Consequently, this chapter has conceived a study reference model that stresses the effects of two factors. ***Firstly,*** the impact of the resources and capabilities which a firm possesses (Barney, 1991, Wernerfelt, 1984). ***Second,*** the impact of ongoing managerial decisions regarding the configuration of the firm's resource bundle, as well as the orchestration and deployment of these assets in particular markets (Adner and Helfat, 2003, Helfat et al., 2007).

To summarise, AO-RM is about how businesses 'orchestrate their assets' so that they can achieve sustained business performance. To support managers' efforts to adapt to their business environment, we have conceived and developed a new AO-RM, as per Figure 3.1. The model seeks to position managerial roles performed during episodes of significant change as the managers concerned reconfigured the affected firm's assets accordingly. The AO-RM considers there to be three main levels to the managerial process. At the highest level, 'Search and Select' processes are expected to dominate; at the middle level, asset and resource 'configuration' processes may be of primary concern; and at the lowest level we presume that mainly asset and resource 'deployment' processes will be of particular concern. The model also suggests that a firm has three levels of resources "strategic, complementary and operational assets". The model has also assumed the effective orchestration of these assets, with managers operating at all of these levels needing to co-ordinate their decision making and action taking with each other, such that overall effective and timely change can be effective within the firm.

Chapter 4 Research Approach, Design, and Methods

4.1 Introduction

The previous chapters presented an argument that included both the knowledge gap of the relevant AO phenomena and the conception, development and presentation of an AO-RM. While Chapter 3 was about making the *theoretical* connections between the different parts of the AO-RM, this chapter is about how the data collection and analysis strategy necessary for populating the model and ensuring that it works effectively was developed from the range of potential options available. Given the plethora of methodological approaches apparent in the broad chronological sweep of literature on AO, it is necessary to frame the particularities of my methodological platform with a wider sense of the social science landscape. The goal of this chapter is thus threefold:

4- To clarify the use of the theory building process from the case studies as the ultimate methodological approach of this research study.
5- To outline and justify the data collection and analysis methods via "interview-based data and questionnaire-based data".
6- To develop systematic tools to apply the study reference model in the case study examples.

To meet these goals, the chapter is divided into five sections; the first of these sections (4.2) will focus on the use of the theory building process in the social sciences at the general level before focussing more specifically on the competing methodologies that have underpinned the research agenda around dynamic capabilities. The second (4.3) will develop the basic research methodology for the thesis, moving from a general discussion of the importance of case-study analysis to a brief rendering of the particularities of the case studies employed in the thesis, and which are developed at length form Chapter 5 onwards. A third section (4.4) will outline the data collection and analysis methods that are central to realising the value of the case study approach, moving from general discussion of possibilities to a more specific rendering of the

features of data collection and analysis for *this* study. A fourth section (4.5) will be concerned with systematic methods of utilising the study reference model. Finally, the chapter will conclude with a summary section.

4.2 Theory Building Process in Social Science: Foundational Terms

To conduct scholarly inquiry in social science, we have to distinguish between three conceptual perspectives: ontology, epistemology and methodology. Ultimately, the human need to uncover reality has always been considered desirable. Hence, ontology is the building block of social science research; it is about our understanding of social realty (Grix, 2002). Consequently, epistemology is about the process of bringing knowledge together and pursuing it to discover new theories (Grix, 2002). Lastly, the methodology is about the path that we choose to acquire social reality in real time, while methods are the strategies by which to collect, analyse and interpret real-world data (Strauss and Corbin, 1990). Figure 4.1 illustrates the interdependence of the four basic steps of scholarly inquiry in the field of social science. We should ***first*** justify the reasons for using one particular methodology rather than another and, ***secondly,*** that we should justify the philosophical basis behind this choice, particularly when it comes to theory building. Hence, in the following paragraphs, the current chapter illustrates the reasons behind choosing the qualitative methodology of case study approaches. In Sections 4.6 and 4.7, the methods which the study ultimately did adopt will be illustrated, which involves in-depth analysis of AO in two real world firm examples: “Tech4i2” and “GMS”. Furthermore, the rest of the chapter will depict the tools “techniques” that the study will use it to apply AO-RM in three different examples.

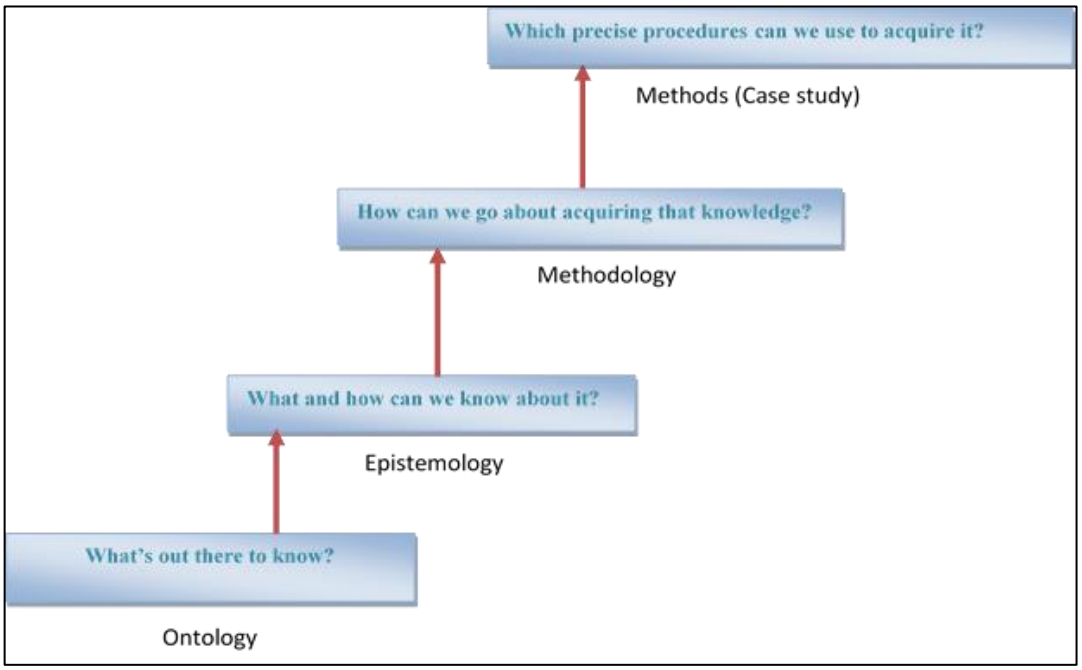


Figure 4.1 The four basic steps of scholarly inquiry in Social Sciences.

Source: Adapted from (Grix, 2002).

In the next section, the chapter will illustrate the rationale behind the use of case study as a model building process in the context of dynamic managerial capabilities.

4.2.1 Methodological Approaches Used in Dynamic Capabilities Research

Based on Helfat et al. (2007), the field of strategic management can generally be said to consist of two aspects: content and process. While content research is conducted through the use of deductive methods to study macro-phenomena such as the link between strategy and market competition, micro-process research uses inductive tools and qualitative data to study micro-foundation phenomena. In this context, the approach of dynamic capabilities "as part from strategic disciplines" deals with two key ingredients, which are the managerial and the organizational processes (Teece, 2007). Helfat et al. (2007 P: 37) asserted that attention has been shifted from the question of "What" in dynamic capabilities (what are the outcomes of dynamic capabilities), to the key question of "How". Accordingly, the current study concentrates on the managerial process, which in particular focusses on "How" strategic management can be

configured and implemented, practically rather than simply theoretically, during market change processes.

Against this backdrop, Barreto (2010) has emphasised the idea that when dealing with fundamentally non-fully observed aspects "like AO phenomenon", scholars can gain valuable insights into the dimensions that form these phenomena by using the case study approach, as shown by, for instance, (Galunic and Eisenhardt, 2001, Pablo et al., 2007). Eisenhardt (1989) and Yin (2003) also recommend the case study method for explorative and explanatory projects such as that envisaged here in an examination of the micro-foundation of asset orchestration mechanisms as part of the DMC framework.

4.3 Case Study as a Research Method

According to Eisenhardt (1989), a case study method is the process of research in which in-depth examination is given to a particular phenomenon. Yin (2009) and Yin (2003) noted case studies are the chosen method when:

a- 'How' forms of the research questions are being set.

b- When a new phenomenon "like AO aspects" is being explored within a (or its) real-life situation.

c- The boundaries between phenomena and context are not always obvious.

Eisenhardt (1989) asserted that case studies usually combine different types of data collection methods such as primary data "interviews", historical or secondary data "archive and records", questionnaires, and real-life observations. In turn, Eisenhardt (1989) noted that case studies can be used to achieve various kinds of goals, such as to provide descriptions, test theories, or generate theories. One of the attractive features that makes case study methods distinctive is that they tie with actual data which is often not the case in the context of other research methods, facilitating the development of testable and empirically valid theory (Eisenhardt (1989).

Thus, based on the exploratory nature of this study in a contemporary setting and given the goal of achieving an in-depth, close-up look at the phenomena of AO

mechanisms, and building on Eisenhardt (1989), Helfat et al. (2007), Yin (2003), the central methodology of this study is that of **building theory from case study research**. The AO literature suggests three areas in which strategic resources can be developed to achieve a competitive advantage: breadth (scope of the firm), depth (throughout different levels within the firm) and life cycle (Sirmon et al., 2011). Hence, for the purpose of deploying AO-RM in a practical context, one of the central tasks of this study is to trace resource orchestration through **the intricate organisational layers of the case study firms** "depth level".

In particular, the context for empirical research in this thesis involved a group of companies from sectors including consultancy, IT, and manufacturing. These companies were based in the UK, Malaysia, and the EU. The focus of the analysis was the managers of these companies most responsible for the change process. These firms all operate within changing dynamic markets, and the managers that informed the study would have experienced substantial change in the external environment (i.e., due to Brexit). This research setting was therefore valuable in obtaining insight into how the managers configured (re-combined, extended) their resource bases through the managerial search and selection, and configuration and deployment processes toward sustaining their competitive responses in the business market. Hence, **the key unit of analysis is the managerial action of AO**. The study considers that these managers work within three different hierarchical levels; high-level, middle-level, and low-level management. Furthermore, the study considers the managers' particular capabilities to shape, reshape, and configure three different levels of resources or "assets"; strategic, co- specialized and make–or-buy assets. Figure 3.1 illustrates this important notion visually.

4.4 Setting Data Collection and Analysing Method

4.4.1 Data Collection Methods

A multiple inductive case studies approach was considered to represent the best method of study, which the thesis has consequently adopted. Building on Creswell and

Clark (2007), and based on the explorative nature of this study, three primary steps informed the development of a data collection strategy for the thesis:

1- Gaining permissions and anticipating ethical issues that may arise during the fieldwork aspect of data collection. Regarding the ethical issues, I applied for ethical approval from the University of Leicester, which was later approved under the reference number *"4136-hom2-sociology"* (Appendix D). Furthermore, before starting the processes of data collection, a "Letter of invitation to participate in study request" as well as "Informed Consent to Participants" was sent in advance to gain appropriate permission (Appendix A).

2- Conducting a high-quality qualitative sampling strategy, which in the case of this thesis takes the form of a semi-structured interview (Appendix B) and a well-structured online questionnaire (Appendix C). Eisenhardt (1989) and Yin (2003) emphasised the fact that although case study research is considered a qualitative method, researchers can use both qualitative and quantitative approaches depending on their intended goals. Accordingly, data can be gathered primarily from four main sources:

    a- Interviews, whether structured or semi-structured.

    b- Observation "whether participant observation or non-participatory observation of the phenomena of interest".

    c- Documentary data "on-going run-through processes within a firm such as their website, or external data sources".

    d- Archival data such as formal records and external data sources.

    For this thesis, semi-structured interviews have been adopted for data collection through the structural hierarchy of the case-study firms. For each firm, face-to-face semi-structured interviews have been conducted which involved asking questions, listening to, and recording the responses of respondents. The interviews were conducted with the people in charge of executing change processes such managing directors/owners marketing, human resources, and operation managers. Furthermore, multiple means by which to collect secondary data have been used, such as archival data from the

chosen firms, markets reports, secondary documentation, and the web sites of the firms themselves.

3- Developing means for recording and storing the data. In this research case I recorded the interviews, transcribed them, and then saved them on my university-based computer. For the online-survey, I used the "Bristol Online Survey" (BOS) software to both design and send the questions as online questionnaires, as well as analysing coding and storing the respondents' data (BOS, 2018). The next two sections illustrate my two data collection methods, which are the semi-structured interview and online questionnaire.

4.4.1.1 Interview-Based Data

According to Bryman (2005), the interview is maybe the most commonly employed method in social science research. Semi-structured interviews are a more appropriate method for exploring the understanding and views of respondents regarding dynamic and complex phenomena, and enable the researcher to gain a larger amount of information and gain better clarification to any answers given (Louise and While, 1994). Accordingly, this thesis adopts the semi-structured interview format. To meet the reliability criteria, the interview protocol comprised four parts with 23 guide questions, (see Appendix B), and additional questions where appropriate to probe or explore further in idiosyncratic cases. As based on Eisenhardt (1989), a fundamental aspect of the theory-building process is that the research thesis should follow a "specific protocol" to ensure that the set of procedures used in collecting the primary and secondary data is both consistent with the intent of the researcher and on a case-to-case basis. Because we are collecting data from different cases, the protocol should ensure that common themes are properly identified. For example, when the interviews are being conducted, the protocol ensures that all participants are asked a fundamental set of questions in the same way. The questionnaire was organised under the following themes:

1. General questions relating to general demographic information about the case firms.

2. Questions related to each firm's resources base and business market change.
3. Questions related to the search and selection processes.
4. Questions related to the reconfiguration and deployment processes adopted by the firms in question.

The interviews were conducted with Tech4i2 and GMS as I have already indicated above. Further details of both companies are provided in chapter 5. The interviews were conducted within the three structural hierarchy levels of the firm "managers at the top, middle and low levels". The research protocol was used to direct the interviews, which were recorded and transcribed. This documentation effort was reviewed as evidence and verification to gain in-depth information to help reach the research goals. The second data collection method chosen for this study was the online-questionnaire method, as outlined in the following section.

4.4.1.2 Online Questionnaire-Based Data

A survey is "a collection of a large quantity of evidence, usually numeric, or evidence that will be converted to numbers, normally by means of a questionnaire" (Remenyi and Williams, 1998 P: 290). Basically, the online questionnaire was used with the case study method in this thesis as complementary to the generalised classification of AO concepts and encompassed firms operating in sectors which are clearly the focus of exogenous business change. This approach increases the interpretability, meaningfulness, and validity of the more detailed case-study findings.

The questionnaire was designed using the "Bristol Online Survey" software (BOS, 2018) and consists of three sets of questions: ***Set A***, which covers background information on the participant firms; Set B, which characterises the main types of change that the firms have to make. In this part of the questionnaire, ***Set B*** was based on work of Tallon (2007); and ***Set C***, which uses the asset orchestration model (see Appendix C). The survey was first piloted through sequential repetitions to ensure reliability; in addition, the questionnaire was sent to experts for evaluation, amendment and redesign in order to fully achieve the study purposes. The next step was to send the questionnaire to the chosen companies, as detailed in Table 7.1. The data were

collected, sorted, and analysed, and so contrasted, compared, and complemented by the semi-structured interviews and with other data sources. Chapter 7 will illustrate the data analysis based on the online questionnaire.

4.4.2 Coding and Data Analysis Methods

Data analysis is the heart of building theory from case studies, but it is both the most difficult and the least codified part of the process (Creswell and Clark, 2007). Following Eisenhardt (1989) the second step after data collection involved the process of analysing qualitative and quantitate data, with an emphasis on semi-structured interview data, which was recorded, transcribed, and systematically coded. Using the basic models of Miles and Huberman (1994 P; 56), the thesis employed an open coding technique, which simply refers to the process of developing data concepts and/or categories for analysis through five essential steps. Table 4.1 outlines the steps of the data analysis phase of this study.

Table 4.1 Data analysis procedures.

Steps	Actions
Step 1: preparing data for analysis	Transcribing interviews, sorting and arranging the data into different types depending on different sources of information.
Step 2: sorting data	Reading the data through to obtain a general sense of the relationship themes and to gain its overall meaning.
Step 3: coding data	Begin detail analysis with a coding process.
Step 4: Within-case analysis	The whole idea is to become highly familiar with each case as a stand-alone unit. Involves detailed case study write-ups for each site to allow the unique patterns of each case to emerge before investigators push to generalize patterns across cases. Its gives the researcher extensive familiarity with each case which, in turn, accelerates cross-case comparison.
Step 5: cross-case data analysis	Select categories or dimensions, and then to look for within-group similarities coupled with intergroup differences. Dimensions can be suggested by the research problem or by existing literature, or the researcher can simply choose some appropriate dimensions.

At this stage, tables could be collated from the analysed text to show the development of these themes in order to help preserve the specificity in their development, which helps to focus the subsequent analysis.

4.4.3 Consideration of Research Quality

The current methodological approach was designed to ensure the overall quality of this research study. This might include using evidence from multiple data sources and building a case study database as well as forming a chain of evidence by linking the questions, evidence, and conclusions together when reporting any findings (Yin, 2009). Validity, reliability and generalizability are the quality criteria in qualitative social research. To gain validity, Yin (2003) emphasises "replication logic", which means that the theory must be tested by replicating the findings multiple times for the result to be accepted as providing strong support for the theory. While the goal of obtaining reliability is to minimize any errors and biases that might arise; hence the use of the case study protocol to deal with the documentation problem (Yin, 2003). Furthermore, for a study implementing the case study design, Yin (2003) suggested that validity can be ensured via triangulation and multiple sources of evidence; Yin (2003) indicted that generalizability is about considering whether the findings are generalizable beyond the existent case study. The criterion of case study is *"analytical generalization"* rather than statistical referencing. In analytical generalization, we could generalize a particular set of results to some wider theory (Huberman and Miles, 2002, Yin, 2003). For this study, the issues of validity, reliability and generalizability have been considered. Consequently, the following strategy of using the study reference model and data collection have been considered:

Firstly: for the issues of validity, the study considered the replication logic or what is referred to as the triangulation strategy to enhance validity through the use of multiple case study sources in order to avoid the potential bias inherent to any single case. Consequently, this research study has conceived three distinctive methods of the use of the AO reference model to characterise specific cases of AO processing, which would apply to the three complementary AO Data elicitation methods proposed and currently being used; please see Figure 4.2.

1- Two case study firms to elicit significant detail for a few case firms. Additionally, the two detailed study cases are used to begin to address each

of the research questions, and particularly to provide documented case-based instances of AO processing.

2- A well-structured online questionnaire based-strategy, to generalise classification of AO concepts, elicited from numerous firms operating in distinctive sectors and when responding to different forms of business change.

3- Interviewing key AO managers to achieve semi-generic case classification.

Secondly: regarding issues of reliability, a clear strategy to deal with documentation procedures has been illustrated through the use of the case study protocol (Appendix C).

Thirdly: for generalizability, and to utilize the study reference model, this study adopted three uses of AO-RM, where "each use will be presented in a specific chapter in this thesis" (see Section 3.7). We suspect that AO-RM can be widely applied to lend structure to significant change projects that involve multiple levels of change management as illustrated in Figure 4.2.

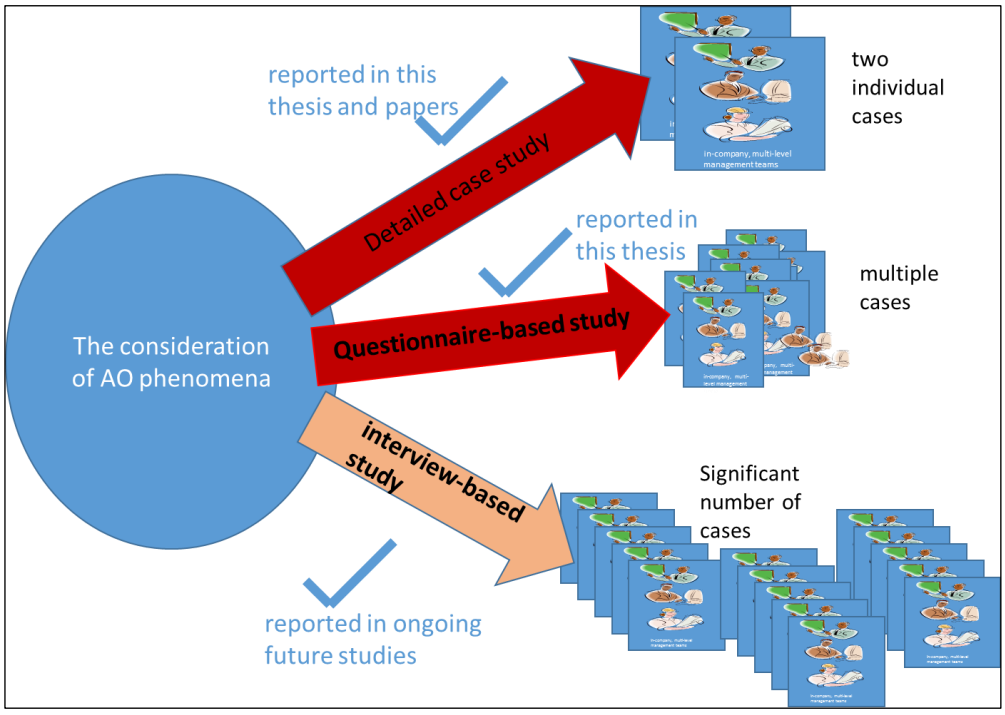


Figure 4.2 Methods of using the AO reference model.

Source: Adopted from (Mansoor et al., 2018).

In essence, to generalize the study reference model the current research study has devised and used multiple data elicitation methods that are also structured via AO-RM. These further elicitation methods are represented in Figure 4.2.

4.4.4 Ethical Considerations

The issue of research ethics should be considered during all study phases; the process of conducting the study, the use of data and the interpretive and analytical process (Miller et al., 2012). Scholars have to consider how ethical issues need to be addressed. Regardless of the study phases, effort should be made to ensure the research process will observe the highest ethical standards. It is a key research skill to understand ethical principles and procedures by which to conduct research.

Based on Creswell and Clark (2007) and Miller et al. (2012), ethical principles in the social sciences should involve the deliberate consideration of ethical procedures and making decisions regarding the same. Accordingly, there are many standards that have been established to better protect the rights of research participants: (i) the principle of voluntary respondents requires that people will participate in your study voluntarily; (ii) ethical procedures are also required, which mean that researchers should protect applicants from any situation where they might be at physical or psychological risk of harm; (iii) to ensure confidentiality, each participant must sign an informed consent form; (iv) the principle of anonymity represents a stricter standard, which implies that researchers should respect the confidentiality and anonymity of the research participants; (v) and lastly, gaining permission and anticipating ethical issues that may arise during the fieldwork. For example, throughout the data collection and analysis stage, the researcher can face a large number of ethical issues that emerge through the processes of data collection and data analysis. Therefore, the researcher should consider the informed consent procedure such as ethical guidelines and research governance confidentiality towards participants (Creswell and Clark, 2007). Further, the study objective and goals should be clearly communicated to the participants. Hence, ethical considerations will be presented throughout the current study stages to certify that the sensitive nature of all information pertaining to people, firms, and

information will be protected. This included sending the consent form as well as the information letter in advance to the interviewees, which contains information about issues that might be of concern to participants before volunteering to be a part of the study; please see Appendix A.

4.5 From Methodology to Technique: Systematic Methods of Utilising the Study Reference Model

4.5.1 An Overview

So far, we have defined the study methods in terms of the data collection and data analysis approach. However, to build a solid methodology and to meet the chapter objectives, this section will consider the use of the correct combinations of technical aspects to support the utilization of AO-RM.

The present research is directed toward theory-building, locating what Hunt (1991) called the context of discovery. Theory can be understood as a coherent description, explanation and representation of observed or experienced phenomena (Gioia and Pitre, 1990). A growing body of the literature emphasizes the importance of the perspectives of multiple paradigms on theory building, and thus the use of multimethod approaches (Kim and Andersen 2012). Theory building is an approach used in scientific research that can involve different research methods and multiple research paradigms. Theory building is defined as *"a purposeful process or recurring cycle by which coherent descriptions, explanations, and representations of observed or experienced phenomena are generated, verified, and refined"* (Lynham, 2002 P: 241) Accordingly, good theory building should result in new knowledge, usually in the form of explanative and predictive knowledge (Dubin, 1976). From the above description, theory building can be conceived as: (i) an ongoing process of producing, confirming, applying, and adapting theory, and (ii) as describes as a multi-stage process in which the researcher develops models, structures, or systems (Lynham, 2002).

Although there is general agreement about the importance of quantitative data during the development of a systems dynamics, social experts have developed a series of

research approaches oriented toward the collection and analysis of qualitative data. In the social science arena, for example, we have case study and grounded theory methodology (Strauss and Corbin, 1997, Yin, 2003). These approaches were created both to test theories and to build and generate new theories (Eisenhardt, 1989), and provide a powerful set of tools with which to promote formal inquiry and theory inference through the analysis of qualitative (textual) data (Luna-Reyes and Andersen, 2003).

Conversely, the perspective of the System Dynamics Model (SDM) is considered a useful approach to building theories (Lane, 2001). However, the question one might raise here is one of how system dynamics is positioned in social theories (Lane (2001); in other words, how it relates to social science paradigms. According to Lane (2001), the theory of system dynamics is "*a structural theory much rather than a content theory"*. This theory claims that the dynamic behaviour of social systems over time can be explained in terms of "*endogenous processes represented by feedback loops, rates and stock variables*". As based on Kopainsky and Luna-Reyes (2008), inquiry methods that are based on system dynamics can assist the understanding of social phenomena. Consequently, the purpose of a system dynamics model is to gain a better understanding of problematic "mantel model" behaviour in order to design policies or strategies to improve system performance over time.

Askin and Standridge (1993) defined the term "Modelling" as a method by which to gain understanding about a system, process, or situation in a "*simplified or idealized way*". System dynamics can be defined as "*a rigorous method of system description, which facilitates feedback analysis, usually through a continuous simulation model, of the effects of alternative system structures and control policies on system behaviour"* (Wolstenholme, 1982). Hence, the purpose of SDM is to increase our understanding of complex systems such as non-linear problematic behaviour (e.g., managerial behaviour), consequently improving system performance with time.

Kim and Andersen (2012) asserted that within the framework of SDM, textual data have been documented as being key sources for building simulation models. Hence

scholars have recognized that a consistent dynamic view can be gained from qualitative data. Accordingly, Kim and Andersen (2012) asserted that qualitative data may be used to generate reference modes, for example, to illustrate the basic causal links underlying model structures, processes or decision making. Furthermore, it can be used to systematically formulate causal structures from qualitative information, resulting in causal maps that may be used to help develop rigorous simulation models (Kopainsky and Luna-Reyes, 2008).

Yet, SDM explanations of the modelling process are very similar to the concept of theory building as understood within the social science paradigm (Kopainsky and Luna-Reyes, 2008). Hence, it is considered that the model building process is a theory-building process in the social framework. The main conclusion is therefore that system dynamics can contribute to an important part of social thinking by providing a formal approach by which to explicate social mechanisms. It is argued that, presented in the right way, the formal yet contingent feedback causality thinking of system dynamics should be able to widely diffuse within the social sciences and make a distinctive and important contribution to them.

4.5.2 What Are Causal Loop Diagrams?

SDM is categorised by two key modelling frameworks: causal loops diagrams (CLD), and stock and flow diagrams (Sterman, 2001). Scholars have used these two terms interchangeably (Kim and Andersen, 2012). A body of literature in the system dynamics framework has shown that CLM is beneficial to: (a) represent the causal links between cause and potential effects (Agyapong-Kodua, 2009) by (b) craft dynamic reference models for alternative processes, strategies, or structures of business organizations through (c) capturing mental models of individuals and teams during business processes, and (d) facilitating the processes of transforming from static modelling to dynamic modelling (Binder et al., 2004, Homer and Oliva, 2001, Weston, 2005).

In general, CLD are known to depict the causal links between cause and effects. They are deduced from verbal or historic reference behaviour of appropriate systems

(Richardson, 1999). It should also be developed from observed trends in system reaction over time. It also forms a connection between structure and the decisions that generate system behaviour (Binder et al., 2004). Basically, it contains variables and arrows which show the causal relationships between the variables. Accordingly, we can conclude that CLD is essential to the scholarly enquiry by:

1- Acquiring systematic clarifications of observed dynamic behaviour.
2- Designing, analysing, and testing strategy alternatives.
3- Understanding certain problematic behaviour in order to design policies or strategies for improving system performance over time.
4- Using qualitative data to conceive and utilise reference models.

However, for the purposes of this study, CLD will be used as part of a five-step processes of "Method of Utilising the Reference Model' (MU-RM), which will be depicted in the following section.

4.5.3 Method of Utilising the Reference Model

Scholars have used a variety of methods to map their modelling behaviour in which they used qualitative data to capture a mental model from people. For example, Kim and Andersen (2012) used a four-stage view of modelling behaviour to argue that the use of qualitative data is ubiquitous to all stages of the modelling process, which are: (a) the conceptualization stage (problem definition and system conceptualization), where the modeller focuses on a part of the real world, a "mental model"; (b) the formulation stage, which posits a detailed structure and selects the parameter values, and can also contain elements of qualitative data; (c) the testing stage (model behaviour and model evaluation); and (d) the implementation stage (policy analysis and use).

According to the preceding literature, and also based on Weston (2005), Weston (2012), and Abdulla et al., (2018), this thesis adopts a unique semi-generic system dynamics model. To express the basic motivation through which to transfer experience and understanding from one dynamic situation to another, the thesis conceived and

developed a five-step Weston's 'Method of Utilising the study Reference Model' (MU-RM). Keep in mind that because we are dealing with complex systems, and these systems (e.g., managerial decision-making in dealing with market change) have dynamic parts, so we have to analyse and predict what might happen in the future (Kim and Andersen, 2012). Accordingly, for the purpose of this study, MU-RM is used as a technical means of helping the researcher in analysing and predicting the dynamic behaviour in a change project. Below is the outline note that describes the primary steps of the MU-RM.

MU-RM Step 0: **Agree an outline description of a possible change scenario (or change scenarios) for the specific case firm:** In consultation with their key stakeholders, during this initial step relevant strategic managers should outline possible scenarios of change required by a specific firm in order for it to sustain (or advance) its competitive behaviour.

MU-RM Step 1: **Populate the RM of AO with specific case information:** In consultation with their key stakeholders, during this second step relevant managers should tabulate case-specific information in the form itemised by the following tables. Thereby, at particular times during the lifetime of the firm, prime elements of specific case change projects (such as defined during step 0) can be defined in alignment with the RM of AO, through being listed as specific sets of 'AO processes needed', 'target assets' and 'prime supporting information.

Table 4.2 Search and Select AO Requirements.

Prime variables & supporting information required - which condition the context for AO processing at this management level	**AO processes needed**	**Conceptual description of the assets - to be developed or to be transformed or acquired**
Variable list	List of search and select AO processes, typically carried out by multiple stakeholders possessing multi-perspective skill sets	List of asset outcomes, consequent on the completion of listed search and select processes

Table 4.3 AO requirements to achieve required system configuration.

Prime variables and supporting information required - which condition the context for AO processing at this management level	**AO processes needed**	**Conceptual descriptions and/or physical manifestations of assets - to be developed or to be transformed or acquired**
Variable list	List of AO processes needed to realise necessary system configurations - Typically carried out by middle management, as well as by multiple stakeholders possessing multi-perspective skill sets.	List of asset outcomes, consequent on the completion of listed configuration processes.

Table 4.4 AO requirements to achieve required systems realisation & deployment.

Prime variables and supporting information required - which condition the context for AO processing at this management level	**AO processes needed**	**Detailed descriptions and/or physical manifestations of assets developed or to be transformed or acquired**
Variable list	List of strategic AO processes - typically carried out by middle- and low-level managers and associated technical staff and systems engineers	List of asset outcomes, consequent on the completion of listed deployment processes

***MU-RM Step 2*: Use of the 'Populated RM of AO' to define managerial and technical responsibilities within each change project and potential sub-projects:** again, in consultation with key stakeholders, during this step relevant managers should identify and designate the owners of the AO processes listed in Tables 4.2 to 4.4 These assignments should reference the position, responsibility and knowledge held by individuals and teams within the specific case firm or by supporting consultants and system providers. This should also be linked to a designation and partial description of AO sub-projects, each of which may need to traverse more than one level of management decision making. These various sub-projects will collectively form the entire change project required.

