DYNAMIC CAPABILITIES

“NOW WE SEE THEM”

IN THE AIRLINE INDUSTRY

by

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ABSTRACT

The study of dynamic capabilities is one of the dominant research streams in strategic management. This dissertation contributes to the dynamic capabilities literature by theorizing and testing key questions regarding the relationship between dynamic capabilities and firm performance. Specific questions to be resolved include: 1) how does the performance of dynamic capabilities affect how firms adapt and co-evolve with the environment, 2) what is the interplay of two different kinds of dynamic capabilities operating simultaneously in the same context, and 3) what role does environmental dynamism and munificence play in the relationship between capability development and fitness in asset intensive industries. These questions are examined in the context of the airline industry where I identify two main capabilities that act as dynamic capabilities, namely, Resource Planning Capability (RPC) and Alliance Management Capability (AMC). First, I propose that there is a positive relationship between the two main capabilities (RPC and AMC) and sustained performance. Secondly, I propose alliance orientation will precede the development of an alliance capability. Third, I propose the interaction effect of AMC and RPC is positively associated with sustained performance. Finally, I propose that the positive relationship between each of these capabilities and sustained performance is moderated by environmental dynamism and environmental munificence such that the relationships is weaker, or stronger, at different levels of dynamism and munificence. I test hypotheses using longitudinal panel data on a sample of 132 firms in the airline industry. The analysis was performed using econometric estimators: a stochastic frontier estimator to test technical fitness of capabilities and random effect
estimator to test the effect on dependent variable sustained performance. The results show that the two capabilities (RPC and AMC) have a positive effect on sustained performance. Interestingly, the two moderators appear to have differing effects on the two capabilities. Environmental dynamism appear to strengthen RPC and weakens AMC. Conversely, environmental munificence strengthen AMC and weakens RPC.
DEDICATION

I dedicate this dissertation to my father, Omar Jefri, who has instilled in me the value of education since my childhood and has supported me all the way from kindergarten to the end of my PhD studies.
LIST OF ABBREVIATIONS AND SYMBOLS

\( \beta \)  Standardized regression coefficients

\( N \)  Number of observations

\( r \)  Pearson product-moment correlation

R&D  Research and Development

\( p \)  Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value

LIWC  Linguistic Inquiry and Word Count

SFE  Stochastic Frontier Estimator

GDP  Gross Domestic Product

GLS  Generalized Least Squares

IATA  International Air Transport Association

WATS  World Aviation Transport Statistics

>  More than

<  Less than

=  Equal to

+  Plus

-  Minus
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CHAPTER 1
INTRODUCTION

This dissertation uses a capabilities perspective to explain how firms in an “asset intensive”
industry change and co-evolve with the external environment. Specifically, I employ a dynamic
capabilities perspective (Eisenhardt and Martin, 2000; Teece, Pisano and Shuen, 1997), which was
originally developed to explain how firms sustain performance and adapt to the external
environment through the development and deployment of capabilities, to examine how firms in
the airline industry respond to changes in their external environment. This theoretical perspective
provides the foundation to address questions regarding how multiple dynamic capabilities,
together and simultaneously, can help firms better align with the external environment.
Organization adaptation and processes of co-alignment with the environment have long been a
concern for organizational theorists (Miles and Snow, 1978; Lawrence and Lorsch, 1967, Helfat,
Finkelstein, Mitchell, Peteraf, Singh, Teece and Winter, 2007). Thus, to address these questions, I
leverage additional theories from the organizational theory literature including contingency theory,
configuration and resource dependence theory to explain variance in firm performance amid
changes in the environment. I aim to contribute to the dynamic capability literature by investigating
the interplay of two capabilities on firm performance. Lastly, I intend to contribute to the literature
on the interface between organizations and the external environment, as the environment sets a
boundary condition for these relationships.
The relationship between organizational capabilities and firm performance has received significant attention in the strategic management literature over the last two decades. The result has been a heightened theoretical understanding of how organizational capabilities can lead to enhanced firm performance. However, while the field’s theoretical understanding of this relationship has advanced since the two foundational papers, Teece et al., (1997) and Eisenhardt and Martin (2000), which are rooted in behavioral theories from organization theory and economics (Cyert and March, 1963; Nelson and Winter, 1982), more research is needed to explain the complex phenomena of dynamic capabilities, especially in asset intensive industries. Integrating theories from organizational theory can inform our understanding of the specific mechanism by which dynamic capabilities are developed and deployed in various contexts and how they help firms sustain performance amid changes in the market (Maritan, 2001; Peteraf, Di Stefano and Verona, 2013).

I chose the airline industry to study the key relationships hypothesized in this dissertation. The airline industry is an asset intensive industry in which airlines harness the power of airplanes to move passengers and cargo from one location to another. In the process of this transfer, airlines must reconfigure resources, leveraging numerous underlying capabilities simultaneously to accomplish their goals. Therefore, airlines must be able to integrate and coordinate these capabilities (Dosi, Nelson and Winter, 2000). For example, with a relatively fixed number of customers who have low switching costs, large variation in fuel and labor costs, and fare price wars, the airline industry must simultaneously develop, integrate, and coordinate its assets in order to remain competitive. This makes the airline industry a fruitful context to study firm-level capabilities.
This dissertation is organized in six chapters. Chapter one is an introduction. Chapter two is a literature review of theoretical framework used in this dissertation. Chapter three is a hypothesis and model development section. Chapter four is a method design section. Chapter five is the data analysis section. Finally, chapter six discusses the finding and gives a brief conclusion.

1.2 A Capability Approach to Understanding Organizations

The literature on capabilities provides important insights to the large and well-established competitive strategy literature and thus aids in explaining heterogeneity in firm performance. Within this literature capabilities have been defined in various ways (see Table 1), there are two definitions that are especially salient as they encompass the other definitions and have been central in informing the discussion of capabilities in general, and of dynamic capabilities in particular. The first definition is from Helfat and Winter (2011) in which capabilities are defined as “the capacity to perform a particular activity in a reliable and minimally acceptable manner” (p. 1244). There are several observations regarding this definition. First, the word “capacity” highlights the purposefulness and intentionality of capabilities. As such, they are purposeful activities geared towards specific goals (Amit and Schoemaker, 1993). Secondly, capabilities are a reliable activity, meaning that they have a recognizable repeatable pattern. Third, they are performed in a minimally acceptable manner, meaning that “there are more or less effective ways to perform an activity” (Helfat and Martin, 2015, p. 5).

The second definition asserts that capabilities are the activities that enable a firm to transform resources “inputs” into outputs, which include products and services (Collis, 1994; Dosi, et al., 2000). This definition demonstrates that capabilities are processes that act upon resources and modify them to produce an output (Winter, 2003). As such, capabilities could have an effect on firm performance through the outputs they produce. However, markets change and consumer
tastes for such products and services change as well. Therefore, the capabilities underlying these product and services may become obsolete (Leonard, 1992).

Recognizing the need for firms to adapt to external environments, scholars identified a special type of capability they termed “dynamic capabilities” that enable firms to adapt to market conditions by changing resources and competences (Teece et al., 1997; Eisenhardt and Martin, 2000). Dynamic capabilities are defined as “the capacity of an organization to purposefully create, extend, or modify the resource base” (Helfat et al., 2007). The resource base includes, for example, resources that could be reconfigured (Eisenhardt and Martin, 2000), capabilities that could be integrated (Winter, 2003; Helfat and Winter, 2011, Helfat et al., 2007), or resource extensions residing in the external environment such as in alliances (Eisenhardt and Martin, 2000; Teece, 2007). When markets are changing, dynamic capabilities can lead to better performance through the resources they reconfigure (Eisenhardt and Martin, 2000) and the capabilities they change (Winter, 2003).

Capabilities include routines and non-routine processes (Eisenhardt and Martin, 2000; Helfat et al, 2007; Teece, 2014, Martin, 2011a). The non-routines processes include managerial decision-making. This role of managers is more evident in dynamic capabilities than in operational capabilities as dynamic capabilities require: 1) a change in internal routines and 2) an overall strategy to respond to external change. Indeed, the dynamic managerial capability concept highlights the role of managerial agency in crafting strategies for the development and deployment of dynamic capabilities (Adner and Helfat, 2003; Martin, 2011b). In this study, I shed light on the role of managerial strategy making in the creation and development of capabilities. This strategic role may be more evident in crafting a new dynamic capability, than in maintaining existing capabilities (Helfat and Peteraf, 2003, Helfat and Adner, 2003). Specifically, alliance orientation,
is a higher-level strategy intended to build and maintain an alliance capability. It is an antecedent to alliance capability development, one of the important dynamic capabilities in this study. Managerial agency is also involved in the development “performance” of capabilities through the sensing, seizing and reconfiguration of resources (Teece, 2007).

Dynamic capabilities are often contrasted with operating capabilities. Operational capabilities are used to turn outputs as a means of exploitation. As such, operational capabilities use the same techniques in producing or serving the same market (Winter, 2003, Helfat and Winter, 2011). Over time, firms can become more efficient in the performance of operational capabilities, which Helfat et al., (2007) term technical fitness. Technical fitness expresses how well a capability performs its intended function (Helfat et al., 2007; Teece, 2007; Martin, 2011a). Conversely, dynamic capabilities change current operations such that they extend operations to new markets or introduce new products (Winter, 2003, Helfat and Winter, 2011). Dynamic capabilities, in addition to “technical fitness”, are associated with “evolutionary fitness”. In the case of dynamic capability “technical fitness” it is about performing the dynamic capability— doing it well. Evolutionary fitness is about doing the “right thing” such as choosing the right customers and serving the correct markets. As such, dynamic capabilities helps firms in navigating a changing environment and sustaining performance. Moving forward in the dissertation the use of the term “fitness” incorporates both the technical fitness and evolutionary fitness outcomes of dynamic capabilities.

1.3 Two Important Capabilities in the Same Context

A firm could have multiple capabilities operating simultaneously in different parts of the organization (Ambrosini and Bowman, 2009; Eisenhardt and Martin, 2000; Helfat et al, 2007). Examples of dynamic capabilities that have been examined in past literature include: new product
development capability (Eisenhardt and Martin, 2000; Eggers, 2012), strategic transformation capability (Slater, Olson and Hult, 2006), marketing capabilities (Morgan Vorhies and Mason, 2009), learning capability (Schilke, 2014b) and alliance management capability (Eisenhardt and Martin, 2000; Schilke, 2014a). All of the above capabilities are considered higher order, meaning they can change routines and processes (Winter, 2003; Danneels, 2008).

For this study, I examine two dynamic capabilities that could potentially impact firm level outcomes in asset intensive industries. These two capabilities are: resource planning capability and alliance management capability. In asset intensive industries these types of capabilities can be categorized as dynamic capabilities even though in many industries they would be considered ‘operational’ in nature (Helfat and Winter, 2011). Resource planning capability allows firms to reallocate resources in order to produce the optimal output. The optimal output is heavily dependent on market demand for the product or service. Alternately, alliance management capability extends and builds on existing resources and competences by acquiring resources (e.g. complementary resources) outside the firm as in hybrid organizations (Eisenhardt and Martin, 2000; Helfat et al., 2007). These capabilities are distinct and different because 1) each will have its own stock of routines and processes that require different levels of managerial involvement. As such, these routines and processes constitute a unique bundle of resources that supports the capability’s goal (Peteraf, 1993). Furthermore, the bundle of routines and processes will differ as well as the level of managerial involvement in these capabilities (Adner and Helfat, 2003). 2) They reside in different areas inside the firm, one close to core operations and one on the periphery. As such, one capability might be geared towards exploitation of current opportunities and another might be geared toward exploration (e.g. R&D capability) (Levinthal and March, 1993).
Theoretically, it has been argued that an alliance capability could lead to firm-level outcomes because it helps firms adapt to and coevolve with the environment through resource reconfiguration (Eisenhardt and Martin, 2000; Dyer and Singh, 1998; Helfat et al., 2007; Helfat and Peteraf, 2003). As such, both of these capabilities are firm-level and were chosen because they are particularly important to firm success in asset-intensive industries (Eisenhardt and Martin, 2000; Danneels, 2008; Helfat and Winter, 2011). Figure 1 below provides a visualization of the two capabilities and where they are estimated to be located within organizational boundaries.\(^1\)

\[\text{Figure 1.1 Dynamic Capabilities’ Position in Firms in Asset Intensive Industries}\]

One of the contributions of this dissertation is the examination of how two capabilities can operate simultaneously and in combination within the same context. Studies that investigate two dynamic capabilities in the same context are limited with the notable exceptions of Danneels

\(^1\text{Figure 1 is an attempt to provide a visualization of dynamic capabilities. The exact location of these capabilities is hard to pinpoint as there are huge variations on how firms operate.}\]
This dissertation extends these limited findings by differentiating between two capabilities and examining their interaction in addition to their main effects.

1.4 Performance of Capabilities and Fitness

The dynamic capability perspective deals with a complex phenomenon (Di Stefano, Peteraf, and Verona, 2014). In one instance, the dynamic capability perspective is concerned with the processes by which organizations develop and deploy capabilities. Contrarily, it is concerned with the processes by which organizations adapt to the environment. As a result, dynamic capabilities need to perform well initially. Whether the performance of dynamic capabilities translates to positive firm level outcomes is entirely different. Following this logic, the dynamic capability perspective separates the performance of capabilities from the ability of firms to adapt to the external environment. Thus, dynamic capabilities could be studied on two levels, one at the capability level and the other at the firm level.

At the capability level, the performance of a capability is an indication of how well it performs its intended function (Helfat et al., 2007; Teece, 2007; Martin, 2011a). Further, the performance of a capability is stochastic, “not linear” in that there is a limit, or “sufficiency”, to how well firms can operate them due to constraints such as bounded rationality (March and Simon, 1984) and resource constraints (Cyert and March, 1963). Thus, the stochastic frontier enables the comparison between firms against the highest performing firm, which is said to have the “best practice,” or multiple firms having “signature processes” in terms of operating the capability (Eisenhardt and Martin, 2000, Teece, 2014). This is not a novel idea as several studies used stochastic frontier models to test performance at the capability level. For example, Dutta, Narasimhan and Rajiv (2005) studied innovation capability using stochastic frontier with
cumulative R&D expenditures and cumulative marketing expenditures as inputs and the number of patents as the output of the capability. They found that both inputs contributed to the performance of the capability as well as their synergistic effect.

I argue in the hypotheses development section of the dissertation that the better the performance of the capability on the stochastic frontier, the better it could be a source for firm performance. The resource based view argues that when capabilities are valuable, rare, inimitable and non-substitutable, they will lead to sustained competitive advantage (Barney, 1991). However, from the population ecology perspective, if the environment is changing almost all firms will be unable to survive and adapt due to inertia and as a result whole population of firms could be wiped out and replaced by a new population of firms (Hannan and Freeman, 1977, 1984). From an evolutionary perspective, Aldrich and Ruef (2006) argue that firms struggle to cope with the environment but some will eventually be able to overcome inertia and adapt to change in the environment. Hence, in the long run, it has been empirically proven that only a limited number of firms in a given population will survive (Aldrich and Ruef, 2006). The firms that survive are likely to be those that are consistently able to profit by creating, extending, or changing their resource base in the face of environmental change (Helfat et al., 2007). Alter their resource base in response to environmental change is facilitated by dynamic capabilities that constantly align and realign internal operations with external environment. The extent to which dynamic capabilities enable firms to make these changes in the context in which the firm operates is referred to as evolutionary fitness (Helfat et al., 2007). Long-term performance and persistent firm growth (e.g. revenue growth) has been suggested to be a good measures of evolutionary fitness (Helfat et al., 2007). Previous empirical studies show that high performing dynamic capabilities are associated positively with performance and competitive advantage (e.g. Shamsie, Martin and Miller, 2009;
Schilke, 2014a), innovation (Danneels, 2002), and revenue growth (e.g. Vandaie and Zaheer (2014). Researchers were encouraged to study capabilities at the capability level and at the firm level. Vandaie and Zaheer (2014) in their study on film production studios in the U.S. motion picture industry measured studio capability as a combination of: 1) the total budget for the studio and 2) the number of awards produced, as inputs and higher revenues of the studio as an output. Vandaie and Zaheer found that studio capability as whole was positively associated with persistent revenue growth over a ten year period. Therefore, it appears that the performance of studio capability, constrained by a limited budget, is a process of reconfiguring resources given the limited available budget.

1.5 The Role of the External Environment

1.5.1 The Context

The capability prospective embraces the context dependence of capabilities (Doty, Glick and Huber, 1993; Eisenhardt and Martin, 2000). As such, the characteristics of the market in which capabilities operate are an important factor in explaining the relationship between how well a dynamic capability is performed and firm fitness. All environments are dynamic to some degree, whether or not they are changing relatively slowly or very fast (Helfat and Winter, 2011). Eisenhardt and Martin (2000) argue that the nature of dynamic capabilities differs in different types of contexts. In high dynamic they are more like heuristics, in lower dynamic environments they become more and more like routines that are relatively stable such in asset intensive industries. Furthermore, a capability could be considered a dynamic capability in one context and an operational capability in another. For example, a marketing capability is a dynamic capability in
the consumer goods industry (Morgan et al., 2009) but could be an operational capability for government contractors.

