THE RESOURCE-CAPABILITY-COMPETENCE PERSPECTIVE IN STRATEGIC MANAGEMENT: A RE-APPRAISAL OF THE EPISTEMOLOGICAL & THEORETICAL FOUNDATIONS

by

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*We also certify that written approval has been obtained for any proprietary material contained therein.
I dedicate my work to my Creator,

I hope to have started this work with sincere and pure intentions, and strive to end it similarly … that God may accept my effort, and look upon me with contentment and mercy, and that others may benefit from any measure of knowledge I have produced.
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Finally, I owe my biggest debt, my deep respect and my gratitude to my parents, who have instilled in me an insatiable hunger for knowledge, and through their actions have taught me that the best investment one can make is an investment in learning.
List of Abbreviations

RCC: Resources, capabilities and competence
RBV: Resource-based view of the firm
RB: Resource-based
DC: Dynamic capabilities
CC: Core competence
MSRP: Methodology of scientific research programs
SRP: Scientific research programs
SBU: Strategic business unit
MNC: Multinational corporation
ISV: Independent software vendor
CMM: Capability maturity model
TAT: Technical architecture team
KPI: Key process indicator
HR: Human resource
ISO: International standards organization
CT: Computed tomography
CEO: Chief executive officer

Abstract

by

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This study presents a review and re-appraisal of the epistemological and theoretical frameworks underlying an expansive body of literature that is of central importance to strategy, namely, the literature on resources, capabilities and competences (RCC). A thorough examination of epistemological and fundamental assumptions results in a structuring of the literature into three distinct schools of thought: (1) the rational-equilibrium school; (2) the behavioral-evolutionary school; and (3) the social constructionist school. The three schools are differentiated according to a set of dimensions spanning several levels of inquiry, including the epistemological, methodological and conceptual levels. In addition, the epistemological perspective employed results in an important re-interpretation of, arguably, the most important classic in the RCC field, namely the work of Edith Penrose (1959), showing that her *Theory of the growth of the firm* displayed a constructionist epistemology.

The study further proceeds to scrutinize and compare the dynamic capabilities (DC) and competence research programs and to show that they stem from two distinct schools of thought. Employing behavioral assumptions and an evolutionary economic theoretical base, the DC program is shown to focus on the dynamics of organizational capabilities, specifically as they relate to systematic adaptation by firms to environmental
changes. On the other hand, the competence program employs a constructionist epistemology and springs from a theoretical base rooted in organizational theory, Schumpeterian and Penrosian economics blended with closed systems theory. As such, it uniquely tackles the entrepreneurial dimension whereby companies actively shape their environments and create future markets. The influence of the epistemological and theoretical foundations of the programs on the progress of their core theory is traced and the differences between dynamic capabilities and competence programs are elaborated with respect to several dimensions.

The study contributes by providing a map of the RCC field that is both deep and broad, which would help researchers work through rampant terminological confusions and situate their work as well as map the progress of the field. The study further sheds light on the similarities, differences and boundaries of the DC and competence programs, and provides a new dimension with which to view Penrose’s contribution. Finally, it contributes to the ongoing debate concerning the appropriate role of economic theory and methodology in strategy research.
Chapter 1

1.1 Introduction

The current study attempts to make sense of a wide field of literature that deals with the internal resources, capabilities and competences of business organizations, henceforth termed the RCC literature, as it pertains to strategic management. This reading of the RCC literature is uniquely based on epistemological foundations and borrows from studies in the philosophy of science that examine how scientific research programs progress. Scholars have been concerned with the resources and capabilities of business organizations since the inception of strategic management as an independent sub-discipline of management. However, the past two decades have witnessed the development of several influential streams of research that place resources, capabilities and competences at the center of explanations of competitive advantage, superior performance in both the short and long run, and the structure and evolution of markets and industries. These are the research streams that constitute the RCC perspective and are the focus of this study. The current study analyzes this vast body of literature based on the epistemological foundations and the basic assumptions making up the theoretical frameworks employed by scholars. Based on these dimensions, I classify the RCC literature into three major schools of thought, each with its distinct set of epistemological and fundamental theoretical assumptions. Each school represents a unique frame or lens which aids scholars and managers in understanding the important role played by internal technical and organizational capacities. As each school provides a way of seeing, it is also a way of not seeing (Mintzberg, Ahlstrand & Lampel, 1998; Morgan, 2006). In other words, the theoretical frames employed by scholars in each school are well
equipped to tackle certain aspects of the RCC phenomena, but this also necessarily renders them blind to other important aspects. A thorough analysis of the underlying philosophical and epistemological bases, and the fundamental assumptions employed by scholars in each school help us in identifying the areas in which each school is most likely to contribute as well as the weaknesses that limit each frame. Such an understanding may be implicitly carried by some expert scholars in the field, but all too often, researchers are boxed within the confines of a particular school without giving much thought to how their work fits within the broader picture of the RCC perspective, or how its limitations may be augmented by work in other schools within the approach. This study argues that such an understanding would be of great benefit to scholars in the three schools and would facilitate scientific progress in the field. In addition, the epistemological perspective employed results in an important re-interpretation of, arguably, the most important classic in the RCC field, namely the work of Edith Penrose (1959), who is considered by most scholars to be the godmother of the field, as her *Theory of the Growth of the Firm* anticipated many of the field’s key insights. This new understanding of Penrose casts a whole new light on the extent of her foresight, and the degree to which her work is relevant for contemporary discourse in the field. Penrose’s use of a constructionist epistemological lens also links up her work with the third school of thought delineated in this study, and aids in specifying the differences in perspective among the schools.