Later, this project design step can naturally enable a consideration of 'decision-integration requirements', 'holistic and sub-project planning and scheduling', and 'holistic and sub-project cost and benefit analysis' (the former by referencing resource requirements for related AO processing, and the expenditures required for their associated asset transformations, developments and/or acquisitions.

MU-RM Step 3: **Construct a visual map of project and sub-project responsibilities, possibly mapping this onto general organisational structures of the specific case firm (and possibly its potential supply chain partners):** the main purpose of this visual map will be to help position AO processing responsibilities and anticipated assets (transformation and acquisition outcomes) within one structure diagram, thereby promoting a holistic understanding of the entire change project and flagging up where collective decision making will be required (such as across strategic, tactical and operational boundaries and/or across existing departmental [responsibility and budget] divisions).

MU-RM Step 4: **Construct causal loop maps to predict likely dynamic (time-based) business outcomes that will arise from the whole AO project:** during this step it is recommended that two multi-stakeholder, multi-knowledge holder discussion meetings should be facilitated by an expert in causal loop mapping. The aim of so doing will be: (1) to defined structural elements of a future model of the changed firm and its potential scenarios of business growth post the change project; and (b) to use the causal loop model of the future firm to collectively predict its likely future business behaviour. Thereby, the causal loop model and its predicted outcomes should be owned by those multi-stakeholders, and this should help commit investment as required from within the firm and/or from external financial investors.

4.5.4 Structure vs Agency Consideration

When this study considers the "systematic stance" in the framework of social phenomena, the reader should keep in mind the philosophical debate about the degree to which structural factors or individual agency "managers" determine decision makers' outcomes. In other words, we should aware of the structuralism versus

agency essence (Dimaggio and Powell, 1983, Heugens and Lander, 2009). In social enquiry, when the study adopts system thinking and casual loop models, this would "automatically" link the word cause within the idea of determent or "deterministic". Hence, in social science, when things have a determent "cause", the question is one of whether the individual is free to make decisions, or if their behaviour is caused and determined by structural factors outside their control.

The debate regarding agency versus structure has been made for a number of decades. For example, many of the studies analysing whether economic conditions have an impact on regime type emphasize the causal role of structural variables. On the other hand, agency-based focused studies highlight the fact that structure is not deterministic and that agents or decision makers have the discretion and ability to effect specific desirable outcomes (Heugens and Lander, 2009).

At stake is the question of whether organizational behaviour is primarily the product of macro social forces or of structural factors. Yet, this camp has the essence of that of the agents being free to make their own decisions and these decisions having certain consequences, but the agents are conscious decisions makers, "making their own decisions" (Heugens and Lander, 2009). The other framework is the "structuralism" perspective, in which behaviour is determined by social structures. Structure is defined as *"the collective systems within which human actors carry out their daily activities"* (Jarzabkowski, 2004). Hence, structuralism stresses the constraining effect of institutions on organizational agency, pointing out how they produce stability and recognition in organizational structures and strategies. So, simply, the individual is a part of certain system, and these "forces in this system causes their behaviour, so they have no choices". (Heugens and Lander, 2009).

In bringing the causal loop view to social science study, the significant question here is how much freedom the individuals have to ignore these structural causes and determine their own choices according to system model. This study builds on the work of (Dimaggio and Powell, 1983, Hay and Wincott, 1998, and Heugens and Lander, 2009), in that we adopt the idea that the underlying assumption of our argument is

that both structure and agency matter in decision making. What ultimately determines performance is how collective or individual agents respond to their environment via the choices they ultimately make. Consequently, the study argues that even though there are structural forces, the manager has the choice as to whether or not to accept a specific situation, and further whether or not recognise this not as a causal but as a more probabilistic point of view.

4.6 Conclusion

To achieve the study aim "propose a new systematic approach to the application and the deployment of emergent asset orchestration concepts in business firms", the study has built a unique road map. This road map included the use of the correct combinations on which to build the research study methodology. This should include conceiving AO-RM, using of some methods and technicalities (e.g., CLD and questionnaire) and populating the reference model with actual AO processes. Accordingly, this chapter has achieved a number of objectives: ***firstly,*** we justified the logic behind using case study approach, ***and*** we synergised the use of the system dynamic model within the context of social science. ***The chapter also*** depicted the data collection and analysis method. ***Lastly,*** the chapter illustrated the use of the tools developed, which has been suggested for application to the study reference model through conceiving and testing novel means of applying structural models in a unique business environment. The method will be tested and developed by properly conducting a large number of case examples in the next three chapters.

Chapter 5 Use 1 of AO-RM: The Applicability of Asset Orchestration Mechanisms, Case Study-Based Analysis

5.1 Context and Overview

The overall purpose of this research study is to undertake inductive-theory building to extend the asset orchestration literature by testing the use of its emergent concepts in the context of the practical operation across multiple case firms. The examination of the literature revealed the need for specific cases examples of AO. In addition, our review showed that the literature suffers from an absence of reference models that might improve our understanding of AO processes or actions through the hierarchical levels of management. To fill this gap in the literature, the study conceived and developed an AO-RM. Accordingly, the objectives of this chapter are:

1- Apply the reference model for the selected case study firms that have been subjected to business change and assess any benefits delivered through the practical application of the reference model in these case examples.
2- Based on 1, to present the results of field research, through which the findings of this case analysis are used to develop answers to the study research question. “How can asset orchestration mechanisms be mapped onto common organising structures used by firms, thereby enabling a management that is more effective in sustaining competitive responses?”

This rest of the chapter is divided into three sections. The first section will be about case study one, “Tech4i2”, and section two will be about case study two, “GMS”. The findings from the transcribed interviews that summarize the evidence and themes within the both case studies will be presented. Lastly, a summary of the findings will be discussed at the end of the chapter.

5.2 Case Studies Analysis and Findings

5.2.1 Introduction to Case Study One: Tech4i2

Tech4i2 is an applied 'Policy Research Consultancy' operating in the fields of technology, innovation and ecosystems studies. It is an SME located in a Midlands-UK Dock Innovation Centre with leading edge research capabilities in economic development, policy evaluation, consultation and engagement and strategy and service delivery. Tech4i2 was founded in 2000. Since 2008, the company has undergone significant expansion, doubling turnover every year. In the last four years, Tech4i2 has undertaken more than 50 projects for high-profile clients. When delivering individual project outcomes, typically Tech4i2 works collaboratively with selected partners from its established network of firms and government organisations around the world. The Tech4i2 consultancy company needs to be highly responsive over agreed time-frames and serving the consultancy needs of individuals, companies, local governments, and international organizations.

The company was founded by Paul Foley, a former Professor of Evaluation and Strategy Development at Leicester Business School. In 2013, the company moved from Loughborough University Innovation Centre to the newly constructed DOCK Innovation Centre in Leicester. In over 30 years of working with policymakers, Professor Paul Foley has developed very strong links with government policymakers in the UK and throughout Europe. This extensive policymaking experience has allowed for the development of considerable expertise in strategy development, operational service delivery and evaluation and monitoring.

Tech4i2 has worked for a wide range of organizations ranging across the public and private sectors, based in both the UK and internationally. Major public clients have included numerous national governments and non-departmental public bodies, the European Commission "EU market", the Organisation for Economic Cooperation and Development, European Investment Bank and the Indian Ocean Commission. The company has also worked extensively with local and regional governments and third

sector organisations. Private sector clients have included the BBC, BT, Eutelsat, France Telecom, NTL, Tesco and Virgin Media, as well as UNISCO and UNDP.

The company has collaborated with leading consultancies and world class universities to provide strategy development, evaluation and impact assessment expertise. Leading consultancy partners include Capgemini, Deloitte, PwC and EY. University partners have included Abu Dhabi University, University of Adelaide, Bocconi University, Brookings Research Institute, University Libre de Brussels, Cardiff University, The Open University of Catalunya, City University New York, Cranfield, Danish Technology Institute, Trinity College Dublin, Hanyang University, University of Hyogo, University College London, Universidad del Norte, Seoul National University, University of South Australia, University of Toronto, University of Strasbourg and the University of Ulster.

What is special about this company in terms of being a good central case study for the application and examination of AO-RM is that it has experienced the market shock of Brexit because its business was mainly with the EU market, as was its work with the consultancy sector. More broadly, this sector also fosters continuous improvement of its employees' capabilities to meet the associated technological changes and customers' needs, especially in competitive areas like the EU. The company is vulnerable to the loss of the EU market because of Brexit; its management has to adapt to this business change. In the next paragraph, the concept of Brexit and its potential effects will be demonstrated. Figure 5.1 illustrates the company's organizational structure with the main functions of each administrative level.

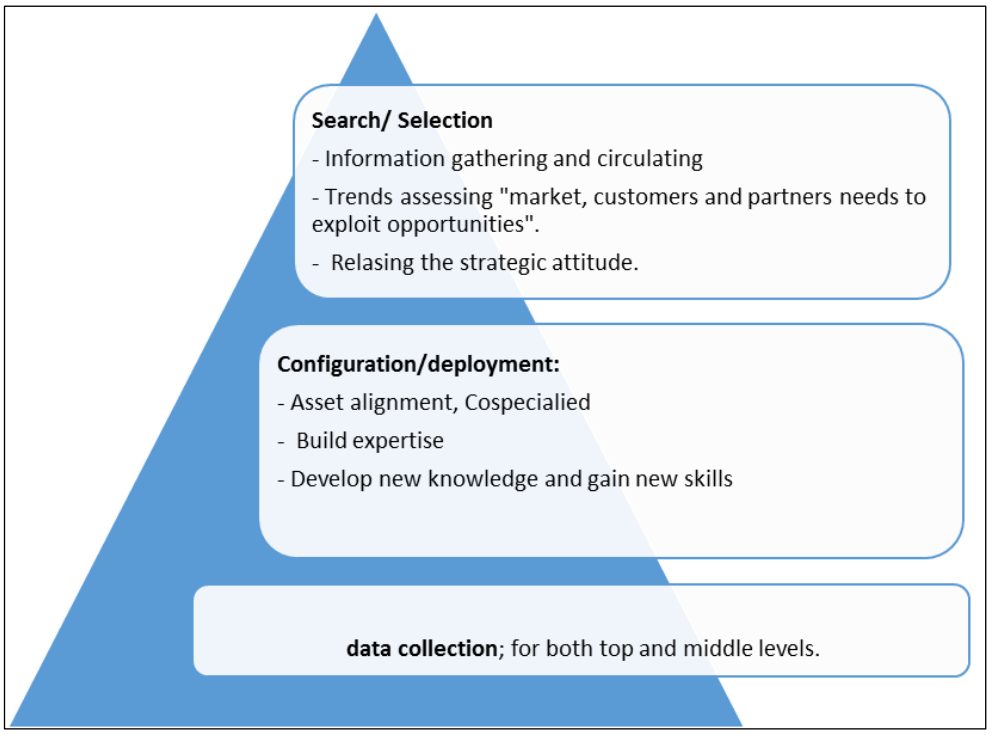


Figure 5.1 Tech4i2 organizational Chart.

5.2.1.1 What is Brexit?

Brexit can be defined as the *"withdrawal of the United Kingdom from the European Union"* (Oxford Dictionary, 2018). On June 23rd, 2016, the British people voted via referendum over whether or not to remain in the European Union. The decision was to not stay with EU. The European Union is the UK's major trade partner, with around half of the UK's trade being with the EU. This makes goods and services cheaper for UK customers and allows UK businesses to export more of their products. In leaving the EU, 'Brexit' would result in reduced trade between the UK and the EU "unless a like-for-like access agreement could be reached". In addition, the UK would benefit less from future market integration within the EU (Dhingra et al., 2016).

Economists reported that leaving the EU would make Britain "poorer" in the long term because it will trade less with the closest neighbours, losing full access to the largest single market on the planet. In addition, the UK economy will likely gain less foreign investment in the future because of these weaker ties. In addition, there will be an enormous increase in uncertainty as UK will spend many years renegotiating its relationship with Europe and the rest of the world (Dhingra et al., 2016). The most

extensive impact of Brexit is likely to be the end to the right to access to the Internal Market and the corresponding end to the obligation of the withdrawing member state to offer unrestricted access to its own market (Busch and Matthes, 2016). Tech4i2 has reflected its worries about the new situation when its managers stated:

> *"So, it kind of changes depending on how the business is going, what projects you have got and that kind of thing, who wants to stay who wants to leave? I am guessing this year is a lot lower than it was the year before because there have been less projects that we were actually paid for within the financial year".*

Accordingly, Brexit is a threat that can be considered a strategic change that Tech4i2 needs to adapt to Ocasio et al., (2018), and in this study, we use the AO perspective to show how this emergent theory can support firms such as Tech4i2 to adapt to this kind of change. Included the search for new markets, services and/or partners. In the next sections, the thesis will illustrate the AO action taken by Tech4i2's managers to cover for the potential loss of its EU market.

5.2.2 Asset Orchestration Processes in Tech4i2: Case Study Narratives

The organizational structure used to realise asset orchestration in Tech4i2 was observed to function over three administrative levels (Figure 5.1) but flexible decisions-making and action taking which traverses those levels is key, such as when the company bids for consultancy contracts from external agencies. The director of the firm and a number of collaborating technical associates (who are typically directors of collaborating consultancy businesses) operate at the top level of the organisational hierarchy. The middle AO level is that at which Tech4i2 employees function to assist in contract bidding and to help manage Tech4i2 assets such that, collectively, they are 'best aligned' to the requirements of existing and new business opportunities. At the lowest level of Tech4i2 management, employees collect data and conduct analyses to deliver needed outcomes for live contracts and to support new contract bidding.

Bearing in mind the collective core competencies within Tech4i2 and its partnering firms, the initial primary roles of the top asset orchestration level in Tech4i2 (see also

chapter 3) are (1) to scan, search, and explore new prospects within existing (and possibly new) business environments of the firm and (2) to then choose to make (contractual) bids for future work that might deliver good potential business opportunities. The director of the firm, along with advice from his technical associates and financial advisor, also has managerial responsibility and a technical role in choosing the overall strategic direction for Tech4i2 in order to ensure the ongoing/longer-term financial viability of the firm.

Tech4i2's middle management level configures the company's assets such that, collectively, they are best aligned to the requirements of selected business opportunities. This function may need to be realised in conjunction with employees in firms collaborating with Tech4i2 in order to satisfy the chosen business opportunities. Furthermore, when configuring/re-configuring assets to realise new opportunities, the firm must remain capable of delivering all processes associated with previously committed business opportunities. At any single point in time, Tech4i2 may have up to five live contracts/projects to fulfil and might be bidding for, or planning to run, another four projects. The lower level, where people working to collect data regarding some potential targeted projects, is linked with the top level to help in gathering the data needed by the top manager, as well as linking with the middle level management. In general, because of the nature of its consultancy business, providing the resources for existing and new business opportunities requires the allocation of technical persons and technical systems (primarily ICT [information and communication technical] capabilities).

Before the Brexit issue, Tech4i2 was dealing with many markets, but the majority of its business was with EU markets. In 2015-2016, a related AO managerial role observed at the top and/or middle level in Tech4i2 was to conduct market research in conjunction with the firm's partners to see what was important to them and what they were trying to achieve in the short and longer term. To engage in search and selection activities effectively, Tech4i2 managers were also required to engage with complementary activities that could help in realising the strategic attitude and lead in-depth discussions with the firm's staff, partners, customers, experts, and governments. The

company is still working with existent relationships to gain new business opportunities, and the top level manager, in conjunction with his partners, has identified the key opportunities that could arise due to the impacts of 5G in the 28 EU Member States.

Such that, Tech4i2 is operating with its key partners to undertake a 5G study in partnership with, and funded by, the European Commission. Subsequent contract bidding in this domain needs to be focussed on the costs, returns and socio-economic impacts of 5G; hence, Tech4i2 and its future bidding partners must have the prerequisite technical and economic skill to successfully bid and deliver any required 5G-related contract outcomes. The company targeted "the 5G socio-economic study for EU zone" and decided to compete with other rivals, ***four phases needed to be completed*** in this regard.

Firstly, the people who in charge of data collection started gathering as much data as possible, which included visiting websites, reviewing old data, sharing information with partners, and generating the data which is considered the most important source of information. ***The second step*** is the data processing by the data analyst, which required finding the index numbers, general trends, forecasting, measuring the potential socio-economic benefits, qualitative and quantitative analyses, charts, and figures, and other crucial indicators that are required to gain an in–depth understanding of necessary bid information. ***The third phase***, to be completed by a software designer who should visualize the main indicators and present them in virtual maps and scenario planning "if that is necessary for the bid". Within this phase, Tech4i2 needed a degree of cooperation from its partner, "Trinity College Dublin", to monitor and evaluate the progress of the €700 million support for its 5G projects. ***The last phase*** is to write the whole bid report; this step should be completed by both middle management as well as top management, and Tech4i2's partners. Accordingly, Tech4i2 announced that the final report from the 5G socio-economic study has been published. To see how Tech4i2 would be affected by Brexit in projects of this kind, and to see what kind of strategy the company developed to adapt to this strategic change, the sections below present the findings relating to each stage of the Brexit asset orchestration processes.

5.2.3 Findings and Evidence of Asset Orchestration Processing Observed in Tech4i2

The following observation, information and findings about AO processing in Tech4i2 summarise managerial responses given during the researcher's six months stay in the company, which included; the company's secondary documents, the company website and through a series of interviews held with Tech4i2 staff. During the fieldwork, the researcher was actively involved with observing and developing processes of search/selection, and the reconfiguration initiative for Tech4i2 as a case study firm. The researcher attended management meetings, contributed opinions and suggestions, and observed and actively interacted with the firm's manager, team, and partners. The following paragraphs describe the various asset orchestration processes currently realised in Tech4i2. The detailed interview findings in this chapter are divided into three themes; search and selection, configuration, and deployment.

5.2.3.1 Search and Selection Processes

In accord with the writings of Teece (2009), top-level search/selection processes are required to detect and shape opportunities; hence, Tech4i2 must continually scan, search, and explore new prospects in order to sustain its business activities. These processes are needed to provide them with the ability to recognize opportunities for technological or market innovation whether in a local or a global business environment. For Tech4i2's top-level managers, this required them to conduct extensive information gathering and to circulate selected information (which assesses market needs and the Tech4i2 strategic attitude) to the second level. Typically, this might involve looking at government requirements with respect to specific calls and contracts, and drawing out in-depth discussions around particular areas of industry expertise.

Search processes provide the ability to recognize opportunities for technological or market innovation, whether in a local or global business environment. For Tech4i2's top-level management, this required them to undertake information gathering and circulation, as we have seen, as well as considering government requirements on some of their contracts and having more in-depth discussion about certain industry

expertise. To conduct the preceding search and selection activities required the manager of Tech4i2 to engage with different kinds of activities such as: (i) regularly visiting the EU headquarters; (ii) frequently cheeking the websites of the UN, UNDP, EU commission, Leicester City Council, amongst others, which was "usually done by the person who in charge of data collecting but this task is closely related to the top manager's function"; (iii) participating in workshops and conferences held in different places worldwide; and (iv) holding in-depth discussions with the firm's staff, partners, customers, experts, and governments.

> *"For me, the biggest response that I have is to attend things like conferences, so every year there is two or three conferences some in London, I recently attended one in New York, which sort of gives you a snapshot of the industry. Therefore, it allows me to think about what is going to happen in the future to plan for things today. So, for me, the biggest response is to actually make the effort to go and attend these conferences and that's something I have only been doing in the last one to two years. But it's directly in response to the technological innovations"* Tech4i2 Managing Director.

The above quote, as captured from the interviews with the Tech4i2 director, clearly shows that the company was regularly conducting the processes of search and selection to achieve two goals: capturing new opportunities, and/or avoiding new business threats. Accordingly, early in 2016 the director of Tech4i2 and his team first started considering pursuing processes of change initiative through frequently searching, scanning, and consulting with customers, "mainly EU Commission, UK and EU Government, and UNDP" and partners. The main consideration was what is important to them and what they were trying to achieve as a company, and in paying close attention to what the UK and EU governments required in some of their contracts. The trigger for change emerged during a review of the UK referendum in terms of exiting the EU market.

The director of Tech4i2, the team, and their partners became aware of the increasing trend of the UK populace showing a preference to leave the EU. After doing further

market research, consulting with other experts working as partners, and looking at what the consequences of Brexit would actually be. The company has recognised Brexit as new threat. They decided that AO is the best way to adapt to this change. Thus, and subsequently to Brexit, an opportunity to find new markets, products and customers, was presented by the company director to "***provide a market analysis of business accommodation in key urban areas located in the East Midlands, Leicester, Northampton and Nottingham"***.

> *"I had been working in the property area for probably thirty years now and there has always been a view put forward by many people that there were not enough small business premises with no evidence no justification no nothing. Although we do have the property work that we are doing which is hopefully going to sell a product in the future. And we have got the dashboard as well which is quite similar. Mainly we do services so consulting services within technology economic consultancy that kind of thing. So, it's very much service-led in that kind of respect. And because of the wide variety of projects that we do there isn't any kind of one service that is our niche as such",* Tech4i2 Managing Director.

Through this project, Tech4i2 would be able to secure new customers as well as gain potential funding and assistance from the East Midlands' local governments. Tech4i2 became convinced that the time was right to find new markets for new products, and that this represented the best strategy by which to adapt to Brexit.

> *"What we have been looking to try and do for two or three years possibly even longer is find some sort of service that we can offer that will have a regular source of income. The idea that we are pursuing is a property market, industrial and commercial property market appraisal probably on a quarterly basis. So that people will subscribe to that, they will probably subscribe for some basic information",* Tech4i2 Managing Director.

The top-level managerial search and selection processes observed in Tech4i2 involved finding the right joint venture partner and conducting any requisite due diligence to exploit opportunities. In addition, the search and selection processes included finding potential customers to deal with them, as the company director expressed:

> *"And the goal is by Christmas to try to get ten organisations in the East Midlands to sign up to buy it. So, if we can get two from Leicester perhaps from the local authority, perhaps two from Derby and two from Nottingham, two from Loughborough a that should make the ten we need. And there are local employment partnerships, and local authorities that I think ought to buy into that stuff. But one that has been interested and intrigued has been Lloyd's Bank who are trying to develop better relationships with, the property the arm that provides money to property developers is keen to develop good better long standing relationships with the property developers that they know."* Top level manager, Tech4i2.

After finding new projects and new partners and customers, the company had to start reconfiguring its resources which included "the software and the analysis team" and redesigning its processes to fit "integrate" within the new business project. The following subsection will discuss the configuration processes during Brexit.

5.2.3.2 Configuration Processes

According to the literature, asset reconfiguration is required as markets and technologies change (Sirmon et al., 2011). Brexit is one of the most serious changes to have affected UK businesses. Since Tech4i2 mostly deals with EU markets, Brexit has negatively affected the company. To cope with these changes, Tech4i2 decided to start the reconfiguration of its assets, which are human resources "top manager social relationship, web designer, data analysts and some expert partners", and intangible resources "software, systems and money". At the start of the reconfiguration initiative, the Tech4i2 director met with all employees as a group and shared his new vision of what the process reconfiguration initiative would do for the company and why it was

important to them. With regards to Brexit, Tech4i2 decided to target new markets with a complementary product ***"provide a market analysis of business accommodation"*** in doing so, Tech4i2 had to reconfigure and recombine its resources and capabilities, but in a new and different way.

To accomplish this project, that is, "provide a market analysis of business accommodation", Tech4i2 worked through four objectives; ***first*ly**, it collected a huge amount of data from different sources such as the Rightmove website, Leicester City Council, and commercial property agencies. The data collection was the result of the analysis of more than 20,000 commercial property vacancy records from 2016 to 2017. These data included information about rental levels in different commercial property locations and provided an insight into relative competitiveness in different areas, as well as the data enabling an examination of how long properties were on the market before being let, thus enabling a comparison of local demand for property. ***Secondly,*** the data analysts sorted this data to find general trends, prices, and the associated demand. The analysis processes showed relatively low levels of supply of industry and office accommodation in Leicester and Leicestershire when compared with other parts of the East Midlands. The ***third phase*** was to design a "businesses model" that would help customers to make appropriate choices regarding investment in commercial properties in the Midlands.

> *"I think as opportunities come along we have limited resources that need to be reallocated. So, it will always require some reallocation of resources to maximise what can be done. So, it might require taking people off current projects to develop a new idea. So, this show an innovative method of investigating over- and under-supply of commercial properties has been developed by comparing the number of properties on the market with the stock/number of different types of commercial property in the local market"* Middle manager at Tech4i2.

The last phase depended on the top manager's social capabilities, since Tech4i2 has a good reputation and its manager has good networking links with customers, local

government and partners. He announced in "A Leicester Business Festival 2017" that this project would provide an overview of the current situation and trends in the East Midlands' property markets.

> *"New markets are entirely what the property thing is about, we have looked, and I have looked, and others have looked, and we can't find anyone else offering what we are offering in local property markets. There are some that do it for the whole of the UK and some that do it for regions, I am still not sure how they can do that, but they claim to be able to do that. So, I think we are developing, we have seen a need and we are developing some information to be able to address that need. Whether the need can be made into a market is perhaps another question. We know that it solves a problem that some individuals or some people within organisations have, whether they are willing to pay sufficient for it to generate a market is perhaps what we are dipping out toe in the water to find out now"* Tech4i2 Director Manager.

However, the company did not stop at this level; their new product needed to be deployed across a number of markets, as well as needing to find sub-products to enhance its new position within the new market(s). Consequently, the company decided to conduct this action thorough deployment processes.

5.2.3.3 Deployment Processes

Deployment processes, which are mostly operated by low and middle management, are required to ensure that contract bids and their outcomes satisfactorily meet clients' expectations and that there is suitable resourcing (short and medium term). Deployment processes must be planned and maintained through (1) the preparation of new contract bids by alignment and realignment of Tech4i2's current assets, (2) the fulfilment of individual projects (which are run after a contract is won) by developing new knowledge and gaining new skills, and (3) the fulfilment of all concurrent projects being run.

Clearly, for the firm to remain profitable within any given timeframe, payments made by clients for a current contract/project portfolio holding must generate at least sufficient income to suitably remunerate staff as well as fund all other company activities. Therefore the current people and assets (and hence the available competencies and capacities which can be aligned to Brexit-related actions and learning as well as to contract bidding and fulfilment) will be limited. Consequently, there is significant collaboration between the mid- and lower-level managers responsible for Brexit and ongoing AO processing leading to the planning and maintenance of (1) to (3) above.

> *"I think if we are moving from a conveyor belt system, which, constantly needs replenishing to a system that is more stable it, will require a realignment. But it still focuses on the skills that the business has got which are evaluation, interpretation, data collection, data management, data analysis. And then the presentation of those results to clients. It's the same skill set that we use on individual projects but applied to something hopefully that will be scalable and just repeatable. And that's probably where the difference lies, that if we can find a way of doing something that people like we can just repeat it, repeat it, repeat it and make it more mechanised, more automated and generate reports automatically, undertake analysis automatically"* Tech4i2 Director Manager.

Based on the evaluation and analysis performed by the lower and middle management, a detailed bids schedule, analysis report, resource "data and report" requirement, and finance implication report were presented to the top management for evaluation and appropriate allocation of finances. It was determined that review meetings would be scheduled, requiring the middle and lower managers to further refine the proposals to address possible concerns raised by top management until a decision was made to implement the best alternative.

5.2.4 Outcomes

The main lesson that could be understood from the preceding analysis is that Tech4i2 has responded to Brexit changes, particularly through the configuration of its resources and development of new products, as well as deploying these new products in new markets. The role of top-level management was particularly significant in terms of its decision to adopt the new strategy of *"provide a market analysis of business accommodation".* Pursuing the AO process initiative resulted in the cumulative effect of redesigning its business models towards developing the market analysis system in terms of business accommodation in key urban areas. Further, Tech4i2 is still sustaining its AO processes, with continual developments being made to adapt to changes in the business market. In addition, the company gave some good examples of the asset orchestration processes, such as: (1) Tech4i2 has engaged with his partners "Spark Legal and time.lex" to undertake a two studies to examine cross-border data flow and the barriers and benefits of cloud computing; (2) identifying the key opportunities that could arise due to the impacts of 5G in the EU28 Member States. Hence, the company gave some good examples of the process routines that were the most impactful due to their redesign through the processes of search and selection, reconfiguration and deployment. One of the better examples of the AO processes was the role of the top manager in linking his company, people, and processes in one single picture to achieve the integration that give Tech4i2 a considerable advantage in coping with the changes resulting from Brexit.

5.3 Case Study Analysis and Findings

5.3.1 Introduction to Case Study Two: GMS

The second industrial case study focussed on asset orchestration processes currently used by a large-scale global manufacturer of semiconductor components. For the purposes of confidentiality, this firm will be referred to as "GMS". GMS is a leading supplier of semiconductor-based solutions, offering a comprehensive portfolio of energy efficient power management, analogue sensors, logic, timing, connectivity, discrete, SoC and custom devices. GMS is driving energy efficient innovations,

empowering customers to reduce global energy use. For example, the company's products help engineers to solve unique design challenges in automotive, communications, computing, consumer, industrial, medical, aerospace and defence applications.

GMS Semiconductor operates a responsive, reliable, excellent supply chain and a quality control programme, a robust compliance and ethics programme, and a network of manufacturing facilities, sales offices and design centres in key markets throughout North America, Europe and the Asia Pacific regions. GMS provides its customers around the globe with a broad portfolio of innovative, energy efficient and environmentally friendly semiconductor technologies. GMS has developed rapidly over the last five years, and consequently its revenue reached $3.907 billion in 2016 with 30,000 employees worldwide. This industrial case study focussed on a significant case of asset orchestration that had recently been realised by the firm. Figure 5.2 illustrates GMS's organizational structure.

GMS has been chosen to be a second case study of this research study for two reasons; firstly**,** the Tech4i2 is a small company, so we need another company that is entirely different in its size and areas of business activity to study AO processes. As discussed in Chapter 4, diversity in the case study examples in terms of size, location and sector will increase research quality. The second reason for choosing this case example was because this firm has experienced significant change; according to nature of the study, it is considered a high-tech company so it needs to re-innovate its products to adapt to business and technological changes.

In this section, we retrospectively report on a significant case of AO processing in GMS, which followed the design and prototyping of new electronic products. The AO processing described led to the distributed manufacture and global supply of that new product. A particular situation of change in GMS was chosen as the focus of a particular study of AO processes: **"the release into global production of a new product design"**. The change process began with the design readiness and release of a new product by a research and development team comprising employees of the case study business.