Here, I test the capabilities in an asset intensive market, specifically, the airline industry. The airline industry is in a moderately dynamic environment, major players are well known and change is occurring frequently. The airline industry is faced with architectural innovations to the basic design of airplanes that have not significantly changed since the Wright brothers (Henderson and Clark, 1990; Dosi et al., 2000). Most of the empirical tests of dynamic capabilities have been in high tech industries (Peteraf et al., 2013). Therefore, several scholars have called for research that investigates dynamic capabilities in a variety of environments, and not just those traditionally thought of as highly dynamic environments (Zahra, Sapienza and Davidsson, 2006; Helfat and Winter, 2011; Peteraf and Helfat, 2009). Consistent with this, and building on the work of Helfat and colleagues, for example, who investigated dynamic capabilities in the oil industry (e.g. Adner and Helfat, 2003; Stadler, Helfat and Verona, 2013), I study dynamic capabilities in a moderately dynamic environment, the airline industry.

1.5.2 The Moderating Role of Environmental Factors

It has become almost axiomatic in the management literature that in order for firms to survive and to enhance firm performance there needs to be congruence between internal operations and contingent factors in the external environment (Lawrence and Lorsch, 1967; Thompson, 1967). The external environment has multiple levels which include the task environment and the macro environment. The task environment contain all organizations with which the focal firm must interact to survive and grow (Castrogiovanni, 1991). While the macro environment include factors such as the economic and political conditions in which the firm is located and therefore affect the
firm indirectly. For this study, I’m considering the macro environment because of the global nature of the airline industry.

Two environmental factors that have been extensively demonstrated to have an effect on firm performance are environmental dynamism and environmental munificence. Environmental dynamism is the absence of a pattern, or the unpredictability, in the environment (Dess and Beard, 1984). Alternately, munificence refers to the availability of resource in the environment that support the growth of firms (Castrogiovanni, 2002; Dess and Beard, 1984). Both of these environmental factors have been shown to impact firm actions and performance. Thus, in dynamic capability literature, these environmental factors set a boundary condition to the relationship between dynamic capabilities and firm performance (Eisenhardt and Martin, 2000).

The kinds of capabilities needed are different depending on the level of dynamism. For example, a less dynamic environment may favor capabilities for exploitation while a more dynamic environment may favor capabilities for exploration (Davis, Eisenhardt and Bingham, 2009). Eisenhardt and Martin (2000) further explain that characteristics of the underlying routines of dynamic capabilities appear differently under varying levels of dynamism. Under high dynamism, dynamic capabilities are fungible and appear as simple rules, while under conditions of low dynamism, dynamic capabilities are based on more established routines and processes. Similarly, munificence in the environment may enable a firm to develop learning routines that encourage experimentation and learning through trial and error, which may not be possible in less munificence environments (Bromiley, 1991). In more munificent environments firms have more opportunities available from which to choose (Castrogiovanni, 1991). Firms operating in munificent environments may enjoy benefits such as gaining access to critical resources and customers.
Both of the environmental factors (dynamism and munificence) in the study include elements in the macro environment. A dynamic environment may include elements such as fluctuations in oil prices. A munificent environment may include elements such as lower taxes, increased government subsides, or lower fuel prices. Therefore, it is important to test the contingent effect of dynamism and munificence at the macro environment level as different regions and countries have variations in the level of munificence and dynamism due to political and economic factors (Wan and Hoskisson, 2003). From a configuration prospective, the set of two dynamic capabilities (e.g. resource planning capability and alliance management capability) need to be properly aligned with the two environmental factors (e.g. dynamism and munificence) to achieve fit (Miller and Friesen, 1983; Meyer, Tsui and Hinings, 1993). For example, resource planning capability could work better in highly munificent environment while performing weakly when there is high dynamism and vice versa. When there is persistent alignment between these dynamic capabilities and elements in the external factors, firms could achieve evolutionary fitness.

The purpose of this dissertation is to delineate the effect of dynamic capabilities on the evolutionary fitness of firms. Secondly, to show how different types of dynamic capabilities could operate together in the same context. Finally, this dissertation test the moderating role of environmental factors (e.g. dynamism and munificence) on the capability and performance relationship.
1.6 Research Questions

The primary research questions addressed in this dissertation include:

1- How do dynamic capabilities influence organizational level outcomes (e.g. sustained performance and firm fitness)?

2- How do two kinds of dynamic capabilities operate simultaneously? What is the interaction between the two kinds of capabilities?

3- What role does the environment (e.g. munificent and dynamism) play in the relationship between dynamic capabilities and firm fitness measures as sustained performance?
In this section, I review the literature on dynamic capabilities which is the main theoretical framework of this dissertation. I first start with tracing the origins of a resources and capabilities which were inspired by behavioral thinking from organizational theory and evolutionary economics. Next, I describe the Resource Based View (RBV) and how Dynamic Capabilities (DC) perspective builds on RBV. Finally, I provide a more detailed review of DC literature.

2.1 Origins of Resources and Capability Research

Theories in strategy, like many young fields of inquiry, originated from older more established fields such as economics and sociology. Capability research originated from organization theory and evolutionary economics (Nelson and Winter, 1982). Evolutionary economics deals with behavioral aspects inside organizations and considers routines and processes as building blocks of performance. Indeed, Teece et al.’s (1997) seminal paper on dynamic capabilities in which they first introduced the construct of dynamic capabilities, could be traced back to Nelson and Winter’s (1982) work on evolutionary economics. A parallel work on capabilities originated from organizational theories (e.g. behavioral perspective) which inspired

\footnote{This was major departure from mainstream economics which emphasized the role of external economic factors and their influence on firm survival, growth, and performance.}
Eisenhardt and Martin’s (2000) seminal paper on dynamic capabilities, in which they set the boundary conditions for the theory and explain the underlying processes of dynamic capabilities from a behavioral lens. Both origins consider internal processes and routines as building blocks for capabilities and these processes and routines potentially have an impact on firm performance (Feldman and Pentland, 2003). Eisenhardt and Martin’s (2000) paper on dynamic capabilities drew on organization theory, especially the work of Ceyrt and March (1963) on the behavioral theory of the firm, and led to additional research based in organization theory. Despite these advances, additional integration of theories from organization theory is needed to explain the complex phenomena of dynamic capabilities (Peteraf et al., 2013; Di Stefano et al., 2014).

2.2 Organization Theory Influences on Capability Research

Insights from previous and current work within the organizational theory paradigm can help explain the complexity of the dynamic capability construct and its relationship to organizational level outcomes and support the relationships proposed in this study. Examples of such theories include resource dependence, contingency and configuration theories, in addition to concepts from complexity perspective (e.g. ambidexterity). These theories are all concerned with effectiveness of organizations rather than efficiency. A description of the basic tenants and assumptions of each theory is provided for further support from in the hypothesis development section.

2.2.1 Contingency Theory

Contingency theory is about organizational design. The notion that there is no best way to organize. The theory asserts that factors in the firm must be aligned with external market to be effective. Contingency theory introduced the notion of fit and emphasized the importance of it.
That is if two factors (e.g. strategy and structure) are properly aligned, this alignment will lead to better performance. Any misfit between the two factors could lead to diminished performance. As a result of the diminished performance, firms must change to attain alignment once again (Donaldson, 2001). Internal characteristics that have been examined in contingency theory based studies include factors such as strategy and structure (Chandler, 1960), as well as structure and size (Burns and Stalker, 1961). External contingency factors matched with internal factors in these studies are related to the task environment (Donaldson, 2001). However, critiques of the theory argue that it is constrained by examining only two variables, and relies largely on cross-sectional studies. Some of the studies in the contingency theory perspective only document correlations between two factors. Additionally, the role of strategic decisions by managers is absence.

### 2.2.2 Configuration Theory

The limitations of contingency theory gave rise to configuration theory. Configuration theory builds on contingency theory by 1) arguing that there is no best way to organize—this is the structural contingency element, and 2) taking into account the social processes of decisions which brings in the managerial decision making element. Based on that, the theory includes more variables, or “variable sets”. For example, a set of internal and external variables are tested for alignment such as the alignment is positively associated with firm performance. Organizations adapt to changes in the external environment by realigning internal factors with external elements in the context in which the firm operates “context-dependent” (Meyer et al., 1993). Some internal elements could be more beneficial in one context than another. For example, Miller and Friesen (1983) studied the alignment between a set of strategy decision making elements (e.g. analysis and futurity) and a set of external elements (e.g. dynamism and uncertainty). One of findings states that as dynamism increases, the need for “analysis” as a decision process, increases. To describe
the content of internal factors, scholars used typologies such as the Miles and Snow typology (1978) to describe strategies firms employ to achieve alignment and realignment. Research has since progressed from studying content to studying processes to explain how firms align internal factors with external factors to affect firm performance. This line of inquiry will inform research on causal relationships rather than just proving a relationship exists. The configuration perspective embraces several assumptions which include: 1) equifinality, that there are multiple ways for firms to be effective, 2) that the relationships are nonlinear, 3) that relationships are context dependent (Meyer et al., 1993; Doty et al., 1993). These assumptions are consistent with assumptions found later on in dynamic capability perspective (Eisenhardt and Martin, 2000).

While contingency and configuration theories are predicated upon the necessity for organizations to maintain some degree of fit between internal and external factors, the theories are largely void of the specific mechanisms by which firms change to reestablish fit. Most of the previous studies have examined the content of firm’s strategies rather than then processes by which firms can realign internal factors with external factors, resulting in the need for additional research (Meyer et al., 1993). Another theory that considers strategic managerial decisions and the external environment is resource dependence theory that is discussed below.

2.2.3 Resource Dependence

Resource dependence theory is concerned with interdependencies that exist between organizations, where each organization is trying secure critical resources in the external environment for growth and survival. To achieve these goals firms use strategic actions such as cooperation with other firms, mergers and acquisitions to reduce these interdependencies (Pfeffer and Salancik, 1978).
Resource dependence rests on three assumptions: 1) the main goal of a firm is to increase its power at the expense of competitors (Emerson, 1962). The increased power makes the firm less dependent on other firms. 2) Resources critical to the firm must be obtained from the external environment, which includes the entire ecosystem of organizations and individuals related to the firm. 3) There is uncertainty about future flows of resources. Therefore, in order for firms to perform and survive, they must effectively acquire and ensure continued access to critical resources (Pfeffer and Salancik, 1978).

Resource dependence theory has been employed in research on alliances and inter-organizational networks. Resource dependence theory informs capability research in that it provides an explanation as to why firms develop an alliance capability and the strategic tactics used by managers to make the capability effective under different environmental conditions.

Resource dependence, contingency and configurationally theories embrace an open system perspective, which is not the case for all organizational theories. An open system perspective considers both internal and external factors when analyzing organizations (Scott and Davis, 2007). All of the above theories are concerned with the effectiveness of organizations rather than efficiency. The resource based view argue that certain competencies will give rise to competitive advantage. The dynamic capability perspective argues that the flexibility of dynamic capabilities enhances organizational effectiveness. In this study I leverage organization theories as complements to the dynamic capability perspective in order to explain the undying mechanism and strategic decisions that lead to effectiveness under different environmental conditions. In building these arguments I combine the dynamic capability perspective with supporting arguments from organization theories. As such, each of these theories inform us about the dynamic capabilities studied in this dissertation and their relationship to evolutionary fitness.
2.2 The Resource Based View (RBV) Preceding Dynamic Capabilities

2.2.1 RBV Theory and Assumptions

The origins of the resource based view can be traced back to Penrose’s (1956) book in which she describes a firm as a bundle of resources that managers could configure and utilize to grow the firm. Building on the work of Penrose, The Resource Based View (RBV) introduced by Wernerfelt (1984) returned the focus of inquiry to internal resources as a potential source of heterogeneity in firm performance and as a basis of competitive advantage. Between Penrose and Wernerfelt, Rubin (1973) also theorized the importance of internal resources and is seen as a bridge between classic and modern resource theories. Proponents of RBV developed the criteria in which resources could enhance the competitive position of firms. The criteria includes valuableness and rarity of resources (Wernerfelt, 1984), inimitability of resources (Lippman & Rumelt, 1982), and non-substitutability of resource, which was adopted from Porter’s (1980) non-substitutability of products in the five forces industry framework. RBV was further developed by Barney (1991) who formalized the VRIN framework and argued that resources that are valuable, rare, inimitable and non-substitutable can provide the basis for firms to build a sustained competitive advantage (Wernerfelt 1984; Barney 1986; Barney 1991).³ Within the VRIN framework firms are able to build a sustained competitive advantage because competing firms cannot duplicate the “VRIN” resources due to isolating mechanisms, path dependencies and causal ambiguity. The main assumptions are that resources are heterogeneous and immobile across firms.

³ The resulting rents are Ricardian because it is based on other firms unable to imitate each other (monopoly rents).
RBV emphasizes the importance of intangible assets, such as organizational culture, patents, and capabilities, in achieving competitive advantage. Thus, RBV treats capabilities as unique path dependent processes difficult to imitate by competitors (Amit and Schoemaker, 1993). According to RBV, the mere possession of certain important capabilities that adhere to “VRIN” criteria are associated with firm performance and sustained competitive advantage (Barney, 1986). However, RBV is silent regarding the mechanism by which capabilities contribute to competitive advantage. While the basic premise of RBV has motivated research in organizational capabilities the research has encountered several challenges.

2.2.2 Critiques of RVB

Despite the advances of RBV and its contributions to the field of strategy, the theory has faced many challenges and critiques. There are three critiques that are most relevant here. First, the environment is a black box in the theory. The focus of RBV is on factors inside firms without regard to the external environment and market demand factors (Priem and Butler, 2001). Secondly, the theory is viewed by some as tautological. Priem and Butler (2001) describe the issue as follows: RBV states that if a firm has valuable resources (which are defined vaguely as resources that increase in efficiency and effectiveness) this will lead to competitive advantage which is also defined as increases in efficiency and effectiveness. This is an obvious tautology. While having “VRIN” is important for firms, it is how firms utilize, manage and coordinate these resources that leads to a competitive advantage (Penrose, 1956). Third, the concept of achieving sustained competitive advantage has been criticized. It has been argued that firms can create temporary competitive advantages and try to adopt and coevolve with the market but it is difficult, if not

4 Barney (1995) improved the framework to VRIO, in which the “O” stands for the organization of resources for exploitation.
impossible, to sustain competitive advantage, especially when markets are changing (Wiggins and Ruefli, 2002). Consequently, these critiques led to the development of new theories including the knowledge based view (Kogut and Zander, 1992), the dynamic capability perspective (Teece et al., 1997; Eisenhardt and Martin, 2000), and the relational view (Dyer and Singh, 1998).

2.2.3 RBV Methodological Challenges

RBV has also faced methodological challenges. These include the challenge of empirical studies identifying which specific (valuable resource) variables are contributing to performance (Crook et al., 2008). Secondly, RBV focuses on the content or possession of resources rather than on the process by which resources contribute to firm performance. The resources alone will not give a competitive advantage, it is how these resources are deployed that makes them valuable (Amit and Shoemaker, 1993). Thus, due to RBV being content driven, it does not explain the mechanisms in which the “VRIN” resources impact firm performance. Further, RBV is silent regarding the potential impact of resources on strategies and operations below the firm level (e.g. the business level) or on the specific outputs from these VRIN resources. The theory simply argues that it will lead to performance at the firm level. For example, valuable resources in a business unit could impact the performance of the specific business unit and not necessarily a significant impact on performance of the whole firm. To overcome these challenges, scholars in RBV literature suggest that studies in RBV should employ longitudinal studies for testing sustainability in performance, testing the performance impact of resources at multiple levels, and testing the outputs of resources in addition to inputs (for more see Armstrong and Shimizu, 2007). Dynamic capabilities and other developments in RBV, overcome (to some extent) the challenges facing RBV theoretically and empirically.
The resource based view and the related theoretical developments (e.g. dynamic capability perspective) are still in the nascent stage of theory development. Additional empirical evidence is needed for them to be considered as established theories, which is a normal progression in scientific inquiry (Kuhn, 1962). Nonetheless, the resource based view and subsequently the dynamic capability perspective have made a lot progress during the last decade are considered to be one of the few theories original to the strategic management field.

2.3 Dynamic Capabilities Perspective

2.3.1 Definition of Capabilities

Understanding the definition of capabilities enhances our understanding of dynamic capabilities and how this perspective developed. There are many definitions of capabilities, I follow the work of Helfat et al., (2007) and Martin (2011) and define capabilities as the organization’s capacity to perform a particular task, function, or activities in minimally acceptable manner. That is, a firm could be better or worse in its capacity to reconfigure resources.