Besides providing this synoptic view of the RCC literature and delineating the three schools of thought within, the current study proceeds to further scrutinize two strands that deal with the dynamics of firm capabilities and competences. The dynamic
capabilities (DC) and competence programs tackle the issue of how organizations intentionally bring about changes to their internal capabilities and resources to adapt to environmental changes and to stay competitive in their markets, or even to establish new markets. These two strands offer an interesting case to study as they both look at nearly the same substantive issue. However, each program springs from a distinct theoretical framework with different epistemological and basic assumptions. These characteristics provide an almost ideal situation in which the effects of the underlying epistemology and theoretical framework may be isolated and examined. I hope to show by means of a review and comparison of the main theoretical arguments of the two programs that the underlying frameworks have non-trivial consequences for the success of research programs in illuminating different aspects of the substantive issue under focus. The awareness of scholars regarding such subtle but important differences is deemed to be vital for scientific progress of the research programs in terms of both explanation and normative implications. Such understanding should also aid in dialogue across research programs as the strengths and limitations of each view are explicitly recognized.

This introductory chapter first sets the historical scene in strategy scholarship in which the RCC perspective developed. After that, the aim, scope and importance of the study are discussed. Finally, a brief description of the contents of each chapter of the study is provided.

1.2 The Strategy Context: A Historical Note

The central question in the field of strategic management and certainly the role of strategic managers revolve around the future survival, growth or viability of a business
organization. In business, to survive in the long term means to possess a product, a service, or several that find customer demand, as well as the capability to bring those products or services to the customer. The intensity of competition adds another challenge, which is that an organization must also have something unique about it, an added value exceeding that of competitors, such that its customers would choose its product / service over its competitors’. This added factor is commonly referred to as competitive advantage, and how a business organization develops sustained competitive advantage has become the Holy Grail of strategic thinking.

1.2.1 A Story of Strategy

Strategic management as an academic discipline and professional practice is a young discipline, roughly fifty years old. Strategy had been taught as a capstone course in business schools in America prior to the 1950s (Rumelt, Schendel & Teece, 1991). Towards the end of the sixties, the first texts on Business Policy, as it was then called, were written by the pioneers at the Harvard Business School. The first model of strategic management, the SWOT model, is well known to every student of management, and sits at the opening of almost every strategy text book. The initial conception of strategy was that of a rational and analytical process, in which information gathered by strategic analysts would eventually be synthesized by the senior executive of a company. Internal analysis revealed the company’s strengths (or distinctive competences) and

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1 The story of strategy presented here is a highly simplified version, and is neither accurate nor comprehensive. Nevertheless, this brief historical context aids in setting the background against which our lead actors – the ideas of the RCC perspective of strategy – will perform.

2 The two prominent texts on strategy were Business Policy: Text and Cases by Learned et al, 1965 and Kenneth Andrews’ The Concept of Corporate Strategy, 1971.

3 Distinctive competences are the early ancestors of contemporary concepts such as resources, capabilities, core competences. Learned et al (1969) define distinctive competences as those things a firm is able to perform better than others, while Selznick (1957) defines them as the ‘character’ of the organization, which includes what it is good at doing and the values it is committed to.
weaknesses, while external analysis of the environment uncovered the opportunities available and threats confronting the company. The strategy process entailed an alignment of the company’s strengths with the opportunities that present themselves.