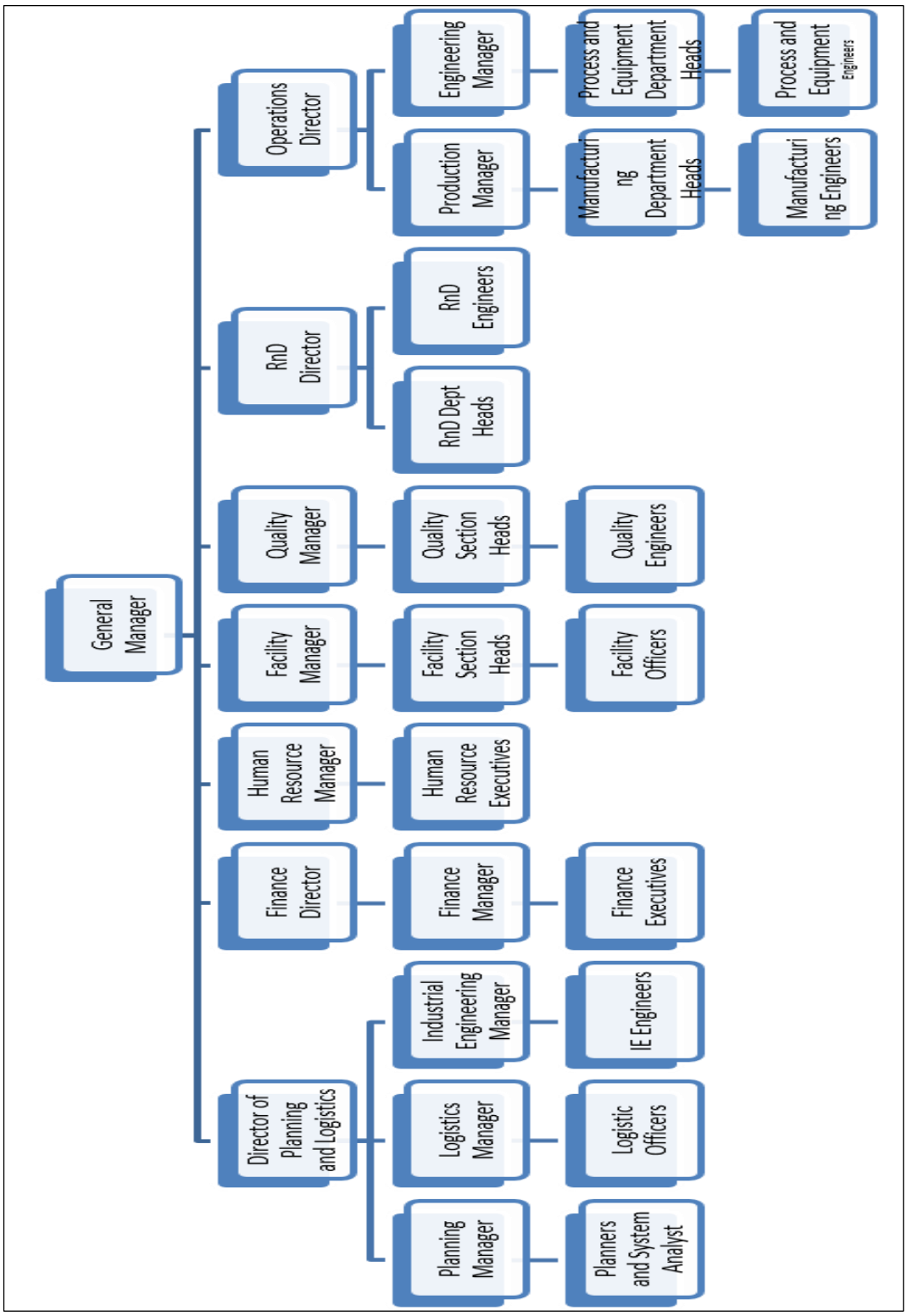


Figure 5.2 GMS organizational chart.

5.3.2 Asset Orchestration Processes in GMS: Case Study Narratives

This section presents the detail of this study in thickly descriptive narratives (Eisenhardt, 1989) with the answer to the basic research question in mind: "How can asset orchestration mechanisms be mapped onto common organising structures used by firms, thereby enabling management that is more effective in sustaining competitive responses?" For clarity and ease of presentation to the reader, the case narratives are organized within Helfat et al. (2007) asset orchestration theoretical framework of search and selection, reconfiguration and deployment so that firms can adapt to change.

GMS has decided to develop new products, a "**new generation of semiconductor**"; MEMs, Motion Sensors, Optoelectronics, High Voltage MOSFETs, Existing Product Enhancements, Power Management, Power Modules, Signal Conditioning and Logic. This product design had previously been realised by the GMS research and development team. Stiff global competition for GMS prompted a rapid time to market for this new product in order for the company to stay ahead of its global competition and gain rapid returns on its investment. GMS managers emphasised the need for timely and co-ordinated involvement of all levels of the company's management. They considered this crucial to enabling rapid planning and evaluation of alternative business strategies needed to produce the new product on a global scale. For example, one key decision to be made concerned choosing appropriate international locations for one or more manufacturing plants and/or deciding whether to outsource component manufacturing.

Key elements of AO processing in GMS were discussed in detail with individuals at each managerial level in order to gain a clearer view of the AO processing requirements needed to ensure both profitable and sustained production, despite anticipated change within the firm's challenging market environments. Further, due consideration during the interviews was given to the need to integrate decision-making across each management level. It was observed that GMS uses cellular manufacturing as a strategic approach to managing complexity, thereby seeking to realise both flexible and competitive manufacturing performance.

The search and selection process in the feasibility study involved the viability of the new manufacturing process which depended upon the type of process technology selection in the form of investment on a fully automated or semi-automated system. The choice of investment determined the type of equipment to be leased or purchased (operational assets). The capacity and requirement for an additional material handling system was also explored with an automated raw material storage and retrieval system.

A detailed study on the resource configuration and deployment strategy was also performed at this stage. The company's Industrial Engineering (IE) team would gather information on the equipment capabilities from the Research and Development Engineers to develop an equipment capacity model using the company's simulation modelling software. Based on the simulation results, a detailed report on the quantity of equipment to be leased or purchased was prepared. Moreover, with information such as cycle time, set-up time and Overall Equipment Efficiency (OEE), a new, computer-generated manufacturing system was developed and used to explore the Kanban system for inventory control and to optimize resource utilization. In the next section, we will present the findings relating to each stage of the asset orchestration process.

5.3.3 Findings and Evidence of Asset Orchestration Processing Observed in GMS

The following findings about AO processing in GMS summarise managerial responses given during a series of interviews held with GMS staff. Each different process will be discussed individually. The detailed interview findings in this chapter are divided into three sections, search and selecting, configuration, and deployment.

5.3.3.1 Search and Selection Processes

The processes of search and selection provides the ability to recognize opportunities for innovation in technology and market change. For GMS's leadership board to add new products, this required them to gather different kinds of information, assess market change, and share this new insight with the second and third managerial levels.

Additionally, it required consideration of their competitors' new trends in some of their contracts, products and strategies.

> *"As I say, we try to watch the news and keep up to date by looking at reports and that kind of thing. Looking at competitors' websites, seeing what kind of projects they are doing. Comparing what we have to offer with those of our competitors by looking at their websites. We also get feedback on tenders quite regularly, on the ones we have put in, and we compare our offer against the one that won the tender and how we failed to meet what they achieved within their offer. Yes, we try to see what new technology projects there are and what new markets there are"* GMS top-level manager.

The GMS change scenario involved the new product to be manufactured to fulfil customer orders. Today, stiff competition in the global market and speedy time to market for new products are necessary in order to stay ahead are among the difficult challenges that organizations have to face. Therefore, the top management of the company would have to evaluate and decide on the best business strategy to achieve such a swift time to market rapid returns on investments. According to a top-level manager *"The industry is always changing but I think it kind of follows technological trends, so the last big change is innovative technology".*

Strategic managerial decision-making was necessary to explore alternatives as to whether to invest in producing the new products (make) or alternatively to engage with a new or existing manufacturing subcontractor (i.e., to buy). The selection of a facility location was also considered an important determining factor in the strategic planning of a global manufacturing corporation. Various aspects, namely the economic, social and political, influenced the site selection decision making. For example, management decision making when searching and selecting viable markets for the new product and deciding how best to configure and deploy existing and new resources of the firm will be crucial in order to ensure that both substantial initial capital spending and ongoing financing will pay off (such as in terms of a rapid return

on investment and subsequent on-going profits) as the product market opportunity itself develops and decays.

An appropriate selection of a material handling system would enable efficient movement, storage, planning and control over new production. The types of raw materials and material quantities available also affects the capacity of the material handling and storage system. However, a supplier management system such as Just in Time (JIT) and Supplier Owned Material System (SOMS) that the company had successfully practiced helped with inventory management and control over the delivery schedules to fulfil demand and minimize operational cost.

5.3.3.2 Configuration Processes

Interview responses showed that all stages of product realisation needed appropriate AO processing within GMS. This was generally agreed with the GMS managers interviewed who, at that time, were concerned with the AO processing associated with the new product introduction. Hence, a holistic approach was needed that could provide managers with a systematic view of the interrelationships between critical resources and the effects that their decisions could have on various life-cycle engineering processes of any new product, as well as adjusting their business model according to the new product's requirements.

> *"We respond to the changes within the market and try to adjust our offer accordingly so that our model fits whatever project we are doing more swiftly. So, the market within technology is changing quite a lot so we try and make sure our business model fits as well as we can"* GMS middle-level manager.

In the case of GMS, a team of Industrial Engineers (IEs) played an important role in assisting the management decision regarding resource configuration and deployment by performing a workflow management study using Discrete Event Simulation (DES). The focus was to evaluate the various AO alternatives and perform appropriate modelling to optimize the performance of the new production system.

> *"And then from there we can improve our processes to meet, or try and improve, to catch up with our competitors. In terms of the business environment, we tend to just do that semi-naturally anyway by keeping up with news, keeping up with trends"* GMS middle-level manager.

To achieve this, the IEs needed to gather information on the equipment capabilities from the Research and Development Engineers to develop an equipment capacity model using the company's simulation modelling software. Based on the simulation results, a detailed report on the quantity of equipment that would need to be leased or purchased was prepared. Moreover, with information such as cycle time, set-up time and Overall Equipment Efficiency (OEE), a new, computer-generated manufacturing system was developed and used to explore the use of the Kanban system for inventory control and to optimize resource utilization. Most importantly, the aim of the simulation modelling was to observe the impact on production measures, i.e., production rate and lead time, in order to achieve the desired production capacity and meet the expected customer demand.

Further, the IE would use their work force database to simulate the task time, task sequence and task frequency to predict the required labour capability and man-machine allocation requirement for labour hiring purposes. Further, based on the space allocation, equipment quantity and detailed equipment specification (dimension and facility requirement), a few alternatives for the new production layout were prepared using AutoCAD to assist the final management decision.

GMS middle managers were responsible for the operational level of planning, and the control and monitoring of manufacturing operations, which were identified based on the critical characteristics of the new product type such as Small Outline, Power Product, Quad Flat, etc. Further co-ordination was required with decision-making enabled by lower-level managers, who were mainly the manufacturing department heads and engineers responsible for tactical and operational manufacturing performance. If the choice was to invest in the new product and an appropriate site selection was made, the company's middle- and low-level management would need to

perform further detailed feasibility studies on the location selection and layout design within the manufacturing site of choice, the type of equipment and process technology, sources of raw material and selection of an appropriate workforce. Issues regarding space allocation for the new product also required consideration such as flow and logistic rules to minimize travel time, distance and costs relating to people, materials and processes.

5.3.3.3 Deployment Processes

Deployment processes, which are mostly operated by low and middle management, are required to ensure that company products adequately meet customers' expectations and suitable resourcing for the products. Deployment processes must be planned and maintained with respect to the preparation of new projects by appropriate allocation and reallocation of GMS's current resources and capabilities. Further, the completion of individual projects is required by developing new knowledge and skills. This would improve completion rates for all concurrently running projects.

For the layout design, the IEs applied a Systematic Layout Planning (SLP) technique and worked around the constraints of the production space allocation to develop a number of layout design proposals using AutoCAD. Based on the space allocation, quantity of equipment and detailed equipment specifications (dimension and facility requirements), a few alternatives for the new production layout were prepared, together with the associated financial implications, to assist management's decision in this regard. The facility department was also heavily involved in this process in terms of providing information on the mechanical and electrical requirements together with associated environmental, health and safety requirements.

Furthermore, GMS's Human Resource (HR) training department handled the workers' training programme and skill development. Referring to IEs proposed man-machine configuration (see earlier) in order to make appropriate decisions as to whether to hire a new workforce or reassign operators from other manufacturing lines.

> *"I have been involved in identifying what has been missing with "…", we have had meetings to see what skills we don't have, what knowledge we don't have, what knowledge we need and that kind of thing. So, for instance, we posted a job advert on LinkedIn"* GMS low-level manager.

Based on the evaluation and analysis performed by the low and middle management, a detailed project management schedule, risk management report, resource requirement, material supplier selection, alternative layout plans and finance implication report were presented to the top management team for evaluation and financial allocation approval. The top management committee involved the manufacturing site of choice's Vice President, Directors, Financial Controller and Human Resource Manager. Scheduled review meetings were held, requiring the middle and lower managers to further refine the proposals to address possible concerns from the top management until the decision was made to implement the best alternative, with priority given to factors such as fastest return on investment and lowest risk.

5.3.4 Outcomes

Based on the preceding analysis, it could be concluded that GMS has responded to its new market needs, particularly through its resource configuration processes and its new products. The role of the middle-level and top-level management were highly significant in terms of the decisions regarding the adoption of the new strategy. The AO processes "search and selection, reconfiguration and deployment" meant that it took GMS more than two years to achieve its new project "new generation of semiconductor". GMS recognised that it should be sustaining the AO processes, and managers noted that they would continue to practice certain beneficial and practical AO mechanisms. From their perspective, the process reconfiguration initiative was exhausting because of the various practices taking place within the company. Indeed, the process asset reconfiguration initiative at GMS resulted in the redesign of many of their semiconductors; for instance, "Aptina Imaging New Products: CMOS Image Sensors and Image Processors at 2014" and "Truesense Imaging, Inc. New Products:

CCD Image Sensors at 2015". When GMS were asked to give some examples of the process routines that were the most impactful due to their redesign through the process reconfiguration initiative, the new project lead highlighted relationship management, which indicates the significance of integration between company levels.

5.4 Conclusion

Our examination of the AO literature (Chapters two and three) revealed a certain weakness in current research because of a lack of specific examples of change projects. It was also apparent of that the three managerial levels had not been considered with regards to AO processes. In addition, the literature review showed a general lack of reference models by which to improve our understanding of AO processes. Accordingly, in this chapter, the applicability of AO mechanism was tested through reference to two companies: Tech4i2, which is a service-based product firm, and GMS, which is a large-scale manufacturer of semiconductor components. Through reference to these two companies, the AO processes have been tested. As shown in the preceding sections, in accordance with the study research question "How can asset orchestration mechanisms be mapped onto common organising structures used by firms, thereby enabling a management that is more effective in sustaining competitive responses?" AO were identified, classified, and discussed in terms of adapting to change and sustaining competitive responses to different change situations within the context of different business environments.

The current chapter has added to the AO knowledge base through achieving **"USE 1 of AO-RM"**; the chapter has further suggested two instances of AO. These instances are presented to address the limitations of the currently AO literature, namely the need for specific AO case examples (instances of AO). However, other aspects have not yet been addressed, so a second use of AO-RM is required in order to offer a visual guide to enhance the thinking of managerial teams as they conceive of change projects and test alternative change strategies through mapping the AO processes used in the case study firms onto the study reference model.

Chapter 6 Use 2 of AO-RM: Systematic Tools for Developing and Applying the Study Reference Model

6.1 Introduction

This chapter will consider the second use of AO–RM in order to form a systematic basis for the creation of an AO Road Map which has the potential to be used to structure and support the design of AO change projects; please see Section 3.7. Hence, this chapter is designed to answer the second research question, "To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses", as well to achieve the study aim about providing an integrative framework approach to the application and the deployment of emergent AO concepts in businesses, through a practical application of the reference model in a selected case study". Here, Tech4i2 will be used as our case study example.

Markedly, this chapter will shift the focus of the study from that of understanding an existing case study to conceiving future proposed scenarios that might guide managers seeking to enhance their firm's ability to adapt to change. Furthermore, this chapter provides ready guides as to how AO ideas can be broadly applied in a variety of different firms using the AO Road Map. This Road Map provides a guide for decision making and action taking at the structural level. Yet, to fill the knowledge gap relating to the absence of integration mechanisms to execute AO in practice, the chapter is an attempt to find a systemic method using the more generally applicable tools of the study reference model. Furthermore, this chapter proposes an approach through which to deal with integrating thinking with regards to dynamic change in the selected case study. Henceforth, this application of the reference model will exemplify multi-level mapping of key AO processes onto a firm's key resources. To achieve the above agenda, this chapter has two principal objectives:

1- To offer a visual guide during the execution of the AO perspective by mapping the AO processes used for the case study firm onto the reference model, consequently providing the firm's managers with a scenario by which to conceive of and dealing with future changes.
2- Based on 1, the chapter will show how the reference model, when populated with case data, can guide the thinking of senior management teams as they conceive change projects and test alternative strategic futures.

Accordingly, this chapter will be comprised of three sections. The first section suggests a holistic Road Map to illustrate a systematic way by which managers can integrate AO processes through the firm's organizational hierarchy. The second section will demonstrate a semi-generic method of utilising the study reference model in the instance of Tech4i2. The final section will summarise the contribution to knowledge made by this chapter.

6.2 Proposed Holistic Road Map in Support of AO Process Integration

6.2.1 The Rationale of Using the Road Maps

Initially, the study derived the reference model from the emergent literature, which suffers from the lack of specific AO case examples. Subsequently, the study developed three example uses of the reference model. In other words, in the preceding chapter, we used specific cases of AO to fix certain aspects of AO (and when fixed, will be considered one of the uses of the AO-RM). In this chapter, the study will attempt to use "capture" more instances of AO (which will constitute the second use of the AO-RM). The second uses will consider proposed change projects in Tech4i2 in which we will attempt to capture information about instances of change situations. In particular, the intention here is to use the AO-Road Map as a "change project method" to improve and support the design of change projects in firms. Consequently, an attempt will be made to achieve one of the study aims, namely that of building a better AO knowledge base.

It was observed that using this reference model required a "detailing" or fleshing out of the study reference model. Fleshing out, in this instance, is in terms of how

managers realised AO processes at each level and throughout/in between the three hierarchical levels. Consequently, the research study proposed an extension of the study reference model through the development of a visual guide or holistic road map to support the AO process integration and collectively understand the dynamics of the business environment of the firm concerned. These proposed extensions will be used through the case study example and "we shall call them instances of the reference model", as such instances are related to a particular change type and particular company. In this case, the change project conducted by Tech4i2 "*provide a market analysis of business accommodation in key urban areas located in the East Midlands such as Leicester, Northampton and Nottingham"*. Markedly, these proposed models and the visual guides also provide a map which the might be useful to other companies.

Significantly, in terms of fully addressing the study research questions, in the following sections we will consider the notions of dynamism and integration and how companies might themselves consider them. Keep in mind that the structured mental models are always working in dynamic situations, where the company concerned must function within a "dynamic business environment" (Teece et al., 1997). In other words, the proposed road map will be designed to deal with dynamic change in the change projects, it is accordingly considered to be a time-based model. Hence, the aim of the proposed methods is to help managers at each different organisational level to integrate their AO processes to support holistic thinking, whether within each hierarchical level and/or across the three levels. Thereby, the subsequent "Road Map" thinking should support the realisation of sustainable firm responsiveness despite impinging dynamics. Which in turn achieve the study aim to provide an integrative framework approach to the application and the deployment of emergent AO concepts in business firms.

To achieve the above mission, we should consider two kinds of challenge; ***firstly,*** we should find appropriate methods to apply such road maps, and ***secondly,*** we should seek to address the integration issue "through the three structural levels and within the same levels". Accordingly, based on the principles described by Abdullah et al.

(2018), Weston (2005), Weston (2012), the study proposes a new '**Method of Utilising the Reference Model' (MU-RM),** which comprises five systematic processes. Noticeably, this MU-RM has been adjusted to fit with this study's requirements through a decrease in the number of complex steps and making the model more straightforward and easy to use. With this in mind, using such methods should suitably support the application of the AO notion in the case of changes arising from Brexit in Tech4i2. Thus, the proposed models have been re-designed to reflect the collective rationale behind the decisions made; it thereby aims to qualify the design asset orchestration project plans and provide an agreed intellectual basis for 'futures prediction' in relation to alternative scenarios of potential change. Below is the outline description of the primary steps of the MU-RM. Please note that this method has also been explained in Section 4.5.3.

6.2.2 Outline Description of the Proposed Road Map

Given the existence of different kinds of possible change project, ranging from small change at one production stage through to large-scale change impacting a whole business model, many forms of proposed cognitive (or mental) model may prove suitable to support this research. Therefore, this section will illustrate the application of Weston's five-step MU-RM (Abdullah et al., 2018).

Because we are dealing with a change project, we are by extension considering a dynamic issue, so accordingly we need a unique technique to help us analyse this dynamic behaviour. In other words, because we are dealing with complex systems and this complex system has some dynamic parts, we have to analyse and predict what might happen in the future. Therefore, the tools of MU-RM "as a technique" can help as to anticipate what might happen in terms of system performance when something is changed in the structure of this system. Finally, it is presumed that a number of significant preparatory systematic actions will have been taken before any particular AO change project is started. With these caveats in mind, the MU-RM was perceived as being a systematic way by which to apply the study RM within the context of this thesis; below, we will illustrate the five steps of MU-RM.

MU-RM Step 0: **Agree an outline description of a possible change scenario (or change scenarios) for the specific case firm:** In consultation with their key stakeholders, during this initial step relevant strategic management should outline possible scenarios for change required by a specific firm in order for it to sustain (or advance) its competitive behaviours. In this thesis, such a change scenario has been adopted and will be referred to herein as "Brexit for Tech4i2". This candidate change scenario may originate from within the firm's functions, such as from planning at the top management level or from marketing and R&D at the middle level of management. Having primarily selected between these candidate scenarios, during the later phases each candidate case should be subject to detailed scrutiny and decision making to test its viability and applicability.

MU-RM Step 1: **Populate the AO-RM with specific case information:** In consultation with their key stakeholders, during this second step relevant managers should tabulate case-specific information in the form itemised as per Table 6.1. Thereby, at particular times during the lifetime of the firm, prime elements of specific case change projects (such as defined during step 0) can be defined in alignment with the RM of AO via being listed as specific sets of 'AO processes needed', 'target assets' and 'prime supporting information'; as well as considering the managerial levels that correspond to the study reference model.

Senior managers should search for primary evidence that collectively allows them, along with other teams/and or structural levels, to make a choice between alternative business substitutes, likely kinds of asset transformations required, and preferred alternative assets and business investment scenarios required to facilitate the particular change. On the other hand, mid-level managers should start to identify and reflect upon the mid-level assets required and the mid-level AO configuration processes necessary to fulfil these change processes, and thereby the overall project objectives. Finally, lower- level management should begin to identify and flesh out the deployment asset change required and the low-level AO processes necessary to meet the desired change and thereby the overall project aims; please see Table 6.1.

Table 6.1 Tabulated requirements to achieve AO Processes.

prime variables and supporting information required that condition the context for AO processing at this management level	**AO processes needed**	**Conceptual description of the assets to be developed or to be transformed or acquired**
Variable list	List of search and select AO processes, typically carried out by top-level mangers in consultancy with multiple stakeholders possessing multi-perspective skill sets. List of AO processes needed to realise necessary system configurations, typically carried out by middle-level managers in consultancy with multiple stakeholders possessing multi-perspective skill sets. List of AO processes, typically carried out by middle- and low-level managers and associated technical staff and systems engineers.	List of asset outcomes dependent on the completion of listed search and select processes. List of asset outcomes dependent on the completion of listed configuration processes. List of asset outcomes dependent on the completion of listed deployment processes.

***MU-RM Step 2*: Use of the 'Populated RM of AO' to define managerial and technical responsibilities within each change project and potential sub-projects:** Again, in consultation with key stakeholders, during this step relevant managers should identify and designate owners of the AO processes listed in Table 6.1. Those assignments should reference the position, responsibility and knowledge held by individuals and teams within the specific case firm or by supporting consultants and system providers. This should also be linked to a designation and partial description of AO sub-projects, each of which may need to traverse more than one level of managerial decision making. These various sub-projects will collectively form the whole change project.

Later, this project design step can naturally enable a consideration of 'decision-integration requirements', 'holistic and sub-project planning and scheduling', and 'holistic and sub-project cost and benefit analysis' (the former by referencing resource requirements for related AO processing, and the expenditure required for their associated asset configuration and development).

MU-RM Step 3: **Construct a visual map of the project and sub-project responsibilities, possibly mapping this onto the general organisational structures of the specific case firm (and possibly the potential supply chains of partner businesses):** In consultation with the new costumers throughout stage three, the relevant multi-level managers should develop and agree upon a simple cognitive "visual" model describing the multi-level AO processes of the proposed new change during team-based meetings. The main purpose of this visual map will be to help position AO processing responsibilities and anticipated assets within one structure diagram, thereby promoting a holistic understanding of the entire change project and flagging up where collective decision making will be required (such as across strategic, tactical and operational boundaries and/or across existing departmental [responsibility and budget] divisions).

MU-RM Step 4: **Construct causal loop maps to predict likely dynamic (time-based) business outcomes that will arise from the whole AO project:** A team of multi-level managers, advised by the project stockholders, should collectively construct, develop and deploy some causal loop diagrams. During this step, it is recommended that two multi-stakeholder, multi-knowledge holder discussion meetings should be facilitated by an expert in Causal Loop Mapping. The aim of so doing will be: (1) to defined structural elements of a future model of the changed firm and the potential scenarios for its business growth post-change project; and (b) to use the causal loop model of the future firm to collectively predict its likely future business behaviours. Thereby, the causal loop model and its predicted outcomes should be owned by those multi-stakeholders, and this should help commit investment as required from within the firm and/or from external financial investors. The positioning of this change project stage in time might need to be flexible. This will depend mainly on the time at which business predictions need to be made.

Finally, to help managers be operative systems thinkers it is important that the decision makers are able to reflect on the language and tools that will be used to best understand the complexity inherent to modern systems. Therefore, the study emphasises the fact that the proposed causal loop diagrams will be configured in a simple and usable way; also, the hypothetical model will then be a detailed, used and

demonstrated. Furthermore, there are many different mental methods that could be adopted but we use causal loops because they have a proven applicability, especially in supporting complex social science thinking and prediction; please see (Kopainsky and Luna-Reyes, 2008, Lane, 2001).

Based on the preceding illustration, in the next section the MU-RM will be instrumented to enhance managerial ability in a way that integrates decision making throughout the organizational structure, crossing "high, middle and low organisational levels". This visual guide will be applied in conformance with the AO processing requirement previously defined. Additionally, the proposed causal loops will be linked to the AO reference model through each distinctive level and across those structural levels.

6.3 Methods of Utilising the Study Reference Model: A Visual Guide in the Case of Brexit Change in Tech4i2

A series of interviews were held with Tec4i2 staff, which shortly followed the UK Brexit decision. The Tech4i2 'project structure' conceived and presently being used to realise Brexit-related asset orchestration was essentially observed to traverse three (top, middle and lower) levels of managerial action. Generally, as the data analysis demonstrated in Chapter 5, responsive, flexible and team-based decision making and action taking is key to successful and sustainable business outcomes; hence, typically when any form of change is required, several individual Tech4i2 staff bring their specific experience, knowledge and skills (as part of a team) to the various AO activities performed. Any Tech4i2 change team should first know exactly what kind of resources and capabilities they need to trigger the change project, and whether the existing resources or the resources and capabilities they need have to be developed, purchased and/or found through partner businesses. In Table 6.2, we report some examples of the resources and capabilities owned by Tech4i2.

Table 6.2 Tech4i2 resources and capabilities.

	Resource and capabilities that might be required to adapt to Brexit change	**Resource and capabilities situation**
1	Applications Knowledge; based around support provision for an Extensive Government, Business and Manufacturing Customer Base	Already exists
2	People Systems and Information Supported Knowledge	Already exists, but needs to be updated in the light of the need for any new software model and analysis capability
3	Government and Business Economic Policy Development and Analysis Techniques	Already exists, but needs to be updated in the light of the need for any new software model and analysis capability
4	Interconnectivity and Systems Analysis Methodologies	Already exists, but needs other capabilities for new activity forms
5	Big Data Access and Analysis Methodologies	Already exists
6	Research Capability	Already exists and needs to be developed
7	Consultancy Capability	Already exists and needs to be developed
8	Relationship, values, location and brand capabilities	Already exists
9	Hardware and software resources	Already exists
10	Partners	Already exists but new partnerships may need to be developed.

The next section illustrates how Tech4i2 might conducted the proposed MU-RU approach, keeping in mind that the various processes required needed to be integrated according to the study reference model, in order to meet the goal of adapting to Brexit change.

6.3.1 Search and Selection of AO Processes

The top-level management thinking should, in particular, consider how the search processes for new opportunities or awareness of threats should be accomplished, such as how Brexit change impacts on Tech4i2 and its projected key end customers will have an impact on the sustainability and profitability of the business. In addition, how Brexit change will affect the availability of necessary employee's skills and possible future investment needs should also be considered. Table 6.3 groups interview responses provided primarily by the managing director of Tech4i2 when asked (with

reference to the study reference model) to characterise the Brexit-related search and selected AO processing. The managing director confirmed that, on an ongoing basis, top-level search and selection processes are required to detect and shape business opportunities in alignment with the firm's strategy. This was as expected and is in accord with the writings of Teece (2009), where small- and medium-sized firms such as Tech4i2 typically must continually scan, search, and explore new prospects in order to sustain their business activities and economic sustainability. However mainly due to the market uncertainty arising from the pending Brexit, Tech4i2's best forward strategy was itself uncertain. Hence AO processes based around combined long- and short-term thinking were necessary to provide Tech4i2 with the ability to recognize new opportunities for market innovation which, collectively, could maintain and develop the business over the long and short term, primarily in new market areas where Tech4i2's existing and evolving policy research and consultancy core competencies might competitively be exploited so as to seek to at least maintain an economically viable order book.

Therefore, following the UK Brexit decision, increased emphasis was placed on Tech4i2's 'new policy research and consultancy contract opportunity search/selection processing within new markets', which has grown markedly relative to other predecessor situations. The interview responses confirmed that many of those new search and select AO processes bear a degree of similarity with pre-existing contract identification and bidding processes, as per Table 6.3. However, critical new information and knowledge and skills related to previously unknown markets required new threads of learning activities. This was manifest in the new need for Tech4i2's top level management to conduct extensive information gathering and to disseminate the associated findings to their staff (and thereby to selected external Tech4i2 associates so as to assess new market needs and in so doing to promote a changing strategic attitude).

Table 6.3 Tech4i2 high-level search and select AO requirements.

Prime variables and supporting information that condition the context for AO processing	**AO processes needed**	**Identification of assets to be developed or transformed or acquired**
Prime external variable market trends, possible acquisitions and alliances Existing and new customer needs New technology and "IT innovations". Government laws/rules. Competitors' activities. Globalization impacts. Prime Internal (to Tech4i2 and its partners) Variables: Firms core competencies and capabilities Firm's human resources Firm's expert skills Firm's expert databases Unique software, systems and applications Firm's brand and history. Customer relationship networks UK, EC and global contract partnership networks. Firms capital, number of employees, hardware, and other financial facilities. Key Tech4i2 Stakeholders: The owner and MD of the firm EU and UN funding organizations. UK Government. Leicester Regional Government funding organization. Lloyds Bank.	Search and Select AO processes Combination of sub-processes necessary to 'detect and shape' new business opportunities for Tech4i2; Assess what government and multinational businesses require with respect to specific project calls and contracts. Draw out key issues from in-depth discussions around some of the industry expertise. Determine general trends and assess opportunities in potential markets. Plan to become better structured and organised internally. Become aware of market changes and external threats, particularly in the new potential markets. Assess the need for new capabilities (e.g., new resources combinations, building new systems and necessary new databases. Gathering, documenting and circulate key and relevant information. Search and Select AO processes necessary to 'detect and shape' new business partnerships for Tech4i2. Sub-processes necessary to find and select the right joint ventures with potential partners. Develop inputs to a new global group of external experts and possible partners Search and select processes that identify new or additional premises: To be located in an EU27 country, thereby post-Brexit to retain at least a limited access to EU R&D contract markets. Conduct ongoing business analysis Consideration of new market business costs, investment returns and socio-economic impact for individual contracts and possible future total portfolios of R&D contracts.	Draft planning scenarios for change: That provide an intellectual insight into what Tech4i2 changes are needed for it to operate in potentially identified World and EU markets. This is needed to determine (1) new asset/resource developments, (2) define a new business model and incentives systems. Examples of new Tech4i2 asset outcomes developed: A market analysis of business accommodation in key urban areas within the East Midlands. A number of instances of finding the right joint venture partner and conducting requisite due diligence to exploit opportunities. Observed key market need for cross-border data flow and the barriers to and related benefits of cloud computing. Observed secondary markets for freedom of data flow across EU Member States. For Tech4i2 and its partners identified key opportunities arising from the impacts of 5G in EU28 Member States.

Other observed top-level managerial Brexit-related search and selection processes involved finding a good joint venture partner and conducting requisite due diligence to exploit new business opportunities. Particularly, for example, the managing director of Tech4i2, in conjunction with his partners, had identified the opportunities that could still arise following the impacts of 5G in EU28 Member States; please see Chapter 5.

At this stage, in consultation with key stakeholders, all relevant high-level managers should develop and agree upon a simple cognitive model showing high-level consideration of search and selection processes. Figure 6.1 demonstrates an example form that this mental model could take. This model should be partially fleshed out during Tech4i2 high-level team meetings with required inputs, outputs, and knowledge, information and underpinning resources.