Also, the term minimally acceptable manner suggests that the performance of capabilities is nonlinear or stochastic in nature, embracing the same assumption of nonlinearity found in configuration theory. Dynamic capabilities were initially characterized as routines. However, more recent work has shown that there are ways in which organizational resources are reconfigured that do not fit the formal definition of being a routine (Dosi et al., 2000; Eisenhardt and Martin, 2000). Dynamic capabilities may also include managerial decision-making, which is part of the dynamic managerial capability concept (Adner and Helfat, 2003; Martin, 2011a).
2.3.2 Dynamic Capabilities Definitions

Capabilities have been described as a source of competitive advantage (Barney, 1991; Amit and Schoemaker, 1993). Dynamic capabilities are a special kind of capabilities; in specific, they are capabilities that enable a firm to adapt to changing environments. They are the processes and routines that bundle, reconfigure and extend resources as markets emerge, collide and die (Eisenhardt and Martin, 2000).

The definition of dynamic capabilities is varied with at least eleven distinct definitions that have been used in the mainstream literature. These definitions are presented in Table 2.1. The definitions are relatively diverse with some definitions focusing on learning, such as the capability of learning how to learn (Zollo and Winter, 2002, Zahra et al., 2006), other definitions focus on managerial decision-making (e.g. the ability to sense and seize opportunities) (Martin, 2011a; Teece, 2000, 2007). A recent well-accepted definition of dynamic capabilities by Helfat et al., (2007:04) is “The capacity of an organization to purposefully create, extend, or modify its resource base.” The resource base includes resources (Eisenhardt and Martin, 2000), operational capabilities (Winter, 2003; Helfat and Winter, 2011), other dynamic capabilities (Helfat et al., 2007), and resources residing in the external environment (Teece, 2007). This is the definition I use in this dissertation because while it succinctly captures the nature of dynamic capabilities, it is sufficiently broad to encompass the other definitions of the same concept.

<table>
<thead>
<tr>
<th>Article</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teece and Pisano (1994)</td>
<td>The subset of the competences and capabilities that allow the firm to create new products and processes and respond to changing market circumstances.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Definition</td>
</tr>
<tr>
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</tr>
<tr>
<td>Teece, Pisano, and Shuen (1997)</td>
<td>The firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.</td>
</tr>
<tr>
<td>Eisenhardt and Martin (2000)</td>
<td>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 organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die.</td>
</tr>
<tr>
<td>Dosi, Nelson and Winter (2000)</td>
<td>The term ‘dynamic’ refers to the capacity to renew competences so as to achieve congruence with changing environment; certain innovative responses are required when time-to-market is critical, the rate of technological change is rapid, and the nature of future competition and markets difficult to determine. The term ‘capabilities’ emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment.</td>
</tr>
<tr>
<td>Teece (2000)</td>
<td>The ability to sense and then seize opportunities quickly and proficiently</td>
</tr>
<tr>
<td>Zollo and Winter (2002)</td>
<td>A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness.</td>
</tr>
<tr>
<td>Winter (2003)</td>
<td>Those capabilities that operate to extend, modify, or create ordinary capabilities.</td>
</tr>
<tr>
<td>Zahra, Sapienza, and Davidsson (2006)</td>
<td>The abilities to reconfigure a firm’s resources and routines in the manner envisioned and deemed appropriate by its principal decision makers.</td>
</tr>
<tr>
<td>Helfat et al. (2007)</td>
<td>The capacity of an organization to purposefully create, extend, or modify its resource base.</td>
</tr>
</tbody>
</table>
| Teece (2007) | Dynamic capabilities can be disaggregated into the capacity:
(a) to sense and shape opportunities and threats
(b) to seize opportunities
(c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets. |
| Teece (2014) | Dynamic capabilities involve higher-level activities that can enable an enterprise to direct its ordinary activities toward high-payoff endeavors. |

### 2.3.3 Dynamic Capabilities Building on RBV

One strength of the Dynamic Capabilities perspective is that it embraces an open system perspective that considers the role of the external environments, which were treated as a black box in RBV. Second, the dynamic capabilities perspective avoids the tautology of RBV by separating the performance of capabilities from firm level outcomes. The capability needs to perform well and even then, it may or may not lead to better firm performance. How well a capability performs is considered to be its efficiency, which includes 1) speed of operating the capability, 2) quality check of operations and outcomes (Helfat et al., 2007; Teece, 2014).

An additional strength of the dynamic capability perspective is that similar to configuration theory, it embraces context dependence (Hefat et al., 2007; Helfat and Winter, 2011; Eisenhardt
and Martin, 2000) such that what could be a dynamic capability in one context, may not be considered dynamic in another context (Collis, 1994). For example, an R&D capability may be a dynamic capability in a context facing disruptive innovations (e.g. Pharmaceutical industry) and not a dynamic capability in the airline industry where change is slower (Anderson and Tushman, 1990). Further, there could be several dynamic capabilities operating in the same context (Prahalad and Hamel, 1990) as I will discuss in the next section.

2.3.5 Dynamic Capabilities Typologies

2.3.5.1 Dynamic Capabilities versus Operational Capabilities

The history of organization theory is full of typologies and mostly these typologies are extremes in a continuum which represent ideal-types (Doty et al., 1993). These ideal-types may not resemble reality in an actual way but they are useful in theory development (Meyer et al., 1993). The typology of dynamic capabilities and operational capabilities are no exception as it is challenging to clearly distinguish between the two types of capabilities in practice (Helfat and Winter, 2011). However, there is a clear theoretical distinction between these concepts. Operational capabilities enable a firm to make a living in the present by exploiting current market positions and being efficient in that pursuit. (Winter, 2003; Helfat and Winter, 2011). Further, operational capabilities create inertia that is necessary for firms to repeat past success and continue to earn a living in the present. However, once environmental conditions start changing, operational capabilities may become a source of liability because of inertia, such as in the case of core competencies turning into core rigidities when environments change (Leonard, 1992). This could be contrasted to dynamic capabilities which could provide the flexibility necessary to align internal factors with the changing environment. Therefore, investing in just operational capabilities could
be detrimental to firms as they could accumulate inertia and be unable to change as the market changes. For a list of definitions of operational capabilities (see table 2 below).

**Table 2.2 Operational Capabilities Definition**

<table>
<thead>
<tr>
<th>Article</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zollo and Winter (2002)</td>
<td>Activities geared towards the operational functioning of the firm.</td>
</tr>
<tr>
<td>Winter (2003)</td>
<td>[Activities geared toward] earning living by producing and selling the same product, on the same scale and to the same customer population over time.</td>
</tr>
<tr>
<td>Helfat and Peteraf (2003)</td>
<td>Performing of an activity, such as manufacturing of product, using a collection of routines to execute and coordinate the variety of tasks required to perform the activity.</td>
</tr>
<tr>
<td>Helfat et al. (2007)</td>
<td>Capability that an organization uses in an effort to earn a living in the present.</td>
</tr>
<tr>
<td>Helfat and Winter (2011)</td>
<td>Operational capabilities enable a firm to perform an activity on an on-going basis using more or less the same techniques on the same scale to support existing product and services for the same customer population.</td>
</tr>
<tr>
<td>Teece (2014)</td>
<td>Ordinary capabilities involve the performance of administrative, operational, and governance-related functions that are (technically) necessary to accomplish tasks.</td>
</tr>
</tbody>
</table>

There are several ways operational capabilities are differentiated from dynamic capabilities. First, operational capabilities are concerned with current operations while dynamic capabilities are concerned with changing markets. Dynamic capabilities are the capabilities that enable a firm to alter the way they do business (Winter, 2003) to become more strategically
flexible. Dynamic capabilities not only need to be performing at high levels of efficiency and reliability than operational capabilities but they also must be effective in helping firms adapt to changing markets (Helfat et al., 2007). Martin (2011) argued: “one is doing the thing right and the other is doing the right thing”. Recently, Helfat and Winter (2011) distinguished between operational and dynamic capabilities and mentioned that it is difficult to make a sharp distinction between what constitutes an operational capability and what constitutes a dynamic capability. The main argument is that it’s hard to know where operational capabilities leave off and dynamic capabilities begin. Similarly, what might be an operational capability in one industry could be a dynamic in another, and vice versa. Helfat and Winter (2011) argue that operational and dynamic capabilities exist on a continuum being at either end where a third type called dual-purpose capabilities exists in the middle where the two archetypes overlap. Building on Helfat and Winter’s (2011) typology and explanations of these types, I provide an visualization in figure 2.1 below.

Figure 2.1 Dynamic Capability Typology

![Figure 2.1 Dynamic Capability Typology](image)

Note: This is a visualization of Helfat and Winter’s (2011) typology.

Dual-purpose capabilities can be used for dynamic purposes and for operational purposes and have the ability to change from operational to dynamic. These capabilities act as operational capabilities in stable conditions and turn into dynamic capabilities during changing conditions. A representation of this type is included in this dissertation through resource planning capability.
Another typology in the dynamic capability literature categorizes capabilities as high order capabilities and low order capabilities. However, there is consensus in the literature that such a typology of higher and lower order is unnecessary and may create confusion. What’s important is determining the level in which the dynamic capabilities are examined. Recently, Di Stefano et al., (2014) used a bicycle drivetrain metaphor to explain the complexity of dynamic capability. These typologies in the dynamic capabilities literature are “ideal-types” that are hard to translate into real life situations, yet they are useful simplifications in theory development, especially given the complexity of the dynamic capability construct (Meyer et al., 1993; Weber, 1963).

2.3.6 The Role of Managerial Decision in Dynamic Capability Perspective

The dynamic capability perspective considers the role of managerial decision-making in the creation, development and execution of dynamic capabilities. This is concluded from early definitions of dynamic capabilities and from recent developments in the literature. Adner and Helfat, (2003) define dynamic managerial capabilities as “capabilities in which managers build, integrate, and reconfigure organizational resources and competences” (p. 1012). Further, Teece’s (2007) tripartite framework explains that dynamic capabilities are composed of the capacity to sensing, seizing and transformation of opportunities (Teece, 2007). Managers not only sense and seize opportunities but also shape new opportunities (Martin, 2011a). Martin (2011a) in his study of six firms in high tech industries, found that in the three high performing firms’ business unit managers were able collaborate to sense and seize opportunities by sharing and reconfiguring resources which translated into better performance by their respective firms.

Dynamic capabilities must be augmented with good strategies to be effective (Teece, 2014). For instance, upper level strategic managerial decisions are instrumental to the creation new
capabilities (Di Stefano et al., 2014). Further, managerial decisions are also part of the execution of capabilities. In this dissertation I argue that managers have a role in the creation of alliance capabilities and to some extent in the execution of the two capabilities examined in this study.

### 2.3.7 Performance Dynamic Capability at the Capability Level

The dynamic capability perspective separates the performance of the capability from the influence the dynamic capability has on firm level outcomes unlike the tautology found in RBV (Priem and Butler, 2001). The performance of a capability is referred to as its technical fitness—how well a capability performs its intended outcome (Helfat et al., 2007). Helfat et al. (2007) explain that dynamic capabilities must be efficient in the first place to have an effect on organizational level outcome. In the dynamic capability perspective there is heterogeneity in the performance of a specific capability. A firm could be better or worse in the performance of a specific capability compared to other firms (Eisenhardt and Martin, 2000). The performance of capabilities across firms are: 1) stochastic in nature (Nelson and Winter, 1985; Dutta et al., 2005) and 2) equifinal in the sense that there are multiple ways for the capability to be effective (Eisenhardt and Martin, 2000; Doty et al., 1993). Recently, several studies used a Stochastic Frontier Estimator (SFE) to test capabilities at the capability level, see table 3 below. For example, Dutta el al. (2005) argue that innovation capability is composed of R&D and marketing expenditure as inputs to produce patents.

#### Table 2.3 Studies using SFE to test Capabilities Performance

<table>
<thead>
<tr>
<th>Study</th>
<th>Constructs and Variables</th>
<th>Methodology</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMJ Dutta et al., 2005</td>
<td>Innovation capability</td>
<td>Sample from semiconductor industry</td>
<td>Both cumulative R&amp;D expenditure and Cumulative marketing expenditure contributed to</td>
</tr>
<tr>
<td></td>
<td>Input:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

31
<table>
<thead>
<tr>
<th>(a) Cumulative R&amp;D expenditure. (b) Cumulative marketing expenditure.</th>
<th>Econometric techniques: Stochastic Frontier Estimator</th>
<th>innovation capability performance. The complementarity of R&amp;D and marketing also significantly contributed to Innovation capability.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable: Affiliate R&amp;D capability</td>
<td>Sample: Taiwanese business groups Panel data consisting of 694 observations for 188 listed firms belonging to 123 business groups across nine years Econometric techniques: Stochastic frontier Model to measure DV (R&amp;D capability). GLS Random effects model to test the effect of intragroup network on group affiliates’ R&amp;D capability</td>
<td>Buyer-supplier centrality leads to significant increases in R&amp;D capability.</td>
</tr>
<tr>
<td>Input: Technological Base Accumulated R&amp;D Expenditure</td>
<td>Output: Technological Outcome</td>
<td></td>
</tr>
<tr>
<td>Input: Technological Base Advantage</td>
<td>Output: Technological Outcome</td>
<td></td>
</tr>
<tr>
<td>Independent variables</td>
<td>Network centrality (equity centrality, director centrality, and buyer-supplier centrality).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longitudinal database of film production studios in the U.S. motion picture industry. The data is comprised of 150 small studios from 1990 to 2010. Econometric technique: stochastic frontier estimation (SFE) to measure capability</td>
<td>Small studios with a larger number of major partners at any given time realize less growth benefits from their capability. The two-way and the three-way interactions between types of centrality are positive and significant.</td>
</tr>
<tr>
<td></td>
<td>Studio Capability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Budget.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cumulative awards.</td>
<td></td>
</tr>
</tbody>
</table>
2.3.8 Dynamic Capability and Firm Fitness

Firm fitness is the primary dependent variable examined in this dissertation. The general concept of fitness within this context stems from contingency and configuration theory. Contingency theory asserts that if two factors (e.g. strategy and structure) align, this fit will lead to better performance. Any misfit between the two factors could lead to decreased performance, which will create motivation for firms to change to achieve fit between these factors once again. Internal characteristics that have been studied from a contingency theory perspective include factors such as strategy and structure (Chandler, 1960), as well as structure and size (Burns and Stalker, 1961). External contingency factors related to the task environment have also been matched with internal factors (Donaldson, 2001).

Dess and Beard (1984) discussed three elements in the task environment that can affect internal operations: dynamism, munificence and complexity. They demonstrated through factor analysis that dynamism and munificence are two separate constructs in the task environment. The task environment is appropriate for this study, as opposed to higher level of the environment, because the study investigates one industry. The task environment includes all organizations that a firm may interact with in this industry. When the external environment is considered, internal factors (e.g. structure and strategy) adapt to external contingencies to achieve external fit for the organization. Similarly, the configuration perspective examines the alignment of internal factors with set external factors and how this alignment affects firm performance. However, contingency
and configuration are silent regarding the mechanism by which firm can achieve alignment. Additionally, concept of external fit in these theories is mostly static. The temporal dimension is mostly absence, although Donaldson (2001) explains that firms try to achieve external fit. Therefore, the mechanisms of how firms change to reestablish fit are not explicitly discussed in these theories. The concept of evolutionary fit is more dynamic, it accounts for alignment and realignment with the environment over time. As such, when a firm is consistently aligning and realigns itself (co-evolving) with the environment, it is referred to evolutionary fit. From our previous discussions on dynamic capabilities, we know that dynamic capabilities can change internal factors to enable firms to adapt to contingencies in the external environment. As such, the degree of alignment between internal factors and external contingencies could be attributed to effective dynamic capabilities. Helfat et al. (2007) refer to the achievement of persistent alignment and realignment with the environment in the context in which dynamic capabilities operate as evolutionary fitness (Helfat et al., 2007). It is the state of persistent alignment between internal factors and external factors that leads to growth and survival in the context in which the firm operates. Levinthal and Warglien (1999) when explaining fitness in the landscape using Kauffman’s (1993) N K model, described firms adapting to the environment by searching for fitness in rugged and smooth landscapes. They describe how it could be easier for a firm to search and explore at the peak of a rugged landscape while only exploiting in a more favorable landscape. This balancing of exploration and exploitation using active search helps firms achieve fitness in the landscape. Later, research suggests that the process of balancing between exploitation and exploration is a dynamic capability (Tushman and O’Rielly, 2008).

The link between dynamic capabilities and firm fitness is a two-step process (Helfat et al., 2007; Eisenhardt and Martin, 2000). In the first step, the dynamic capabilities themselves must be
functioning well “technical fitness”. In the second step, dynamic capabilities must help a firm consistently align internal factors with elements in the task environment in which the firm operates to achieve evolutionary fitness. Therefore, I use a multilevel approach to testing dynamic capabilities. I first test the performance of each specific capability at the capability level and then test if the capability leads to better performance at the firm level.