The decade of the seventies saw the rise (and fall) of the next school of strategic thinking, in which the conception of strategy was that of a highly organized and accurate strategic planning process\(^4\). Strategic planning very soon became a heavy bureaucratic burden stifling competitiveness and responsiveness of business corporations and resulted in widespread disenchantment with the achievements of the strategy industry and academe. Strategy was revived through the contributions of the prominent economist Michael Porter, whose work on competitive strategy quickly became mainstream practice during the early to mid-eighties (Porter, 1980; 1985). Drawing primarily on the structure – conduct – performance approach in industrial organization economics, Porter’s five forces model offered strategists an ingenious tool for comprehensive analysis of industry and competitive conditions. Together with Porter’s generic strategies and value chain tools, strategy making was once again conceptualized as a rational analytical activity within a game of strategic positioning and maneuvering. The key to competitive advantage was to gain a favorable position in an industry relative to competitors, and to engage in strategic maneuvering so as to protect that position. Gaining market share was the key prescription, and protection of market share through the erection of entry barriers and the inhibition of competition were the focus of strategic practice. Parallel to Porter’s work, the PIMS studies provided empirical support for Porter’s hypotheses based on an

\(^4\) See Mintzberg (1994).
extensive database (Prahalad & Bettis, 1986). The Boston Consulting Group tools featured market share as a prominent variable in determining the attractiveness of SBU's in terms of cash flow. These approaches make up the positioning school of strategy, according to the classification by Mintzberg et al. in the Strategy Safari (1998). Yet again in the 1980s, there seemed to be a serious problem with strategy, as American companies fared poorly in the face of Japanese competition (Collis & Montgomery, 1995).

1.2.2 The Resource-Based View, Dynamic Capabilities & Core Competences

During the early to mid 1980s, when the positioning approach was dominant in strategy, a different view emerged, once more inspired by economists and economics-inclined strategy scholars. Although contributions to this new approach popped up at different places in different times, the approach crystallized under the name of the Resource-Based View (henceforth RBV) ever since Birger Wernerfelt published his paper in 1984 under the same title (Wernerfelt, 1984). This new approach was to have profound consequences for strategic management, as it presented a break with conventional wisdom at the time. The dominant view according to the positioning school attached prime importance to the structure of the industry and the nature of the competition in the firm's environment. These factors were the main determinants of a company's strategy, and thus its success or failure. Internal competences were aligned in order to fit with the requirements of the market. The key to above average profits was the ability to sustain a position in the industry while inhibiting competition. The importance of the RBV lay in the shift of focus from the outside to the inside of the firm. Instead of

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5 The Boston Consulting Group offered a prescriptive approach to strategy based on its Market Growth – Share Matrix, the Experience Curve and the Product Life Cycle model.
limiting competition, RBV scholars made the case for sustained economic rents that may accrue to idiosyncratic firm resources not uniformly accessible to all competing firms. For the economic theory of the firm, the RBV’s emphasis on firm heterogeneity was a significant improvement over the representative firm assumption, which assumed away any need for management (Helfat et al., 2007). The RBV explained the conditions under which a sustained rent may accrue to some rare firm-specific resource, such as superior location. However, further explanation was needed regarding intangible assets, especially knowledge and capabilities, which were deemed an important source of idiosyncratic rent streams. In addition, the dynamics through which firms developed new resources and capabilities were not well understood. It is important to note here that although the RBV came to be recognized as a distinct approach in strategy in the latter part of the 1980s, its main insights had been anticipated thirty years earlier by economist Edith Penrose in her 1959 book *The Theory of the Growth of the Firm*.

In the latter part of the 1980s, a distinctive stream of contributions dealing with the dynamic and intangible aspects of the RBV appeared. Two of these contributions were received with high enthusiasm and inspired a sizable flow of literature: these are ‘*Dynamic Capabilities and Strategic Management*’ by Teece et al. (1997)\(^6\) (henceforth DC) and ‘*The Core Competence of the Corporation*’ by Prahalad and Hamel (1990) (henceforth CC). The DC literature takes economics, specifically evolutionary economics, as its base discipline and speaks to a largely academic audience. In this sense, it is more in keeping with the general spirit of the RBV, and some authors (such as Helfat) are key contributors to both the resource-based and dynamic capabilities