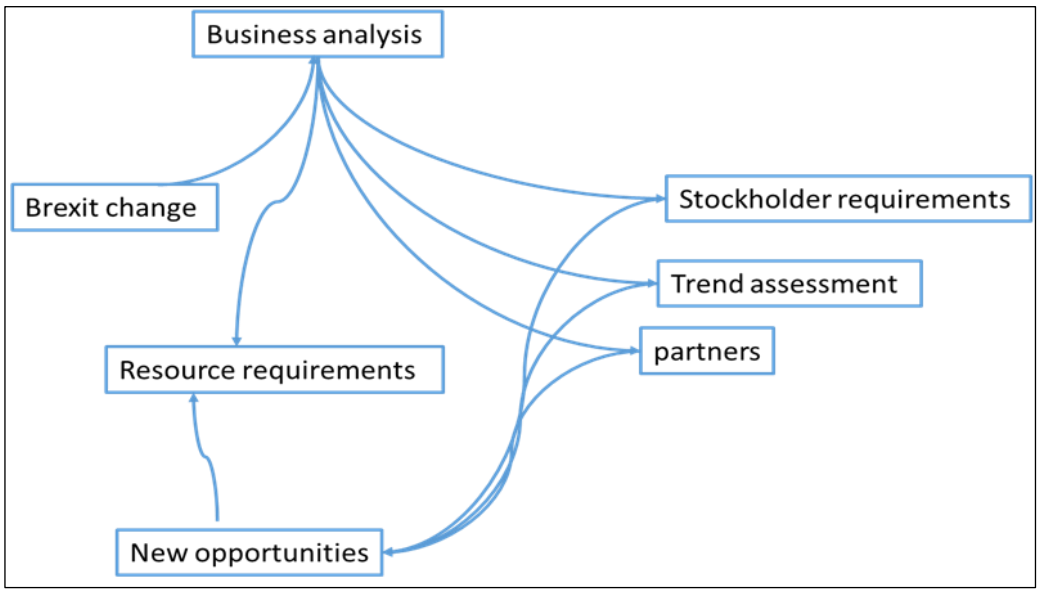


Figure 6.1 Illustrative cognitive model used to unify search and selection processes.

Further key threads of Brexit-related AO Search and Select processing related to defining the best possible future premises of Tech4i2, which in effect needed to anticipate its quasi-stable new strategy. This AO processing was also centred upon the managing director, although, as required, appropriate occasional support was given by middle- and lower-level managers, partners and stakeholders. Essentially, a particular focus of attention was that of finding a suitable premises (short and longer term) and

securing the finances for new or partial premises opportunities in the Midlands, primarily for geographical, language and cultural reasons.

The final step in the change project phase suggests that such a cognitive model as that shown in Figure 6.1 can help build a causal loop counterpart cognitive diagram, which can underpin the collective high-level thinking needed to predict future time-based dynamics of the business, following the realisation of the selected change strategy. This is undertaken in order to satisfy potential stockholders and middle- and low-level managers. In addition, in consultation with key stakeholders, during the current change project phase top-level managers should use the study reference model as a cognitive basis for tabulating specific change case AO processing. Thus, at particular times during the lifetime of the firm, prime elements of specific case change projects can be redefined in alignment with the reference model having been listed as specific sets of high-level 'AO processes needed'; please see Figure 6.2.

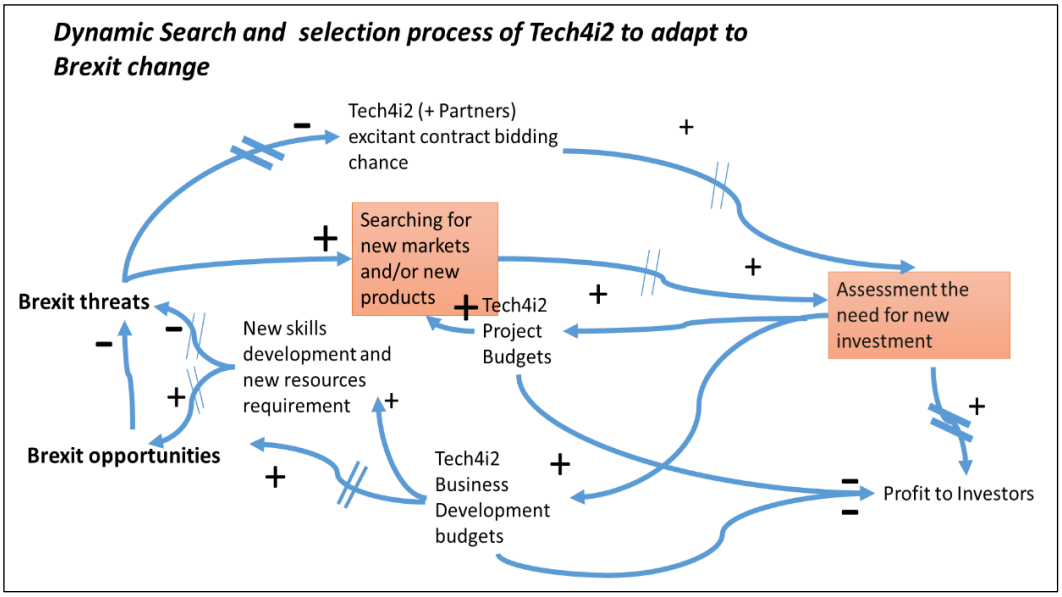


Figure 6.2 Causal loop map of search and selection processes.

From Figure 6.2, we can see that Tech4i2 needs to avoid the threats of Brexit and continue looking for potential new business opportunities. We can also see that the main goal in the search and selection stage is to find new markets for its existing knowledge/skills/products and/or find new opportunities for its existing products in new markets. These search and selection processes require Tech4i2 to develop its

employees' skills as well as find and deploy new capabilities and resources. The above processes will depend on the investment budget and the visibility study for the expected profits. Further, Figure 6.2 illustrates that Tech4i2 can reduce the threats due to Brexit by increasing the capabilities and "skills" of their employees. In addition, it should accumulate resources according to the needs of its new situation. At the same time, as and when Tech4i2 has developed these new capabilities they could act as a source of new business opportunities.

Lastly, Figure 6.2 illustrates a simple form of causal loop diagram; critically, this diagram was designed to bring the various multi-perspective views held by the top management "team" into one causal map, which could include relevant managers in partner businesses. Henceforth, different perspectives will enquire about the model itself and future scenarios under current consideration. Furthermore, it is believed by the author that this could provide a basic structure for bringing multi-departmental information and knowledge into one high-level dynamic (continuous systems simulation) model which can, if required, be run using a proprietary future continuous simulation tools.

6.3.2 Configuration of AO Processes

Table 6.4 groups interview responses obtained from Tech4i2 managers (operating primarily at the middle and top organisational levels) when they were asked (with reference to the study reference model) to characterise the Brexit-related system configuration AO processing in which they were engaged or expected to be engaged in in the near future. All Tech4i2 middle managers confirmed that they are required to contribute to complementary activities that help the managing director determine and realise the ongoing change in the firm's strategic attitude. Their interview responses showed that a principal role of middle-level asset integration processes in Tech4i2 is to plan to achieve alignment between 'available competencies and capacities of Tech4i2 staff' and 'Tech4i2's current and projected project workloads'. This is necessary to ensure that contract bids and their outcomes satisfactorily meet clients' expectations In addition, the author proposes that – in consultation with key stakeholders – during the current change project phase, all relevant mid-level managers should use the study

reference model during team-based meetings as a cognitive basis for tabulating needed mid-level AO processes in the form itemised in Table 6.4.

Table 6.4 AO requirements to achieve required system configuration.

Prime variables and supporting information required	**AO configuration processes needed**	**Conceptual descriptions and/or physical manifestations of needed assets and/or asset changes**
The new Strategic Vision for Tech4i2: To ensure that the firm moves towards newly identified markets and their competitive environments. All necessary contract and contextual Information needed. To ensure that contract bidding information and bid outcomes can satisfactorily meet client's expectations.	Conduct specific asset configuration actions needed by individual projects To ensure that contract bid outcomes meet client's expectations, such as by: Designing a work plan for each bid and for new projects anticipated. Developing a specific plan of teamwork relationship and roles with each bid's partners or joint ventures. Use of the new strategic vision to direct the creation of new capabilities which address the firm's new competitive context; By developing new knowledge and gaining new skills towards the fulfilment of individual projects (which will be run after a contract is won) and to fulfil all concurrent projects run by Tech4i2. This may, as directed by the strategic plan, require the recruitment of new staff with new needed competencies and work capacities. Use of the new strategic vision to bundle resources to build enhanced capabilities; -to address the firm's new competitive context, such as - By team building and keeping skills up to date. - By implementing the firms' new business model according to the fulfilment of each individual project. -By facilitating new knowledge development and gaining new skills, which might involve learning new analytical tools and the purchase of new data and software. Use of the new strategic vision to coordinate the co-specialisation of assets.	Example asset outcomes are dependent on the completion of the listed configuration processes: -Use of managerial relationships with stakeholders to write new bid's proposal in a more creative way which reflects Tech4i2's growing business experiences. -Use of Tech4i2's emergent capabilities to offer new products for current or new customers in the same or new markets. - In property markets: use of Tech4i2's analytic capabilities with software design capabilities to produce applications that provide new customer features that enabled them to gain a clear insight into the commercial property "in specific places and period of time".

Significantly, the managers in charge of the mid-level processes should begin to identify and flesh out the AO configuration processes necessary to fulfil Brexit change and thereby Tech4i2's overall goals. The timings of mid-level management decisions are likely to be largely asynchronous with those of decision making by top management because there is a causal dependency between those levels with regards to information and knowledge and, possibly, shared team involvement.

During this phase, and in consultation with key partners, all relevant mid-level and high-level management consultation should develop and agree upon a simple cognitive model to illustrate management attention on configuration processes. Figure 6.3 shows an example of the form that this mental model could take. Critically, at this stage the decision should be made having considered the need to balance the new markets' (products) requirements and the firm's ability to achieve these needs. Hence, the new Tech4i2 vision should be constructed in the light of these new requirements. This might include re-bundling, re-coordinating and re-building the firm's resource capabilities; please see Figure 6.3.

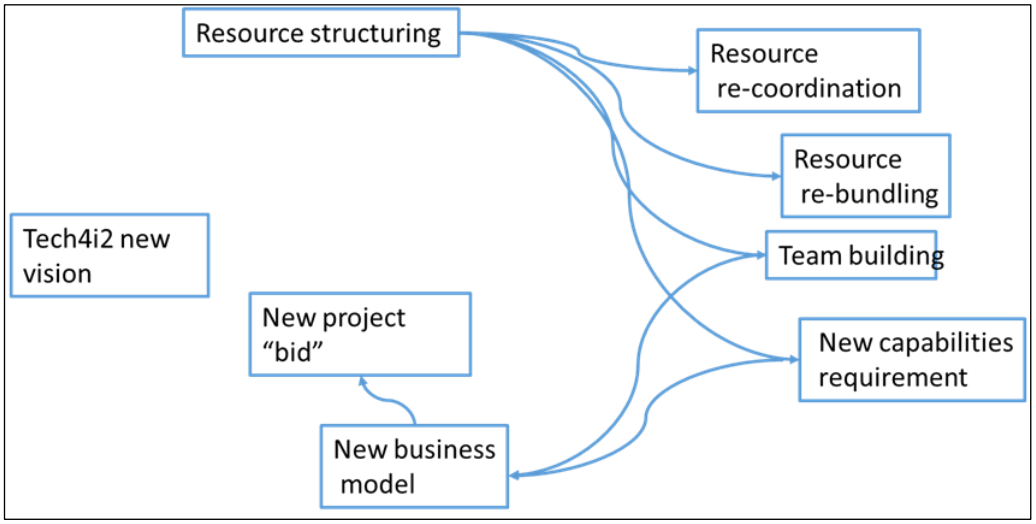


Figure 6.3 Illustrative cognitive model used to unify configuration processes.

However, during this phase of the consultation with the project winner, it is recommended that mid-level and high-level managers should develop and agree upon a simple causal loop diagram representing the new change situation during their team-

based meetings. Figure 6.4 illustrates an example form that this causal loop model could take.

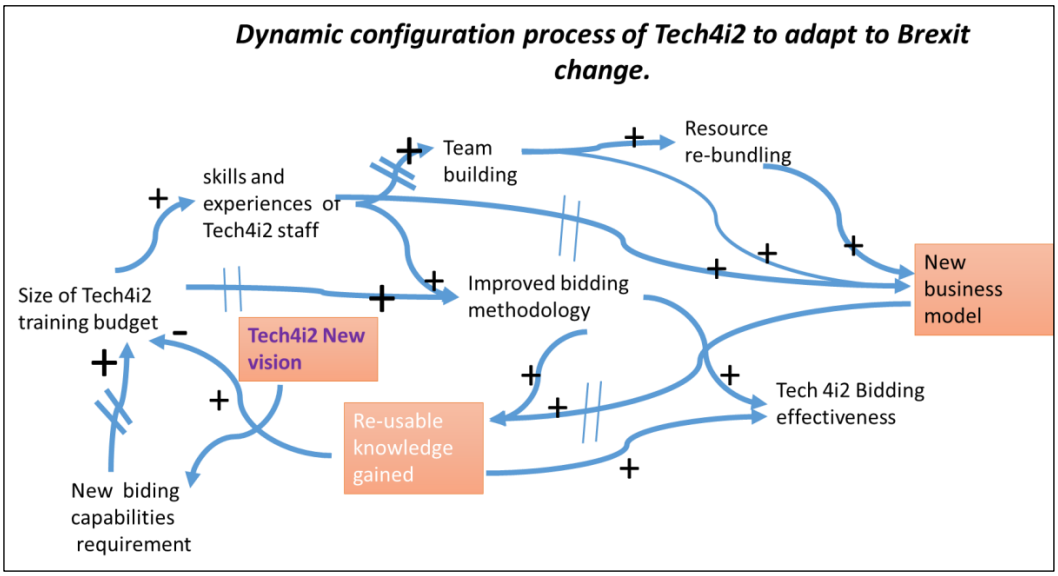


Figure 6.4 Causal loop map of an example configuration process.

The process depicted in Figure 6.4 indicates the suggested way in which Tech4i2 could build and deploy its new strategic vision. Firstly, the company needs to develop its bidding capabilities to fit with the new market/product "commercial property project". This should include the development of the teams' skills and capabilities "to meet the new software requirements". In addition, Tech4i2 should improve its bidding methodology so as to consequently improve its bidding effectiveness. On the other hand, when Tech4i2 re-bundles its resources this will likely require the modification of its business model. Collectively the above-mentioned processes will enhance the firm's ability to gain new re-usable knowledge and thus introduce a new "learning curve", thus helping achieve the new vision. However, improving those capabilities and gaining new resources will depend on the size of the training and investment budget; please see Figure 6.4 .

6.3.3 Deployment of AO Processes

Table 6.5 groups the interview responses provided primarily by middle- and lower-level Tech4i2 managers when they were asked to characterise their ongoing Brexit-related (system realisation and deployment) AO processing. Suitable resourcing (short

and medium term) must be planned and maintained for the redesign of the firm's business model according to changing strategic steers consequent upon Brexit planning and decision making, and also upon the realisation of new projects won from new markets as they proceed. Clearly for the firm to remain profitable in any given timeframe, payments made by clients for a current Tech4i2 contract/project portfolio holding which must generate at least sufficient income to suitably remunerate Tech4i2 staff as well as to fund all other company activities. Therefore the 'current people assets' (and hence the available people competencies and capacities that can be aligned to Brexit-related actions and learning (as well as to contract bidding and fulfilment) will be limited. Consequently, significant tension will exist between the mid- and lower-level managers responsible for Brexit and ongoing AO processing that leads to the planning and maintenance of the above processes; please see Table 6.5.

Table 6.5 Brexit-related AO requirements to achieve a change in Systems Realisation and Deployment.

Prime variables and supporting information required	**AO realisation and deployment processes needed**	**Detailed descriptions and/or physical manifestations of assets to develop, transform or acquire**
The new Strategic Vision for Tech4i2 -to ensure that the firm adequately serves newly identified markets and their competitive environments. All necessary contract and contextual Information needed -to ensure that contract fulfilment will satisfactorily meet clients' expectations with all necessary contract planning and budget information	Conduct deployment processes: -that apply the established and emergent Tech4i2 capabilities and networks: to create value for customers and wealth for stakeholders. This would typically include three main sub-processes: Mobilizing: "The process of identifying the capabilities needed to support capability configurations necessary to exploit opportunities in the new and established markets" (Sirmon et al., 2007 P: 277). The intent of mobilizing is to identify and design the capability configurations necessary to exploit opportunities in markets identified by the strategic plan and thereby to gain a competitive advantage. Coordinating: "The process of integrating identified capabilities into effective yet efficient capability configurations which can gain a competitive advantage in alignment with the developed	For Tech4i2, the main new markets accessed or to be accessed include: UE Commission, UNDP, UK Government organizations, Leicester Local Government, Commercial property markets in the Midlands, UK. In responding to market change and opportunities, Tech4i2 has since developed several

	strategy" (Sirmon et al., 2007 P: 277). Leveraging: "the process of physically using capability configurations to support a chosen deployment strategy, which includes the resource advantage strategy, market opportunity strategy and entrepreneurial strategy (Sirmon et al., 2007 P: 277). The leveraging of the Tech4i2's capabilities in one market context has resulted in organizational learning that fosters their application in other cognate market settings. These additional applications have so far proceeded by: (1) leveraging the same capabilities to serve other customers with similar needs, (2) using the knowledge gained by serving a given customer's needs to sell other services to that same customer, and (3) Learning how to apply the market segment-oriented expertise so developed. In respect of the above AO deployment processes, for Tech4i2 to build effective, interactive relationships with customers it is vital to gain the knowledge required to match the firm's capabilities to customers' needs, especially their latent needs. Generally, Tech4i2 has also determined to choose markets in which its capabilities can be effectively leveraged to create the greatest value for customers.	new capabilities such as related to realising strategic investments in firms which it will leverage elsewhere.

At this lower level, managers should begin to identify and flesh out the deployment asset changes required, and the low-level processes needed to fulfil the Brexit change, and thereby the overall project goals. The timing of low-level management decisions made is likely to be largely asynchronous with that of decision making through middle and top levels of management, which will likely support the causal dependencies between low-level management, with information and knowledge and possibly team memberships shared by middle and top management. In consultation with middle and top managers, relevant lower-level managers should (during team-based meetings) develop and agree upon a simple cognitive model describing their low-level deployment processes. Significantly, this low-level model should be fleshed out to show how necessary low, mid and high-level resource-based decision making should

be integrated. Figure 6.5 provides a visual aid of the form that the model at this level could take.

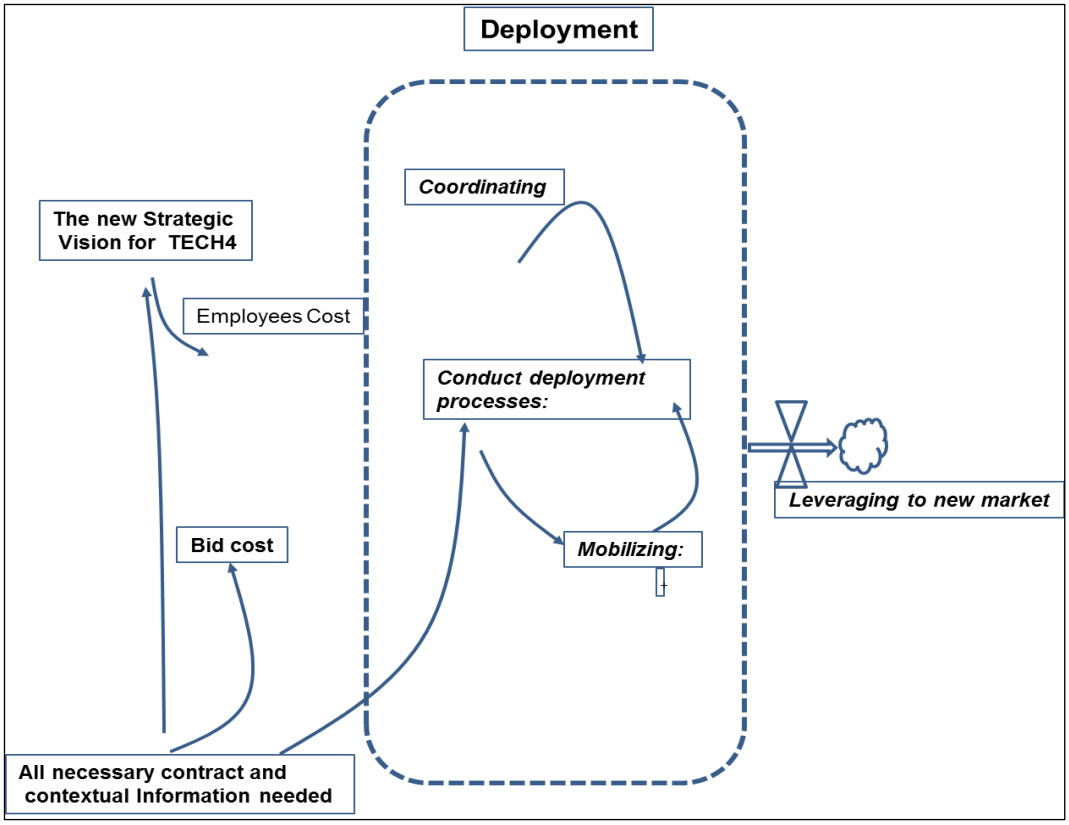


Figure 6.5 Cognitive model used to integrate deployment processes.

Finally, it is recommended that low-level managers should develop and agree upon a simple causal loop diagram representing the new change situation during their team-based meetings. Hence, the final step in the change project phase proposal is that such cognitive model will help build a causal loop counterpart cognitive model. This causal loop diagram can underpin the collective low-level thinking needed to conduct the entire change strategy in order to satisfy potential stockholders and managers in the upper levels; please see Figure 6.6.

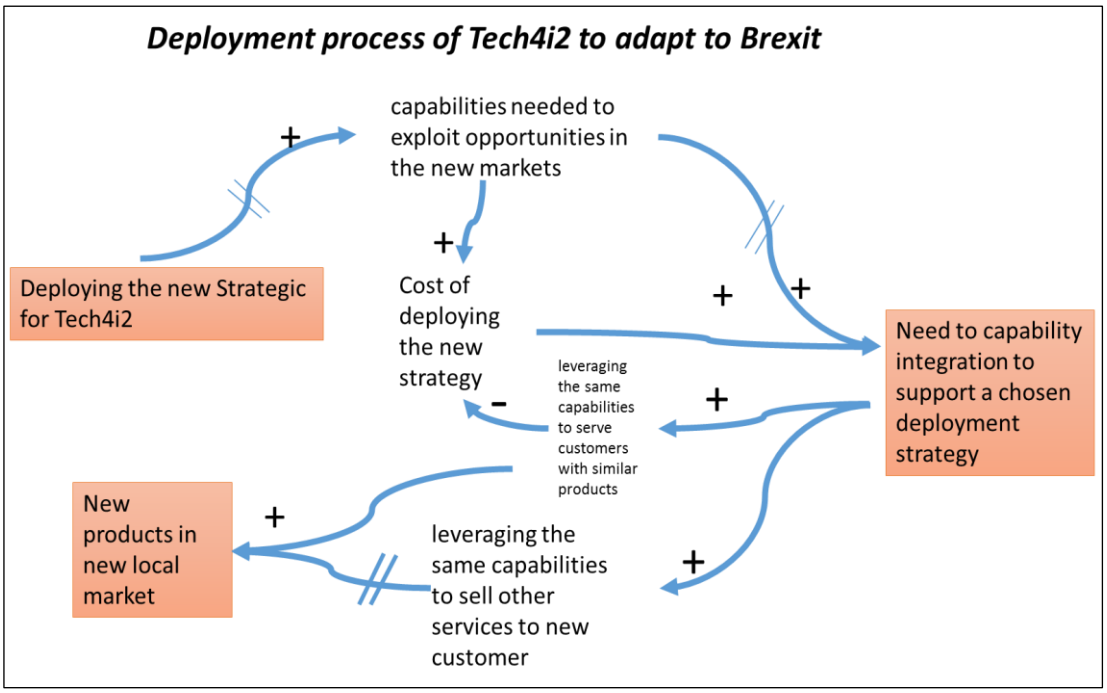


Figure 6.6 Causal loop map of deployment processes.

The goal of the above causal diagram is to help Tech4i2 conduct its deployment processes. This includes choosing new markets for their new products and "*providing a market analysis of business accommodation in key urban areas located in the East Midlands such as Leicester, Northampton and Nottingham"*. Deployment of the new strategy required new (or the leverage of existing) resources and capabilities to exploit its business chances in the new markets identified.

It should be kept in mind that the deployment process is responsible for the manner in which the entire AO process itself is conducted; hence, it should be intimately related with all three AO levels. Consequently, this management phase needed to be integrated with all three managerial levels. Markedly, the causal loop map in Figure 6.6 demonstrates in example form how this integration should be realised. This model should then be collectively fleshed out (possibly through a series of team meetings) to show how the necessary high-, mid- and low-level resource-based decision making should be integrated.

6.4 Conclusion

The chapter used the RM to form a conceptual basis for creating an AO Road Map, from which we can conclude that the chapter has filled the knowledge gap, which was about the absence of a well-integrated “guide map” concerning the AO mechanism through the managerial levels, consequently answering the second research question.

In this chapter, we have used the AO Road Map to support the design of change projects in Tech4i2 by providing a framework for decision making at multiple levels of the AO processes. In addition, team-based decisions-making was linked via the use of mental models. Thus, this filled a gap in the integration of AO processes by showing that the team can work together through these different processes. However, the chapter considered the road mapping of the Tech4i2 change project, which represented a completely different use of the AO processes from their first use in “Chapter 5”, which examined detailed instances of AO (more detailed case examples). In the next chapter, the third use of AO-RM will be presented. Issues of applicability and generalization will be investigated through the use of an online questionnaire and data-gathering approach.

Chapter 7 Use 3 of AO-RM: About the General Applicability of the Study Reference Model: Online Questionnaire-Based Analysis

7.1 Introduction

This chapter uses an online questionnaire-based analysis to test the utility and applicability of the study reference model. As mentioned in Section 3.7, the third use of AO-RM would be to guide the design of an online-questionnaire with a view to eliciting a large number of additional case populations of the AO-RM with a view to seeking commonality between AO processing at multiple levels. Additionally, by deploying such a survey, this thesis chapter seeks to determine whether the study reference model can usefully represent common AO activities deployed within firms that are needed to sustain their responsiveness within dynamic business environments. Thus, by analysing the participants' responses, the aim here is to systematically generate new data on how businesses go about 'orchestrating their resources' capabilities so that they can achieve sustained and adaptable business performance. In addition, as highlighted in Section 2.8.1, the AO literature suffers from a general lack of "instances of AO", that is, specific case examples, as actually practiced in firms. Accordingly, the section aims to achieve the following objectives:

1- To examine typical AO processes used in various firms to realise business change.
2- To consider the applicability of the study reference model as representative of the nature of different firms, as per differences in size, business sector and/or relative position in their market(s).
3- To generalise findings under 1- and 2- and thereby to appraise the utility of the reference model in terms of its ability to provide generic support for AO project design.

To achieve the above agenda, we first consider the data collection and data analysis aspects that were considered in order to design and apply the online questionnaire.

Secondly, the firms' ability to adapt to business change (e.g., its responsiveness) will be examined. Thirdly, the applicability of AO processing concepts and managerial integration processes will be investigated. Lastly, the chapter will evaluate the three uses of AO-RM together, and then will summarise them in a set of concluding remarks. It should be borne in mind that this chapter will present the survey results with only a basic interpretation of its results; the next chapter, however, will discuss these results in more depth.

7.2 Data Analysis Process

It was decided that the online-questionnaire would consist of three sets of questions as follows (see Appendix C): ***Set A*** questions would elicit background information about the participants and their firms, and thereby enable the classification of those firms submitting questionnaire responses, whereas answers to ***Set B*** questions would characterise the nature of the responsiveness that had to be achieved by those firms. ***Set C*** questions were focussed more directly on assessing the potential utility of the AO reference model with respect to each firm. Also, it was decided that to analyse the answers to the Set A questions a descriptive method would be used. However, a statistical analysis approach was chosen to analyse the answers to the Set B questions, while for Set C a thematic analysis would be conducted (Bryman, 2014).

The deployment process of the online-questionnaire included piloting example survey questions with participants from three companies that have business activity in the consultancy and IT sectors. Also, practitioners and academics familiar with survey design suggested reformatting the questionnaire. In terms of content, the questionnaire was designed to gain two kinds of data, namely quantitative and qualitative data, (Appendix C). Consequently, for quantitative questions the study was designed to use statistical descriptive analysis to answer closed questions whose answers were based upon the Likert scale, while for the qualitative questions the study was designed to use thematic analysis, with participants providing qualitative data in the form of written responses to "open-ended questions".

The online survey was conducted using the "Bristol Online Survey" (BOS) software. This software provides a professional service that allows users to develop, deploy, and analyse surveys via the internet. BOS is used by over 300 organisations, including roughly 130 UK universities in addition to other establishments and public bodies (BOS, 2018). The online questionnaire was sent by email to a list of companies that carry out their businesses in disparate sectors such as IT, consultancy, academia, and banking services. The surveys were sent to 40 companies of different kinds covering large firms, medium-sized firms and SMEs. Unfortunately, however, there were only 17 respondents; please see Table 7.1 [1].

Table 7.1 Characteristics of participant companies.

response Code	Company name	Company sector	Company age	No. of employees
299085-5952157	University Teknkal Malaysia	Education	17	1798
299085-6017799	Tech4i2	Consultancy	9	3
299085-6373447	Preferred to remain anonymous	IT and Media and Entertainment	37	1150
299085-8136334	Call of Crows	Consultancy on Public Policy	8	14
299085-8136945	Together in Matson	Social Community Organisation	22	3
299085-8138201	Red Hat Consulting	IT Consultancy	8	26
299085-8140605	Lombard and Ulster Ltd	Merchant Banking	+100	50
299085-8143775	My Money Karma	Financial Services	2	20
299085-8155441	Econometric consultants Ltd	International Policy	20	1
299085-8158227	Maven Fellows	Academic Consultancy	1	0 (Charity)
299085-8237221	Halifax	Retail FS	100+	25000
299085-8828957	Telit Communications	IT Solution	3	46
299085-8829348	Vipera	Gaming Software	5	52
299085-8829658	Neil Raven Associates	Academy	9	4
299085-8830006	SciSys	Software Security	8	22
299085-8830253	Convatec Consulting	IT Consultancy	2	11
299085-8913735	Manufacturing Modelling	Evidence-based Research	10	10

[1] However, the processes of finalizing the questionnaire was not easy, it went through a very long processes of testing and finalization. This required seeking external and internal guidance "experts", as well as the support of both of my supervisors, in addition to changing the wording, harmonization, changing the number of questions, and changing the positions of these questions in the questionnaire itself. It took more than eight months to devise these questions and make them ready for use.

7.2.1 Background Information about the Participant Firms

Table 7.1 above, illustrates that the respondent companies vary widely according to their sector, size and firm's age. Some of these companies are UK-based while others are multinational enterprises. In addition, we can clearly see that the companies operate in a range of sectors covering consultancy, IT, education, and software. For example, we have five companies working in the consultancy sector, four companies working in IT sector, and two firms working in the financial sector. In addition, we can see that these companies differ in their age, with two of these companies having been established for over 100 years. However, some other firms are still emerging with an age of no more than one or two years.

Lastly, Table 7.1 also demonstrates that the companies differ very significantly in terms of the number of full-time employees they deploy. For instance, we have a very large company with 25,000 people working full time; another company has 1798 full-time employees, but we also have a very small firm with only one worker. To gain a clearer insight into the online questionnaire and thereby to analyse its use in more depth, the next paragraphs will highlight the second part of the survey which was related to examining the companies' responses to changes in their particular business environments.

7.3 Characterising the Responsiveness of the Participant Firms

According to the study reference model, as conceived and described in Chapter 3, in this study the term responsiveness is used to refer to 'a firm's ability to adapt to business change'. The questionnaire asked respondents to describe their firm's ability to sustain competitive responses.