Figure 2.2 Linking Dynamic Capabilities to Evolutionary Fitness
CHAPTER 3
THEORY AND MODEL DEVELOPMENT

The main objective of this section is to develop a theoretical basis for the hypotheses regarding the role of dynamic capabilities in firm adaptation to the external environment and in achieving evolutionary fit in the context in which they operate. There are two specific dynamic capabilities examined in this dissertation: resource planning capability and alliance management capability. These two dynamic capabilities have both similarities and differences. In building the theoretical model I will establish the rationale for choosing these two capabilities and the impact they have on firm fitness as determined by objective performance outcomes such as long-term performance and persistent revenue growth. I also examine the conditional effect of two environmental factors, dynamism and munificence, on the relationship between the dynamic capabilities and evolutionary fitness. The conceptual model developed here draws theoretical support from the dynamic capabilities perspective which I augment with supporting arguments from additional organization theories including contingency and configuration theories, resource dependence theory.

3.1 Two Dynamic Capabilities

Two dynamic capabilities that are likely to be especially important in organizations are resource planning capability and alliance management capability. As discussed earlier in the dissertation, these two capabilities operate in different parts of the organization and could be co-
dependent and complementary in nature. My goal is to investigate the heterogeneity in these capabilities and the heterogeneity of performance of firms engaging in activities related to these two capabilities.

The two capabilities have both similarities and differences. First, the two capabilities are distinct types of dynamic capabilities. One is a dual-purpose capability and one is a dynamic capability. Resource planning capability is a dual-purpose capabilities because it normally acts like an operational capability for exploiting current products and markets, and could act like a dynamic capability when exploiting new opportunities and markets (Helfat and Winter, 2011). Resource planning capability is usually: 1) created and develops with the founding of the firm as it starts when founders/managers make resource allocation decisions for the initial stocks of assets, and 2) associated with core operations (Helfat and Peteraf, 2003). Thus, resource planning is internally oriented, and is therefore, geared more toward exploitation even though it could be used for exploratory purposes. On the other hand, alliance management capability is initiated at any point in the life of the firm; and it pushes firm boundaries outwards enabling access to knowledge and capabilities outside the firm (Thompson, 1967). Thus, it is externally oriented and therefore, geared more towards exploration even though it could be used for exploitation.

Despite their differences, the two capabilities hold characteristics of dynamic capabilities. Common themes between the two capabilities include: 1) both capabilities have the capacity to enable firms to sense and seize opportunities (Teece, 2007). Resource planning capability enables firms to scan the market for new market opportunities. Similarly, alliance management capability enables firms to scan the market for potential partners and then to form alliances with strategic partners. 2) Both capabilities could be used as a tactics to respond to changes in the environment.
Some capabilities are created early in the life of the firm, especially those tied to internal operations, while other capabilities are created at some point along the life cycle of the firm. The initiation and development of new organization wide dynamic capabilities usually involves strategic top management decisions such as in the case of alliance capability. In this dissertation, I will refer to this strategic intention to create and develop alliance capability as an alliance orientation (Adner and Helfat, 2003). The two capabilities and their relationship to firm performance are explained in more details in the following sections.

3.2 Resource Planning Capability

3.2.1 Resource Planning Capability Conceptualized

Resource planning capability is the capacity to implement changes to resources (inputs) to influence production capacity (Helfat and Winter, 2011). Eisenhardt and Martin (2000) indicated that the process by which firms make strategic decisions is a dynamic capability. Indeed, resource planning within the context of dynamic capabilities refers to strategic decisions embedded within routines and processes, rather than ad hoc problem solving, end of year budget planning, or a long term strategic plan (Winter, 2003, Martin, 2011a; Helfat and Martin, 2015). Resource planning capability is about making decisions regarding resource allocations and extends over several products or markets served. In the airline industry, resource planning capability is the capacity to effectively and efficiently offer an extensive choice of routes (Delfman, 2005). This involves the process that controls the flow of aircrafts and passengers which involves resource configuration and reconfiguration. This capability is strategically important for the survival and growth of airlines and has been described as core competency (Leonard, 1992; Delfmann, 2005).
The main goal of the resource planning capability is to achieve an optimal capacity level. This could mean optimal production capacity in manufacturing firms or optimal capacity utilization in service firms (e.g. seating capacity in airlines). It is important to note that that maximizing capacity to the optimal level does not necessarily entail producing at full capacity; as the performance of routines and capabilities are stochastic in nature (Nelson and Winter, 1982). There should always be some slack to have a buffer for various situations (e.g. emergency situations). In fact, full investment of physical and human resources may result in a negative effect on performance (Sirmon and Hitt, 2009). Further, the optimal capacity may differ from one context to another. For example, in the airline industry the optimal capacity that airlines strive to achieve is around 85-90%, with an average seat capacity of 79.0% worldwide for 2013 (WATS 85th, 2014).

3.2.2 Resource Planning Capability Performance and Evolutionary Fitness

To achieve optimal capacity, resource planning capability must find the optimal configuration of resources using processes, routines and effective judgment. This involves thriving to achieve technical efficiency in operating the processes and routines augmented with effective managerial decisions from managers responsible for resource planning. There is heterogeneity between firms operating a resource planning capability such as they attempt to achieve technical efficiency and optimal capacity in their own way. This condition is referred to as “equifinality” (Eisenhardt and Martin, 2000). This heterogeneity stems from the components of resource planning capability: resources, processes and managerial decisions. First, from a resource based perspective, firms have a unique bundle of resources (Amit and Schoemaker, 1993; Barney, 1991). For example, in the airline industry resources include fleet, human capital (e.g. pilots and crew members), and hubs. Second, firms use disparate processes to configure resources. These processes account for complementarity of resources and help match existing resources in the best
combinative way possible. In the airline industry, these processes include, for example, flight scheduling, fleet assignment and timing. Third, resource planning managers must utilize available processes and leverage resources to produce the best operational output. Overall, the better the firm is in achieving optimal capacity, the better it is in operating the capability.

The operational improvements as a result of resource planning lead to higher revenues from operations. Due to resource planning capability being a dual-purpose capability, it is normally an operational capability employed to manage existing markets and customers. Overtime, the capability enables a firm to become more efficient in existing markets. The more technically fit the capability, the lower the cost and the higher the revenues from operations (Helfat et al., 2007). The capability may be used for dynamic purposes as well, such as when exploring new opportunities to complement existing markets. When the capability goes further to explore new opportunities to serve new customers and markets, it turns into a dynamic capability (Helfat and Winter, 2011; Kahl, 2014). This shift of focus from operational to dynamic is, in part, inherent in the capability itself and partially a deliberate shift as a result of decisions from resource planning managers. This dual nature is what Helfat and Winter (2011) referred to as dual-purpose capability. An example of resource planning capability from the airline industry could illustrate this dual role. Within the airline industry, resource planning activities can exploit existing markets by: 1) routinely monitoring and managing fleet productivity, and 2) reconfiguring assets by adjusting capacity allocations to improve accommodation of passengers. It can also explore new opportunities by: 1) routinely analyzing the market and forecasting demand, and 2) redeploying resources to new routes and adjust capacity accordingly.

When there are changes in the environment, resource planning turns into a dynamic capability. This involves reconfiguring resources so the firm can achieve the best fit between the
firm’s resource configuration and the new state of the external environment. According to definition of Eisenhardt and Martin (2000), dynamic capabilities are “strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die” (p. 1107). The dynamic purposes of resource planning include serving new markets/customers and releasing or stopping services to others. By making changes to flight schedules and fleet assignment, resources will be redeployed to match new configuration. Thus, managerial judgment becomes essential as some of the routines and processes might be relaxed to simple rules to accommodate managerial response to changes in the market (Cyert and March, 1963). For example, resource planning capability creates “options” for resource reconfigurations over what might be needed in the annual planning process. This alignment and realignment of resources with market conditions leads to better fitness with the environment. In general, Sirmon et al. (2010) found that when a capability is performing above average, it is associated with value added, which is revenue minus processing cost. As such, when firms perform resource planning capability at high level, both the operational and dynamic part, it could ensure a steady stream of revenues despite environmental changes. Therefore, resource planning capability, with both its operational and dynamic purposes, enhances firm fitness in asset intensive industries. Formally stated:

Hypothesis 1: The higher the performance of resource planning capabilities, the higher will be firm sustained performance.

3.3 Alliance Management Capability

3.3.1 Early Alliance Research

When trying to explain why firms exist, Williamson (1975) explained that transactions either happen in the market or inside an organization’s “hierarchy”. In some cases it becomes too
costly and time-consuming to contract everything in the market place. So firms hire employees
with managers to have some sort of oversight and monitoring over unanticipated and hard-to-
contract tasks. A third hybrid form was later suggested, inter-organizational relationships,
networks or alliances, which exist between markets and hierarchy (Ouchi, 1980; Powell, 1990). In
the 90’s, our understanding of alliances advanced and extant research examined why firms engage
in alliances (Powell, Koput and Smith-Dioerr, 1996) the benefits of engaging in alliance activities
(Doz and Hamel, 1998) and the costs associated with managing alliances (Gulati and Singh, 1998).
Alliances extend firms’ boundaries to the external environment by reaching out to other firms
through boundary-spanning activities and arrangements. There are advantages and disadvantages
the firm may experience when extending their boundaries in this manner. Disadvantages are
related to relational uncertainty with partners as one firm may exploit the relationship at the
expense of a partner (Steensma, Marino, Weaver and Dickson, 2000). Other disadvantages exist
such as concerns about jeopardizing trade secrets (Doz and Hamel, 1998). Advantages include
reducing interdependencies, learning from other firms, and gaining legitimacy. The main goal of
alliances is to increase operational revenues through alliances (Doz and Hamel, 1998).

Since early on, experience in managing alliances has been a focal variable because of
learning from prior relationships and the notion that being embedded in a social network could
improve chances of forming and benefitting from new alliances (Gulati, 1995; Grannovetter, 1992;
Uzzi, 1997). As such, the literature has generally accepted that future alliances depend heavily on
past alliances “path dependence” (Gulati, 1995, Powell et al., 1996).

In the new millennia, research on alliances has expanded exponentially; mostly focused
on theorizing and studying factors affecting alliance success at the alliance level (Anand and
Khanna, 2000), the dyadic level (Zollo, Reuer and Singh, 2002; Goerzen and Beamish 2005;
Sampson, 2005), and more recently at the portfolio level (Heimeriks and Duyster, 2007). These factors include alliance capability and the underlying capabilities such alliance coordination between partners and coordination across alliances in an alliance portfolio, and the capability to sense and seize partnerships (Schilke and Goerzen, 2010).

Research on alliances has been supported by links to resource dependence theory and contingency theory. Due to firms being interdependent with other firms, they reach out to external resources to reduce interdependencies through alliances (Pfeffer and Salancik, 1974; Hillman, Withers and Collins, 2009). From a contingency perspective, factors in the external environments could create a misfit between a firm and external contingencies affecting performance. Alliances could help firms return to a state of fit by: 1) stabilizing the environment, 2) protecting the firm from turbulence, and 3) permitting access to critical resources. The processes by which firms reach realignment could be attributed to a firm’s alliance management capability (Schreiner, Kale and Corsten, 2009). Yet, the mechanism by which alliance management capability is developed and deployed to achieve such alignment and realignment is understudied.

### 3.3.2 Alliance Management Capability

In recent alliance research, the capability prospective has been used to explain heterogeneity in managing alliances. Alliance management capabilities constitute all firm-specific skills and activities that enable a firm to manage an alliance or a portfolio of alliances (Schreiner et al., 2009; Schilke and Goerzen, 2010). These activities include coordination, bonding and communication with a partner and coordination across alliances when there are more than one alliance (Schreiner et al., 2009; Schilke and Goerzen, 2010).
I focus on the capability to manage multiple alliances (portfolio of alliances), which is all the alliances that a firm is involved in (Hoffman, 2005), for several reasons. First, a capability to manage a portfolio indicates a firm-level alliance strategy that spans multiple alliances. This implies learning to coordinate and learning from the multiple alliances in which a firm is involved (Sarkar, Aulakh and Madhok, 2009; Wassmer, 2010). Second, research on the portfolio level suggested linkages to firm level outcomes (e.g. Rothaermel and Deeds, 2006; Aggarawal and Hsu, 2009; Wang and Rajagopalan, 2015). Thus, this firm-level alliance capability is a dynamic capability as will be argued in subsequent sections.

3.3.3 Alliances and Dynamic Capabilities

From the dynamic capabilities prospective, alliance management capability is defined as the capacity to purposefully create, extend, or modify the firm’s resource base, augmented to include the resources of its alliance partners (Helfat et al., 2007). In this dissertation, I focus on the routines and processes of managing a portfolio of alliances. These are upper level organizational processes that constitute a firm’s ability to effectively create, govern, and leverage a portfolio of alliances. Beneath these upper level processes are factors that help firms better manage alliances. There are multiple factors that contribute to the development and management of an alliance capability that is effective (Eisenhardt and Martin 2000). In the next section I describe the general process of alliance capability creation, development and deployment before examining how firms manage alliances through an alliance management capability.

3.3.4 Alliance Management Capability Development Process

There are two stages of the alliance capability development process, one is concerned with antecedents to alliance formation which was mostly ignored in previous literature and the second
stage is concerned with post formation “once alliances are up and running” (Wang and Rajagopalan, 2015). Consistent with the alliance literature, I define alliance management capability as a upper level strategic capability that is composed of business level managerial decisions embedded within routines and processes to manage and monitor alliances at the portfolio of alliances, which include the capabilities of sensing and seizing partnerships, coordination, and learning (Khanna, 1998; Kale, Dyer and Singh, 2002; Hoffmann, 2005; Heimeriks and Duysters, 2007; Schnriener et al., 2009). For a list of alliance management capability definitions from the literature see table 4 below:

**Table 3.1 Alliance Management Capability Definitions**

<table>
<thead>
<tr>
<th>Article</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Khanna (1998)</td>
<td>Alliance capability as “a firm’s ability to identify partners, initiate alliances, and engage in the ongoing management and possible restructuring and termination of these alliances” (p. 351)</td>
</tr>
<tr>
<td>Kale, Dyer and Singh (2002)</td>
<td>Alliance capability would rest upon how effectively the firm is able to capture, share, and disseminate the alliance management know-how associated with prior experience.</td>
</tr>
<tr>
<td>(Hoffmann, 2005)</td>
<td>Alliance capability on the portfolio level constitutes the ability to develop the alliance portfolio strategy, establish an alliance management system, and coordinate and monitor the portfolio.</td>
</tr>
<tr>
<td>Heimeriks and Duysters (2007)</td>
<td>Alliance capability is defined as a higher-order resource, which is difficult to obtain or imitate and has the potential to enhance the performance of the firm’s alliance portfolio.</td>
</tr>
<tr>
<td>Schnriener, Kale and Crosten (2009)</td>
<td>The skills required to manage a firm’s entire alliance portfolio. <em>Alliance portfolio capability</em> comprise skills such as the ability to (a) form new alliances that do not compete with other existing alliances in the portfolio, (b) carefully select partners for a given alliance that are compatible with partners in other extant alliances, (c) set up an appropriate firm-level mechanism to monitor various</td>
</tr>
</tbody>
</table>
alliances in its portfolio, or (d) coordinate activities and knowledge flows across individual alliances in the portfolio, and others (Hoffmann, 2007).

| Schilke and Goerzen (2010) | Alliance management capability can be considered a “type of dynamic capability with the capacity to purposefully create, extend, or modify the firm’s resource base, augmented to include the resources of its alliance partners” |

Because alliance capability is a firm-level capability, it involves decisions from top management especially for the initiation of the development of the capability and the early stages capability’s development. In the initial stages of development top executives intervene and establish a strategic orientation toward alliances. Following this, top management will have a significant role in the development of the alliance dynamic capabilities. They direct the efforts in building routines and processes to manage alliances and to aid in decision making regarding resource investments (Adner and Helfat, 2003). As a result of top management directions, routines and processes are created and institutionalized. These routines are exercised on a daily basis allowing the firms to benefit from organizational learning as they enhance the management of alliances. In the second stage (the post-formation) stage, the alliance business level routines and processes are further enhanced and developed. The combined outcomes of these business level capabilities routines ultimately lead to better performance of the higher order alliance capability. As such, alliance management capability shapes the business-level routines and in the same time influenced by their outcome. The result of the process of shaping and reshaping business-level routines could be in the form of higher revenues from alliances (Doz and Hamel, 1998). As external elements in the environment change more quickly, the need for the higher order alliance management capability to change business level routines, increases (Thompson, 1967; Eisenhardt
and Martin, 2000). Accordingly, firms need to adjust the alliance capability to achieve alignment with environmental factors. This exercise of alignment and realignment could enhance firm fitness. I have depicted a model below to show how alliance management capability is developed and consequently affects evolutionary fitness:

**Figure 3.1 Alliance Management Capability Development Process**

The model above explains how dynamic capabilities go through the capability development process: First, top management behavior and action leads to the development of alliance dynamic capability (capability performance) which leads to organizational performance and strategic outcomes (evolutionary fitness). The next two hypotheses are related to alliance management capability.
3.3.5 Alliance Orientation

As alluded to earlier, some capabilities are created at various points in the firm life cycle. At key stages, a firm’s development executives can choose between multiple capabilities and invest in those that are aligned with their strategy. When examining alliances in the dynamic capability framework, I’m referring to an organization wide strategy with intent and purpose—not disparate alliance activities. The intent or purpose of top management to engage in strategic alliances is an alliance orientation. Further, alliance orientation is the strategic choice to enter relational agreements with other firms. As such, I define alliance orientation as a strategic orientation set forth by top management to pursue partnerships with other firms. Overall, top management orientation towards any strategic capability should precede the development of the capability (Adner and Helfat, 2003). Several examples of strategic orientations have been discussed in the literature; examples include entrepreneurial orientation (e.g. Covin and Slevin, 1988), dominant logic (Kor and Mesko, 2013) and long term orientation for family firms (Breton-Miller and Miller, 2006). Few studies in the alliance literature examine the preformation stage of alliances, which includes decisions that lead to the creation of alliance management capability.