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\(^6\) Teece, Pisano & Shuen ‘s article “Dynamic Capabilities and Strategic Management” was published in the Strategic Management Journal in 1997. The working paper version of this article was out in 1990, and that is really the date the ideas developed and started to be circulated in the strategic management literature.
literatures. On the other hand, the Core Competence approach is rather unique among the RCC contributions, as it springs from the management discipline. Albeit couched in rather simple terminology and speaking to a largely practitioner audience, it created an immense impact on strategy scholarship and industry. Prahalad and Hamel’s Core Competence article is the *Harvard Business Review*’s most reprinted article ever (Hamel & Heene, 1994) and the authors are credited for the diffusion of resource-based ideas in management practice (Wernerfelt, 1995).

### 1.3 Aim and Scope of the Research

This research provides a general review of the RCC literature, and a more detailed review and comparison of two of its important research programs – the dynamic capabilities and competence programs. The general review is both deep and broad in scope; however, it is not meant to be a comprehensive or exhaustive review. The analysis of the RCC literature presented here is deep in the sense that it goes far beyond the theoretical concepts to examine the philosophical and epistemological world view as well as the fundamental assumptions underlying the theories. These implicit considerations are argued to have a profound effect on the types of substantive issues dealt with and the theoretical apparatus employed to gain insights into these substantive problems. This study seeks to make these links explicit. In another sense, the review presented here is broad in that it scans a wide body of literature and provides a synoptic map of this vast terrain that delineates three main schools of thought: 1) Rational-Equilibrium school; 2) Behavioral-Evolutionary school; 3) Social constructionist school. This broad view takes note of the landmarks that help researchers navigate the terrain,
and provides exemplary pieces of research to illustrate the various strands of research within each school. However, it can by no means provide a comprehensive and exhaustive account of research in such a wide area.

Besides presenting a general review of the RCC literature, this study further aims to explore the interesting case of the dynamic capabilities and competence strands of the RCC literature. These two research programs are interesting because they have become increasingly influential views in explaining how firms can achieve and sustain competitive advantage by manipulating and reconfiguring their internal capacities. Both programs seek to provide a dynamic view of firm capabilities and how they relate to organizational performance and market evolution. With their emphasis on the development of unique firm capabilities or competences that are built over the collective experience of the organization, the two approaches seem to be sending the same core message to managers. In this firm-specific knowledge (with both its technological and organizational components) lies the key to a world of advantages that are exclusive to the firm and difficult for competitors to imitate. The resourceful exploitation and augmentation of such knowledge paves the way for innovation, which is the only guarantor of long term success in a highly competitive environment. This high degree of similarity often makes it difficult for researchers to make sense of the reason why these two strands exist independently. Very often, scholars consider them to be one research program while attributing the differences to mere semantic preferences and a proliferation of terms that in many cases refer to the same phenomena (Dosi, Nelson & Winter, 2000; Foss, 1997). In other instances, scholars have tried to scrutinize the essence of capability and competence to show that there are non-trivial differences in the
concepts (Stalk, Evans & Schulmann, 1992; Ray & Ramakrishnan, 2005), or to show that one concept encompasses the other (Teece et al., 1997). Further, some scholars see the existence of these two independent streams as indicative of a divide that threatens the progress of the RCC perspective (Foss, 1996; 1997; Schulze, 1994). These arguments have not produced a convincing explanation of the reasons for the existence and lack of integration of these two streams. This study presents a new way to look at these two research programs, and argues that examining the deep-seated and unarticulated philosophical underpinnings help us to explain the differences between the theoretical frameworks and to discern the strengths, shortcomings and areas where each is well positioned to contribute. In order to do so, each research program is situated in its relevant school of the RCC approach, according to the general review of the RCC literature described above. Further, the main theoretical constructs and arguments of each program are reviewed, and linked with its fundamental assumptions. This study utilizes a methodology based on a blend of epistemological considerations with Lakatos’ *Methodology of Scientific Research Programs* (henceforth MSRP) (1978) to assess the DC and competence programs, in terms of philosophical underpinnings, theoretical structure and empirical progress. Finally, the research programs are compared and the roots and implications of their different underlying frameworks are discussed.