Indeed, the main question asked of respondent firms was *"to what extent do you agree that your firm can readily adapt to business change?"* Further, a large number of sub-questions were asked to gain a depth of understanding about the nature of the firm's adaptability. The questions asked were (please see Appendix C):

1- Responsiveness to significant volume change in consumer demand?

2- Responsiveness to regulatory change in the business environment?
3- Ability to readily enter into new regional or international markets?
4- Ability to extend variety among the range of products made available for sale?
5- Can readily empower employees for individual learning?
6- Ability to readily customise their products?
7- Responsiveness to external market requirements?

Finally, the answers given were ranked according to a Likert five point scale. The points were: “could not feasibly adapt; possibly could adapt; not applicable; usually can respond, but need a significant change process; and regularly and readily adapt to the change”.

We can see from Figure 7.1 that 48% of the participating companies regularly and readily adopted to business change. In addition, 30% of the participating firms usually respond but with the need for some significant change process. Consequently, 78% of the participating companies felt they were able to adapt to market change. Therefore, we can conclude that over three-quarters of the participating firms have at least some degree of ability to respond to business change, which indicates that those companies need to consider how to adapt to new market demands and/or changing customers’ needs (please see Figure 7.1). The results also show that the firms have regularly and readily adapted to change in their markets, with the need for significant supporting change processes. Accordingly, we can conclude that the questioned firms have a good responsiveness to business changes, which shows their adaptability to change in the markets’ and customers’ needs.

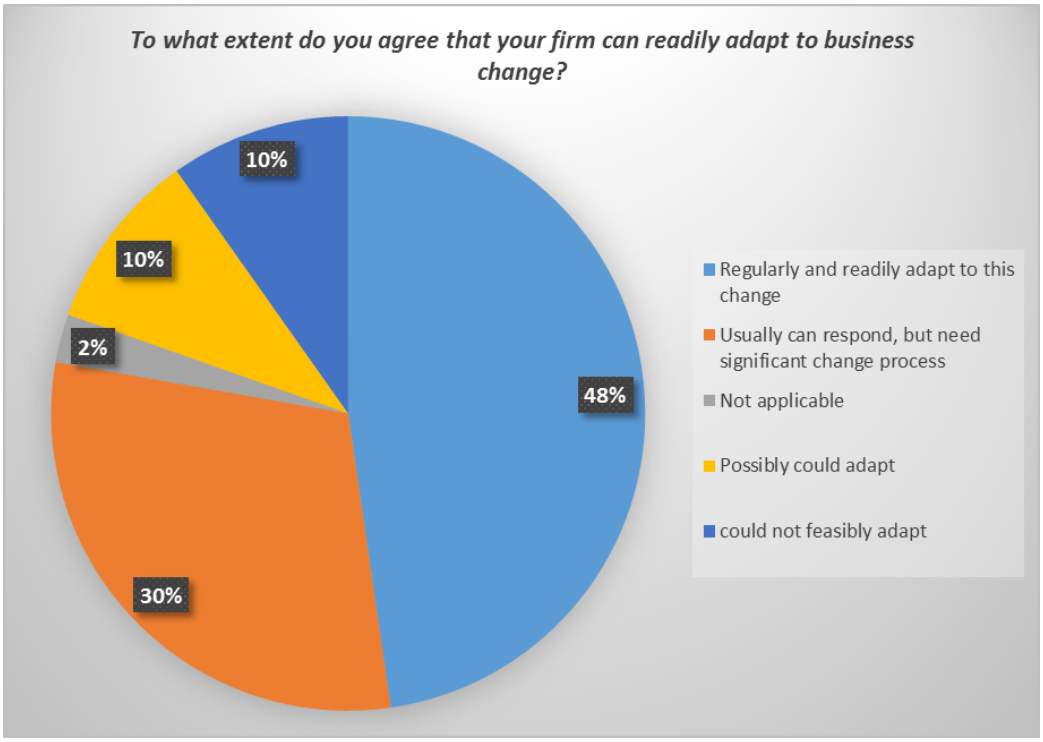


Figure 7.1 Firms' responsiveness.

7.4 Proposed Use of a New Reference Model of Asset Orchestration

As mentioned at the beginning of this section, by analysing the answers to the three sets of questions (Set A, Set B and Set C), the study aims to analytically gather data on how businesses go about orchestrating their assets such as to achieve and sustain a business advantage. In this section, the qualitative "open-ended" questions were used to capture the applicability of the study reference model throughout the position of managerial roles performed during episodes of significant change (such as the recent Brexit crisis).

To examine the applicability and generality of the study reference model, two kinds of question were asked, as related to the functionality of the AO model. Firstly, we state that we consider there to be three main levels of managerial processes, 'search and select' processes at the highest level, 'configuration' processes at a mid-level and 'deployment' processes at the lowest level. Secondly, we state that we supposed that typically managers will operate at all of these levels and need to co-ordinate their decision making and action taking across these levels.

The main question asked was "Do you feel that our new reference model of asset orchestration usefully represents some of the managerial actions that you and other managers in your firm take part in when realising business change?" We can see from Figure 7.2 that 88 % of the participants answered yes, which indicates a high level of general usefulness and applicability of the study reference model. To back up answers, typical qualitative statements made by respondents were:

> *"This pretty much represents what I do with a small number of employees where I am the main consultant and the roles are relatively well defined. Your hierarchical description is pretty much how we organise"* Manager Code -299085-28829658.

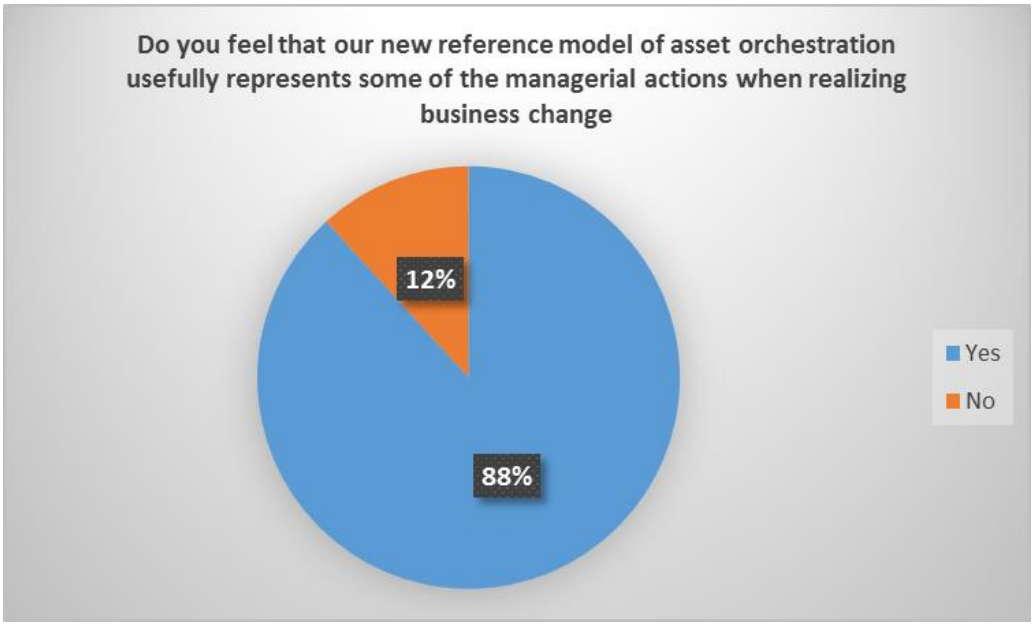


Figure 7.2 The applicability of the AO model.

However, later we asked those participants who answered "Yes" to the preceding question whether they preferred to represent the AO model in some different way. Accordingly, their answers were "open-ended answers" clustered around three types of exceptions:

The First exception, when some managers thought that the study model might not fit with very small or big companies, stating, for example:

> *"In smaller firms, three management levels are too many. "….." has only one person in a senior managerial role and none at Middle"* Manager Code 299085-26017799.

The same view was found in some very big companies, where managers believed that:

> *"the hierarchical pyramid doesn't work well for a £120,000 revenue, one FT manager, 7 board members, it is questionable where the power sits in reality against theory"* Manager Code 299085-28136945.

The second exception was related to the unique nature of some of the companies. For example, for a company hiring only experts to create IT solutions, these kinds of firms might have a unique organizational structure that does not fit with the proposed AO model. For example, one of the respondents stated that:

> *"For our company the ranking of management layers has limited application. We work very clearly on the principle of changing constellations of individuals whose particular skills are tailored to the needs of the contract that we win or the solution that we need to implement in our customer organisations. In this sense we do not have senior and junior or middle and top, though your model does show the process of change well"* Manager Code 299085-28138201.

Another respondent stated that:

> *"For us its three levels of asset - strategic through to operational is not sensitive enough to the sorts of assets that underpin what we do. Our software offer is relatively simple to construct but very hard to think about and it is that thinking which is vital to the success of the business. This is not represented in your model and, if it were, it would not be segmented into the hierarchies you indicate"* Manager Code 299085-28829348.

The third exception was firms that have a unique organizational structure with one directional authority with certain companies such as "accounting and financial firms" which prefer to keep the flow of authority top-down only, or "high centralization".

> *"most of the time it is a top-down direction and implementation, layers of management delegation are common in the financial sector - however, they can sometimes prevent upwards communication from employees at a business front end of the business to those at senior management positions"* Manager Code 299085-28140605.

In the preceding section, the main concern was the examination of the applicability of the AO-RM in a larger number of companies. From the above analysis, we can conclude that the study reference model has general organisational features found in many firms, despite operating in different sectors. In addition, we can suggest that the results derived from the online questionnaire support our analysis in the qualitative phase of our research in Chapter 5, which indicates that the AO-RM is a useful framework which can be applied and generalized. However, there are notable exceptions when the model might not fit.

In the next section, the applicability, usefulness and generalisability of the study reference model is examined according to the reported nature of AO processes. This is achieved by seeking to group individual questionnaire responses within classes defined as 'search and selection', 'configuration' and 'deployment'.

7.5 The Applicability of AO Processing Concepts

7.5.1 Search and Selection Processing

With the aim of testing the general utility of the AO-RM, the questionnaire asked if respondent firms had recently been involved in significant new 'search' activities and, if they answered yes, they were asked, "how did they achieve their new search activities?" and "who were the manager(s) who realised these search processes".

From Figure 7.3 we can see that 88% of the participants answered 'yes', which indicates that among the studied firms, the need to conduct search activities is commonplace.

Figure 7.3 Search and Selection activities.

Furthermore, from the more detailed data collected we can deduce that the managers of the studied companies conduct their search processes in many different ways.

Firstly, they conduct search activities through visiting and "participating in conferences", for example, attending "International and European briefings" and "participating in international exhibitions". Participants reported search activities such as:

> *"Networking (outbound and inbound visits) to local and multinational organizations, and mostly through contacts built over time, such as via the co-founder who has 30 years of experience networking in industry"* Manager Code 299085-25952157.

Another respondent stated that:

> *"Our key issue has been to extend our consultancy into Europe, particularly working for European governments and the EU. This has*

> *clearly proven to be challenging because of Brexit. However, we have attended European briefings, purchased model tenders and sought the advice of EU lobby groups"* Manager Code 299085-28136334.

Secondly, search strategy reported as being used by respondent companies is to analyse trend reports such as financial and market analyses. Participants reported search activities such as:

> *"Telit Communications has recently been involved in a very significant set of acquisitions. This is the crude answer to your question - when we feel we need to search, we buy. But our search activities prior to this are informed by monitoring product developments, focus groups with existing customers and intelligence gained at our quarterly trade shows"* Manager Code 299085-28828957.

A third way of achieving search processes was reported by respondents was through consulting activities, whether from partners or by hiring or "buying" from the external market. Participants reported search activities such as:

> *"We worked with Cranfield Trust for 18 months to work out a robust and effective model of business planning, this was part of a 36-month radical organizational change. This started with getting the manager to think differently. Also, we searched information from government agencies and mainly other large organisations, thereby accessing knowledge available to our business partners"* Manager Code 299085-28136945.

The final search strategy reported and recognised by the data analysis was through analysing activities relating to threats and opportunities in the external environment:

> *"We have been involved in a rapid extension of our activities and markets, as well as products, because of the rise of North Korean, Russian and Iranian hackers. This has involved a trebling of turnover and the acquisition of 43 new clients. Our clients tend to identify us,*

> *and since we compete with Sophos we tend to serve smaller companies and individuals whereas Sophos deals with middling and large companies"* Manager Code 299085-28830006.

We also asked the participant about "the person(s) who realised these search processes". Normally our data shows that, in the main, these search processes were undertaken by top-level management. However, in respondent businesses with smaller numbers of employees, and particularly in some consultancy companies, this kind of task was shared with middle management,

> *"In this work with the external consultants was the major player, namely the senior management and in small extent the middle management"* Manager Code 299085-26373447.

> *"Ours was a two-stage process, with middle management attending the briefings and meeting lobbyists and senior managers (including me) dealing with tenders"* Manager Code 299085-28136334.

Regarding 'selection' processes, the participants were asked if they/their firm had recently been involved in any significant selection activities. From Figure 7.3 we can see that 88% of the responders answered yes to this question. The data shows that the managers of those companies performed their selection processes in two different ways.

Firstly, they undertook selection activities by working with partners, whether new or existing ones. Participants reported selection activities such as:

> *"New collaborations with community and industrial partners, applying for joint-research grants (local and international), appointment of relevant industry's CEOs for mutual cooperation"* Manager Code 299085-25952157.

Another respondent stated that:

> *"Our key challenge has been new technology platforms of the sort required to move into European tendering agreements. Much of the*

> *information is pre-set and we needed a pre-population tool. I and one other senior colleague were responsible for selecting partner IT organisations, beta testing the product and then alpha testing with model tenders"* Manager Code -299085-28136334.

Secondly, some managers undertook selection processes through entering new markets or developing "new" products.

> *"The growth in demand for remote working, which we believe is consequent on Brexit, has encouraged us to think about targeting people who might move to low tax domiciles. This has involved a significant investment in new staff and the development of a new partnership arrangement with the recruitment firm Hays who will now market our products"* Manager Code 299085-28830253.

Additionally, the questionnaire asked the participant managers about who carried out the selection process. Primarily, the answer was that selection processes are performed by top-level management, however, sometimes the high-level managers share this responsibility with the middle management and/or a team working with them, particularly when they need to decide on an investment strategy.

> *"This is a collaborative endeavour with me asking questions and encouraging the FT manager to investigate, think and write and expand their horizons. What I try and avoid is telling them the answers and dictating as this is their project"* Manager Code 299085-28136945.

From Figure 7.3 we can see that the participant firms have conducted search and selection processes. In addition, our analysis shows that the search and selection processes are run by top-level management. The managers accomplished search and selection actions by performing various activities such as participating in conferences, monitoring market trend reports, as well as making vital decisions regarding new investments in new markets and/or products. In the following paragraphs, the study will examine the ways in which the companies practiced configuration processes.

7.5.2 Configuration Processing

The questionnaire referred again to the study RM and asked if the firms had recently been involved in significant new configuration activities. The data showed that 59% answered yes while 41% answered no, which indicates that a small majority of the companies studied have engaged in configuration processes; please see Figure 7.4.

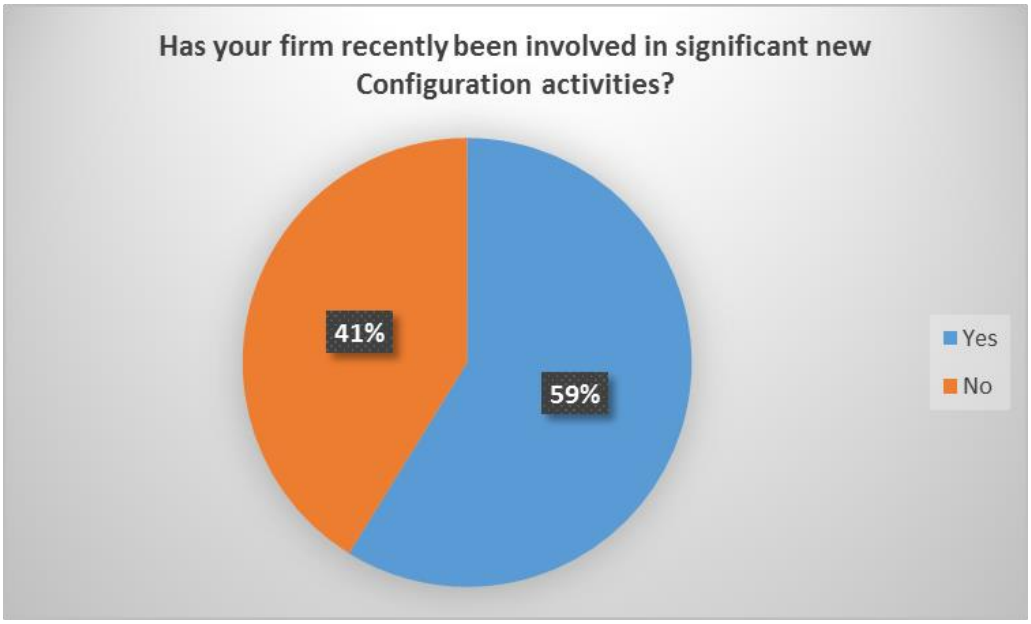


Figure 7.4 Configuration Process.

To gain a more detailed insight into the nature of those configuration processes, the questionnaire asked the participants to describe what kind of configuration activities were involved. Their individual answers were then grouped into two types of configuration process.

The first of these groups was 'capabilities improvement', as needed to deal with change through advancing employees skills. Participants reported configuration activities such as:

> *"We have tried to move away from open tender offers and to try and build platforms with customers that facilitate repeat and extension business. This has meant that we need to train staff to focus on added value rather than the new IT solutions that they have in the past offered to clients. Those clients have in turn become more risk*

> *averse and so we have had to move away from wipe clean systems to those which build upon existing infrastructure and practice"* Manager Code 299085-28138201.

Secondly, the companies have developed new products and/or improved upon existing ones.

> *"Need to customise existing core competencies and develop new knowledge necessary to bid for the realise specific consultancy contracts that through previous search activities were deemed to be appropriate customer targets; i.e., we're a reasonable fit to our firm in requirements and financial terms"* Manager Code 299085-28913735.

Furthermore, we asked the managers about how configuration processing was organised. Primarily, responses showed that configuration processing was achieved by middle-level management. However, sometimes configuration activities could be orchestrated by a collaborative team and/or by high-level managers.

> *"The manager and their staff team working with some local people, trial out ideas and then are encouraged to produce short reports which the board can then use to focus reflection on, which then improves funding bids and clarity of work"* Manager Code 99085-28136945.

From Figure 7.4 we can deduce that the participant firms had recently been involved in configuration activities. Their managers perform configuration processes through capability improvement activities and through developing new products and/or improving upon existing ones. In addition, the data analysis shows that it is mainly middle management that is conducting these kinds of processes; however, teamwork might be the best way to deal with such kinds of change situation.

7.5.3 Deployment processing

To gain a deeper understanding about actual examples of deployment activity in the participant firms, and to classify these activities with reference to AO-RM, the questionnaire asked the participant firms whether they had recently been involved in new deployment activities and, if so, to characterise them. Please see Figure 7.5.

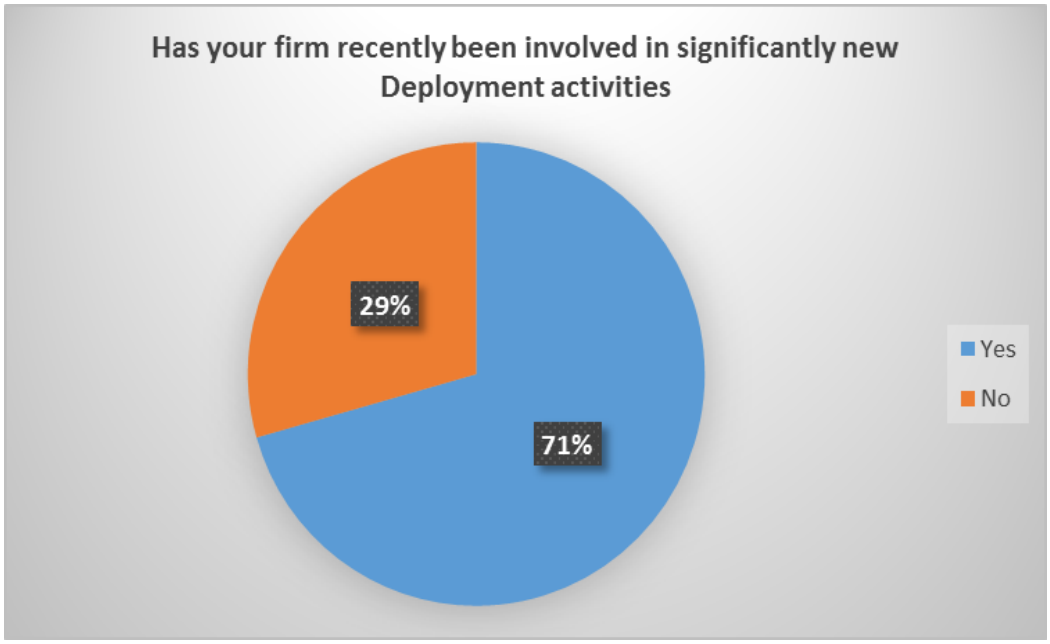


Figure 7.5 Deployment process.

Essentially participants' answers showed that almost three-quarters of their firms had been recently involved in realising significant new deployment activities: ***firstly,*** when entering new markets and using new technology, the responding managers stated that they had extended their deployment activity to enable their business to reach new markets, and that this might be linked to developing new products for those new markets. Participants reported deployment activities such as:

> *"In 2015 we were deployed in two countries. We are now in 17. This has involved three core changes to the way we organise the company: new premises and new dedicated regional teams, with an overall increase in headcount; the authoring of multiple software patches as a solution to hacking threats BEFORE we deployed our main platforms, which has involved a new commissioning process for*

> *local support systems; and a new system of training. This was previously done in-house and on the job. We have now outsourced training to an IT consultancy firm"* Manager Code 299085-28830006.

A second alternative deployment strategy reported was through re-allocation of the firms' resources and capabilities and/or investing in new ones to meet changing demands.

> *"We have seen an upsurge in customer enquiries which have not been generated by marketing campaigns or even word of mouth. This is because we deal with software products and their application which allow remote working. We have seen a particular demand from bankers for secure working from Switzerland. Knowing this we have extended our newspaper advertising, product drops, email campaigns etc. with a particular focus on Switzerland"* Manager Code 299085-28830253.

The questionnaire also asked who was responsible for realising these deployment processes. The results indicated that deployment processes were primarily achieved by middle management, possibly with the assistance of consultant engineers.

> *"The lead of the project was a middle manager together with engineers from our service department and IT departments"* Manager Code 299085-26373447.

Other respondents stated that deployment processes can be realised by middle-level managers in collaboration with high-level managers.

> *"Mainly myself, a "high-level manager" and complementary persons in our partner businesses; and where appropriate involving deployment processes and persons in customer/government businesses"* Manager Code 299085-28913735.

Figure 7.5 shows that the investigated firms have recently been involved in new deployment activities. Managers practised deployment processes and extended their

deployment activity through entering new markets and using new technologies. In addition, other managers performed their deployment strategies through re-allocation of their firm's resources and capabilities, whether in the same companies or in new markets. However, the above data analysis surprisingly revealed that although we had supposed that deployment activities would be mostly carried out by low-level managers, the online questionnaire responses received indicated that it was actually by middle managers who assumed such tasks "with collaboration with high-level managers". It is clear, however, that within the companies responding to the questionnaire that many different ways have been used to enact AO processes in order to search for new business opportunities and customer demands, to show wariness about threats, and by investing in a range of selection, configuration and deployment strategies to cope with business change.

7.6 Managerial Integration Processes

In this section, the issue of 'integrating AO processes' is explored. Further consideration is given to the research question: "To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses?" Furthermore, integration mechanisms and processes will be investigated along two dimensions, as follows:

Firstly, managers participating by responding to the questionnaire and the study reference model were asked to reflect on the importance of 'integrated management decision making' across the various AO levels, namely search and select, configuration and deployment processing.

Secondly, alignment mechanisms used between the three levels of AO processes (search and select, configuration and deployment) were explored, as were their relationships with the firms' assets (namely strategic assets, complementary assets and operational assets).

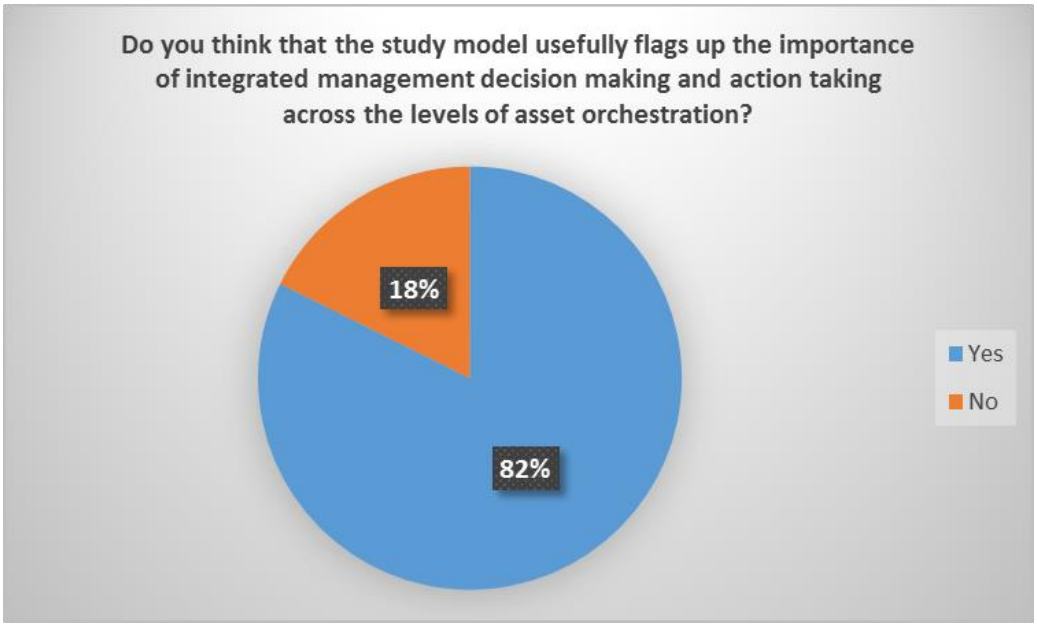


Figure 7.6 Managerial Integration process.

The reader is referred to Figure 7.6, which relates to the question asked therein, which shows that 82% of the participating managers agreed that the integration mechanism is actively performed through the study reference model. Consequently, we can conclude that the model provides an integrating framework for developing the AO processes at the various managerial levels. In addition, Figure 7.6 indicates that the integration processes facilitate and integrate decision making, and consequently action taking, through the various managerial levels. Participants reported integration activities such as:

> *"Integrated Cumulative Grade Point Average (i-CGPA) for students' performance, reviewing of curriculum to relate to IR4.0, transfer of staffs within faculties (resources utilization based on need)"* Manager Code 299085-25952157.

However, the participants suggested that some firms need unique kinds of models to align their activities. Yet, some other companies do not use the three levels structures:

> *"the model looks too strict in the way in which management level activity will be done and there may be companies where this model is a fit but other companies use different strategies and use a different*

approach and use other groups, e.g., delegate decision for strategic assets to middle management or even external companies" Manager Code 299085-26373447.

From Figure 7.6, we can deduce that the model points to the significant role of the integration process that activates the AO processes and links the search and selection, configuration and deployment processes so as to align managerial actions, thus adapting to business change and achieving any required competitive responses.

The second indicator considered by the questionnaire was needed to establish if the study model usefully flags up the need for alignment mechanisms between the three AO processes "Search and selection, configuration and deployment" with the firm's assets "strategic asset, complementary asset and operational assets".

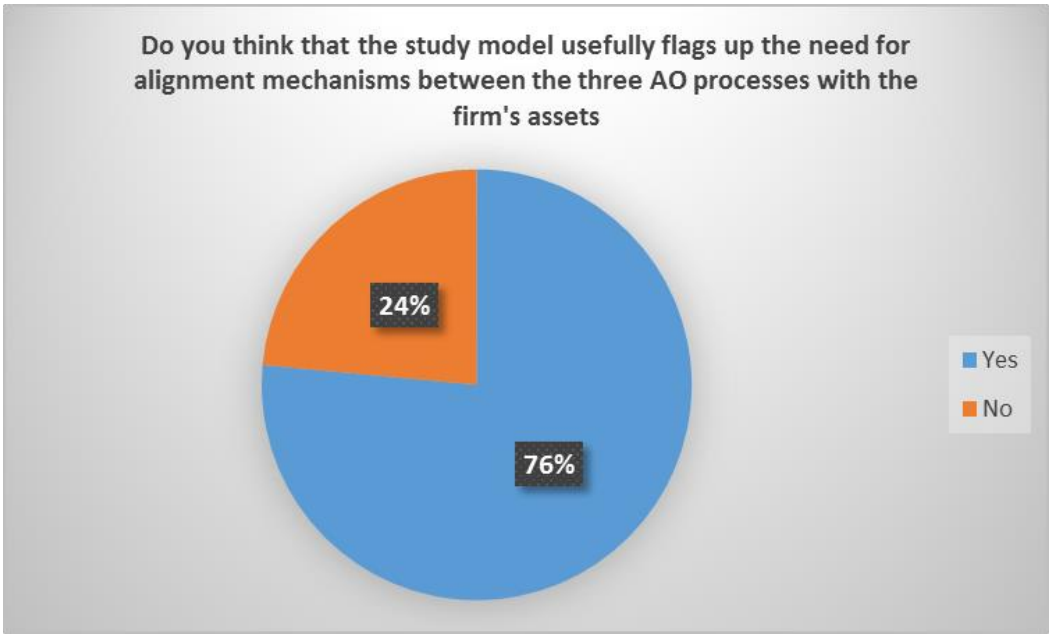


Figure 7.7 The need for alignment mechanisms.

Figure 7.7 illustrates that 76% of participants have flagged up the need for alignment mechanisms, which again indicated the applicability and utility of the study reference model. However, in some cases the integration mechanism was challenged; for example, by organizations which have many different units and that operate in different markets. In these cases, our study model might not be beneficial. Participants reported alignment activities such as:

> *"Well, what I feel is that often this deeper type of integration does not happen because the business portfolio is split up into too many sub-divisions within the company and then they compete for access to the overall firm's budget. It can make them like factions at war rather than an integrated whole working to such a model"* Manager Code 299085-28140605.

The analysis, Figure 7.7, highlights the significance of rich alignment amongst the three managerial levels within the three kinds of firms' assets "Strategic, complementary and operational assets", which support the managerial pursuit to achieve and sustain their firm's competitive responses. Markedly, from the above analysis we can see that the integration mechanism has an essential role in enhancing a firm's ability to adapt to business change, though it should be noted that there is no 'ideal' integration model that fits all kinds of firms.

Finally, the online survey study revealed that the AO reference model was considered useful to the participants companies. The study showed that the integration mechanism improved the managers' abilities to respond to different kinds of business changes. It is evident that alignment processes are one of the main problems and that the role of the top and middle managers in integrating the three structural level is crucial. In addition, by populating the AO reference model with specific case study data, this might help show how senior and middle management teams can become better informed. Figure 7.4, for example, showed that configuration activities can be orchestrated by a collaborative team of top-level and middle-level managers. Accordingly, the managers across the structural levels can unify their decision making via the complementary use of their firm's resources. Another example, Figure 7.7, depicted the significance of a rich alignment amongst the three managerial levels within the three kinds of firms' assets, which supports the managerial effort to adapt to market change.

7.7 Evaluating the Three Uses of AO-RM in One Integrated Picture

So far, we have conducted two very detailed case studies in Chapter 5 which considered detailed instances of populated AO-RM in specific case examples (Tech4i2 and GMS). Then, in Chapter 6, the study pursued a more in-depth case study to develop the models. We have developed an approach or methods of using the AO-RM. Clearly, we have used a Road Map to support the design of change projects in firms. Lastly, in this chapter, we looked at the generalizability of the study reference model through a survey of 17 companies. In general, the investigation and the evidence showed that AO-RM is useful for use and generic within different kinds of organizations. In each of the three chapters, we have used the study reference model in three different ways which are, respectively (see Section 3.7):

1- Use 1: to guide semi-structured interviews, which are aimed at the elicitation of two case examples “Tech4i2 and GMS” to populate of the AO reference model, hence showing how these AO processes needed to be achieved to support the firms’ adaptability to market changes. These case examples were reported in Chapter 5.
2- Use 2: The study RM has been used to structure and support the design of AO change projects through establishing a conceptual basis for the creation of an AO Road Map. This use has been detailed in one case example in Chapter 6. However, in a second case study of “GMS”, similar arguments were presented and discussed in a peer-reviewed research paper (Abdullah et al., 2018).
3- Use 3: to guide the design of an online-questionnaire with a view to eliciting many additional specific case populations of the AO reference model, itself with a view to seeking commonality between AO processing at multiple levels. The online questionnaire was described and discussed in the current chapter.