Alliance orientation includes the decisions to create an alliance capability and to follow through after the capability is well established and running. For example, Teece (2007) emphasized top management’s role in shaping opportunities by implementing structures and guidelines, and gaining loyalty and commitment. Thus, alliance orientation helps nurture and build up an alliance capabilities, which includes configuring and redeploying resources and processes related to alliances through top management decisions (Kandemir, Yaprak and Cavusgil, 2006). After the capability is established, top management could use the capability for shaping the environment and adapting to it. From a dynamic capability perspective, top management decision-making
affects the manner in which firms adapt to changing environments through the impact of the decisions on the development of dynamic capabilities (Adner and Helfat, 2003; Helfat and Martin, 2015). For example, in asset intensive industries the configuration of alliances gives alliance managers the “options” for alliance reconfiguration that assist in responding to the environment. However, alliance capability is hindered due to the nature of asset intensive industries, alliances are long-term and not easily reconfigured.

Top management decisions have an important role in forming strategies that help firms adapt to and shape the environment (Simon, 1957; Teece, 2007), alliances are one of the strategies that not only help firms adapt to the environment but also help shape the environment. A firm’s overall strategy (shaping vs. adapting strategy) affects how the firm approaches alliances (e.g. Hoffman, 2007). According to resource dependence, firms face uncertainty in the environment. To reduce uncertainty, top management is compelled to engage in partnerships for several possible strategic reasons including: 1) reducing interdependencies, 2) increasing legitimacy, and 3) gaining access to valuable resources (Thompson, 1967).

Few studies in the alliance literature, with notable exceptions, have examined how top executives’ involvement and commitment improves a firm’s alliance capability. Alliance orientation is a preformation construct that has an effect on post formation variables. As such, alliance orientation has an effect on most of the activities that occur after the alliance capability is established. Top executive involvement in alliance strategy making was found to lead to better development of an alliance capability (Lambe, Spekman and Hunt, 2002) and alliance success (Sluyts, Matthyssens, Martens and Streukens, 2011). The main goal for the managerial decisions regarding alliances is to have an effective alliance strategy. Closely related to alliance orientation is alliance proactiveness that refers to the extent to which with how a firm is actively searching for
alliance partners ahead of their competition (Kraiser, Marino, Kuratko and Weaver, 2013). The stronger the attention and emphasis from top management towards alliances, the more the firm will be proactive in sensing and seizing of alliance opportunities. Alliance proactiveness has an effect on alliance complexity represented by the extensiveness and diversity of the firm’s alliance portfolio (Sarker et al., 2009; Kraiser et al., 2013). Another post-formation factor influenced by alliance orientation is the development of an alliance dedicated function. An alliance function is either built by a corporate level strategy (Kale, Dyer and Sing, 2002) or it happens later on when firm realize the need to have a central location to manage alliance. The stronger the alliance orientation, the more likely 1) the alliance function is set up early on and 2) learning from experience is faster and more efficient. Therefore, I posit:

Hypothesis 2: A firm’s alliance orientation will be positively associated with a higher performing alliance management capability.

### 3.3.6 Alliance Management Capability Development

The literature identifies factors or attributes to better manage alliances. These factors or attributes can be considered activities and processes of an alliance management capability. These activities and processes can improve the management of a single alliance (e.g. Zollo et al., 2002) or the whole portfolio of alliances (Wassmer, 2010; Al-Laham, Amburgey and Bates, 2008). Of these activities and processes learning from experience, the existence of a dedicated function and alliance decision complexity make up a significant part of alliance capability construct.

#### 3.3.6.1 Learning from Alliance Experience

Learning from experience is an integral part of the development of an alliance management capability. It is the process by which firms learn how to learn about alliances. In the alliance
literature, experience has been heavily researched. Previous alliances allow firms to gain knowledge pertaining to alliance management that helps them with dealing with repeated alliances with the same partner (Zollo et al., 2002; Al-Laham et al., 2008) or future alliances with other partners (Hoang and Rothaermel, 2005). This experience in forming alliances is associated with alliance success (Anand and Khanna, 2000; Kale et al., 2002). The more firms learn from previous alliances, the fewer mistakes they will make in ongoing and future alliances and the better able they are to exploit value from these relationships. However, the relationship between experience and success is not always linear. Previous literature found that prior experience is beneficial to a certain extent and then the value diminishes due to depreciation of benefits from learning (Sampson, 2005; Vandie and Zaheer, 2014). For example, the benefit from the first alliance is enormous for the second alliance with same partner, the firm will have developed routines and social relationships with the partner from the first alliance. However, the benefit from the second alliance will be less significant for the third alliance and so on.

Furthermore, all experience are not equal, especially for a portfolio of alliances (Eggerds, 2012; Heimericks and Duyster, 2007). First, there is experience with the same partner that could improve existing and future alliances with the same partner. Second, firms can gain experience in different types of alliances with same partner. These are distinct experiences that may or may not be transferable to other types of alliances with same partner. For example, a firm could gain experience in joint venture alliances; which is different from experience in license agreements. Additionally, the experience a firm gains from an explorative alliance is different from that gained from an exploitative alliance (Stettner and Lavie, 2014, Hess and Rothaermel, 2011). Lastly, there is experience from alliances of different partners. Experience gained from alliance portfolio diversity.
Experience has an effect on other factors of an alliance management capability. It is well established in the management literature that learning from experience is associated with a positive experience curve improvement in operational outcomes (Yelle, 1979). The literature on organizational learning and absorptive capacity provides an extensive discussion on how learning from experience improves operational performance (e.g., Cohen and Levinthal, 1990; Levitt and March, 1988). For example, Rothaermel and Deeds, 2006 found that experience from prior alliances leads to increased product development to a certain point. Overall, experience from prior alliances is critical to improving technical efficiency of the capability of managing alliances, leading to improved operational outcomes from alliance capability such as efficiency and speed of operation. Consistent with this argument, Al-Laham et al. (2008) found that experience from prior alliances is positively associated with speed in forming new alliances.

### 3.3.6.2 Dedicated Alliance Function

The creation of a dedicated alliance function is an integral part of the development of an alliance capability. Firms learn from prior experience in forming alliances and develop routines and processes that will eventually be institutionalized in an organized structure (Schilke and Goerzen, 2010). The structure is where the explicit and implicit knowledge could be codified into routines and processes. These repeatable routines and processes become institutionalized in a central location referred to as a dedicated alliance function (Heimeriks, Duysters, and Vanhaverbeke, 2007). This centralized, dedicated function can serve as an incubator for alliance learning and as storage for alliance-related knowledge. This function allows the firm to focus on alliance-related activities; processes and decision making that constitute a firm’s alliance capabilities. Important activities that could be exercised inside the dedicated function may include: 1) identifying and evaluating potential partner options (Sarkar et al., 2009), 2) monitoring and adjusting results of
partnerships (Doz and Hamel, 1988), and 3) revising and updating agreements and other forms of cooperation “reconfiguration”. These dedicated alliance functions could be connected high level executives depending on the strategic importance alliances are for the firm (Hiemeriks and Dyster, 2007; Chandler, 1962). For example, Lufthansa has a VP of alliance, who oversees all alliance activities outside and within the airline. Overall, having a dedicated alliance function was found to improve alliance efficiency (Kale et al., 2002).

3.3.6.3 Alliance Diversity

The literature has identified factors besides experience and the existence of a dedicated function involved in managing alliances such as the degree of alliance portfolio diversity. Alliance diversity increase the complexity in managing alliances. This complexity stems from having more complex alliances and a more complex portfolio. As such, the decisions alliances managers may encounter include not only the type of relationship but also the diversity of types. Alliances have different forms; some alliances are more complex than others. A more complex portfolio includes a greater diversity of alliances as well as a greater percentage of complex alliances. A licenses agreement, for example, is less complex than a joint venture, which involves an equity stake (Sampson, 2005). When there is more uncertainty about the relationships, alliance manager may choose joint ventures over simple well-specified agreements (e.g. licensing or code-share agreements in the airline industry) (Anand and Khanna, 2000). If there were diversity in the portfolio it would entail more complex decision making in terms of managing the different forms. There were some inconsistent findings on the effect of alliance diversity on performance. Some found a positive relationship with performance (e.g. Sampson, 2005) and some found a negative (Beamish and Goerzen 2005) more recently it has been found that it has a U shape relationship (e.g. Dyster and Loshkin, 2011). It is good to a certain extent and then then it starts to affect
performance negatively. Moreover, alliance managers may choose to stick with one type of agreement (specialize) or to diversify by using a variety of agreements (Aggarwal and Hsu, 2009). Emirates airlines; for example, specializes in joint ventures and acquisitions and is not involved in any of the big alliance constellations. This turned out to be an effective strategy for the airline.

Building a complex alliance portfolio that includes a variety of types of agreements could be an indication of an exploration focus, while specializing with a portfolio with less variety of relationships could be an indication of exploitation focus. Trying to mix complex types with simple types may have negative implications because underlying routines are different (Stettner and Lavie, 2014). Recently, Stettner and Lavie (2014) in their study on the software industry found that firm that focus on either explorative alliances or exploitative alliances perform better than firms performance try balance a “mix” of exploration and exploration with the portfolio.

Thus, managerial decision making on the type of relationships a firm engages can have an impact on alliance capability outcomes. Similar to the other two alliance factors, there should be a balance in diversity or lack thereof that contributes best to the overall alliance capability.

3.3.6.4 The Combination of Alliance Factors

Alliance management capability could be developed in various ways (Heimericks and Dusters, 2007). The three important factors intertwine to improve the higher alliance capability’s operational outcome. For example, experience helps with complex decisions regarding alliances (Samson, 2005) and also helps in creating the dedicated function. Alliance business-level management may help create and manage an effective alliance dedicated function. As such, these three factors work not in isolation and together they create a more effective capability. The best
balance between the capabilities may require upper level guidance for an effective overall alliance strategy.

At the firm level, an alliance management capability gives strategic flexibility to the firm (Sanchaz, 1993). For example, when the environment is uncertain, a firm may pursue more alliances to ensure access to critical resource (Pfeffer and Salancik, 1978). Further, firms may need to make decisions about exploitation or exploration of opportunities to be strategically agile in order to achieve fit (Levinthal and Warglien, 1999; March, 1993). Alliances could be used for exploitation and exploration. Exploitative alliances leverage internal knowledge to improve existing products while explorative alliances search for external knowledge for innovation of new products. An example of exploration alliances would be R&D alliances, while an example of exploitation alliances may include marketing alliances or shared service agreements in airlines. An alliance management capability is considered a dynamic capability because: 1) top management as a balancing act that complements internal strategies. For instance, if a firm has an internal focus on exploitation, it could use a complementary alliance strategy to explore, and vice versa. 2) Business-level alliance managers can reconfigure alliances to respond to environmental changes. Both these reasons suggest that an alliance management capability is an effective tool to ensure that the firm stays competitive in the market. As such, alliances support the firm’s efforts to achieve fitness with the environment. Furthermore, a high performing alliance capability should contribute significantly to revenue from operation. For instance, Vandiae and Zaheer (2014) in their study of firms in the movie studio industry found that alliance capability leads to better revenue growth. Based on the above theoretical arguments, an alliance management with all of it elements could assist firm in sustaining performance. Therefore, I posit:
Hypothesis 3: The higher the performance of alliance capability, the better will be firm sustained performance.

3.4 The Interaction of the Two Capabilities (Synergistic Effect)

Firms need to balance their strategic capabilities to achieve the flexibility necessary to navigate a changing environment. These strategic capabilities may: 1) complement each other and work together effectively under the same market conditions or they could be, 2) totally isolated capabilities, and have no effect on each other, or be 3) substitutes, leading to duplicate efforts.

Both alliance management capability and resource planning capability are firm-level. Firm-level dynamic capabilities require intervention and attention from top management, in contrast to operational capabilities, which need less management attention (Nelson and Winter, 1956, Zahra et al., 2006). Resource planning capability is a dual-purpose capability in that it serves as an operational capability in some ways and as a dynamic capability in others. As an operational capability, it enables a firm to make a living in the present by exploiting exiting opportunities but also serves as a dynamic capability because it alters the way a firm makes a living by exploring new opportunities. A resource planning capability configures and reconfigures strategic resources concerning core operations of the firm (Delfman, 2005). The closer the capability is to core operations or the more it is “internally oriented”, the more emphasis it places on exploitation (O’Reily and Tushman, 2008; Teece, 2014). If we imagine the two capabilities on a circle, alliance capability is on the periphery protecting core operations from external pressures (Thompson, 1967), as shown in figure 1 in the introductory section (Chapter 1). Alliances could be used for exploratory purposes (e.g. R&D alliances) such as learning from other firms about new trends and opportunities. This protects the firm from uncertainty and the information gathered from exploration will help in tough times (Thompson, 1967). Thus, resource planning is geared more
towards exploitation and alliance capability is geared more towards exploration, enabling a balancing act between exploitation and exploration (O’Reiley and Tushman, 2008). Recently, Stettner and Lavie (2014) found that balancing exploitation and exploration between internal operations and alliances is better than balancing within each mode.

In this context, the two capabilities complement each other and synergies exist between resource planning and alliances. Because of complementarity, I expect the capabilities to strengthen each other. For example, if an airline forms an alliance with another airline, this could bridge their critical hubs together, as a result, this could bring higher traffic for the two partners resulting in a better utilization of resources. As such, an effective alliance capability tries to match the focal firm with partners that have complementary markets (Mitsuhashi and Greve, 2009). The synergies between the two capabilities bring in more revenue for the firm. There are ways in which firms could enhance complementarity, the capabilities could be integrated in a single dedicated function or separated in distinct dedicated functions with facilitating the sharing of information and resources. The decision to integrate or separate the functions may depend on the compatibility of routines. For example, the routines that support exploitation are distinct from routines that support exploration. In this case each capability has distinct supporting routines favoring separation of functions yet management has to ensure communication and sharing of information is high between the two dedicated functions. These two dynamic capabilities could strengthen each other depending on the level of shared interdependence. Reciprocal interdependence is the highest level of collaboration and in it units share resources and information and as such are both recipients and providers of inputs and outputs with each other (Thompson, 1974). Martin (2011) found that reciprocal interdependence among capabilities is associated with better performance. The alliance literature suggests that firms should have inter-firm communication as it relates to alliances.
(Niesten and Jolink, 2015). This could be in the form of communication between two departments through joint task forces, and joint business planning. In this case, we expect some degree of communication between the resource planning dedicated function and the alliance dedicated function. Zheng, Liu and George (2010) in their study of two capabilities operating in context of biotechnology small firms, found that alliance capability positively interacts with innovative capability to produce higher firm performance represented by firm valuation. Due to the resource planning capability being internally oriented and geared more towards exploitation and the alliance capability being externally oriented and geared more towards exploration, the firm could balance exploitation and exploration through these capabilities. Based on the above, I expect alliance capability to interact positively with resource planning capability to produce a better fit for the firm operationalized as sustained performance. Therefore, I posit:

Hypothesis 4: The interaction effect of alliance management capability and resource planning capability will be positively associated with sustained performance.

3.5 The Role of the Environment

Dynamic capabilities are important in all markets. Each distinctive market is exposed to different environmental forces. Firms operating in these markets are affected by environmental pressures, which affect variation, selection and retention of firms (Aldrich and Ruef, 2006). In moderately dynamic markets, a change in the environment affects variation in internal processes and actions of firms (e.g. capabilities) rather than selection and retention by the external environment (Eisenhardt and Martin, 2000). There are multiple levels of the environment. The appropriate level for this study is the task environment, which includes all organizations that the focal firm interacts with to survive and grow, because this level affects variation between firms in
processes and decision-making (Castrogiovanni, 1991). Elements in the task environments that affect firm performance have long been of interest to strategy researchers. They have been used in many studies in strategy as a conditional effect or boundary conditions to established theories. Particularly important factors that can affect strategic processes are dynamism and munificence. These factors affect decision making (Goll and Rasheed, 1997), behavior (Cyert and March, 1963), and resource/capability development and investment (Sirmon, Hitt and Ireland, 2007; Helfat et al., 2007). As a result, they have a profound effect on the potential for firm to grow and survive (Aldrich and Ruef, 2006). These environmental factors might have differing effects on the relationship between dynamic capabilities and firm performance depending on the specific capability under investigation and the market in which they operate (Eisenhardt and Martin, 2000). Below I examine the effect of dynamism and munificence on the relationship between our two dynamic capabilities and firm fitness.