### 1.4 Significance & Contribution of the Research

The body of RCC literature that is the focus of this study is arguably the most important research approach in the field of contemporary strategy, and has had a marked influence on both scholarship and practice (Collis & Montgomery, 1995; Wernerfelt,
and some scholars look to it to provide a comprehensive framework or paradigm for the strategy field (Sanchez & Heene, 2004) while other scholars hope to develop the rudimentary outlines of a more adequate micro-economic theory of the firm based on the insights of the RCC perspective (Teece, 2007; Helfat et al., 2007). Given the size and importance of this literature, a thorough review is a highly desirable endeavor. The current review makes some valuable contributions to the current understanding of the RCC literature. First, it provides a guiding structure that helps scholars make sense of this extensive body of literature through the delineation of the three schools of thought set out in Chapter 3. The strength of this typology lies in its encompassing nature, within which any piece of research in the field can be situated, together with its deep scrutiny of the implicit philosophical underpinnings and fundamental assumptions that are taken for granted or not subjected to discussion in most pieces. Such broad yet deep understanding of the various streams of literature is a valuable contribution to both experts and scholars new to the field. Besides providing a synoptic view of the RCC literature, the study aids in specifying the strengths and weaknesses of each school and to locate the areas where each is likely to make distinct contributions. This understanding is vital for progress in the field as scholars become more aware of how their work fits within the bigger picture of the RCC field, and how its boundaries can be pushed outward to make for scientific progress. Further, the re-interpretation of Penrose’s work from an epistemological angle contributes on two levels. First, it emphasizes the importance of understanding the philosophical underpinnings of theoretical work and how it relates to the choice of theoretical perspectives, empirical methods and usefulness of the results for both theory
and practice. On another level, the findings regarding Penrose present a new perspective with which to view Penrose’s pioneering work, and shows how this visionary scholar produced insights that remain highly relevant to contemporary work. It also calls for inquiring into the reasons why she chose to employ a constructionist epistemology when examining the growth of business organizations, a point that is taken up further in the review of the competence program and its comparison with the DC program. The key insight relevant here differentiates between a positivist epistemology that explains retrospectively and a constructionist epistemology that explores ex ante how organization members go about creating novel market opportunities and new capabilities to capture them.

The subsequent review and comparison of the two programs concerned with the dynamics of organizational competences and capabilities also makes some important contributions on several levels. On the methodological level, the study contributes by inferring the implicit philosophical underpinnings and epistemological assumptions implied in the theoretical literature. Such an in-depth analysis has not been carried out for the RCC literature, and its relevance is substantial to both the methodology and strategy fields. It shows how philosophy influences methodological choices, and is borne out in the substantive premises, hypotheses, findings as well as managerial implications.

On the level of strategy scholarship, the study presents a novel lens by which to differentiate between the two programs, which many scholars overlook. Contrary to what some scholars may think, this differentiation does not inhibit progress by increasing the fragmentation of the field facilitates. On the contrary, the differentiation between the DC and competence programs facilitates progress by outlining the domains of contribution of
each program, which shows that although they stand separate from each other, they illuminate different but complementary pieces of the puzzle. The comparison of the DC and competence programs concludes that the positivist approach of dynamic capabilities is suited to analyzing business behavior in a retrospective light, in which case there are clear categories to analyze and business, competitive and market outcomes to measure. On the other hand, the constructionist approach of the competence program is aimed at theorizing about entrepreneurial behavior ex ante, where cognitive and business activity is geared towards the creation of future potential through learning new competences and shaping future markets.

Beyond the theory and scholarship, this study also contributes in shedding light on the relationship between scholarship and practice, which is a crucial issue in an applied field such as strategic management, and on the managerial implications and normative dimension of strategy theory. A distinction is drawn here between theories illustrating routes of causation and plausible relationships and patterns among variables concerning past empirical data drawn from retrospective analysis of business conduct and theories trying to aid managers in making decisions about novel issues concerning the future. It is shown that the DC program produces the former while the competence program results in the latter kind of normative insights. This is why the competence program focuses on the conditions that will enable managers to make effective choices rather than providing recommendations on specific courses of action or relations among particular variables. Both types of normative considerations are important for managers, but being aware of the difference is a critical matter that must not escape the awareness of both scholars and practitioners.
Finally, the current research sheds light on several important debates that have taken place in the literature. For example, it relates to the ongoing debate about the appropriate role that the field of economics plays in the development of theory in strategic management. It also relates and sheds light on an earlier debate about a schism that exists in the resource-based literature that threatens the emergence of a unified paradigm. Specific reference has been made in that context to the unique character of Prahalad and Hamel’s work, but no adequate explanation and resolution of the intellectual divide was presented. Moreover, the study integrates the philosophy of constructionism with the RCC literature and sheds light on the unique contributions of management cybernetics and closed systems theory with respect to the study of organizational resources, capabilities and competences. This exchange is deemed to be a healthy dynamic in the progress of the field as discourse takes place among schools of thought that have proceeded in relative independence.