By placing the three uses of AO-RM within the three chapters in one integrated picture, we can suggest that the preceding uses of AO-RM have built new knowledge about AO, and filled the existing research gaps which are: (1) the AO literature suffers from a lack of sufficient case information about the types of AO processes; (2) a lack of

AO instances in specific case examples in the literature; and (3) the need for integration mechanisms which support teamwork being performed more effectively when undertaking a change project.

Referring to the study knowledge gap and the three uses of AO-RM, these chapters (5, 6 and 7) shows how the reference AO model can be used to obtain a meaningful classification of actual asset orchestration processes used by companies. The reference model has proven useful in two distinctive ways. ***Firstly,*** it was used as a mental model and a paper-based visual model to structure face-to-face questioning of senior, middle-level and lower-level managers alike so as to elicit data about actual, multi-level change processes carried out by their parent companies. ***Secondly***, the representation of the reference model allowed its embedded concepts to be explained to those managers who were interviewed face-to-face, following which those persons interviewed positioned their own asset orchestration activities into the multi-level context of the model.

7.8 Conclusion

This chapter described the data collection and analysis undertaken during the online questionnaire study. The survey was designed to achieve two goals: (1) to illustrate the applicability of the study reference model, and (2) to generalise the utility of the reference model. The results showed the study AO reference model usefully represents a number of managerial actions. **The chapter also showed that the study RM is of utility to other companies during change periods, which also indicated its generic nature. In addition, the analysis illustrated that the integration mechanism improved the managers' ability to sustain competitive responses**. For example, when managers were asked to reflect on the importance of 'integrated management decision making' across AO structural levels, the results showed that 82% of the participants agreed that the integration mechanism is actively performed through the AO-RM.

Finally, this chapter contributes to the AO literature and fills the knowledge gap regarding the general lack of information in the literature about the types of AO

processes “AO instances”. In addition, the very long process of refining this questionnaire ultimately proved highly effective in eliciting targeted responses about these core questions. Thus, we reflect on the fact that these questions worked very well. The gradual working up of the questions generated a very significant set of data that allowed further in-depth exploration, and further achieved the chapter’s aims.

The next chapter will discuss the study findings in more detail, in addition to illustrating the study conclusion and proposing a number of future recommendations.

Chapter 8 Discussion and Conclusion

8.1 Introduction

The purpose of this chapter is to again answer the study research questions and show how the answers are supported by the empirical study, and further to draw together the proposed applications and outcomes from the study reference model and the empirical investigation. In addition, it will explain how the answers fit relative to the literature regarding the subject of AO. Hereafter, the objectives of this chapter are:

1- To bring together all the study chapters under a single picture in light of the study's literature review, reference model, the empirical case studies and the proposed road maps.
2- To compare and contrast the benefits delivered within the case study firms; in addition, the practical implications will also be inferred.
3- To examine whether appropriate lessons have been learned from the preceding chapters and state the reflected essential contribution to the existing knowledge, and any potential contribution this thesis might be able to make in the future.
4- To draw out the abstracted indications for where things will move next and suggest possible "future avenues" for the study of AO phenomena.

To achieve the above objectives, this chapter is divided into four key sections. The first section will bring all the chapters together under a single picture to gain a more comprehensive and unified view of the essence of this thesis. The second section will present a detailed discussion about the main findings from the empirical studies in Chapters 5, 6 and 7. The third section will highlight the study conclusions and limitations, and state the research contributions to the current knowledge. In addition, it will suggest a number of research avenues for further studies. The concluding section will summarise the entire chapter.

8.2 Review of the Literature, Research Questions, Aims, and Objectives

Historically, before resource based-theory had been introduced, Penrose claimed that *"the experience of management will affect the productive services that all other resources are capable of rendering"* (Penrose, 1959 P: 5). Previously, the role of managerial actions' "decisions" have been widely overlooked by the scholars of resource management in the framework of the strategic management field. Subsequently, the concepts of managerial dynamic capabilities and asset orchestration have partially contributed to filling this gap (Adner and Helfat, 2003, Helfat et al., 2007, Sirmon et al., 2008, Sirmon and Hitt, 2009, Sirmon et al., 2011). However, our work was motivated by the realization that the ability to sense and seize market opportunities and take competitive action have become core elements of strategic thinking in present-day organizations (Sambamurthy et al., 2003). The research effort presented in this thesis is thus a response to scholars' calls for further "applicable" work before the full range of strategy implementation (Sirmon et al., 2011). More importantly, this is one of the first studies to provide empirical, systematic maps describing the use of the asset orchestration perspective. Explicitly, in this thesis we develop a reference model of the managerial role of utilizing resources by focusing on the key variables of asset orchestration: search and selection, configuration, and deployment. In addition, the thesis proposes a semi-generic guide as to how to properly utilize such a model.

The study has provided a chronological review that has traced the more influential theoretical paradigms within the framework of strategic management. Therefore, this study research traced and illustrated the business environment that has led to shifts in attention from one paradigm to another (Chapter 2). Accordingly, an overview of the seminal literature describing the market-based and resource-based views, and the importance of dynamic managerial capabilities and the notion of asset orchestration, has been provided: (Bain, 1959, Caves, 1964, Mason, 1948, Porter, 1985) and (Barney, 1991, Penrose, 1959, Rumelt, 1984, Wernerfelt, 1984). In particular, the study has reviewed the emergent AO perspective and reviewed remaining weakness in its

theories from an application perspective, and additionally proposed methods for their application (Helfat et al., 2007, Sirmon et al., 2011).

Based on the examination of the literature review, the study has identified a gap in the current AO literature which currently limits its systematic and practical application within different firms. This required the study to set the research questions as follows:

1- How can asset orchestration mechanisms be mapped onto common organisational structures used by firms, thereby enabling management to be more effective in sustaining competitive responses?
2- To what extent does the integration mechanism acting between the asset orchestration processes “search and selection, configuration and deployment” and the firm’s multi-level assets improve managers’ ability to sustain firms’ competitive responses?

Based on the knowledge gap and the research questions, the first aim of this research project was to study the processes of AO as a new managerial mechanism to improve our understanding of natural dependencies in firms with regards to asset orchestration processes. The second aim was to propose an integrative framework approach regards the application and the deployment of emergent asset orchestration concepts in business firms. To fulfil the study aims, the following research objectives were devised:

1- Review the emergent concept of asset orchestration and previously proposed methods in terms of their application, and review remaining weakness in those applications.
2- Conceive a new reference model of the mechanisms of asset orchestration and apply the reference model in selected case study firms that have been subjected to specific kinds of change (e.g., Brexit).
3- Conceive and test a systematic method of applying the reference model, where that method encompasses multi-stakeholder decision making in support of change projects in some case study examples.

We examined the literature review and developed the AO concept that indicated the gap in the literature and which demonstrated the limitations to the systematic and

practical application of AO in different firms. Therefore, the study conceived and developed a new AO reference model to provide a simple and visual illustration of current AO thinking that could help managers to understand the mechanistic aspects of emergent AO theories in detail; please see Figure 3.1. Later, after developing the study reference model, the study applied this model to two case study firms that have been subjected to business change in order to assess the potential benefits delivered (Tech4i2 and GMS). Therefore, the research study shifted in this sense from the theoretical perception derived from the literature to practical solutions through the analyses of two case studies. Finally, the case study approach was chosen as the appropriate methodology to answer the research questions and achieve the study goals.

8.3 Discussion of Key Research Findings from the Case Studies

To achieve the chapter agenda, this section is divided to three sub-sections: firstly, the relationship between the study reference model and the Strategy as Practice perspective will be discussed; secondly, the integration capabilities and the rationality of the proposed road maps will be explained, and lastly, the link between the stages of studying the study reference model and AO process lifecycle will be illustrated. Notably, to gain more fruitful illustration, the results from Chapters 5, 6 and 7 will be again used in the following discussion.

The analysis study in Chapters 5 and 7 shows that each of the case study firms have explicitly demonstrated these three managerial levels to be practising the three AO processes mentioned above. The analysis of Tech4i2 has revealed that the top-level manager has repeatedly enacted the search and selection process using the firm's strategic assets. Yet, we have clearly seen in data analysis that the company director has struggled to gain new insight and to remain updated regarding market needs and to tighten the company's relationships with its stakeholders. When the company top manager "in consultation with his partners" felt the challenges of Brexit, he consequently decided to design new products and select new markets to serve in the "local market". According to the new situation that has arisen due to Brexit, the

decision has been made to adopt a new project (within a new market) entitled "provide a market analysis of business accommodation in key urban areas located in the East Midlands such as Leicester, Northampton and Nottingham".

In this stage, the analysis shows that the role of the middle-level management has developed "in consultation with the top- and low-level managers". The middle management of Tech4i2 had to use the complementary "co-specialized asset", similar to software programmers and technicians experience in order to design, examine and validate new projects. This has required specific kinds of technical and managerial capabilities such as building new software as well as the cooperation of the entire company staff, which included the capabilities of data collection, analytics, software designers and partners.

In the case of GMS, our analysis illustrates that the company's top-level managers pursued a strategy of sensing the market's needs and associated competition in order to find opportunities and avoid external threats. Hence, they have recognised the presence of hard global competition. These kinds of situations put more pressure on managers to rapidly and effectively respond in order for the company to stay ahead of any global competition. Hence, the company selected a new project, that of a "new generation of semiconductors". After the project was nominated, GMS managers recognized the need for the integrated involvement of all levels of the company's management team.

The middle managers of GMS are responsible for the operational level of planning, namely controlling and monitoring the manufacturing operations. Our analysis shows that the middle-level managers have explicitly used their capabilities to deal with the change associated with the "new generation of semiconductors". For example, a team of Industrial Engineers (IEs) played an essential role in assisting the top management's decision making in terms of the resource configuration by performing workflow management studies using Discrete Event Simulation (DES). Due to these changes, the company's middle-level management had to use complementary assets, which included redesigning the software for some machines as well as performing further feasibility studies on the selection of a suitable location and the design layout. In

addition, redesigning the space allocated for the new product also required other considerations such as the associated flow and logistical rules in order to minimize travelling distance and costs between people, materials and processes.

The study analysis also revealed that GMS's low-level managers are using their capacities to operate at the tactical level or daily manufacturing performances. Furthermore, GMS low-level managers had the capacity to use the operational resources such as a material supplier selection, alternative layout plans and finance implication reports. However, the study analysis indicated that some functions should be completed in cooperation with middle management; for example, to further refine the proposals, a timetable would need to be instigated requiring the middle and lower managers to address possible concerns from the top management until a decision was made regarding the implementation of the best alternatives.

The preceding discussion shows that the current study is an attempt to fill a gap identified in the literature. The research study has responded to this gap by conceiving of a reference model that depicts the managerial AO process and provides a visual guide for utilizing such a model. However, the prior literature demonstrates that the resource-based view (RBV) has been widely criticised due to its ignorance of the role of managers in configuring and integrating the firm's resources and capabilities (Girod and Whittington, 2017, Helfat et al., 2007, Adner and Helfat, 2003). Consequently, in this study, we examined the firm's managerial hierarchy as a means of extending the literature relating to asset orchestration phenomena. In this regard, we described how different AO processes with specific structural levels require a unique set of capabilities. As such, AO actions are required to develop those capabilities. Hence, we explicitly addressed the role of managers' actions to successfully sense, configure, and deploy a firm's resources.

Notably, the managerial consideration in the majority of previous work was equivalent to that of high-level management (Sirmon et al., 2008). For example, Martin (2011) argues that general managers play an essential role in adapting organizations to business change. However, his study was otherwise silent about the role of other managerial levels, and he attributed all the managerial asset orchestration actions to

the company executives. Hence, he defined executive leaders as "*the managers whom conduct activities such as setting organizational goals, developing plans, and strategic decision making and who have authority and control over the allocation and orchestration of organizational resources"* (Martin, 2011). Further, Martin's study argues that it is top-level managers who conceive and capture the emergent product-market opportunities. Furthermore, Smith and Tushman (2005) asserted that senior management plays a key role in strategic change, such as those that occur during technological transitions. Hence, they suggested that the role that top-level management must accomplish should include decisions about organization form and asset allocation.

Our discussion showed that top-level managers do indeed have a significant impact on a firm's ability to adapt to strategic change; however, middle-level management is also clearly important. In this regard, Quigley and Hambrick (2012) measured the impact of CEOs on firm performance and found that CEOs effected about 12.7% of the variance of firm performance during the period 1950–60, and an average of 25% of the variance during the period 1990–2000. This result indicates that there are other factors that have a potential effect on firm performance, and this must include the middle and low management.

The current study's analysis supports the preceding examination; for example, the case studies demonstrate that middle management has a significant role in maintaining alignment between the three managerial levels. This is in line with the study by Taylor and Helfat (2009), which further emphasises the critical role of middle managers on the success or failure of business changes or "technological transitions", due to their roles as organizational connectors of the high and low managerial levels. In addition, the statistical analysis in Chapter 7 shows that the search and selection processes are mainly completed by top-level management. However, the analysis also shows that high-level managers share the middle management and/or a team with them when there is a need to make a decision regarding investment strategy. The data also shows that the managers of the considered companies perform search processes in two different ways; firstly, they undertook selection activities by working with partners,

and secondly managers perform selection processes by entering new markets or developing “new” products.

Many other studies have emphasised the significance of the role played by middle managers, who are ultimately responsible for mediating communication between the top-level and the lower ranks. It should be borne in mind that the analysis assumed that managers at this level usually use the complementary asset. However, Chadwick et al. (2015) argue that middle managers have a significant role in operationalizing both strategic, as well as complementary, resources. Furthermore, (Teece, 2007) supports the strategic role of asset reconfiguration processes, as performed by middle management, as a key strategy especially during change “e.g., market and technological change” (Teece, 2007). In addition, the study survey supports the case study results. The analysis of the questionnaire shows that middle management is involved in significant new configuration activities; however, occasionally, high-level management engages with middle management to conduct configuration processes.

This study investigation also shows that middle management plays a crucial role during the implementation of the strategy of change. The middle managers have to configure the complementary asset in order to fulfil the change strategy. For example, when Tech4i2 decided to develop new software with a database, the data analysists and the programmers “as the middle management team” designed new software that operates as a platform to provide all the information needed by customers regarding the commercial properties in a specific area. Along the same lines as the current study, Balogun, (2003) considered middle management to be a strategic asset. His study suggested that middle management have four roles in implementing change strategies: (i) undertaking personal change; (ii) helping others through change; (iii) implementing necessary changes in their departments; and (iv) keeping the business going. Ultimately, the analysis of the case study firms shows that middle management has a unique role, especially during times of change. However, there are a number of previous studies that do not agree with the results of this study, for example middle-level management have been subjected to much criticism, in particular that middle

managers have been considered to have a negative influence on change, "e.g., in downsizing decisions" (Dopson and Stewart, 1990).

The analysis also shows that the low-level management are responsible for deployment activities within the AO model. The interview responses demonstrated that a prime role of lower asset deployment processes in the case study firms is to ensure that operational processes and their outcomes satisfactorily meet top management and customers' expectations; also, a suitable means of resourcing must be planned and maintained. Our analysis is in agreement with Sirmon et al. (2011), who asserted that operational low-level managers focus on the ordinary activities of specific groups within the firm. Furthermore, our analysis shows that the low-level management is responsible for data gathering. This is also emphasised by Sirmon et al. (2011), who note that the operational managers both conform and experiment and, more essentially, they provide detailed information for middle management. Further, Floyd and Lane (2000) suggest that the three managerial levels should work together in order to implement the entire strategy, in which case the role of operational-level managers conforms to the entire plan of AO actions through the other managerial levels, which has been corroborated and, indeed, emphasised by the results of the current study.

However, the results from the online questionnaire indicate that middle management is mainly responsible for deployment processes. Surprisingly, this process should supposedly be done by low-level managers, while based on the data it is actually usually completed by middle managers. Accordingly, either the study suggested that this result comes from a misunderstanding of the deployment process by the participants "might be they mixed deployment process with the configuration actions" or it indicates the significance of middle management in synchronizing the entire AO process. As asserted by Sirmon et al. (2011 P: 1406), "*middle managers are critical to ensuring that structuring, bundling, and leveraging actions are congruent".*

To summarize, the above debate shows that prior research has considered the strategic role of management in adopting to business change; however, these studies have largely focussed on top-level management (Chadwick et al., 2015). In contrast,

our study of AO explicitly recognizes that multiple levels of management must cooperate and contribute to the realization of a firm's pursuit to adapt to change. However, in order for a firm to take full advantage of their resources "strategic, complementary and operational resource", managers at all levels must orchestrate their actions so as to be in concert with each other to achieve proper integration.

8.3.1 The Study Reference Model and Strategy as Practice

The debate about a practical guide "road map" for applying the AO model is related to the concept of "Strategy as Practise" (Hendry et al., 2010, Jarzabkowski, 2004, Whittington, 1996, Whittington, 2001). The concept of strategy as practice is concerned with how managers strategized or how they apply strategy. In this regard, scholars argue that a changing business situation "e.g., change in consumers' demands" are vital factors in gaining competitive advantage in dynamic environments. Hence, in these situations repeatable practice is a problem that needs to be considered within the context of strategic management. Therefore, "*we should examine strategy not as something a firm has, but something a firm does"* (Jarzabkowski, 2004 P: 529).

Surprisingly, the Strategy as Practice perspective conceives a strategy as a process, or being activity directed towards the achievement of strategic objectives as operated through the actions and interactions of multiple managers, "teams", distributed throughout a firm (Hendry et al., 2010). Therefore, we can clearly see that the "Methods of Utilising the Study Reference Model (MU-RM)", which was developed and used in this study "Chapter 6", is a real example of the Strategy as Practice perspective, which constitutes a significant contribution to this research study. In the current study, we consider the firm has three structural levels, the same as Whittington (1996) suggested in the sense that the Strategy as Practice model was aimed at the managerial levels. However, he opened the door to further work into "*the issue of how managers doing strategy "act and interact in the whole strategy-making sequence""* (P: 732). Thus, the practice perspective is concerned with managerial activity, which is close to what the current study suggests.

Furthermore, the debate in this section is related to the notion of routine, as highlighted in Chapter 2. (Winter, 2003) considered the concept of DC as a routine when he defined it as: "An organizational capability is a **high-level routine (or collection of routines)** that, together with its implementing input flows, confers upon an organization's management the asset of decision options for producing significant outputs for particle type" (P: 991). According to Whittington (1996), strategic managers routinely use their practical capacities in the daily world of strategy-making (e.g., the AO process). Further, scholars have stated that capabilities include two sorts of routines: *"those to perform individual tasks and those that coordinate the individual tasks. The need to coordinate tasks implies that a capability involves coordinated effort by individuals"* (Helfat and Peteraf, 2003 P: 999). Consequently, one of the current study's agendas is to suggest practical applications as to how managers can learn to achieve these routines, whilst in addition suggesting a guide map "Methods of Utilising the Study Reference Model" that provides simple and practical means "routines " by which a strategy can actually be performed.

Further debate in this section is given with regards to linking the "systematic stance of this study" within the concept of structure versus agency; please see Chapter 4. In this regard, the study refers to the philosophical argument as to whether structural factors or individual agency "managers" determine the process of decision making (Dimaggio and Powell, 1983, Heugens and Lander, 2009). In other words, when the study adapts a system-thinking approach, this would "automatically" link the notion of cause with the idea of a determent or "deterministic". Hence, in social science a logical question arises as to whether the individual "managers" are free to make decisions, or whether their behaviour is caused and determined by structural factors outside their control. However, our study concluded in Chapter 4 that even if there are structural forces, the manager has the choice as to whether or not to accept a specific situation; this indicates both structural and agency matters in decision making. Jarzabkowski (2004) further argued that this reciprocity between agent and structure enables the persistence of social order. Further, Jarzabkowski (2004) suggests that the routinized nature of daily managerial practice may be explained by concepts of determinism

(Giddens, 1984), "*In which the interaction between agents and socially produced structures occurs through repeated situated practices that form part of daily routines"* (Jarzabkowski, 2004 P: 531). Consequently, our reference model is in precise agreement with the above discussions about the significance of the parallel role of both managers "agent" and the organization's structure. Moreover, it matches Whittington (1996) debate about the need for practical skills and the capability to work within existing structures and routines, rather than the theoretical knowledge of some guide book. Consequently, the visual guide developed and used in this study might be considered a very good example in this regard.

To conclude, the focus of the Strategy as Practice approach was on how managers, as "practitioners of strategy", are actually acting. In other words, the key concern of Strategy as Practise was: ***what does it take to be an effective strategy practitioner?*** In this study, we developed and introduced a simple visual reference model, and guide road map (MU-RM), which were conceived to usefully structure and document the positioning of multi-level descriptions of managerial AO processes, and further to link these processes with resource descriptions that have to be realised as parts of particular kinds of change project. Hence, the study has clarified the real associations between AO mechanisms and different levels of asset hierarchy. Additionally, the examination of two case studies has given a very clear application of the Strategy as Practise perspective, which is considered a major contribution of this study.

8.3.2 The Integration Capabilities and Rationale of the Proposed Road Maps:

The discussion in this section will consider the study research question: "To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses?" In seeking to address these outstanding concerns, this research thesis characterised and then used a simplification of the emergent AO literature through a proposed 'reference model of AO processing'. Initially, this model was formulated as being simple to use, that of a visual interviewing tool for characterising and classifying

procedural aspects of large- and small-scale change projects; however, this simple AO reference model was subsequently found to usefully advise and help structure the multi-level interviewing of managers.

It should be borne in mind that the need to integrate actions is more significant during a time of change (Taylor and Helfat, 2009). Hence, the issue of integration processes has been widely highlighted in this study. In this regard, numerous scholars have emphasised the significance of the alignment of managerial decisions in allowing firms to compete and respond effectively to strategic change. For example, Sirmon and Hitt (2009) asserted that to enter a new market effectively, managers must make the correct decisions regarding how the best alignment between the processes of resource investment and deployment "AO processes" can be achieved. Their study found that fitting the decisions of resource deployment and investment have direct effects on a firm's performance. However, the issue of integrating deferent perspectives to gain new insight regarding the mechanism by which firms adapt to strategic change is not, to date, supported by a reasonable number of applied studies in the literature. So, significantly, this study provides detailed guidance that can help managers in their ability to respond to strategic change.

The most important of the proposed methods (MU-RM) is that consisting of the set of routines and mechanisms that underpin effective integration. Therefore, our study agrees with Helfat and Campo-Rembado (2016) in that the integrative capabilities consist of the ability to integrate activities in **a repeated and reliable** manner, which is considered part of the asset orchestration capabilities. Furthermore, Moeen (2017) suggests the "integrative capabilities" may span vertically amongst phases of structural levels or horizontally across department value chains. Thus, the study proposed the MU-RM serves as a **coordination mechanism** across the organization's structural levels, both vertically and horizontally.

However, the issue of whether the integrative actions should be run by high-level management or middle management is a controversial issue that needs further consideration. According to our analysis, the integration capabilities have two phases, **the first phase**, where this study assumed that the process of search and selection are

a function of high-level management. Herein, the integration process is a part of the process of search and selection of delivering new **knowledge and information**. This point of view matches the perspective of Li et al. (2013) when they suggest that high-level managers serve a vital role in the search process. Further, a top-level management that more successfully searches for and acquires new knowledge and information is able to make better decisions with regards to strategic change, for example when the director of Tech4i2 had the clear insight regarding the market gap "the chance to develop software to provide a market analysis of business accommodation in key urban areas located in the East Midlands, such as Leicester, Northampton and Nottingham". Consequently, he informed his staff decision makers, as well as his partners, about the new market need and the associated project requirements.

Based on the preceding discussion, when the integration process is related to the identification of new knowledge and information "search and selection" from the external business environment, it should be completed by top-level managers. According to this point of view, the idea of "fit" is embedded within the search and selection of a firm's resource and capabilities portfolio.

The second phase is when the integration actions include **the ability to integrate activities**, which mostly involves middle management who are responsible for the process of asset configuration through the use of complementary assets. This job requires them to be involved with different activities, mostly linking the upper management level with the lower level. Yet, they have a significant role in sharing information and knowledge across the firm's structural levels. Herein, the middle managers, as **"integrators"**, serve as facilitators of coordination mechanisms between the firm's departments by confirming shared understanding "knowledge and information" over the structural levels as well as **synchronizing the change activities** over the structural levels, for example when GMS middle managers were involved in change projects "the release into global production of a new products design"; please see Chapter 5. In this case, the mid-level managers began to identify and flesh out the mid-level asset transformations required in addition to the mid-level AO configuration

processes necessary to fulfil those transformations as defined by senior managers. Yet, the timing of mid-level managerial decisions is largely synchronised with that of decision making and information and knowledge over the upper and lower levels. However, Sirmon et al. (2011) suggest that in some types of firms "decentralized firms" not only are the middle management involved in synchronization efforts to support the top-level management in their efforts to adapt to strategic change, but so are the operational level managers, "low-level".

The above discussion highlights the significance of integration capabilities; however, the emergent literature mostly attributes the integrative mechanisms to the middle management level than to the top or the low levels, which is adopted by the current study whereby its outcomes show that middle managers act as facilitators of the change process. The next section will discuss the time consequences of the asset orchestration process through the study reference model.

8.3.3 The Study Reference Model and AO Process Lifecycle

Sirmon et al. (2011) suggest that a firm's asset orchestration mechanisms can begin at any level of the organizational structure. However, the analysis of the case study firms, "Tech4i2 and GMS" shows that the AO processes has lifecycle sequences starting from the top level down toward the lowest levels. Yet, this sequence needs to be synchronised by top-, middle- and low-level management. The examination of the case firms revealed that the new change project starts by scanning the business environment "search and selection stage" with regards to new threats or opportunities. Then, top strategy-makers should select appropriate "opportunities" for new markets, or products, or both "declares initiatives of new change project". Later, middle-level managers implement the new change strategy by interpreting strategic intent into the form of practical actions, that is, the "configuration stage". Finally, the operational level "deployment stage" ensures the new project conforms to the detailed work plan.

The discussion above partially agrees with Helfat and Peteraf (2003 P: 1003) when they suggest that a firm's capabilities have three lifecycle phases: the foundation, the

development, and the maturity stage. However, Helfat and Peteraf (2003) examined the lifecycle of the capabilities as a process, but rarely refer to the role of managers as actors of the questioned capabilities. Markedly, Helfat and Peteraf (2003 P: 999) argue that after the maturity stage, the capability might be effected by external factors, "innovation". These factors might have sufficient impact to alter the current development of the capability, hence leading to what is called "capability branching" which take one of four actions: renewal, redeployment, recombination and replication. Interestingly, this stage of the capability lifecycle matches the configuration stage of our model, where the middle management rebuild or coordinate the firm's resources and capabilities to respond or adapt to market change. Balogun (2003) adds some contribution to the preceding debate when his study suggested that middle-level managers may be of particular importance at this stage of the AO process lifecycle, which matches the arguments of the current study. His study suggested that when an organization is undergoing transformation change, their middle managers are generally used to fulfil a "change intermediary" position throughout the implementation phase. Other researchers have emphasised that at this stage of the AO lifecycle, middle managers are vital to the success or failure of the change process "industrial transitions", due to their roles over and across structural level connectors (Taylor and Helfat, 2009).

8.3.4 Discussion of Key Research Findings from the Online-Questionnaire

In this section, the research study presents a discussion that combines the quantitative and qualitative findings from the online questionnaire. The questionnaire was designed to gain three kinds of information: (i) background information about the participant firms; (ii) questions to help characterise the main types of change that the applicant firms need to make; and (iii) information about the utilization of the proposed reference model of asset orchestration; please see Chapter 7. This section consists of key elements that have emerged from the survey findings, which are mainly concerned with: ***firstly,*** examining the firm's adaptability to business change; ***secondly,*** demonstrating the applicability of the study reference model and whether it needs to be justified according to the individual natures of different firms; and ***the third*** concern

is about generalising the study findings and the utility of the reference model to enhance its support for AO project design. The discussion in this section will be based on the above three objectives (please see Appendix C).

8.3.4.1 Firms' Adaptability to Business Change

The results from Chapter 7 show that the participating organizations have regularly and readily adopted to changes in their businesses though with the need for significant change processes; please see Figure 7.1. Consequently, in this study we can suggest that the participating firms have a strong responsiveness to business changes, which indicates that these companies are considering their adaptability to their markets' and customers' needs. There is further evidence that might be drawn from our analysis, which is to recognize that if managers in different markets already possess dynamic managerial capabilities, the trigger for leveraging these capabilities must come from environmental scanning and high-level development in the light of asset orchestration "search and selection" actions. Hence, the preceding discussion highlights the significance of the managerial ability in scanning and seizing market opportunities. However, Tallon (2007) emphasis that the process of search and selection should be a continuous process when he asserted that that top-level management must know how, or when, to respond to change, or indeed when not to react.

On the other hand, the analysis of the study survey indicates that the participant companies are readily empowering their employees in terms of individual learning in order to respond to change. This result could be considered a response to researchers' calls for capability building, which suggests that companies that have failed to systematically build their capabilities could find themselves unable to sustain their competitive response (Ravichandran et al., 2005). In addition, the questionnaire results show that the participating companies invest according to their customers' needs. In this regard, Sirmon and Hitt (2009 P: 1376) consider the decisions regarding resource investment "acquire and develop resources" and how to best to deploy these resources "decisions determine the specific market in which to engage those investments"; these decisions are considered to be the essence of asset orchestration.

Furthermore, their study emphasises that these kinds of AO capabilities "resource investment and deployment" can enhance a firm's ability to compete effectively, and so sustain its business adaptability. In addition, Sambamurthy et al. (2003) asserted that as firms invest in certain complementary assets such as supply chain management and knowledge technologies, their value can be judged in terms of how they might enhance integration capabilities or the degree of adaptability.

To summarize, in this part of our study we present a discussion of how managers can approach orchestrating their firms' resources and capabilities so that they can achieve sustained business adaptability. The literature evidence supports our empirical results, which suggest that organizations might be better adapted to their business's needs when they understand the mechanisms of AO capabilities and can decide how to systematically invest resources in building these abilities (Sirmon and Hitt, 2009).

8.3.4.2 Applicability and Generalizability of the Study Reference Model

An initial objective of the online questionnaire study was to demonstrate the applicability of the study reference model and to generalise both the findings and the utility of the reference model in order to enhance its support for AO project design. In Chapter 5, we examined the study reference model in two detailed case studies. However, we used an online questionnaire to support our analysis from the qualitative phase "case study". Hence, we could examine the applicability and generality of the study reference model in a larger number of companies. The main concern was that of the utility of the new AO reference model in representing some of the managerial actions that managers take part in during periods of business change.

Our analysis highlights the rich interplay between the three managerial AO processes, with the three structural levels that indicate the utility and applicability of the study reference model. More significantly, our theoretical reference model points to the important role of the three AO processes that activate these dynamic managerial capabilities and link them to co-ordinate their decision-making and action taking with each other. Markedly, the debate in this section matches the case study analysis in Chapter 5, which shows the usefulness of the study reference model in the

examination of the case studies. In particular, the structured interview responses received, as well as the survey analysis, showed a need for multi-level but congruent decision- and action taking centred on specific instances of search and select processing and configuration; please see Chapter 5. The above finding is in agreement with (Sambamurthy et al., 2003) who suggest that the relationships amongst the dynamic “managerial” capabilities and competitive actions help to evaluate how well the business units in large firms leverage IT capabilities in their competitive actions. This in turn indicates the significance of managerial AO capabilities through the managerial levels.