3.5.1 Environmental Dynamism

Environmental dynamism is the absence of a discernable pattern in changes in the external environment which result in unpredictability and uncertainty (Dess and Beard, 1984). Dynamism is concerned with unpredictability of environmental change that is a result of fluctuation in rate of change.

The level of dynamism in the environment can be expected to affect the relationship between dynamic capabilities and firm performance (Eisenhardt and Martin, 2000). During low level of dynamism, the nature of capabilities as dynamism increases so should the need for resource reconfiguration through dynamic capabilities. The effect of dynamism could be different for each of the dynamic capabilities. For instance, Danneels (2012) found that environmental turbulence which is a part of dynamism has a strengthening effect on the relationship between R&D capability
and performance but a weakening effect on the relationship between marketing capability and performance.

Dynamism can cause misfits between internal operations and external conditions, resulting in lower performance (Miller and Friesen, 1983). Dynamism can affect firm operations by: 1) creating variations in how firms react and adapt to changes (Aldrich and Ruef, 2006), and 2) creating more opportunities for exploitation and exploration (March, 1991). The processes by which firms can react and adapt to changes through sensing and seizing of opportunities could be attributed to dynamic capabilities (Teece, 2007). As dynamism increases, the need for dynamic capabilities increases to achieve realignment of internal and external factors once again and the characteristics and nature of dynamic capabilities change as well (Eisenhardt and Martin, 2000). As dynamism decreases, dynamic capabilities become less important because there will be less need for change. For example, in less dynamic environments, the focus will be on exploitation of opportunities that could be achieved through operational capabilities that are efficient. Due to resource planning being internally oriented, the focus is more on exploitation. Following this logic, when dynamism is low, it operates normally as an operation capability. When dynamism is high, dynamic capability could adjust resources (make reconfiguration decision) to match to the level of dynamism in the environment. Yet, these adjustments take time and are costly (Maritan, 2001). In Stadler et al.’s (2013) study in the oil industry, which is also an asset intensive industry, they argue that the time it takes to adjust may depend on the stage of resource acquisition and development. Even though it is harder for managers of dual-purpose capabilities to change resource configurations during high dynamism compared to dynamic capabilities, they are vital for firms to maintain fitness with the external environment. Therefore, I expect dynamism to have a
strengthening effect on resource planning capability and firm sustained performance. Formally stated,

**Hypothesis 5a:** Environmental dynamism positively moderates the relationship between a resource planning capability and sustained performance, such that the relationship should be weaker under high levels of dynamism in the environment.

This involves having to cope with uncertainty (Thompson, 1967; Pfeffer and Salancik, 1976). For example, firms could create business units in the periphery to protect the firm and its internal operations from the external environmental (Thompson, 1967). These units are referred to as boundary-spanning units. These business units serve as buffer to core business operations. They also have capabilities that allow them to react and adapt to market changes. An example of such business unit is alliance function.

Yet, theoretically, the basic argument is that as dynamism increases the need for dynamic capabilities increases due to the need for change (Helfat and Winter, 2011). During periods of high environmental dynamism, firms need to access knowledge externally in order to reduce uncertainty about the environment. Through alliances, firms acquire information about new products and trends in the market. Therefore, firms that have more partnerships perform better in highly dynamic environment. Schilke (2014) in his study found that explorative (e.g. R&D) alliances perform better under moderate levels of dynamism than low levels of dynamism. Therefore, I posit:

**Hypothesis 5b:** Environmental dynamism will positively moderate the relationship between alliance management capability and sustained performance, such that the relationship should be stronger when there is high dynamism in the environment.
3.5.2 Environmental Munificence

Environmental munificence is the level of resources available in a particular environment (Dess and Beard, 1984). Environments are considered highly munificent when there is an abundance of resources and are considered to have low munificence when resources are scarce. Munificence environments enable access to critical resources otherwise not available in less munificence ones. This study is considering munificence at the macro environmental level. At this level, a low munificence environments could be characterized as highly competitive, economically deficient, and with few opportunities. Resources in the macro environment are affected by factors such as cheap labor, abundance of capital; and favorable economic and political conditions. Globally within the airline industry, regions differ in the number of customers, customer spending capacity, and willingness to pay. The level of munificence in the environment may also be impacted by government subsides, fuel prices, taxes, etc. Firms gain many advantages from operating in a highly munificent environment. First, firms could create and accumulate resource slack. Resource slack is the difference between excess resources over necessary payments (Daniel, Lohrke, Fornaciari and Turner, 2004). Slack can help firms create and accumulate funds for investing in capability development (Bourgeois, 1981; Helfat et al., 2007). These capabilities, such as a resource planning capability, in turn could enable the exploitation of opportunities. Secondly, environmental munificence can affect decision-making (Castrogiovanni, 1999) such as to encourage management to exploit opportunities and it could create a situation in which managers have more opportunities from which to choose. Third, munificent environments allow firms to invest in building new capabilities and to strengthen existing ones (Sirmon et al., 2010). All of this helps firms grow and survive (Aldrich and Reuf, 2006; Radolph and Dess, 1984).
When there is munificence in the environment, the demand for products and services becomes higher which can impact the evolutionary fitness of firms. Firms in a munificent environment could “have a good life and live comfortably” (Helfat et al., 2007). It is even better when firms have dual-purpose capabilities that can turn into operational capabilities that seize the prolific opportunities that exist in such markets. Due to resource planning capability having dual-purposes—acting operationally at times and dynamically at other times. In highly munificence environment there be less need for resource reconfiguration. As such, resource planning will act more like an operational capability. Therefore, resource planning capability should have better alignment with a high munificence environment than a low munificence one. This alignment leads to evolutionary fitness. Formally stated,

*Hypothesis 6a: Environmental munificence will positively moderate the relationship between a firm’s resource planning capability and sustained performance, such that the relationship should be stronger when there is high munificence in the environment.*

However, some dynamic capabilities are more valuable in less munificent environments. For example, capabilities that are geared more towards exploration such as R&D, and alliance and acquisition capabilities enable firms to search for new opportunities externally when faced with environmental pressures (Levinthal and Warglien, 1999). A less munificence environment causes uncertainty and interdependencies, causing top management to rely on alliances as way to reduce uncertainty about future opportunities (Pfeffer and Salancik, 1978, Powell, 1990). Less munificence increases the level of competitive intensity between firms making it harder to access critical resources (Powell, 1990). In the face of increased competition, alliances could be used as a strategy to gain access to critical and complementary resources from the external environment (Hillman et al., 2009). In addition, alliances in less munificent environments are a signal of strength
as they are a source of legitimacy and a beneficial marketing tool especially for younger firms. Park and Mezias (2005) found the munificence negatively moderates the relationship between alliances and abnormal stock returns. Further, the presence of an alliance capability when environments are hostile (less munificence) realigns internal operations to help firms adapt to the environment and sustain fitness. Therefore,

**Hypothesis 6b: Environmental munificence will negatively moderate the relationship between alliance management capability and sustained performance, such that the relationship should be stronger when there is low munificence in the environment.**

### 3.6 Conceptual Model

The overarching theoretical framework is the dynamic capability perspective. There are two dynamic capabilities: resource planning capability and alliance management capability. Both capabilities are processes that have inputs and expected outputs. A resource planning capability that includes all the inputs to the capability will have an operational level output that potentially has an effect on firm performance and evolutionary fitness (H1). On the other hand, alliance management capability is influenced by an alliance orientation that initiates and influences the inputs of the alliance management capability process (H2). Then, the inputs of the alliance capability process that includes business level alliance routines and processes will lead to an alliance operational outcome that could potentially affect firm fitness, which is operationally measured by sustained performance (H3). The interaction of the two capabilities influence sustained performance and firm fitness (H4). The relationship between the two capabilities and firm level outcomes are moderated by two environmental factors, dynamism and munificence (H5 and H6). Below I present the conceptual Model:
Figure 3.2 Conceptual Model
CHAPTER 4

METHODS

In this chapter I describe the empirical methods utilized to test hypotheses developed in chapter 3. First, I present the measurement model. Second, I describe data sources, sample and econometric techniques used in the study. I then list study variables and describe measurement for each variable.

4.1 Measurement Model

The below model (Figure 4.1) is a preview of variables discussed in this section. It also shows the predicted relationships between the variables.

**Figure 4.1 Measurement Model**
4.2 Sample and Data Sources

The objective of this dissertation is to understand dynamic capabilities and their underlying processes that affect firm level outcomes. Traditionally, dynamic capabilities have been tested in highly dynamic environments (e.g. high technology industry). However, moderately dynamic environments are equally important (Eisenhardt and Martin, 2000; Helfat and Winter, 2011). The airline industry is a perfect setting to test capabilities over time, specifically resource planning capability and alliance management capability, because the airline industry is composed of many organization-wide capabilities concerned with the goal of transferring passengers and goods from one point to another. As argued in the hypotheses development section, in asset intensive industries, there are two important capabilities, namely, resource planning capability and alliance management capability. These types of studies that include change processes often require a longitudinal design (Meyer et al., 1993). Thus, theory is tested using longitudinal panel data from the airline industry in the period from 2003-2014. The sample includes firms from the global airline industry. The airline industry is categorized into 1) passenger, cargo and leisure airlines, and 2) international and domestic airlines. For this study, I chose international passenger airlines.

The longitudinal panel data is compiled from different sources. Data on financial and operational performance come from IATA World Air Transport Statistic (WATS-58). WATS-58 also includes fleet and employees data that wasn’t included in older series of the data. Data on alliances formed were gathered from Airline Business magazine, which conducts annual surveys on the alliance activity in the industry, including equity alliances. Detailed data on company profiles, daily routes and alliance membership were gathered from websites such as Flightglobal.com/dashboard (Flightglobal) and centreforaviation.com (CAPA). The sample
consists of approximately 132 airlines with complete data; this translates into approximately 1500 firm-year observations.

4.3 Estimated Econometric Techniques

The hypothesized model will be tested by applying two econometrics techniques. A Stochastic Frontier Estimation (SFE) is used to measure capability. SFE has been used extensively in the Economics literature and has recently found its way to strategy research. In particular, it is used to capture performance at the capability level (e.g. Vandie and Zaheer, 2014; Mahmood, Zhu and Zajac, 2011). The model enables researchers to examine how well a capability performs across firms. The advantage of this technique is that it treats a capability as a process by incorporating inputs and outputs of capabilities. To test hypotheses regarding the dependent variable of interest, I used random effect panel estimation model is employed. Usually the choice between fixed or random effect models may depend on the results of a Hausman test (Hausman, 1978). However, in this case the capabilities’ measures are time invariant which constrain the use of fixed effect and entails random effect models. These models are tested using STATA 14 statistical software.

4.4 Variables

4.4.1 Dependent Variable

*Sustained Performance.* I used income from operation for 12 years period as a measure of sustained performance. Sustained performance is a firm level outcome that measures the quality or performance of the firm’s dynamic capabilities. Lower sustained performance indicates that the firm’s dynamic capabilities are not creating resource configurations that are maintaining ‘fit’ with changes in the environment (Helfat et al., 2007)
4.4.2 Independent Variables

There are two main effects variables, resource planning capability and alliance management capability. Before testing their effect on the dependent variable, their inner performance need to be assessed (Helfat et al., 2007). Following Dutta et al. (2005); Mahmood et al. (2011); Vandaie and Zaheer, (2014), I use stochastic frontier estimator to test the performance of the capabilities at the capability level. SFE is suitable for several reasons. First, it depicts the stochastic nature of capability performance (Nelson and Winter, 1982). Second, it compares firms against the firm with the best practice of the capability (Eisenhardt and Martin, 2000). Third, it overcomes the limitation of measuring either inputs or outputs of a capability alone (Armstrong and Shimizu, 2007). Thus, it has the advantage of capturing the capabilities process of transforming inputs into outputs. Finally but not least, it has the ability to depict the optimal feasible production outcome from any given input by any firm in the sample.\(^5\) As such, several firms may achieve the optimal performance with a different set of inputs. The capability may take a score from zero to 1. The 1 score is adjusted to the best practice firm and does not necessitates full maximum output. Figure 1 below shows the efficient frontier curve:

\(^5\) It calculates a best feasible outcome from the input and subtracts the actual performance. The difference is the inefficiency of the capability.
Figure 4.2 Stochastic Frontier Curve

Note: Figure is adopted from Mahmood et al. (2011), Firm A is operating at optimal output, while Firm B is underperforming.

*Resource Planning Capability.* The goal of the resource planning capability is to find the optimal configuration of resources and capabilities. It is defined as the capacity to effectively and efficiently offer an extensive choice of routes within the airline industry (Delfmann, 2005). This involves managing many resources and capabilities related to the capability to manage a network of routes. The capabilities involve the processes that control the flow of the aircrafts and passengers. Airlines differ in the way they manage their networks. Thus, there is heterogeneity between airlines in performing the capability. First, they differ in the collection of resources. Some airlines have newer and more recently updated fleets than others. The capacity to make strategic decisions in assigning fleet and allocating resources are an important source of heterogeneity as well. However, the goal of this capability is the same across airlines, which is to optimize capacity utilization. Below are inputs to measure the technical efficiency of resource planning capability in airline industry, which include fleet, labor (e.g. pilots and crew members) and routes.

Inputs to resource planning capability:
Below I have listed the inputs for the resource planning capability which include resources that resource planning managers continuously configure and reconfigure.

*Labor*- Labor is measured as the total number of pilot and crewmembers from 2003 to 2014 (Good, Röller and Sickles, 1995).

*Fleet*- Fleet is the change in total number of aircrafts multiplied by their weight from 2003 to 2014. I split the aircraft owned by airlines in into three categories based on their seating capacity (Min and Mitsuhashi, 2012). The first category consists of aircrafts that have 89 seats or less coded as 1, the second have a seating capacity between 90 and 174 seats coded as 2, and the last category has large aircrafts with 175 seats or more coded as 3. The justification for giving higher weights to larger aircrafts because they are the ones used mostly for international routes, which are more profitable and certainly carrying more passengers. I then multiplied the number for each firm in each category by the weights.

*Routes*- For any route, firms need to allocate fleet and labor to service that route. Given that firms in the sample all serve international routes, I measure it as the number of international routes from 2003 to 2014 to be able to compare firms on an equal footing (Lazzarini, 2007).

Hence, these are inputs of resource planning capability function:

\[ \text{Resource Planning Capability}_{it} = f(\text{Labor}, \text{Fleet}, \text{Routes}, \text{Controls}) + \varepsilon_{it} \]  

[Equation 1]

Output of resource planning capability:

*Capacity Utilization*- Capacity utilization in airlines is a measure of operational performance and is operationalized as, the percentage of occupied seats to total seats available. Thus, similar to previous studies (e.g. Lazzarini, 2007), I use passenger load factor on international routes as a proxy.
for capacity utilization, it is considered as measure of operational performance. It is basically the number of passengers carried internationally multiplied by distance (RPK) divided by available seats multiplied by distance (ASK). Optimal capacity is a result of best resource reconfiguration of various inputs (e.g. pilots, planes and routes). Thus, capacity utilization is a good proxy for resource planning capability because it shows how well the firm is able to configure resources (e.g. labor and fleet) to achieve the best outcome.

Hence, the Random effect time decay SFE model is specified as,

\[ \ln (CU) = \beta_0 + \beta_1 \ln (\text{Labor}) + \beta_2 \ln (\text{Fleet}) + \beta_3 \ln (\text{Routes}) v_{it} - S u_{it} \]  

[Equation 2]

I added S to the equation to account for time decay model. S = +1 for a production model and -1 for a cost model.

**Alliance Management Capability.** There are three primary types of alliances (cooperative agreements) in the airline industry: 1) Non-equity alliances, such as codeshare agreements between airlines where the customers of an airline can reserve a seat on a partner’s plane, 2) equity alliances, where one firm owns a percentage of another or two firms own equity in each other, 3) joint ventures where two or more firms create a new legal entity, a third firm. In terms of measuring alliance capability, previous literature used a composite measure with formative variables (e.g. experience and diversity) leading to an overall latent variable (Wassmer, 2010), I measure alliance management capability using SFE with these formative measures, lower level capabilities, serving as the input in the model. This is more suitable because 1) it enables testing of the technical efficiency (quality) of the alliance capability, 2) it captures the heterogeneity of firms in terms of their ability to perform the capability and 3) it captures the interconnectedness between the input
variables in addition to each variable individually. Below are the inputs for the alliance production function:

Inputs of alliance management capability:

Alliance experience captures the extent to which a firm learn from cooperation agreements with other firms. Alliance experience is divided into two inputs, total non-equity alliances and total equity alliance.