The remaining part of this introductory chapter gives a brief overview of the upcoming chapters of the dissertation.

1.5 Overview of the Dissertation

After this introduction, Chapter 2 lays out the philosophical and methodological foundations on which the ensuing discussion will be based. The first part of the chapter provides an overview of positivist philosophy of science, which rests on a basic epistemological view of scientific theories as objective descriptions of an independently existing reality that is governed by universal laws. The second part of the chapter presents an alternative philosophy of science based on social construction. This view
acknowledges that observation is necessarily theory-laden, and that theories are value-laden, and therefore concludes that scientific inquiry produces an essentially subjective view of reality. Communities of scientists create their inter-subjectively validated or, in other words, socially constructed version of reality. The final part of the chapter describes Lakatos’ Methodology of Scientific Research Programmes (MSRP), which provides a useful framework for assessing the progress of groups of theories. The philosophical considerations together with Lakatos’ MSRP provide a methodological framework that is utilized in the following chapters to analyze the RCC perspective in strategy, and to assess the conceptual structure and the progress dynamics of two very important research programs, namely the Dynamic Capabilities and Competence-based programs.

Chapter 3 re-examines the RCC literature by means of a general but in-depth review based on the epistemological underpinnings and deep-seated assumptions implied in the literature. The first part of the chapter revisits the pioneering work of Edith Penrose (1959), in which many key ideas of the resource-based view and the capabilities and competence literatures were anticipated. The focus on epistemology brings out the important insight that in studying the growth of business organizations, Penrose emphasizes the importance of employing an explicitly constructionist epistemology. While Penrose’s foresight comes twenty years before constructionism started to be widely debated in literature, this dimension of Penrose’s thought is hardly recognized in the RCC literature, which overflows with references to Penrose’s theory. The rest of the chapter delineates three broad schools of thought within the RCC literature on the basis of the epistemological and theoretical framework that underlies conceptual contributions
in each school. For each school, I examine the fundamental assumptions, the main outlines of the theoretical and empirical methodologies, and present a brief review of some exemplary literature that belongs to the school. Besides epistemology, the schools are differentiated according to a set of dimensions pertaining to their assumptions about the degree of rationality imputed to managers, the degree of strategic choice assumed, the relation between the firm and its environment (market and industry), and the degree of dynamism in the orientation of the theory. The review also highlights how each school relates to Penrose’s work. The review presented in this chapter provides a broad structure of the RCC literature that should be helpful to scholars in navigating the field and situating their work within the broader body of RCC research. It also results in a new interpretation and a deeper understanding of Penrose’s classic.

Chapter 4 reviews the theoretical structure and progress of the dynamic capabilities research program according to Lakatos’ MSRP. First, the essence of the dynamic capability concept is examined followed by an analysis of its underlying epistemology and basic assumptions, which places the DC program within the behavioral-evolutionary school of RCC literature. I describe how this hard core of the DC program evolved over a period of almost two decades and the progress its theoretical structure has undergone by resorting to the contributions of the main proponents of the DC program, such as Teece, Helfat, Zollo, Winter, and Dosi among others. In the second part of the chapter, I discuss some unresolved tensions in the conceptual framework of dynamic capabilities. I conclude that the dynamic capabilities concept is most adequately positioned to examine incremental changes and reconfigurations in current capability structures and in bringing about path dependent changes in the vicinity of extant value
potentials. Although some authors argue that the DC program can also accommodate path breaking and discontinuous change, the considerations detailed in this study relating to the epistemological and basic theoretical structure of the program do not support this contention.

Chapter 5 reviews the theoretical structure and underlying epistemology of the competence program, which belongs to the social constructionist school of the RCC literature. The core theory is based on Prahalad and Hamel’s work on core competence, strategic intent, stretch and leverage (Hamel & Prahalad, 1989; 1990; 1993; 1994). Their ideas were further developed under the banner of the competence-based approach to strategic management by authors such as Sanchez, Heene and Thomas and incorporated within the cybernetic approach to management by authors such as Espejo and Schwaninger. Following the general thrust of the current study, I examine the epistemology implicit in Prahalad and Hamel’s work, and follow on to make explicit the underlying assumptions of their theory. This is further aided by examining the structure of the competence program’s theoretical framework as it developed subsequently. The chapter elaborates on the four main characteristics of this framework, which is dynamic in nature and geared towards the real problems facing managers who build competences for an uncertain future to create rather than react to market conditions. The systemic dimension taps into a unique systems view of organizations and their competences based in management cybernetics. The cognitive dimension connects this program with the constructionist epistemology of Penrose and with the dynamic and future oriented thrust of the competence-based perspective. The holistic dimension shows how the perspective
taken allows for the resolution of the main tensions that were problematic for the DC program.