Interestingly, the results of the online questionnaires support the case study analyses of the importance of integrated managerial capabilities. Two indicators have emerged from the survey analysis. ***Firstly,*** the study model usefully flags up the importance of integrated decision making and action taking across the levels of asset orchestration. ***Secondly,*** the study model usefully flags up the need for alignment mechanisms between the three AO processes "Search and selection, configuration and deployment" with the firm's assets “strategic asset, complementary asset and operational assets". The preceding result highlights the essential role of integration capabilities, whether by the top-level or the middle-level management. Studies on alignment between managerial capabilities and business strategy can help explain what is happening here; for example, Tallon (2007) illustrates that in a volatile market where both IT capabilities and competitive strategy are vulnerable to change, firms can expect to encounter problems when trying to respond to business change. In addition, other studies refer to the consequences of misalignment, where the results suggest that a lack of asset integration between resource investment and deployment will negatively affect a firm’s performance (Sirmon and Hitt, 2009).

Lastly, the preceding discussion demonstrates that managerial integration capabilities are still the trigger that aligns the entire AO process, whether through the organizational levels or across these levels. The debate here is confirmed by other scholars who suggest that the ability to integrate business and managerial capabilities can exist only when clear and robust synchronized systems exist in a system that will

allow mangers to make effective, integrated decisions (Pelletier et al., 2017, Sambamurthy et al., 2003, Tallon, 2007).

8.4 Section Summary

Our discussion herein has been about how the AO model might be widely applied in a variety of different firms. In addition, it advances the conceived reference model and finds a systemic method into more generally applicable tools. The main concern of the study was about how the latest AO theory helps the business become more responsive. In other words, the overall research project is concerned with the way in which the manager puts together human, capital, technological, and intellectual assets to allow firms to respond to changing market contexts.

Our theorizing highlights the rich interplay between the three managerial levels in the form of AO processes to achieve and sustain a firm's competitive responses. More significantly, our theoretical and practical model points to the important role of an integration strategy to activate the processes of AO and link the search and selection, configuration and deployment processes over an organization's structure to shape the managerial capabilities and execution of competitive response actions. In the following section, the study conclusion and contribution will be illustrated first, and finally the study limitations and areas for additional study will be emphasised.

8.5 Conclusion, Contribution, Limitations and Areas for Additional Research

8.5.1 Conclusion

In this thesis, we drew from the resource-based view (RBV), which considers the role of organizational resources and capabilities in gaining high performance. An important extension of RBV concerns the role of managerial resources in adapting to strategic change. Managerial resources, *"as the skills and abilities of managers"* Castanias and Helfat. (1991 P: 661) are important contributors to the entire range of firm resources and capabilities through asset orchestration logic "a managerial machismo to integrate

and deploy the firm resource and capability". As presented, the AO concept extends our understanding of RBV and provides a basis for future resource-based study (Adner and Helfat, 2003, Helfat et al., 2007, Sirmon et al., 2011), hence gaining a better understanding of how the AO processes manage a firm's resource portfolio across its structural levels.

Accordingly, the primary purpose of this research project was to study AO processes as a new managerial mechanism by which to improve understanding about how firms adapt to business change. Yet, our study proposed a new systematic approach to the application and the deployment of emergent AO concepts in business firms, so enhancing the managerial ability to adapt to business change.

Accordingly, the main concern of the study was about how the latest AO concept can help businesses become more responsive against market change. Therefore, the current research study was conducted around two research questions: **(1)** "How can AO mechanisms be mapped onto common organising structures used by firms, thereby enabling a management that is more effective in sustaining competitive responses?", and **(2)** "To what extent does the integration mechanism acting between the asset orchestration processes "search and selection, configuration and deployment" and the firm's multi-level assets improve managers' ability to sustain firms' competitive responses?" The study had three objectives: **(1)** Review the emergent concept of asset orchestration and previously proposed methods in terms of their application, and review remaining weakness in those applications, **(2)** Conceive a new reference model of the mechanisms of asset orchestration and apply the reference model in selected case study firms that have been subjected to specific kinds of change (e.g., Brexit), **(3)** Conceive and test a systematic method of applying the reference model, where that method encompasses multi-stakeholder decision making in support of change projects in some case study examples.

Our analysis provides answers to the study research questions and has achieved its objectives. The study examined the literature and found that the actual associations between AO mechanisms and different levels of any asset hierarchy have yet to be clearly explained. Additional, the current study found that there is a significant gap in

how complex, multi-levels of AO management decision making should be decomposed, delivered and reintegrated into a coherent and effective whole.

By examining the literature, we conceived, developed and deployed the simple reference model of AO processing. Remarkably, by developing the model of AO processing, this study has demonstrated, irrespective of the very significant differences in the nature and scale of operation, business targets and necessary example assets and resource system configurations in different business firms that essentially each firm appeared to be similar in terms of AO needs. In other words, the study reference model has the feature that it can be generalized to firms working in different sectors such as IT, consultancy and academia. One of the more significant findings to emerge from this study is the beneficial use of the AO reference model "the three uses of the AO-RM". One of these uses was to form a conceptual basis for a creating an AO Road Map which has been used to structure and support the design of AO change projects, referred to as MU-RM.

Our theorizing highlights the rich interplay between the three managerial levels in the form of AO processes to achieve and sustain the firm's competitive responses. In particular, the study shows how senior and middle management teams can begin to unify their decision making. These findings suggest that the study reference model was also found to usefully position multi-level descriptions of AO processes. **Hence, the model provides an integrating framework for developing the AO perspective at structural levels**. The proposed approach therefore facilitates and integrates decision making through the various managerial levels, and consequently action taking via a proposed semi-generic road map. More significantly, our theoretical and practical model points to the important role of **the integration strategy that activates the processes of AO and links the search and selection, configuration and deployment processes over the organization's structure to align the managerial activities and the execution of their competitive responses.**

The findings suggest that the high-level managers should perform the search and selection process by using strategic resources. Top-level managers pursue their sensing of the market needs and the position of their competition in order to find opportunity

and avoid external threats. **Our analysis also showed that top-level managers had a real impact on a firm's adaptability to strategic change**. The study findings further suggested that top-level management has a vital effect on middle management's actions, who are critical to the integration process in terms of the complementary assets required for strategic change. **Middle management has meaningfully been shown to have a significant influence on organizational change through enacting the integration process**. **Yet, middle management play a significant role in the successful integration of top and lower-level management**. The findings also suggest that in a change situation, middle managers are best characterized as change intermediaries, achieving two roles during the implementation of change: **interpretation of the change intent** and **using the complementary assets.**

The findings have also shown that the role of low-level management is operationalizing the value-added assets, or "operational assets". Because we are considering strategic analysis, the low-level management has gained less attention. In other words, the low-level management deals mainly with the daily operational capabilities more than the change processes themselves, which require the use of managerial dynamic capabilities. Therefore, this leads us to suggest that the structural level is a nested hierarchy and the three AO processes overlap, though with some time consequence. However, **synchronizing resource orchestration actions across levels is more complex than the existing work proposes.**

Finally, our AO model clarifies the role that managers play in both shaping a unique package of resources, as well as in deploying those resources (through search and selection, configuration and deployment actions), **thus leading to differences in firms' strategies in adapting to change**. Accordingly, in order to have an effective strategy that helps the business become more responsive, managers at all levels of a firm must be carefully arranged, coordinated, and supported in their activities "orchestrated by top, middle and low-level management".

8.5.2 Study Contribution

Based on Sirmon and Hitt (2009), the study of asset orchestration is warranted because this subject is poorly understood and forms a critical future study schema. The current study offers several opportunities to add to knowledge in terms of conceptual and empirical contributions. ***Firstly,*** the current study has explored a new, emerging research stream of dynamic capabilities. Hence, the study presents a new and innovative conceptual analysis of firms' adaption to strategic change. ***Secondly,*** the study empirically explored and evaluated, in a practical sense, the mechanisms of asset reconfiguration and deployment through which firms adapt to strategic change. The next subsections highlight the contributions made by the thesis to knowledge, and the consequent implications for managers and consultants working in different businesses.

8.5.2.1 Theoretical Contributions to Knowledge

This study has added to the RBV literature in general and that of AO in particular. The study examined the literature and filled an existent gap regarding the lack of actual associations between asset orchestration mechanisms and different levels of any asset hierarchy. Further, the study found that there is a significant gap as to how complex, multi-levels of AO management decision making should be decomposed, delivered and reintegrated into a coherent and effective whole. Thus, the study has developed and provided a conceptual reference model which was conceived from the notions of asset orchestration.

In this study, our examination of the literature clearly showed that the current AO literature suffers from an absence of clear definitions of the "search and selection, configuration and deployment" variables. Hence, in this study we contribute to the literature by defining each of these factors. Further, our research study extends the literature by presenting an integrated framework of asset orchestration, which enriched our understanding of RBV and dynamic capabilities. Also provides a base for further, future study, thus gaining a deeper understanding of how managers' actions "asset orchestrating" to manage a firm's resource portfolio across the structural levels of the firm. Hence enhances our knowledge of how firms develop and sustain the

asset-based competitive responsiveness that allow them to effectively adapt to market change.

Furthermore, we argue that the study reference model represents a contribution to knowledge as a unique framework of deployment practice of AO processes, which is able to incorporate and explain the extant literature on resource and capabilities. Thus, this research suggests a new perspective through an extended model derived from the dynamic capability perspective. Markedly, these proposed models and the visual guide used to map it might be useful to both scholars and practitioners, which we consider a contribution to knowledge.

8.5.2.2 Contribution to Practice

This study has two main contributions to practice; ***firstly***, conceiving and developing the study reference model, AO-RM, and applying this model in selective case study firms. ***Secondly***, developing a road map guide to the applications of AO which we call "Methods of Utilizing the Reference Modell" (MU-RM), which provide an integrative framework approach to the application and the deployment of emergent AO concepts in change projects. In adopting such a reference model, it can be used to form a conceptual basis for creating an AO Road Map that works as a managerial guide during the execution of AO change projects.

One of the major contributions of this study is that it represents the first attempt to apply the emergent asset orchestration components at the individual level "managerial level". In this study, we carefully examined the literature and found a lack of detailed studies that show how to apply such prospective "AO" in real case studies. Henceforth, the main contribution of this study was to conceive and propose a reference model that works as a road map to guide managers during change projects. Significantly, this study has shown that the road map provides a framework for decision making at multiple levels and seeks to link team-based decisions and actions via the use of mental models. It should be borne in mind that this study has used models "e.g., System Dynamics Model", which have not commonly been used in

Strategy, so one of the practical contributions is to make these models applicable for use in the field of Strategic Management.

Furthermore, our reference model helped managers to decompose and hence simplify the understanding of AO processes. In addition, conceiving the mechanistic aspects of AO processes through the provision of a simple and visual guide of how asset orchestration is widely applied in a variety of different firms "change scenario". Further, a direct outcome of the structured interviews was a case study example of emergent AO thinking in action, which in itself usefully extends the base of emergent AO literature by providing a concrete example of the mappings between required AO processes, well-structured AO decisions and actions, leading to the consequent change project. Finally, this is the first study to develop and adopt a unique semi-generic system dynamics model "Method of Utilising the study Reference Model" to express the basic motivation to transfer experience and understanding from one dynamic situation to another.

In summary, the study suggests asset orchestration as a proposed model to adapt to strategic change, which contributes to the knowledge by: **(i)** reviewing the literature and analysing remaining weaknesses in emergent AO concepts from a theoretical and application perspective to establish a new reference model; **(ii)** showing how this reference model can be applied and fleshed out in particular companies; and **(iii)** showing how we can move to future thinking through connecting to the dynamic of the business firm through using the system thinking tools which can help managers to predict future changes.

8.5.3 Limitations

While this study seeks to add to the understanding of the mechanistic aspects of AO and its effects on strategic change, the study was limited by its exploration of only one in-depth review of three dimensions "areas", where Sirmon et al. (2011) suggest that research into AO can be used to extend RBB and dynamic capabilities. These dimensions are **(1)** breadth (AO across the scope of the organization), **(2)** life cycle (AO at various stages of organization maturity), and **(3)** depth (AO across levels of the firm)

"we have already studded the depth area". These other dimensions need to be explored and investigated as well. It should also be noted that while this study only investigated two case study firms in the UK, future studies should be able to investigate more cases of companies that differ in terms of size, sector and industry. Thus, the generalizability of these research results is limited by sector and country.

It must be made clear that, initially, the AO reference model was designed to be used as a visual tool which is simple to use. Therefore, it does not seek to cover all aspects of AO in organisations. For example, it does not seek to characterise issues related to changes in organising structures, cultural change, IT systems design, investment and incentivisation, market and competitor impacts, or political and other environmental concerns. In addition, the study does not claim its findings to be of general significance, but we suspect that AO-RM can be widely applied to lend structure to significant change projects that involve multiple levels of change management.

Furthermore, the online questionnaire design was restricted by a number of limitations. There were only 17 participant companies, with data restrictions and the limited time of their managers. This meant that the researcher was invited to contribute only a limited number of questions and could not increase the scope of the online survey questionnaire. This restriction might have constrained the amount of data available for the quantitative and qualitative analyses and allowed for less variance in certain areas than would have otherwise been preferred.

8.5.4 Areas for Additional Future Research

The consideration of the research findings, contribution and the limitations that apply to them suggest a number of opportunities for future exploration. Drawing support from Sirmon et al. (2011), who suggested three areas in which to study AO phenomena, it is clear that more research is required to explore these dimensions, especially in the area of lifecycle which is concerned with AO at various stages of an organization's maturity, as contrasted with Helfat and Peteraf (2003) who suggested that a resource-based competitive advantage comes about over a period of time. Accordingly, a study of the capabilities lifecycle will help to make AO dynamic by

providing a framework for understanding the evolution of the managerial capabilities over time.

With the prospect of extending the use of the study findings, we suggest a study of AO in more detailed, specific kinds of changes. Thus, this research has thrown up many questions in need of further investigation; for instance, are the common classes of AO processing and asset transformation causally linked to distinctive types of firms? Are common classes of AO processing and asset transformation causally linked to different types of environmental dynamic?

More studies are needed concerning the practice perspective of managerial activity, which considers the notion of Strategy as Practice "how managers doing strategy". In addition, to generalise the study findings and the utility of the reference model to enhance its support for AO project design, further study could consider extending the study road map in a number of potential ways:

1- Extend the road map design to better-structured AO projects.
2- Extend the road map design to include dynamic future prediction.
3- Extend the road map design to realise AO faster and more effectively.
4- Provide the firm's managers with scenarios for conceiving and dealing with future changes using the system thinking and modelling processes.

Conversely, Sirmon et al. (2011) suggest that the research on AO has the potential to extend our understanding of RBV and dynamic capabilities by explicitly addressing managers' roles with regards to firms' resources. Yet, they call for more theoretical and empirical testing to understand the managerial actions required to manage a firm's resources. Consequently, Quigley and Hambrick (2012) measured the impact of CEOs on firm performance. This result indicated that there are other factors that can have potential effects, including the middle- and low-level management. We thus suggest further study to measure the impact of middle management on firm performance.

Adner and Helfat (2003) suggested three underpinning dynamic managerial capabilities, namely human capital, social capital, and cognition. Later, Helfat and

Martin (2015b) suggested incorporating the possible effects of these three underpinnings simultaneously on strategic change. Accordingly, the effects of these three factors on asset orchestration is in need of additional investigation.

Lastly, to make the study contribution to practise becomes reality for stakeholders; we can take this model out of them in many ways; ***Firstly,*** I "with an academic and experts team" have been involved with publishing a series of papers and books to make the applicability of AO notions in hand. ***Secondly***, this thesis and other related publications will be available as a web resource "e.g., University of Leicester open access". ***Lastly***, a consultancy service will be available to help both academics and practitioners conduct their change projects from an of AO perspective.

8.6 Final Conclusion

Grounded in the resource-based view of the firm, scholars have suggested that AO concepts can facilitate the structuring and integration of many and various change processes (Helfat et al., 2007). Hence, we conceived and proposed a reference model to help the managers at each different level to integrate their AO processes within their respective hierarchical levels. The study ended with the development of an approach to, or methods of, using the AO-RM. Therefore, we captured real cases and detailed them through three uses of the AO-RM. The first use was with regards to semi-structured interviews, which targeted the two case study firms used as examples to show the detailed elicitation of the AO processes. The second use was from a conceptual basis that of creating an AO road map, which has been proposed for use in structuring and supporting the design of AO change projects. The last use dealt with guiding the design of an online questionnaire, with a view to seeking commonality between AO processing at multiple levels.

The study concluded by showing that it constitutes a valuable addition to current knowledge by investigating uses and applications of the AO-RM. The reference model has helped to define how the AO processes work in actual case examples. Further practical use was demonstrated by providing the case firms with a number of suggested steps through which to integrate the change project and some technical

aspects to show how to structure their projects and encourage their teams to work together. Consequently, this contributed further to the knowledge gained by addressing the gap that remained in the literature regarding the integration of AO processes by showing that the management team can work together through these different processes. Lastly, the study recommended some future avenues for additional research that might enrich the AO concept.

Appendices

Appendix A Participant Informed Consent and Letter of Invitation:

Consent to be a Qualitative Interview Research Participant:

Dear Sir/Madam, you are being asked to participate in a research study. This form is designed to tell you everything you need to think about before you consent to participate in the study. Your participation is ***completely voluntary;*** should you decide to take part in the study, you can choose to decline answering any question you are uncomfortable answering or completely withdraw from the research study without any penalty.

Study Title:

An integrative framework for Asset Orchestration.

Principal Investigator:

Hamdan Mansoor, PhD student, University of Leicester (Email: hom2@le.ac.uk)

Research Study Purpose:

The purpose of this study is to gain a deep understanding of the managerial dynamic capabilities impact on strategic change in business firms. Yet, the initial aim of this research project is to study the processes of asset orchestration phenomenon as a new managerial mechanism to improve our understanding of the natural dependencies in firms and to thus build new knowledge about the questioned subject.

Your participation and time commitment:

You are being asked to participate in an interview lasting about 45-60 minutes. The interview will be audio-recorded with your permission; however, no identifying information will be included on the recorded transcripts.

Research Implications to Consider:

Some of the interview or survey questions may be perceived as being of a sensitive nature because of the business direction of any small and medium term enterprises you are involved with. At all times you retain the right to decline to answer any questions that you consider too personal or business sensitive. In the event that you feel that you have experienced stress or anxiety during your participation in the study, you may terminate your participation at any time. All notes, recordings, and any comments will be destroyed.

Benefits of Participation:

There may be no personal benefit to you as a study participant, but the PhD researcher hopes to contribute to an academic body of knowledge based on practical experiences having engaged with the performances of small and medium enterprises. This will greatly enhance our knowledge the pragmatic ways to think about future managerial and dynamic capabilities. Whilst no payment is made in exchange for your participation in this study (to protect its intellectual independence), in return for your support the PhD student will provide you with reports summarizing the research findings and highlighting the managerial processes, which help firms to adapt to business change. In this way it is hoped that everyone who participates can share together in best practice across the business community.

Confidentiality:

Your participation in this study will be anonymous. Any information you provide will be kept strictly confidential and retained at all times according to the Data Protection Act (1998) in the UK. Any data created will not be shared with a third party. This means that the research records generated will be kept in a password-protected folder on the researcher's computer that will have been security code encrypted by the University of Leicester’s IT department. Only the researcher will have access to the records. Your name, the name of your company, or other facts that might identify you will not be identified in the study. The digital audio-recordings will be destroyed upon completion of the study. Any anonymous general trends will be retained in a secure locked cabinet

at the university and will also be destroyed once the PhD has been completed and submitted for examination.

Questions:

If you have any questions about this study or your part in it, you may contact Hamdan Mansoor at hom2@le.ac.uk

If you have questions about your rights as a research subject or if you have questions, concerns, or complaints about the research, you may contact the University of Leicester via:

Nita Sudra; Postgraduate Programme Administrator/ Department of Sociology, University of Leicester, University Road, Leicester LE1 7RH

Tel: +44 (0)116 252 2750

Email: ns75@le.ac.uk

Consent

I have read the above information. I have asked questions and received answers. I consent to participate in this study.

Name of Participant: _____

Signature of Participant: _____

Date _____ Time _____

Signature of Person Obtaining Consent: _____

Date _____ Time _____

Letter of Invitation to Participate in Study

Dear Research Participant:

I am conducting a series of research interviews as part of my doctorate thesis in Strategic Management supervised by Professor Steven King at the College of Social Sciences of the University of Leicester (sak28@le.ac.uk). The study's main focus is to gain a deeper and more practical understanding of the managerial dynamic capabilities that can impact on strategic change in business enterprises. An area of research with which is it concerned is the mechanism of search and selection, configuration and deployment that companies use in their pursuit in adapting to strategic change. Academics call these processes "Asset Orchestration" but there is less available information on these important aspects of business operation than there should be in studies of business success and failure to adapt to change.

The vital function of dynamic managerial capabilities is asset orchestration which is: Involve identifying the critical assets and investing in them (search/selection), and then developing a governance system along with a means for their effective use identified. The second part of asset orchestration involves the coordination of co-specialized assets and their use in productive ways configuration/deployment).

The alignment between these functions enhances the firms' capacity to adapt to business environment conditions. Adaptability in terms of address, creates, and exploits the change in business market. To gain a better insight regarding the mechanism of asset orchestration and strategic change a glossary of terms would be attached in separate sheet.

It would be very helpful if [……. Company] would agree to be a part of this research project. I will need to interview managers and employees involved with change project through the firm organizational structure "managerial levels". These interviews and review of relevant documentation should take no more than 40-60 minutes per session. Please be assured that all information obtained for this research project will be handled with the utmost respect to confidentiality and nondisclosure of any

business information. The study will be conducted according to the Data Protection Act (1998) at all times. I hope you will agree to participate in this research.

Please do get in touch at the email below if you feel you would like to take part.

Thank you so much for kindly considering this request; your opinions and experiences of business and enterprise would be valued.

Yours faithfully,

Hamdan Mansoor

Email: hom2@le.ac.uk

Appendix B Semi-Structured Interview

Thesis Title: An integrative framework for Asset Orchestration

Introduction: My project is concerned with the way in which you as manager put together your human, capital, technological, and intellectual assets to respond to changing market context; these managerial functions are termed ***"Asset Orchestration".***

Current strategic management perspective argues that during times of change, business environments become more competitive; which in turn requires firms to possess managerial skills that can create, adapt to, and exploit market change and while so doing to identify and action ways of responding to the need for change.

In this research, I'm focusing on what are referred to as ***"Dynamic Managerial Capabilities",*** which are how managers help firms renew and recreate a resource base to adapt for strategic change. In today's business markets, while firms struggle to respond to unexpected challenges and environmental dynamics, the role of managerial dynamic capabilities is to support firms' ability to achieve adaptability to customers' needs and technological requirements.

General questions about your firm; please answer the following questions:

a- What is the name of your firm? And what is your role in the firm?
b- How old is your firm?
c- What types of products and/or services does your firm offer?
d- How many permanently employed people (full or part-time casual) work within your firm?
e- Who are your main customers, suppliers, and competitors?
f- Describe the general characteristics of the markets you serve in?
g- At what stage of life cycle your firm should be considered? A new market entry, a growing business, or maturity stage?

Questions related to your firm's resources base and business markets change:

The resource base: Resources are something that the firm can draw upon to accomplish its aims. They could be tangible *(e.g. machines, buildings, money)*, intangible *(e.g. information, software, values),* and human resources *(e.g.* managers, employees), as well as other specialist capabilities (like *unique experience, strategic network relations*) which the organization owns, controls, or has access to on a preferential basis. The term resource base implies that we consider ***capabilities*** to be a kind of firm's resource. In this regard, we use the terms ***resources,*** and ***assets*** interchangeably. The study considers that firms could deal with business changes in the sense of creating, adapting to, and exploiting change.

With respect to recent changes in the business market(s) in which your firm operates:

1- Within the last three years, please describe the nature of the business market changes that you have observed.
2- In responding to the latest changes, what did you perceive to be your most important resources and capabilities that facilitated the change processes, and why?
3- What action(s) did you (as a manager) undertake in responding to the change?
4- Who was involved in the change processes such as "managers, individuals, teams or consultants"?
    a) Have this activities been varied according to the managerial level? "Top, middle, or bottom level"
    b) What was the nature of the processes which assigned to each level?
5- Did you access to any relevant key sources of knowledge, resources, and capabilities outside the organisation that helped in applying change processes?

a) During that period of time, do you consider the firm has changed in terms of its lifecycle curve? “like development or maturity stage”
b) Do you consider this change has been happened because of internal factors? like “old product, system, and/or technology”
c) Do you consider this change has been happened because of external factors? like “ new technology, change of government laws, and/or market demand”

Questions related to the search and selection processes:

The search/selection processes are expected to require managers to be involved in specific activities centred on processes of environment scanning; searching; and exploration. Consequently, this is likely to Involve managerial decision making that is relate to the level of investment needed, the choice of an appropriate organizational structure, and types of asset deployment including *“human, capital, technological, and intellectual assets”.*

Please think of opportunities and threats in your business environment?

6- Have you been involved in activities such as searching for new markets, technology, or new strategy?
7- How did you perceive and achieve external market developments? (e.g. through conferences, market analyses reports …).
8- Within the last three years, in case of needing new solutions (e.g. building new systems, new database, new resources combinations):
    a) What is the most important for you as a manager; outsourcing the needed solutions? Or building/ changing them inside the firm?
    b) Would establishing new solutions inside the firm give some advantages, what kind of advantages would it give?

c) Which managerial level "and/or team" have usually been involved in such tasks?

d) How often have you been involved in such activities like (planning scenarios of change, new resources development, building new systems)

A business model is a specification describing how an organization fulfils its purpose. All business processes and policies are part of that model.

Within the last three years; think of the primary managerial decision and organizational business processes that have impacted on your firm.

9- In responding to market changes; have you been involved in some decisions that are related to firm strategic investment?

10- Has this required you to develop some capacities/skills to set out alignment between firm departments, and insure resources allocation?

a) What kinds of capabilities / skills would be required?

b) Which managerial level "and/or team" should be involved?

11- Did these decisions required changing the design of organizational systems, incentives, and/or structures?

Questions related to reconfiguration processes adopted by your firm:

Asset reconfigurations is a key strategic functions of management to find new value-enhancing resource combinations inside the firm or in its direct supply chain. This may be because many of the most valuable assets inside the firm are knowledge related and hence not tradable; "knowledge assets, managerial experience, human capital". Hence, the coordination and integrated "alignment" of such assets can create value that cannot be replicated in a market. Consequently, asset reconfiguration creates an opportunity for managers to use the firm's knowledge to build resources and value inside the firm (or in its direct supply chain) instead of purchasing from markets.

12- To what extent has the changes in your business environment require the re-allocation, building, and re-combination of firm assets?

13- Have you been involved in activities such as identifying, or building missing assets? (e.g. new skills for employees, technical requirements for new products).

   a) Which managerial level "and/or team" should be involved in such activities?

14- How you have been involved in aligning these assets in productive ways? (e.g. re- building, re- deployment, re- combining inside the firm).

   a) Has this included in particular re deployment, re build, and re-combination of non- tradable assets?
   b) What value has your firm gained from these processes?

Questions related to deployment processes adopted by your firm:

Deployment process may involve physical transfer of resources to new locations or sharing resources without physical transfer. Yet, its co-ordinated utilization of firm resource and capabilities to settlement the new or the existent products in the new markets to achieve the desired target and meet customer's expectations.

15- Have you recently been involved in significantly new 'deployment activities' such as when deploying new configurations of production systems to meet the new products requirement.

16- Please describe what kinds of deployment activities your firm have undertaken? For example, did your company decisions or actions result in new or changed systems operation; training programs, etc.?

Appendix C Online-Questionnaire

Thesis Title: An integrative framework for Asset Orchestration

Introduction:

We will be most grateful for your participation in this questionnaire, the purpose of which is to improve the knowledge base about how businesses achieve responsiveness. The survey forms part of a research study, which is part funded by the UK Government and Leicester University and seeks improved methods of enabling business change.

Completing the survey should take no more than 30 minutes and will enable our research team to report back to you about how respondents to this questionnaire are sustaining business performance. Questions seek basic information about your company through to questions about your firm's adaptability. If you have any questions or concerns about completing the survey please contact the main PhD researcher involved, namely Hamdan Mansoor via the following contact details;

Email: hom2@le.ac.uk

Phone: 0044 (0) 116 252 5344

Mobile: 0044 (0) 7979 653 400

Purpose of our research programme and this questionnaire:

The main concern of the study is about; "Can latest Asset Orchestration Theory help your business become more responsive"?

The overall research project is concerned with the way in which you as a manager put together your human, capital, technological, and intellectual assets to allow you to respond to changing market contexts. The latest strategic management literature refers to these managerial functions using the collective term "**Asset Orchestration**".

The questionnaire requests answers from you to three sets of questions, which seek:

Set A: Background information about you and your firm:

Set B: To characterise the main types of change your firm needs to make:

Set C: Use the model of asset orchestration:

Question Set A: Background information about you and your firm:

What is the name of your firm?

What main markets does your company operate in?

What is the age of your firm?

What is your role in the firm? What does this involve?

How long have you been employed by this company?

How many full-time employees are in your firm?

Question Set B: Characterise the responsiveness of your company:

Please rank your answers on a scale of 1-5;

Where 1 = ‘could not feasibly adapt’ and 5 = 'regularly and readily adapt to this change’.

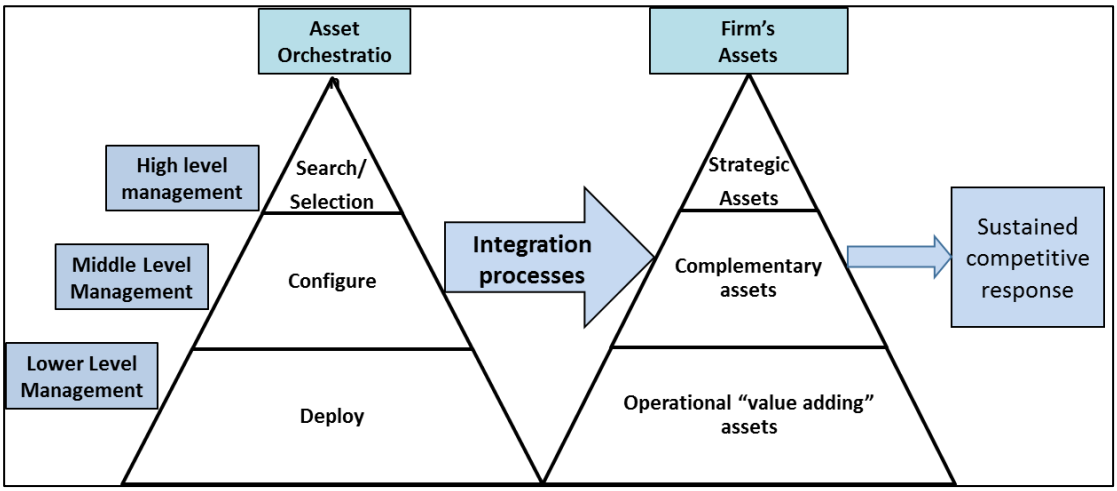
In relation to sustained competitive responses made by your firm; to what extent do you agree that your firm can readily adapt to business change?

	Could not feasibly adapt	Possibly could adapt	Not Applicable	Usually can respond, but need significant change process	Regularly and readily adapt to this change
B1-Respond readily to significant volume changes in consumer demand?	☐	☐	☐	☐	☐
B2- React readily to new product or service launches by competitors?	☐	☐	☐	☐	☐
B3-Respond readily to regulatory change in business environment?	☐	☐	☐	☐	☐
B4-Enter readily into new regional or international markets?	☐	☐	☐	☐	☐
B5-Generally respond readily to external market requirements?	☐	☐	☐	☐	☐
B6-Readily extend variety among the range of your products available for sale?	☐	☐	☐	☐	☐
B7-Readily customise your products?	☐	☐	☐	☐	☐
B8-Readily reduce/rationalise variety amongst your products or services?	☐	☐	☐	☐	☐
B9- Readily empower employees for individual learning?	☐	☐	☐	☐	☐

Question Set C: using the model of asset orchestration

Proposed use of a new Model of Asset Orchestration

By analysing your answers to the following set of questions we aim to systematically gather data on how businesses go about 'orchestrating their assets' so that they can achieve sustained business performance. To aid our analysis we have used key management theories and our own experiences in the form of the new 'Model of Asset Orchestration' shown in the below figure.