**Total non-equity alliances** - Non-equity alliances are divided into two categories: the first is less complex codeshare agreements between two airlines counted as 1 for each agreement. The measure reflects the dyadic nature of the agreement. For example, if firm A and firm B have a codeshare agreement; it will be counted as 1 for firm A and 1 for firm B. To move away from the simple linear alliance count, the measure reflects the temporal effect because the scores are cumulative (e.g. Rothaermel and Deeds, 2006). The second category includes more complex joint operation agreements, which include joint sales and marketing, etc., counted as (3) for each joint operations between two airlines. They are counted as (3) because these joint operations come in packages usually involve two or more of specialized agreements such as frequent flyer programs, baggage handling, and sharing landing slots and gates in airports. These agreements require higher resource involvement and more complex than code share agreements.

**Total equity alliance** - Following Jiang, Tao and Santoro. (2010), equity alliances are coded as follows: minor equity share up to 20 percent as (2), substantial equity shares of 21–49 percent (3), equal equity shares of 50 percent (4), major equity shares of 51–79 percent (5), and dominant equity shares of 80+ percent (6). Thus, total equity alliance is the cumulative number of equity alliances and the weighted average of strength of these equity involvements.
Alliance Diversity- Firms have diverse types of alliances with different degrees of complexity (Rhoades and Lush, 1997). For example, equity alliances are more complex than none-equity alliances (Sampson, 2005). Following Jiang et al. (2010), I adopt Blau Index of Variability (Blau, 1977) to portfolio diversity (e.g. Powell et al., 1996; Sarkar et al., 2009; Jiang et al., 2010). This index is used to measure heterogeneity of categorical variables, where for any given diversity variable: \( D = 1 - \sum p_i^2 \) where \( D \) represents the degree of diversity, \( p \) represents the proportion in a given category, and \( i \) is the number of different categories. The variables range from 0 (all agreements are of similar types) to 1 (all agreement are of different types).

Output of alliance management capability:

Revenue from Operation- The main goal of alliances is to grow business operations through partnerships and thus contributing to revenues. Revenue from operation is appropriate because it captures the added value from alliances.

Hence, the Random effect time decay stochastic frontier estimation is specified as

\[
\ln (\text{Rev}) = \beta_0 + \beta_1 \ln (\text{Nonequity}) + \beta_2 \ln (\text{Equity}) + \beta_3 \ln (\text{Diversity}) + \nu_{it} - \nu_{it} \quad [\text{Equation 3}]
\]

Alliance orientation. Alliance orientation measures corporate executives’ emphasis and attention to alliances which lead to alliance capability creation and development. I use content analysis using the LIWC2015 program (Short, Broberg, Cogliser and Brigham, 2009a) to count the number of times alliances were mention in the annual reports as a proxy for how important alliances are in the eyes of executives of the firm. I used a mix of deductive and inductive approaches to create a word list (Short et al., 2009a). I first created a list deductively from the definition of alliances. Then, I let the program find words from the annual reports of airlines to induct more words to the list. The approach was used in studies testing dominant logic, and long-term orientation of family
firms (e.g. Short, Payne, Brigham, Lumpkin and Broberg, 2009b). The new words are context specific; therefore, the new list was validated by four expert judges from the airline industry. The word list includes words such as mergers, a term which in the academic world is separate from alliances. However, in the airline industry, two firms might merge but have had totally separate operations. They just happen to have the same owner. For example, Air France and KLM merged in 2004 but have totally separate operation until the present time and have “never totally merged”. Therefore, the expert judges in the airline industry considered mergers with separate operations as part of an overall alliance strategy. For the list of alliance orientation words see Appendix A.

4.4.3 Moderators

*Environmental dynamism.* Environmental dynamism is the unpredictability in the environment (Schilke, 2014). Previous studies used Dess and Bread’s Items: 1) Instability in sales, 2) instability in employment, 3) instability of value added, 4) instability of price-cost margin (e.g. Catrogianni, 2002). Some studies used only one or two items from the above list. For example, Lin, Yang and Arya (2009) used only the unpredictability of sales item as a measure of dynamism. My measure is similar and distinct from Dess and Beard’s (1984). It is similar in that I use the same procedure in taking the standard error of the regression slope coefficient and dividing by the mean value. Dess and Beard’s measure of dynamism is at the industry level and could not be exactly translated when studying a single industry. Therefore, I adopt Miller, Ogilvie, and Glick (2006) suggestion that dynamism could be studied at different levels. Specifically, I study fluctuation (instability) in the environment using jet fuel prices because airline depends heavily on fuel to operate. Fuel cost is expected to affect the performance of airlines directly through operating cost or indirectly through lower demand. High fluctuations in oil prices would mean great uncertainty for airlines. If firms are hedging fuel prices, then they are basically reducing the effect
of dynamism. I measure dynamism in the airline industry by regressing jet fuel cost for each airline on year dummies from 2003 to 2014 and then I take the standard error for year dummies and divide it by the mean of oil prices for each year. This measure is similar to Dess and Beard’s instability measures with accounting for heterogeneity between firms in managing fuel cost.

*Environmental Munificent.* Dess and Beard (1984) used five items to compare manufacturing industries in terms of their level of munificence: 1) growth in sales, 2) growth in employment, 3) growth in value added, and 4) Growth price-cost margin, and 5) growth in the number of establishments. The rate of growth of these items was divided by the mean of the dependent variable over a 10 year period. Castrogiovanni (2002) used the same items as above except for number of establishments. He found that munificence in industries tends to decrease over time; as a result, firms in new industries enjoy higher munificence than firms in established industries. Following previous studies (e.g. Dess and Beard, 1984; Castrogiovanni, 2002) researchers studied munificence in a diverse set of environmental settings, such as countries (e.g. Wan and Hoskisson, 2003). Wan and Hoskisson (2003) categorized countries into low munificent countries and high munificent countries based on economic and political factors. Similarly, I categorize countries into ten regions: Asia, Southwest Pacific, East Europe, West Europe, North America, Central America, South America, Middle East, North Africa and South Africa. Then, I calculate the GDP for each region to arrive at GDP per region as a measure of munificence. This measure of munificence captures the level of endowment associated with each region. In a post hoc analysis I used growth in RPK per region as an alternative measure. Growth in RPK per region captures the percentage annual increase in traffic per region, which is more consistent with Dess and Beard (1984) measures of growth.
4.4.4 Control Variables

I control for variables that could affect the dependent variable (sustained growth in revenue) and potentially cause confounding effects. At the country level, I use GDP per capita to control for consumer spending because it could have an affect firm performance. Further, it could have an effect on the level of munificence in the task environment.

GDP per capita=government spending + gross investment + private consumption + (exports-imports) ÷ population                  \[\text{[Equation 4]}\]

At the firm level, I control for Firm Age as firm age could have an effect on firm performance. Finally, I include dummy variables for Year effects 2003-2013. Table 4.1 below presents an overview of the variables and measures of the study.

Table 4.1. Variables and Measures

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Description</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Performance</td>
<td>I used income from operation for 12 years period as a measure of sustained performance</td>
<td></td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alliance Orientation</td>
<td>Number of times alliances were mentioned in annual reports for airlines.</td>
<td>Content Analysis using a word list that represent alliances in the airline industry.</td>
</tr>
<tr>
<td>Alliance Management Capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input 1</td>
<td>Total number of non-equity alliances</td>
<td>Non-equity alliances are divided into two categories: the first in less complex codeshare agreement between two airlines counted as 1 for each agreement, the second the is more complex joint operation agreements, which include joint sales and</td>
</tr>
<tr>
<td>Input 2</td>
<td>Total equity alliances</td>
<td>Total number of equity alliances multiplied by their complexity.</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Input 3</td>
<td>Alliance Diversity</td>
<td>The extent to which a firm a diverse portfolio of alliance types.</td>
</tr>
<tr>
<td>Output</td>
<td>Revenue from Operations</td>
<td>Revenue from operation captures the added value from alliances.</td>
</tr>
<tr>
<td>Resource Planning Capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input 1</td>
<td>Labor</td>
<td>Total number of pilots and crew members, whom represent labor directly involved with operations</td>
</tr>
<tr>
<td>Input 2</td>
<td>Routes</td>
<td>the number of international routes</td>
</tr>
<tr>
<td>Input 4</td>
<td>Fleet</td>
<td>The type and number of aircrafts</td>
</tr>
<tr>
<td>Output</td>
<td>Capacity Utilization Load Factor)%</td>
<td>The number of passengers carried internationally multiplied by distance divided by available seats multiplied by distance. A measure of capacity utilization</td>
</tr>
<tr>
<td><strong>Moderating Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Dynamism</td>
<td>I measure dynamism in the environment using past fluctuations in jet fuel prices</td>
<td>Take jet fuel cost over 12 year and then take the standard error of the regression slope and divide it by the mean of oil prices per year.</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Environmental Munificent</td>
<td>The level of munificence in each region.</td>
<td>I categorize into six regions: Africa, Asia Pacific, Europe, Latin America, Middle East and North Africa. Level of munificence, based on growth in Revenue Per Passenger Kilometers (RPK) and growth in GDP per region. Post Hoc analysis; based on growth in Revenue Per Passenger Kilometers (RPK).</td>
</tr>
</tbody>
</table>
CHAPTER 5

RESULTS

Table 5.1 below reports summary statistics for study variables. Scores for the dependent variable income from operation ranged from – $2.6 billion to $10.4 billion with a mean of $97.7 million. Table 5.2 reports correlations between study variables. It appears that there is a high correlation between firm age and alliance capability, which could suggest the older firms are at advantage in term of establishing and maintaining an alliance capability by being longer in the market. Rationally, dynamism should have very low correlations with study variables except the dependent variable. The reason is that dynamism by definition is unpredictability in the market that is not and should not be associated with normal factors and operations.

Table 5.1 Summary Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income from Operations</td>
<td>1,260</td>
<td>97,692</td>
<td>530,421</td>
<td>-2,609,435</td>
<td>10,400,000</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Planning Capability (RPC)</td>
<td>1,596</td>
<td>0.203</td>
<td>0.054</td>
<td>0.025</td>
<td>0.340</td>
</tr>
<tr>
<td>Alliance Management Capability (AMC)</td>
<td>1,596</td>
<td>2.33</td>
<td>0.887</td>
<td>0.145</td>
<td>6.27</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.2. Correlation Matrix

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Income Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Resource Capability</td>
<td>0.06*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Alliance Capability</td>
<td>0.20* 0.11*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Dynamism</td>
<td>-0.08* 0.00 -0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Munificence</td>
<td>0.08* -0.039 0.01 0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Firm Age</td>
<td>-0.05 -0.03 0.15* -0.10* -0.07*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 GDP/cap</td>
<td>-0.01 0.01 -0.03 0.00 0.06* 0.07*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P< .05
a. Pairwise,

5.2 Regression Results

A random effect panel estimation was perform to study the effect of dynamic capabilities on income from operations. A random effect estimation is more appropriate than fixed effect estimation because resource planning capability and alliance management capability are time-invariant variables, they vary between firms rather than within firm, overtime. Because of the panel nature of the data, a Lagrange Multiplier (LM) test was applied to justify a panel estimation (e.g. fixed or random effect) rather than pooled OLS estimation. The test detects unabsorbed heterogeneity in the data, which justifies a GLS random effect estimation. To correct for heteroskedasticity, I used robust standardized coefficients.

Table 5.3 below reports results for the hypotheses that examines the effect of resource planning capability, alliance management capability, their interaction, and the moderating role of
environmental dynamism and munificence on income from operations. In Hypothesis 1, I proposed that resource planning will be positively associated with sustained performance. Model 1 shows that there is a positive and significant relationship between resource planning capability and income from operations ($\beta = 0.06; \ p < .05$). Thus, hypothesis 1 is supported. In Hypothesis 3, I proposed that alliance management capability will be positively associated with sustained performance. Model 2 shows that there is a positive and significant relationship between alliance management capability and income from operation ($\beta = 0.20; \ p < .05$). Thus, hypothesis 3 is supported.

Model 3 introduces the interaction between the two capabilities, resource planning and alliance management. In Hypothesis 4, I stated that the interaction effect of the two capability will be positively associated with sustained performance. This Hypothesis is not supported ($\beta = 0.01; \ p > .05$).

Model 4 introduces the moderating effect of environmental dynamism on the relationship between resource planning capability and sustained performance and the relationship between alliance management capability and sustained performance, respectively. In Hypothesis 5a, I predicted that environmental dynamism will positively moderate the relationship between resource planning capability and sustained performance. The results reveal a positively significant interaction effect ($\text{RPC X Dynamism}, \ \beta = 0.44; \ p < .05$). Therefore, dynamism appear to positively moderate the relationship between resource planning and sustained performance. In Hypothesis 5b, I predicted that environmental dynamism will positively moderate between alliance management capability and sustained performance. The results reveal a significant effect but in opposite direction ($\text{AMC X Dynamism}, \ \beta = -0.38; \ p < .05$). Therefore, dynamism appear to
negatively moderate the relationship between alliance management capability and sustained performance.

Model 5 adds the moderating effect of environmental munificence on the relationship between resource planning capability and sustained performance and the relationship between alliance management capability and sustained performance, respectively. In Hypothesis 6a, I predicted that environmental munificence will positively moderate the relationship between resource planning capability and sustained performance. Therefore, munificence appear to negatively moderate the relationship between resource planning capability and sustained performance. The results reveal a significant effect but in opposite direction (RPC X Munificence, $\beta = -0.29$; $p < .05$). In Hypothesis 6a, I predicted that environmental munificence will positively moderate the relationship between resource planning capability and sustained performance. In Hypothesis 6b, I predicted that environmental munificence will negatively moderate the relationship between alliance management capability and sustained performance. Similarly, the results reveal a significant effect but in opposite direction (AMC X Munificence, $\beta = 0.21$; $p < .05$). Therefore, munificence appears to positively moderate the relationship between alliance management capability and sustained performance.

Table 5.3. Results GLS Random Effect Model

<table>
<thead>
<tr>
<th>Income from Operation</th>
<th>Model 1 (H1)</th>
<th>Model 2 (H3)</th>
<th>Model 3 (H4)</th>
<th>Model 4 (H5) a, b</th>
<th>Model 5 (H6) a, b</th>
<th>Model 6 (Full)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Age</td>
<td>-0.038</td>
<td>-0.072*</td>
<td>-0.071*</td>
<td>-0.094*</td>
<td>-0.064*</td>
<td>-0.084*</td>
</tr>
<tr>
<td>GDP/cap</td>
<td>-0.016</td>
<td>-0.001</td>
<td>-0.002</td>
<td>-0.006</td>
<td>-0.006</td>
<td>-0.009</td>
</tr>
<tr>
<td>Resource Planning</td>
<td>0.061*</td>
<td>0.028</td>
<td>-0.197†</td>
<td>0.178**</td>
<td>-0.041</td>
<td></td>
</tr>
<tr>
<td>Capability (RPC)</td>
<td>(0.034)</td>
<td>(0.033)</td>
<td>(0.032)</td>
<td>(0.035)</td>
<td>(0.032)</td>
<td>(0.034)</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.018)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.018)</td>
<td>(0.017)</td>
</tr>
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</table>

83
<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alliance Management</td>
<td>0.204**</td>
<td>0.198**</td>
<td>0.453**</td>
<td>0.078</td>
<td>0.316*</td>
</tr>
<tr>
<td>Capability (AMC)</td>
<td>(0.050)</td>
<td>(0.049)</td>
<td>(0.160)</td>
<td>(0.058)</td>
<td>(0.134)</td>
</tr>
<tr>
<td>RPC X AMC</td>
<td>0.011</td>
<td></td>
<td></td>
<td>0.022</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
<td></td>
<td></td>
<td>(0.040)</td>
<td></td>
</tr>
<tr>
<td>RPC X Dynamism</td>
<td>0.437*</td>
<td></td>
<td></td>
<td>0.448*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.199)</td>
<td></td>
<td></td>
<td>(0.201)</td>
<td></td>
</tr>
<tr>
<td>AMC X Dynamism</td>
<td>-0.383*</td>
<td></td>
<td></td>
<td>-0.397*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.198)</td>
<td></td>
<td></td>
<td>(0.201)</td>
<td></td>
</tr>
<tr>
<td>RPC X Munificence</td>
<td>-0.287*</td>
<td></td>
<td></td>
<td>-0.323*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.112)</td>
<td></td>
<td></td>
<td>(0.125)</td>
<td></td>
</tr>
<tr>
<td>AMC X Munificence</td>
<td>0.214*</td>
<td></td>
<td></td>
<td>0.253*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.097)</td>
<td></td>
<td></td>
<td>(0.116)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.010</td>
<td>-0.019</td>
<td>-0.022</td>
<td>-0.034</td>
<td>-0.018</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.036)</td>
<td>(0.036)</td>
<td>(0.034)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>Wald chi-square</td>
<td>6.47†</td>
<td>18.45**</td>
<td>21.48**</td>
<td>22.32**</td>
<td>23.92**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29.29**</td>
</tr>
<tr>
<td>N</td>
<td>1244</td>
<td>1244</td>
<td>1244</td>
<td>1244</td>
<td>1244</td>
</tr>
</tbody>
</table>

**Note:** **p < 0.01, *p < 0.05, †p < 0.1; Robust standard errors between parentheses

Model 6 (the full model) reports all variables and all four interactions were significant. Interaction graphs can be found in Appendix B.