Chapter 6 compares the dynamic capability and competence-based research programs according to a set of dimensions that are implied in the analyses presented in the previous chapters. First, the positivist epistemology of DC is contrasted with the constructionism of the competence program. This basic philosophical assumption leads to marked differences between the DC and CC approaches concerning several important issues, including the questions pursued and methodology used in research. On a more substantive level, the research shows that the epistemology implicit in the two approaches influences the way they conceptualize the nature of the relation between the firm and its external environment, the extent of strategic choice imputed to top executives and the essence of strategy making. The comparison also reveals important differences regarding a host of other dimensions including organizational learning, managerial implications and the relations between strategic management theory and practice. This final chapter distills and summarizes the main conclusions of the research, and examines their implications for progress in the RCC literature in general, and more specifically in the dynamic capability and competence programs. The limitations of the current study are mentioned and fruitful directions for future research are considered.
Chapter 2
Epistemology & Methodology

This chapter gives an overview of the philosophical and methodological considerations that constitute the basic methodology of this study. The first part of the chapter describes the variant epistemological perspectives of positivism and constructionism and reviews how they relate to some central debates in the philosophy of science. These epistemological perspectives are central to the current study as the core dimensions used to examine the RCC literature and to compare the dynamic capability and competence programs, are derived from epistemological considerations. The philosophy of science background is also important as the current study is concerned with analyzing the foundations and development of thought in the RCC literature. In this sense, the subjects of the current study are the different theoretical frameworks that study organizational resources and capabilities, just as the philosophy of science is concerned with the study of scientific theories. This research is thus relevant to the study of how social science progresses and to the examination of various factors that render theories more or less adequate in explaining the phenomena of interest. This chapter also provides a brief overview of Lakatos’ methodology of scientific research programmes (MSRP), which provides a general framework for analyzing the structure and progress dynamics of the dynamic capability and competence research programs. Finally, the chapter closes with a description of the methodology followed in the remaining chapters. This methodology includes a set of dimensions that facilitate the analysis of the RCC literature and the delineation of its three constituent schools of thought. The same
dimensions are used in the review and comparison of the dynamic capability and competence programs.

2.1 Epistemology

According to the Merriam Webster online dictionary, epistemology is defined as “the study or a theory of the nature and grounds of knowledge, especially with reference to its limits and validity.” In scientific research, epistemology deals with the most fundamental assumptions that researchers hold regarding the possibility of gaining true knowledge about the real world. The overwhelming majority of scholars do not explicitly state their epistemological stances upfront in their research, in which case epistemology remains at the implicit, taken for granted sub-conscious of the scientific community. Explicit treatment of epistemology is relegated to philosophers of science and methodologists. This study is an attempt to unearth the epistemology that underpins the RCC perspective in strategic management and to do so, a review of basic epistemological and methodological debates is necessary.

2.2 Positivist Philosophy of Science

Positivist epistemology assumes the existence of an independent objective real world, and that valid objective knowledge about the world can be attained when scholars follow the canons of the scientific method. The positivist view highly regards such values as objectivity, impartiality and accuracy in the observation of phenomena under study. The honest scholar strives to detach him/herself as much as possible from the subject under study, so as to give a pure account of reality as it really is without contamination arising from his/her subjective influence. It is assumed that the natural
(and social) world is ordered according to a set of natural laws. Scientists aim to discover these laws and structure them into coherent logical systems called theories. Ideally, scientific progress represents the cumulative uncovering of more pieces of the reality puzzle, which allows a description, explanation and prediction of phenomena.