This figure seeks to position managerial roles performed during episodes of significant change (such as may have happened in your firm following the recent Brexit crisis) as those managers concerned reconfigured a firm's (monetary and other resource) assets accordingly.

Here we consider there to be three main levels of managerial processes. At the highest level 'Search and Select' processes are expected to dominate; at a mid-level asset and resource 'Configuration' processes may be of primary concern; and at the lowest level we presume that mainly asset and resource 'Deployment' processes will be of major concern.

We have also assumed that typically managers operating at all of these levels will need to co-ordinate their decision making and action taking with each other, such that effective and timely change to the overall firm can be made.

Please answer the following question set, having viewed our new model of asset orchestration:

C1: Do you feel that our new model of asset orchestration usefully represents some of the managerial actions that you and other managers in your firm take part in (or previously have taken part in) when realising business changes of types considered during the earlier questions set A?

- ○ Yes
- ○ NO

In the case of your answering (C1) with a yes, please use free text to state if you would have preferred to represent this Figure in some different way

In the case of your answering (C1) with a No, please say why you feel the figure miss-represents reality in the case of your firm?

C2: Referring again to our asset orchestration model; has your firm recently been involved in significant new 'Search activities'; such as when seeking new markets, new technology, or developing a new strategy?

- ☐ Yes
- ☐ NO

If you have answered yes to C2; how did your firm achieve your new Search activities? (Such as through market analyses reports, product research, conference attendance, etc.…)

If you have answered yes to C2; Please say who realised these search processes? (e. g. senior managers, middle managers?)

C3: Referring again to our study model, has your firm recently been involved in significant new 'Selection activities' such as selecting new markets, new technology, or new strategy?

- ☐ Yes
- ☐ NO

If you have answered yes to C3; Please describe the kinds of selection activities your company undertook? For example did your firm's decisions or actions result in finding and/or changing key resource allocations? (Such as finding new partners, selecting new premises)

If you have answered yes to C3; Please say who realised this processes? (e. g. senior managers, middle managers, technologists and/or engineers?))

- ☐ Yes
- ☐ NO

C4: Referring again to our study model, has your firm recently been involved in significant new Configuration activities? such as configuring new product introduction, sales processing, resource planning, or supply chain systems?

If you have answered yes to C4; Please describe what kind of configuration activities were involved? For example did your decisions or actions result in specifying, designing and/or changing key systems?

If you have answered yes to C4; Please say who realised these processes? (e. g. senior managers, middle managers?)

C5: Referring again to our study model, has your firm recently been involved in significantly new 'Deployment activities' such as when deploying new configurations of IT, ERP or shop floor management systems?

If you have answered yes to C5; Please describe what kinds of deployment activities your firm have undertaken? For example did your company decisions or actions result in new or changed systems operation; training programs, etc.?

If you have answered yes to C5; Please say who realised these processes? (e. g. senior managers, middle managers?)

C6: Bearing in mind previous asset orchestration processes in your firm, do you think that the study model usefully flags up the importance of integrated management decision making and action taking across the levels of asset orchestration?

- ☐ Yes
- ☐ NO

If you have answered no to C6; what kinds of Integration processes should be identified?

C7: Do you think that the study model usefully flags up the need for alignment mechanisms between the three AO processes "Search and selection, configuration and deployment" with the firm's assets “strategic asset, complementary asset and operational assets"?

- ☐ Yes
- ☐ NO

If you have answered no to C7; what kind of alignment mechanisms or processes do you feel should be identified?

Thank you very much for your valuable time

Appendix D Ethics-Approval-Letter

University Ethics Sub-Committee for Sociology; Politics and IR; Lifelong Learning; Criminology; Economics and the School of Education

7/05/2016

Ethics Reference: 4136-hom2-sociology

TO:

Name of Researcher Applicant: **Hamdan Mansoor**

Department: Sociology

Research Project Title: An integrative framework for Asset Orchestration.

Dear Hamdan Mansoor,

RE: Ethics review of Research Study application

The University Ethics Sub-Committee for Sociology; Politics and IR; Lifelong Learning; Criminology; Economics and the School of Education has reviewed and discussed the above application.

1. Ethical opinion

The Sub-Committee grants ethical approval to the above research project on the basis described in the application form and supporting documentation, subject to the conditions specified below.

2. Summary of ethics review discussion

The Committee noted the following issues:

Thank you for responding to our comments. We are happy to approve your application.

3. General conditions of the ethical approval

The ethics approval is subject to the following general conditions being met prior to the start of the project:

As the Principal Investigator, you are expected to deliver the research project in accordance with the University's policies and procedures, which includes the University's Research Code of Conduct and the University's Research Ethics Policy.

If relevant, management permission or approval (gate keeper role) must be obtained from host organisation prior to the start of the study at the site concerned.

4. Reporting requirements after ethical approval

You are expected to notify the Sub-Committee about:

- Significant amendments to the project
- Serious breaches of the protocol
- Annual progress reports
- Notifying the end of the study

5. Use of application information

Details from your ethics application will be stored on the University Ethics Online System. With your permission, the Sub-Committee may wish to use parts of the application in an anonymised format for training or sharing best practice. Please let me know if you do not want the application details to be used in this manner.

Best wishes for the success of this research project.

Yours sincerely,

Dr. Laura Brace

Chair

Bibliography

ABDULLAH, R., WESTON, R. H., MANSOOR, H. O., KING, S. & JACKSON, P. 2018. Transformational Change in Firms by Systematically Applying Emerging Asset Orchestration Concepts. *Manuscript sumbitted for publication*.

ADNER, R. & HELFAT, C. E. 2003. Corporate effects and dynamic managerial capabilities. *Strategic Management Journal,* 24, 10**,** 1011-1025.

AGYAPONG-KODUA, K. 2009. *Multi-product cost and value stream modelling in support of business process analysis.* PhD thesis. UK: Loughborough University.

AMIT, R. & ZOTT, C. 2001. Value creation in e-business. *Strategic Management Journal,* 22, 6-7**,** 493-520.

ARAGÓN-CORREA, J. A. & SHARMA, S. 2003. A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review,* 28, 1**,** 71-88.

AREND, R. J. & BROMILEY, P. 2009. Assessing the dynamic capabilities view: spare change, everyone? *Strategic Organization,* 7, 1**,** 75-90.

ASKIN, R. G. & STANDRIDGE, C. R. 1993. *Modeling and analysis of manufacturing Systems.* New York: John Wiley.

AUGIER, M. & TEECE, D. J. 2009. Dynamic capabilities and the role of managers in business strategy and economic performance. *Organization Science, INFORMS,* 20, 2**,** 410-421.

AUGIER, M. & TEECE, D. J. 2013. *The palgrave encyclopedia of strategic management*. Basingstoke: Palgrave Macmillan.

BAERT, C., MEULEMAN, M., DEBRUYNE, M. & WRIGHT, M. 2016. Portfolio entrepreneurship and resource orchestration. *Strategic Entrepreneurship Journal,* 10, 4**,** 346-370.

BAIN, J. S. 1959. *Industrial organization.* New York: John Wiley.

BALOGUN, J. 2003. From blaming the middle to harnessing its potential: Creating change intermediaries. *British Journal of Management,* 14, 1**,** 69-83.

BARNEY, J. 1986. Strategic factor markets: Expectations, luck, and business strategy. *Management Science,* 32, 10**,** 1231-1241.

BARNEY, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management,* 17, 1**,** 99-120.

BARNEY, J. B., KETCHEN, D. J. & WRIGHT, M. 2011. The future of resource-based theory revitalization or decline? *Journal of Management,* 37, 5**,** 1299-1315.

BARRETO, I. 2010. Dynamic capabilities: A review of past research and an agenda for the future. *Journal of Management,* 36, 1**,** 256-280.

BASILE, A. & FARACI, R. 2015. Aligning management model and business model in the management innovation perspective. *Journal of Organizational Change Management,* 28, 1**,** 43-58.

BECK, J. B. & WIERSEMA, M. F. 2013. Executive decision making: Linking dynamic managerial capabilities to the resource portfolio and strategic outcomes. *Journal of Leadership & Organizational Studies,* 20, 4**,** 408-419.

BENNER, M. J. & TUSHMAN, M. L. 2003. Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review,* 28, 2**,** 238-256.

BHARADWAJ, A. S. 2000. A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS quarterly,* 24, 1**,** 169-196.

Binder, T., Vox, A., Belyazid, S., Haraldsson, H. and Svensson, M., 2004. Developing system dynamics models from causal loop diagrams. *Proceedings of the 22nd International Conference of the System Dynamic Society* pp. 1-21.

BOS. 2018. *Bristol Online Survey*. Available at: https://www.onlinesurveys.ac.uk/ [Accessed 10 May 2018].

BRYMAN, A. 2005. *Social research methods.* Oxford: Oxford University Press.

BRYMAN, A. 2014. *Social research methods*. Oxford: Oxford University Press.

BUSCH, B. & MATTHES, J. 2016. *Brexit–the economic impact. A meta-analysis, IW-Report.* Cologne Institute for Economic Research.

CAMBRIDGE DICTIONARY. 2018. *Orchestrate meaning, Cambridge English Dictionary.* Available at: https://dictionary.cambridge.org/dictionary/english/orchestrate? q =orchestration [Accessed 20 May 2018].

CAPRON, L. & MITCHELL, W. 1998. Bilateral resource redeployment and capabilities improvement following horizontal acquisitions. *Industrial and Corporate Change,* 7, 3**,** 453-484.

CASTANIAS, R. P. & HELFAT., C. E. 1991. Managerial resources and rents. *Journal of Management,* 17, 1**,** 155-171.

CASTANIAS, R. P. & HELFAT., C. E. 2001. The managerial rents model: Theory and empirical analysis. *Journal of Management,* 27, 6**,** 661-678.

CAVES, R. 1964. *American Industry: Structure, Conduct, Performance*. Englewood Cliffs, NJ: Prentice-Hall.

CHADWICK, C., SUPER, J. F. & KWON, K. 2015. Resource orchestration in practice: CEO emphasis on SHRM, commitment-based HR systems, and firm performance. *Strategic Management Journal,* 36, 3**,** 360-376.

CHAKRABARTI, A., VIDAL, E. & MITCHELL, W. 2011. Business transformation in heterogeneous environments: The impact of market development and firm strength on retrenchment and growth reconfiguration. *Global Strategy Journal,* 1, 1-2**,** 6-26.

CHANDLER, A. D. 1962. *Strategy and structure: Chapters in the history of the american enterprise.* Cambridge: MIT Press.

CHIRICO, F., SIRMON, D. G., SCIASCIA, S. & MAZZOLA, P. 2011. Resource orchestration in family firms: investigating how entrepreneurial orientation, generational involvement, and participative strategy affect performance. *Strategic Entrepreneurship Journal,* 5, 4**,** 307-326.

CHRISTMANN, P. 2000. Effects of "best practices" of environmental management on cost advantage: The role of complementary assets. Academy of Management journal, 43, 4, 663-680.

CONNER, K. R. 1991. A historical comparison of resource-based theory and five schools of thought within Industrial organization economics: Do we have a new theory of the firm? *Journal of Management,* 17, 1**,** 121-154.

CRESWELL, J. W. & CLARK, V. L. P. 2007. *Designing and conducting mixed methods research.* London: Sage Publications, Inc.

CROOK, T. R., KETCHEN, D. J., COMBS, J. G. & TODD, S. Y. 2008. Strategic resources and performance: A meta-analysis. *Strategic Management Journal,* 29, 11**,** 1141-1154.

DHINGRA, S., OTTAVIANO, G. I. P., SAMPSON, T. & VAN REENEN, J. 2016. *The impact of Brexit on foreign investment in the UK.* London: Centre for Economic Performance, London School of Economics and Political Science.

DI STEFANO, G., PETERAF, M. & VERONA, G. 2014. The organizational drivetrain: A road to integration of dynamic capabilities research. *The Academy of Management Perspectives,* 28, 4**,** 307-327.

DIMAGGIO, P. J. & POWELL, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review,* 48, 2**,** 147-160.

DOPSON, S. & STEWART, R. 1990. What is happening to middle management? *British Journal of Management,* 1, 1**,** 3-16.

DUBIN, R. 1976. *Theory Building in Applied Areas.* Chicago: Rand McNally, Handbook of Industrial and Organizational Psychology.

DUTTA, S., NARASIMHAN, O. & RAJIV, S. 2005. Conceptualizing and measuring capabilities: Methodology and empirical application. *Strategic Management Journal,* 26, 3**,** 277-285.

EISENHARDT, K. M. & MARTIN, J. A. 2000. Dynamic capabilities: What are they? *Strategic Management Journal,* 21**,** 1105-1121.

EISENHARDT, K. M. 1989. Building theories from case study research. *Academy of Management Review,* 14, 4**,** 532-550.

FAULKNER, D. O. & CAMPBELL, A. 2006. *The Oxford handbook of strategy: A strategy overview and competitive strategy.* New York: Oxford University Press.

FLOYD, S. W. & LANE, P. J. 2000. Strategizing throughout the organization: Managing role conflict in strategic renewal. *Academy of Management Review,* 25, 1**,** 154-177.

FOSS, N. 1997. 'Resources and Strategy: A Brief Overview of Themes and Contributions', in FOSS, N. (ed.) *Resources, firms, and strategies: A reader in the resource-based perspective.* New York: Oxford University Press, pp. 3–18.

GALUNIC, D. C. & EISENHARDT, K. M. 2001. Architectural innovation and modular corporate forms. *Academy of Management Journal,* 44, 6**,** 1229-1249.

GIDDENS, A. 1984. *The Constitution of Society*. Los Angeles: Univ. of California Press.

GIOIA, D. A. & PITRE, E. 1990. Multiparadigm perspectives on theory building. *Academy of Management Review,* 15, 4**,** 584-602.

GIROD, S. J. G. & WHITTINGTON, R. 2017. Reconfiguration, restructuring and firm performance: Dynamic capabilities and environmental dynamism. *Strategic Management Journal,* 38, 5**,** 1121-1133.

GRANT, R., M. 2002. *Contemporary strategy analysis.* Oxford: Balckwell.

GRANT, R., M., 2010. *Contemporary strategy analysis.* New York: John Wiley.

GRIX, J. 2002. Introducing students to the generic terminology of social research. *Politics,* 22, 3**,** 175-186.

GRUBER, M., HEINEMANN, F., BRETTEL, M. & HUNGELING, S. 2010. Configurations of resources and capabilities and their performance implications: an exploratory study on technology ventures. *Strategic Management Journal,* 31, 12**,** 1337-1356.

GRUNDY, T. 2006. Rethinking and reinventing Michael Porter's five forces model. *Strategic Change,* 15, 5**,** 213-229.

HANSEN, G. S. & WERNERFELT, B. 1989. Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal,* 10, 5**,** 399-411.

HANSEN, M. H., PERRY, L. T. & REESE, C. S. 2004. A Bayesian operationalization of the resource-based view. *Strategic Management Journal,* 25, 13**,** 1279-1295.

HART, C. 1998. *Doing a literature review: Releasing the social science research imagination.* Los Angeles: Sage Publications, Inc.

HAY, C. & WINCOTT, D. 1998. Structure, agency and historical institutionalism. *Political studies,* 46, 5**,** 951-957.

HELFAT, C. E. & CAMPO-REMBADO, M. A. 2016. Integrative capabilities, vertical integration, and innovation over successive technology lifecycles. *Organization Science,* 27, 2**,** 249-264.

HELFAT, C. E. & MARTIN, J. A., 2015a. 'Dynamic managerial capabilities: A perspective on the relationship between managers, creativity, and innovation in organizations', in A. HITT, J. Z. (ed.) *The Oxford handbook of creativity, innovation, and entrepreneurship*. New York: Oxford University Press, p. 421-429.

HELFAT, C. E. & MARTIN, J. A., 2015b. Dynamic managerial capabilities: Review and assessment of managerial impact on strategic change. *Journal of Management*, 41, 5, 1281-1312.

HELFAT, C. E. & PETERAF, M. A. 2003. The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal,* 24, 10**,** 997-1010.

HELFAT, C. E. & PETERAF, M. A. 2015. Managerial cognitive capabilities and the microfoundations of dynamic capabilities. *Strategic Management Journal,* 36, 6**,** 831-850.

HELFAT, C. E. & WINTER, S. G. 2011. Untangling Dynamic and Operational Capabilities: Strategy for the (N)ever-Changing World. *Strategic Management Journal,* 32, 11**,** 1243-1250.

HELFAT, C. E., FINKELSTEIN, S., MITCHELL, W., PETERAF, M., SINGH, H., TEECE, D. & WINTER, S. G. 2007. *Dynamic capabilities: Understanding strategic change in organizations.* Malden, Mass: Blackwell.

HENDRY, K. P., KIEL, G. C. & NICHOLSON, G. 2010. How boards strategise: A strategy as practice view. *Long Range Planning,* 43, 1**,** 33-56.

HEUGENS, P. P. & LANDER, M. W. 2009. Structure! Agency!(and other quarrels): A meta-analysis of institutional theories of organization. *Academy of Management Journal,* 52, 1**,** 61-85.

HITT, M. A., IRELAND, R. D., SIRMON, D. G. & TRAHMS, C. A. 2011. Strategic entrepreneurship: Creating value for individuals, organizations, and society. *The Academy of Management Perspectives,* 25, 2**,** 57-75.

HITT, M. A., LEE, H.-U. & YUCEL, E. 2002. The importance of social capital to the management of multinational enterprises: Relational networks among Asian and Western firms. *Asia Pacific Journal of Management,* 19, 2-3**,** 353-372.

HOLCOMB, T. R., HOLMES JR, R. M. & CONNELLY, B. L. 2009. Making the most of what you have: Managerial ability as a source of resource value creation. *Strategic Management Journal,* 30, 5**,** 457-485.

HOMER, J. & OLIVA, R. 2001. Maps and models in system dynamics: A response to Coyle. *System Dynamics Review,* 17, 4**,** 347-355.

HUBERMAN, M. & MILES, M. B. 2002. *The qualitative researcher's companion.* Thousand Oaks: Sage Publications, Inc.

HUNT, S. D. 1991. *Modern marketing theory: Critical Issues in The Philosophy of Marketing Science.* Cincinnati, Ohio: South-Western Publishing Company.

JARZABKOWSKI, P. 2004. Strategy as practice: Recursiveness, adaptation, and practices-in-use. *Organization Studies,* 25, 4**,** 529-560.

KARIM, S. 2006. Modularity in organizational structure: The reconfiguration of internally developed and acquired business units. *Strategic Management Journal,* 27, 9**,** 799-823.

KIM, H. & ANDERSEN, D. F. 2012. Building confidence in causal maps generated from purposive text data: mapping transcripts of the Federal Reserve. *System Dynamics Review,* 28, 4**,** 311-328.

KOPAINSKY, B. & LUNA-REYES, L. F. 2008. Closing the loop: promoting synergies with other theory building approaches to improve system dynamics practice. *Systems Research and Behavioral Science,* 25, 4**,** 471-486.

KOR, Y. Y. & MESKO, A. 2013. Dynamic managerial capabilities: Configuration and orchestration of top executives' capabilities and the firm's dominant logic. *Strategic Management Journal,* 34, 2**,** 233-244.

LAAKSONEN, O. & PELTONIEMI, M. 2018. The essence of dynamic capabilities and their measurement. *International Journal of Management Reviews*, 20, 2, 184-205.

LANE, D. C. 2001. Rerum cognoscere causas: Opportunities generated by the agency/structure debate and suggestions for clarifying the social theoretic position of system dynamics. *System Dynamics Review,* 17, 4**,** 293-309.

LI, Q., MAGGITTI, P. G., SMITH, K. G., TESLUK, P. E. & KATILA, R. 2013. Top management attention to innovation: The role of search selection and intensity in new product introductions. *Academy of Management Journal,* 56, 3**,** 893-916.

LOUISE, B. & WHILE, A. 1994. Collecting Data Using a sSemi-Structured Interview: A Discussion Paper. *Journal of Advanced Nursing*, 19, 2, 328-335.

LUNA-REYES, L. F. & ANDERSEN, D. L. 2003. Collecting and analyzing qualitative data for system dynamics: methods and models. *System Dynamics Review: The Journal of the System Dynamics Society,* 19, 4, 271-296.

LYNHAM, S. A. 2002. The general method of theory-building research in applied disciplines. *Advances in Developing Human Resources,* 4, 3**,** 221-241.

MANSOOR, H.O., Weston, R.H., Abdullah, R., King, S., Jackson, P. and Foley, P. (2018) 'A systemic approach to applying asset orchestration theory', Int. J. Agile Systems and Management, Vol. 11, No. 4, pp.315–339.

MARTIN, J. A. 2011. Dynamic managerial capabilities and the multibusiness team: The role of episodic teams in executive leadership groups. *Organization Science,* 22, 1**,** 118-140.

MASON, E. S. 1948. The current status of the monopoly problem in the United States. *Harvard Law Review,* 62**,** 1265.

McGee, J., Thomas, H. and Wilson, D. (2005). *Strategy:Analysis & Practice*. London: McGraw-Hill.

MEDINA-GARRIDO, J. A. & RUIZ-NAVARRO, J. 2003. IT and dynamic capabilities. *International Journal of Information Technology,* 9, 1**,** 47-66.

MILES, M. B. & HUBERMAN, A. M. 1994. *Qualitative data analysis: An expanded sourcebook*. London: Sage Publications, Inc.

MILLER, T., BIRCH, M., MAUTHNER, M. & JESSOP, J. 2012. *Ethics in qualitative research.* London: Sage Publications, Inc.

MINTZBERG, H., 1993. Structure in fives: *Designing effective organizations.* Englewood Cliffs, N.J: Prentice-Hall, Inc.

MINTZBERG, H., AHLSTRAND, B. W. & LAMPEL, J. 1998. *Strategy Safari: The Complete Guide Through the Wilds of Strategic Management*. London: Prentice-Hall, Inc.

MOEEN, M. 2017. Entry into nascent industries: disentangling a firm's capability portfolio at the time of investment versus market entry. *Strategic Management Journal,* 38, 10**,** 1986-2004.

Nelson, R., and S. Winter 1982. *An evolutionary theory of economic change.* Cambridge, MA: Harvard University Press.

O'REILLY, C. A. & TUSHMAN, M. L. 2008. Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior,* 28**,** 185-206.

OCASIO, W., LAAMANEN, T. & VAARA, E. 2018. Communication and attention dynamics: An attention-based view of strategic change. *Strategic Management Journal,* 39, 1**,** 155-167.

OXFORD DICTIONARY. 2018. *Brexit meaning, Oxford Dictionaries*. Available at: https://en.oxforddictionaries.com/definition/brexit [Accessed 9 May 2018].

OXFORD DICTIONARY. 2018. *Orchestration meaning, Oxford Dictionaries*. Available at: https://en.oxforddictionaries.com/definition/orchestration [Accessed 9 May 2018].

PABLO, A. L., REAY, T., DEWALD, J. R. & CASEBEER, A. L. 2007. Identifying, enabling and managing dynamic capabilities in the public sector. *Journal of Management Studies,* 44, 5**,** 687-708.

PANAGIOTOU, G. 2006. The impact of managerial cognitions on the structure-conduct-performance (SCP) paradigm: A strategic group perspective. *Management Decision,* 44, 3**,** 423-441.

PELLETIER, C., VIERU, D. & CROTEAU, A. M. (2017) The Interorganizational Relationships Process: An Asset Orchestration Mechanisms Perspective in an SME Context. *The 50th Hawaii International Conference on System Sciences*. Manoa, USA. Association for Information Systems.

PENROSE, E. 1959. *The Theory of the Growth of the Firm.* Oxford: Basil Blackwell.

PETERAF, M., DI STEFANO, G. & VERONA, G. 2013. The elephant in the room of dynamic capabilities: Bringing two diverging conversations together. *Strategic Management Journal,* 34, 12**,** 1389-1410.

PORTER, M. E. 1979. The structure within industries and companies' performance. *The Review of Economics and Statistics,* 61, 2**,** 214-227.

PORTER, M. E. 1985. *Competitive advantage: Creating and sustaining superior performance.* New York: Free Press.

PORTER, M. E. 1996. 'What is Strategy', in MAZZUCATO, M. (ed.) *Strategy for Business: A Reader.* London: Sage Publications, Inc, pp. 10-31.

PORTER, M. E. 2008. The five competitive forces that shape strategy. *Harvard business review,* 86, 1**,** 25-40.

PRALHAD, C. & HAMEL, G. 1990. The core competencies of the corporation. *The Harvard Business Review,* May-June**,** 79-91.

QUIGLEY, T. J. & HAMBRICK, D. C. 2012. When the former CEO stays on as board chair: Effects on successor discretion, strategic change, and performance. *Strategic Management Journal,* 33, 7**,** 834-859.

QUINN, J. B. 1980. *Strategies for change: Logical incrementalism.* Burr Ridge: Irwin Professional Publishing.

RALSTON, P. M., BLACKHURST, J., CANTOR, D. E. & CRUM, M. R. 2015. A structure–conduct–performance perspective of how strategic supply chain integration affects firm performance. *Journal of Supply Chain Management,* 51, 2**,** 47-64.

RAVICHANDRAN, T., LERTWONGSATIEN, C. & LERTWONGSATIEN, C. 2005. Effect of information systems resources and capabilities on firm performance: A resource-based perspective. *Journal of Management Information Systems,* 21, 4**,** 237-276.

REMENYI, D. & WILLIAMS, B. 1998. *Doing research in business and management: An introduction to process and method.* London: Sage Publications, Inc.

Richardson G. P.1999. Reflections for the future of system dynamics. *Journal of the Operational Research Society,* 50, 4**,** Special issue on system dynamics, 440-449.

RUGMAN, A. M. & VERBEKE, A. 2000. Six cases of corporate strategic responses to environmental regulation. *European Management Journal,* 18, 4**,** 377-385.

RUMELT, R. 1984. *Towards a Strategic Theory of the Firm in Competitive Strategic Management.* Englewood Cliffs, N.J: Prentice-Hall, Inc.

RUMELT, R. P. 1991. How much does industry matter? *Strategic Management Journal,* 12, 3**,** 167-185.

RUMELT, R. P., SCHENDEL, D. E. & TEECE, D. J. 1994. *Fundamental issues in Strategy: A research agenda.* Boston: Harvard Business School Press.

SAMBAMURTHY, V., BHARADWAJ, A. & GROVER, V. 2003. Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS quarterly,* 27, 2**,** 237-263.

SANTOS, F. M. & EISENHARDT, K. M. 2005. Organizational boundaries and theories of organization. *Organization Science,* 16, 5**,** 491-508.

SCHENDEL, D. E. & HATTEN, K. J. 1972. Business policy or strategic management: A broader view for an emerging discipline. *Academy of Management* 1972, 1**,** 99-102.

SIRMON, D. G. & HITT, M. A. 2009. Contingencies within dynamic managerial capabilities: interdependent effects of resource investment and deployment on firm performance. *Strategic Management Journal,* 30, 13**,** 1375-1394.

SIRMON, D. G., GOVE, S. & HITT, M. A. 2008. Resource management in dyadic competitive rivalry: The effects of resource bundling and deployment. *Academy of Management Journal,* 51, 5**,** 919-935.

SIRMON, D. G., HITT, M. A. & IRELAND, R. D. 2007. Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management review,* 32, 1**,** 273-292.

SIRMON, D. G., HITT, M. A., IRELAND, R. D. & GILBERT, B. A. 2011. Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. *Journal of Management,* 37, 5**,** 1390-1412.

SMITH, W. K. & TUSHMAN, M. L. 2005. Managing strategic contradictions: A top management model for managing innovation streams. *Organization Science,* 16, 5**,** 522-536.

STAN, M. & PURANAM, P. 2017. Organizational adaptation to interdependence shifts: The role of integrator structures. *Strategic Management Journal,* 38, 5**,** 1041-1061.

STERMAN, J. D. 2001. System dynamics modeling tools for learning in a complex world. *California Management Review,* 43, 4**,** 7-25.

STRAUSS, A. & CORBIN, J. 1990. *Basics of qualitative research: Grounded theory procedures and techniques.* Thousand Oaks: Sage Publications, Inc.

STRAUSS, A. & CORBIN, J. M. 1997. *Grounded theory in practice*. Thousand Oaks: Sage Publications, Inc.

TALLON, P. P. 2007. Inside the adaptive enterprise: An information technology capabilities perspective on business process agility. *Information Technology and Management,* 9, 1**,** 21-36.

TAYLOR, A. & HELFAT, C. E. 2009. Organizational linkages for surviving technological change: Complementary assets, middle management, and ambidexterity. *Organization Science,* 20, 4**,** 718-739.

TEECE, D. & PISANO, G. 1994. The dynamic capabilities of firms: An Introduction. *Industrial and Corporate Change*, 3, 3, 537-556.

TEECE, D. J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. Research policy, 15, 6, 285-305.

TEECE, D. J. 2000. Strategies for managing knowledge assets: the role of firm structure and industrial context. *Long Range Planning,* 33, 1**,** 35-54.

TEECE, D. J. 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal,* 28, 13**,** 1319-1350.

TEECE, D. J. 2009. *Dynamic capabilities and strategic management: Organizing for innovation and growth*. Oxford: Oxford University Press.

TEECE, D. J. 2012. Dynamic Capabilities: Routines versus entrepreneurial action. *Journal of Management Studies,* 49, 8**,** 1395-1401.

TEECE, D. J., PISANO, G. & SHUEN, A. 1997. Dynamic capabilities and strategic management. *Strategic management journal,* 18, 7**,** 509-533.

THOMAS, H. & POLLOCK, T. 1999. From I-O economics' S-C-P paradigm through strategic groups to competence-based competition: reflections on the puzzle of competitive strategy. *British Journal of Management,* 10, 2**,** 127-140.

THOMAS, H. & VENKATRAMAN, N. 1988. Research on strategic groups: Progress and prognosis [1]. *Journal of Management Studies,* 25, 6**,** 537-555.

TRAHMS, C. A., NDOFOR, H. A. & SIRMON, D. G. 2013. Organizational decline and turnaround a review and agenda for future research. *Journal of Management,* 39, 5**,** 1277-1307.

TRANFIELD, D., DENYER, D. & SMART, P. 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management,* 14, 3**,** 207-222.

Wales, W.J., Patel, P.C., Parida, V. and Kreiser, P.M., 2013. Nonlinear effects of entrepreneurial orientation on small firm performance: The moderating role of resource orchestration capabilities. *Strategic Entrepreneurship Journal*, 7, 2**,** 93-121.

WANG, C. L. & AHMED, P. K. 2007. Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews,* 9, 1**,** 31-51.

WERNERFELT, B. 1984. A resource-based view of the firm. *Strategic Management Journal*, 5, 2, 171-180.

WESTON, R. 2005. *Unified Modelling of Complex Systems-to facilitate ongoing organisation design and change*. UK: Loughborough University.

WESTON, R. H. 2012. Model driven integrated decision-making in manufacturing enterprises. *Advances in Decision Sciences.* Article ID 328349**,** 1-29.

WHITTINGTON, R. 1996. Strategy as practice. *Long Range Planning,* 29, 5**,** 731-735.

WHITTINGTON, R. 2001. *What is strategy-and does it matter?* London: Thomson Learning.

WINTER, S. G. 2003. Understanding dynamic capabilities. *Strategic Management Journal,* 24, 10 Special Issue**,** 991-995.

WOLSTENHOLME, E. F. 1982. System dynamics in perspective. *Journal of the Operational Research Society* 33, 6**,** 547-556.

Yin, R. 2003. *Case study research: Design and methods*. 3rd ed. Thousand Oaks: Sage Publications, Inc.

YIN, R. K. 2009. *Case study research: Design and methods*. 4th ed. Thousand Oaks: Sage Publications, Inc.

ZAHRA, S. A. & GEORGE, G. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review,* 27, 2**,** 185-203.

ZAHRA, S. A. & NIELSEN, A. P. 2002. Sources of capabilities, integration and technology commercialization. *Strategic Management Journal,* 23, 5**,** 377-398.

ZAHRA, S. A., SAPIENZA, H. J. & DAVIDSSON, P. 2006. Entrepreneurship and dynamic capabilities: a review, model and research agenda. *Journal of Management studies,* 43, 4**,** 917-955.

ZOLLO, M. & WINTE, S. G. 2002. Deliberate Learning and the Evolution of Dynamic Capabilitie. *Organization Science,* 13, 3**,** 339-351.