### 5.3 Panel Stochastic Frontier Estimation Results

I tested the performance of dynamic capabilities using panel stochastic frontier estimator. The model takes into the account time decaying variables. The result of the stochastic frontier to measure resource planning capability and alliance management capability is shown in table 5.4 and 5.5 below.
### Table 5.4 SFE
Results for Resource Planning Capability

<table>
<thead>
<tr>
<th>Variables</th>
<th>ln(Capacity Utilization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln (Labor)</td>
<td>0.044**</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
</tr>
<tr>
<td>ln (Fleet)</td>
<td>-0.022**</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
</tr>
<tr>
<td>ln (Routes)</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.390**</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
</tr>
</tbody>
</table>

Log-Likelihood 1715.5**

Note: ** significance at 1% level  
Standard errors are in parentheses;  
The log-likelihood function is used to test the overall significance of the model.

### Table 5.5 SFE
Results for Alliance Management Capability

<table>
<thead>
<tr>
<th>Variables</th>
<th>ln(Capacity Utilization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln (equity alliances)</td>
<td>0.247**</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
</tr>
<tr>
<td>ln (non-equity)</td>
<td>0.275**</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
</tr>
<tr>
<td>ln (diversity)</td>
<td>-0.275**</td>
</tr>
<tr>
<td></td>
<td>(0.076)</td>
</tr>
<tr>
<td>Constant</td>
<td>15.853**</td>
</tr>
<tr>
<td></td>
<td>(0.280)</td>
</tr>
</tbody>
</table>

Log-Likelihood -159.95**

Note: ** significance at 1% level  
Standard errors are in parentheses;  
The log-likelihood function is used to test the overall significance of the model.
5.4 Alliance Orientation Results

Table 5.6 below reports the results for Hypothesis 2, which posit that alliance orientation will be an antecedent to an alliance capability and associated positively with each component of an alliance capability as well as the capability as a whole. Thus, I test the main effect of alliance orientation on four dependent variables using multiple regressions with each regression having a distinct dependent variable. The first regression tests the effect of alliance orientation on non-equity alliances. The results show that alliance orientation has a positive and significant effect on non-equity alliances ($\beta = 14.2; p < .05$). The second regression tests the effect of alliance orientation on equity alliances. The results show that alliance orientation has a positive and significant effect on equity alliances ($\beta = 2.4; p < .05$). The third regression tests the effect of alliance orientation on alliance diversity. The results reveal that alliance orientation has a positive and significant effect on alliance diversity ($\beta = 0.22; p < .05$). Therefore, alliance orientation has significant and positive effect on each component of alliance capability.

The fourth regression tests the effect of alliance orientation on the overall alliance capability. The results reveal that alliance orientation has a positive and significant effect on alliance capability ($\beta = 0.47; p < .05$). The final regression tests the direct effect of alliance orientation on income from operation. The finding reveal that there is no relationship between alliance orientation and income from operation ($\beta = 0.13; p > .05$). These findings suggest that alliance orientation does not have a direct relationship with income from operation but rather could have an indirect relationship through alliance management capability. Put differently, the relationship between alliance orientation and sustained performance could be a full mediated by alliance capability.
Table 5.6 Alliance Orientation Results for Hypothesis 2

<table>
<thead>
<tr>
<th>Alliance Orientation</th>
<th>Non-equity Alliances</th>
<th>Equity Alliance</th>
<th>Alliance Diversity</th>
<th>Alliance Capability</th>
<th>Income from Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>14.2*</td>
<td>2.42*</td>
<td>0.22*</td>
<td>0.47*</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>(3.59)</td>
<td>(1.14)</td>
<td>(0.07)</td>
<td>(0.10)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Constant</td>
<td>4.32*</td>
<td>2.18*</td>
<td>0.14</td>
<td>-2.45</td>
<td>-0.00</td>
</tr>
<tr>
<td></td>
<td>(1.92)</td>
<td>(0.75)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>N</td>
<td>910</td>
<td>910</td>
<td>900</td>
<td>910</td>
<td>883</td>
</tr>
</tbody>
</table>

Note: Robust standard error are reported between parentheses
*P < 0.05

5.5 Post Hoc Analysis

I performed a post hoc analysis, as robustness check, with an alternative measure for the dependent variable income from operation and instead I used income from operation over total assets (ROA). In the analysis I also changed the measure for munificence from GDP per region to Growth in RPK per region. The results random effect estimation did change from the original analysis. Resource planning is no longer significant while alliance capability remained significant. Interestingly, the new results reveal that both dynamism and munificence strengthens the relationship between resource planning and sustained performance, this in line with hypotheses, as such, supports H5a and H6a. Note that H6a was not supported in original analysis. The new analysis also reveal that both dynamism and munificence weakens the relationship between alliance management and sustained performance. This is opposite to H5b but supports H6b.
CHAPTER 6
DISCUSSION

6.1 Dynamic Capabilities

The purpose of this dissertation was 1) to study dynamic capabilities in an asset intensive industry context that, even though at the beginnings of capability research was the context in which the first theories were developed (e.g. Helfat, 1997), has since received little attention particularly since the introduction of the concept of dynamic capabilities, 2) to study the interplay of more than one dynamic capability in the same context. Following Helfat and Winter (2011), I categorize capabilities as being either operational, dual-purpose, or dynamic capabilities. In the context of the study resource planning capability is characterized as a dual-purpose and alliance management capability is characterized as a dynamic capability. The empirical results of the study show that both capabilities were associated positively to a sustained performance “evolutionary fitness”, measured as income from operation over a span of twelve years. These findings support Helfat et al. (2007) proposition that dynamic capabilities lead to evolutionary fitness. I do however observe a stronger positive result from alliance capability, which could suggest that dynamic capabilities are more important than dual purpose capabilities to attaining evolutionary fitness.

Regarding the important question of how the interplay between the two capabilities is manifested and whether they are intertwined in their operations. Extant capabilities theory suggests that firms could have multiple capabilities operating simultaneously within its boundaries. Little is known about how these capabilities interact. From the limited research, it is suggested that the
capabilities interact and this interaction produces a positive (synergistic) results (e.g. Zheng et al., 2010). However, in this case of this study the does not interact to produce a positive synergistic effect. The results show that the interaction between the two capabilities is not significant. This implies that the two capabilities are more isolated than otherwise expected. Perhaps this could be related to the nature of asset intensive industries which separates the capabilities that are associated with resource reconfiguration of the huge fixed cost (e.g. airplanes, routes, etc.) from capabilities associated with resource reconfiguration of variable cost (e.g. services). Resource planning capability could be contributing to performance through cost cutting (efficiency), while alliances management is contributing through the added value from alliances that directly affect revenue. As such, each capability serves a different purpose for the firm and contributes to performance distinctively, with non-significant overlap which circles back to Helfat and Winter’s (2011) theorizing about the distinct nature of different types of dynamic capabilities. They differ in the way they are created, management and the purposes they serve (Helfat and Peteraf, 2003). These differences are further observed when environmental conditions are controlled for as explained in the next section.

6.2 Environmental Conditions

The results show a rich interplay between the dynamic capabilities and the two environmental factors studied in this dissertation, dynamism and munificence. Table 6.1 below show a summary of the results.

<table>
<thead>
<tr>
<th>Main Effects</th>
<th>Significance</th>
<th>Direction</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 Resource Planning Capability &amp; Firm Performance</td>
<td>Supported</td>
<td>Same</td>
<td>+</td>
</tr>
<tr>
<td>$H2$</td>
<td>Alliance Orientation &amp; Alliance Management Capability</td>
<td>Supported</td>
<td>Same</td>
</tr>
<tr>
<td>$H3$</td>
<td>Alliance Management Capability &amp; Firm Performance</td>
<td>Supported</td>
<td>Same</td>
</tr>
</tbody>
</table>

### Interactions

| $H4$ | Resource Planning Capability & Alliance Planning Capability | Not Supported | = |
| $H5a$ | Resource Planning Capability & Environmental Dynamism | Supported | Same | + |
| $H5b$ | Alliance Management Capability & Environmental Dynamism | Supported | Opposite | - |
| $H6a$ | Resource Planning Capability & Environmental Munificence | Supported | Opposite | - |
| $H6b$ | Alliance Management Capability & Environmental Munificence | Supported | Opposite | + |

### 6.2.1 Environmental Dynamism

The analysis revealed interesting results. As expected, environmental dynamism strengthened the relationship between resource planning and sustained firm performance. This is in line with the theoretical argument that as the extent of market dynamism increases, so should the need for resource reconfiguration. In a low-dynamic state of the market, there will be less managerial-decision making regarding resource reconfiguration as resource planning will be more like an operational capability. That is the nature of the capability will be in the form of routines and processes, while decision-making will be about improving efficiency. As the environment becomes more dynamic, the managerial decision-making component regarding resource reconfiguration increases. As such, the need for resource planning capability, acting as a dynamic capability, increases. This assist firms in maintaining fit and sustaining performance.

Contrary to expectations, in this study, I observe that dynamism weakens the relationship between alliance capability and firm performance. This result is somewhat contradictory to resource dependence theory, which suggests that when the environment is uncertain; firms tend to
use alliances more to improve performance (Pfeffer and Salancik, 1976). The result is not so surprising given that recent studies (e.g. Schilke, 2014) in the dynamic capability literature, found a curvilinear relationship between alliance management capability and dynamism, where alliance capability works best in moderately dynamic environments. As a robustness check, I tested the interaction of the square of dynamism with alliance capability and found that dynamism still weakens the relationship between alliance capability and performance, which suggest a linear relationship. One explanation is that the normal state of the airline industry is characterized as moderately dynamic environment. Any abnormal fluctuations (increased dynamism) will weaken the relationship between alliance capability and firm performance.

### 6.2.2 Environmental Munificence

In this study and opposite to what was hypothesized, I observe that environmental munificent weakens the relationship between resource planning capability and firm performance. One explanation is that firms in munificent environments tend to slack and become less than optimal in terms of efficiency. Resource planning, acting as an operational capability, is focused on efficiency to achieve optimal resource configuration. This makes it less important in highly munificent environments where firms can accumulate slack and perform well at the same time (Bourgeois, 1981; Wan and Hoskisson, 2003). In other words, firms can perform and live comfortable without resource planning performing at optimal level.

Again, contrary to expectation, I find that environmental munificent strengthen the relationship between alliance management capability and firm performance. One explanation for this finding is that in highly munificent environments firms can explore alliance opportunities to gain access to critical and complementary resources, which in otherwise less munificent environment it is more difficult (Pfeffer and Salancik, 1976). Another explanation is that in low
munificence environments going after too many alliances has other consequences that make pursing too many problematic. This downside effect may be less salient in highly magnificence environments.

6.3 Contribution to the Literature

6.3.1 Dynamic Capability Literature

This dissertation contributes to a specific gap in the dynamic capability literature with regard to three types of capabilities suggested by Helfat and Winter (2011) in which they categorized capabilities into operational, dual-purpose and dynamic and that these types of capabilities may differ their 1) nature, 2) the way they are developed, and 3) the way they operate in distinct contexts. In asset intensive industries, a resource planning capability may appear to have an important operational dimension but at the same time it can create options for resource configurations when the environment changes. As such resource planning is characterized as a dual-purpose capability. On the other hand, alliance management capability create options for resource reconfiguration all the time, therefore, characterized as a dynamic capability.

In addition, the study demonstrated that these capabilities differed in how they responded to environmental conditions. Resource planning capability worked better when the environment becomes more dynamic while alliance management capability worked better under highly munificent environments. As such, by introducing dynamism and munificence as moderators, the study contributes by setting boundary conditions to the relationship between dynamic capabilities and firm fitness (e.g. sustained performance).

I also contribute to the dynamic capability literature by responding to the recommendation of Helfat and colleagues to test dynamic capabilities in a moderately dynamic environments, which
have been previously, for the most part, neglected. Empirically, I contribute by 1) measuring the performance of the capabilities separately first and then their effect on firm fitness operationalized as sustained firm performance.

6.3.2 Alliance Management Literature

Extant alliance research studied the impact of an alliance management capability on alliance success and little research has shown a link to firm level outcomes. The study contributes to the alliance management capability or the alliance portfolio management capability literature, by showing the alliance management capability is positively associated with firm level performance. In specific, the results showed that a high performing alliance capability is positively associated with firm fitness operationalized as sustained performance.

Recent alliance research suggested breaking up an alliance capability into its constituent parts (Schilke and Goerzen, 2010). In this study, I theorize about the different components of an alliance capability, which include experience and diversity. These components intertwine and contribute to the performance of an overall alliance capability. The results suggest a well-managed alliance capabilities, given the components of a portfolio of alliance, is a strategic tool for the firm to navigate a changing market.

6.4 Managerial Implications

The insignificant results of the interaction effect between the two capabilities may suggest that they may perform better as being separated into two isolated departments and allocating different goals and responsibilities for the heads of these departments. Further, top management should be able to identify the major capabilities in their company and be aware of the type of
industry they are operating in to better assess how to create, develop and maintain the major capabilities.

Top management in asset intensive industries should be aware that the management of a portfolio of alliances is more complex than otherwise expected. Alliances in asset intensive industries have different time horizons and are based on long-term contracts. Therefore, top management must ensure that alliances are conducted based on overall alliance strategy that is aligned with the firm’s overall strategy and not an ad hoc practice.

6.5 Future Research

This study on dynamic capabilities was conducted in a moderately dynamic environment. I echo the sentiments of Helfat and colleagues and encourage future studies on dynamic capabilities to be conducted similar moderately dynamic environments or even more stable ones such as the consumer goods industry. Future research study can similarly test more than one dynamic capability in the same context and investigate if they interact or act separately.

The literature on firm-level alliance management capability is still in the discovery phase of the different components or factors that contribute to an overall alliance management capability. Future research could benefit from using primary data collection design to enlighten the field about the different components (e.g. an alliance dedicated function) and how they contribute to the performance of the capability.

6.6 Conclusion

In this dissertation, I integrated the dynamic capability literature with the alliance management capability literature, to conduct wide range study on two dynamic capabilities in the airline industry. The results showed that the two capabilities examined in this study are positively
associated with firm fitness operationalized as sustained performance. In the context of the study, the two capabilities differed in their nature, one is a dual-purpose and one is dynamic, which may be the reason they differed in the way they respond to environmental factors.

The study of dynamic capabilities is a fascinating subject with many practical implications and offers rich opportunities for future research, this is just the tip of the iceberg in terms of research that could be conducted in this area of study. Alliance management capability could be considered a sub-field of the capability research, which acquires detailed knowledge from the alliance literature. Similarly, the alliance management capability is an interesting research area that needs further investigation especially as it relates to managing a portfolio of alliances (e.g. diversity of alliance portfolio).
REFERENCES


Collis, D. J. (1994). Research note: how valuable are organizational capabilities?. *Strategic management journal, 15*(S1), 143-152.


Makadok, R. (2003). Doing the right thing and knowing the right thing to do: Why the whole is greater than the sum of the parts. *Strategic management journal*, 24(10), 1043-1055.


## APPENDIX A

### Alliance Orientation Word List

<table>
<thead>
<tr>
<th>Affiliation</th>
<th>Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreement</td>
<td>Merger</td>
</tr>
<tr>
<td>Alliance</td>
<td>Mutual agreement</td>
</tr>
<tr>
<td>Association</td>
<td>Mutual understanding</td>
</tr>
<tr>
<td>Coalition</td>
<td>Oneworld</td>
</tr>
<tr>
<td>Codeshare</td>
<td>Partnership</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Party</td>
</tr>
<tr>
<td>Cooperation</td>
<td>Relationship</td>
</tr>
<tr>
<td>Equity alliance</td>
<td>Sponsor</td>
</tr>
<tr>
<td>Interlining</td>
<td>Skyteam</td>
</tr>
<tr>
<td>Joint operation</td>
<td>Stake</td>
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<tr>
<td>Joint venture</td>
<td>Star alliance</td>
</tr>
<tr>
<td>Member</td>
<td>Synergy</td>
</tr>
</tbody>
</table>
APPENDIX B

The Interaction between Strategic Capability and Environmental Dynamism
The Interaction between Alliance Capability and Environmental Dynamism
The Interaction between Strategic Capability and Environmental Munificence

Adjusted Predictions

Income from Operation

Low Munificence
High Munificence

Low Strategic Capability  High Strategic Capability
The Interaction between Alliance Capability and Environmental Munificence