As a general philosophy of science, positivism is not a single doctrine. There are several shades of positivist philosophy of science, and in this brief overview, I try to give the main outlines of how positivist philosophers view science and scientific progress that would facilitate the examination of RCC literature. The most radical form of positivist philosophy is known as logical positivism, which is rooted in the work of the Vienna Circle scholars during the period from 1925 to 1936. Logical positivism has been sharply criticized by both proponents and antagonists of positivism, as its prescriptions are so restrictive as to eliminate much of what has passed as science. However, a review of its main ideas is important in appreciating its more mature versions. In general, logical positivism rests on the dual pillars of logical (axiomatic) analysis and the use of empirical evidence to verify theories. The philosophy may be identified by three main methodological prescriptions. First, knowledge claims have to be either analytic or synthetic, “...either true by virtue of the definition of their own terms, or true, if true at all, by virtue of practical experience,” (Blaug, 1992: 12) and metaphysical statements are disregarded as meaningless as far as science is concerned. Second, knowledge claims have to be verifiable, meaning they can be tested through observational evidence. These two prescriptions provide the criteria for assessing the cognitive significance of statements (what qualifies as science) and they imply that theoretical terms that are not directly observable pose a problem. The positivist solution comes through the
prescription of operationalism, according to which abstract theoretical concepts are taken to be synonymous with measurement operations performed on them, to associate them with observable phenomena (Caldwell, 1982: 27). The third main idea in the logical positivist doctrine is the unity of science proposition, which holds that social and physical sciences are not categorically differentiated and should use the same methodology based on logical analysis and observation (Caldwell, 1982). As such, the logical positivist view was extremely restrictive and in its attempt to weed out metaphysics from science proposed prescriptions which, if taken seriously, would write off most scientific contributions and significantly inhibit scientific progress.

Criticized by scholars who considered themselves devout positivists, logical positivism gave way from the mid 1930s to a more mature version known as logical empiricism (Caldwell, 1982). The major tenets of logical empiricism can be understood by examining three big questions and going over the answers proposed by various philosophers. These questions are: (1) what criterion separates meaningful scientific statements from meaningless metaphysics? (2) how are scientific theories structured? (3) what is the nature of scientific explanation? It is worth noting here that most philosophy of science was developed around the scientific model of the natural sciences, and specifically physics. This does not make it less relevant for the social sciences of economics and strategic management with which this research is concerned. It will actually aid in examining the controversial relations between these disciplines and in assessing the role of economic methodology in the study of organizational capabilities and competences.
Regarding the first of the questions, the logical empiricists held several views on the demarcation criterion that separates scientific from meaningless statements, or what the logical positivists called the criterion of cognitive significance. Complete verification through observational evidence, the criterion of cognitive significance upheld by logical positivists, proved to be too restrictive, as it ruled out statements of universal laws. Universal statements could never be completely verified through a finite number of empirical experiments, and therefore verification was discarded. Popper, who was an aggressive critic of logical positivists, proposed falsification instead. The naive version of Popper’s falsification criterion asserts that while universal statements cannot be decisively verified, no matter how large the number of supporting experiments, they can be decisively falsified by just one critical refuting instance. The famous example of the claim that all swans are white, cannot be decisively verified no matter how large the number of white swans we encounter; while only one black swan suffices to falsify it. Therefore, to qualify as science, a statement had to be falsifiable, which means that it had to forbid certain circumstances from taking place. Yet again, naive falsificationism was too restrictive, as it did not allow the inclusion of “...affirmative existential hypotheses as meaningful,” because they did not forbid any particular events from occurring, and therefore could not be falsified by critical experiments (Caldwell, 1982: 21). The notions of confirmation and testability soon became the generally accepted criteria of cognitive significance, as the logical positivist aspiration for clear cut demarcation between science and nonsense gave way to a greater focus on the evaluation of different hypotheses and theories, and the acknowledgement of degrees of confirmation and testability.
As for the second question concerning the structure of scientific theories, most logical empiricists adopted the hypothetico-deductive model, which provides that “... the formal structure of a theory is nothing more than that of a mechanical calculus, or a hypothetico-deductive system.” (Caldwell, 1982: 25) According to this model, a theory is made up of a hierarchy of statements. The highest level is constituted of the primitive statements or axioms, which act as the premises on which the theory is based. The intermediate level consists of theorems, which are derived statements that are logically deduced from the axioms. The low level statements are the conclusions of the system, which are then interpreted into observable statements to be tested empirically. Accordingly, the logical empiricists did not deem it necessary to test the significance of each statement separately; rather the theory as a whole is tested through comparing its predicted consequences with observable data. An important implication for logical empiricist thought is that theoretical terms that do not refer to directly observable entities are accepted as unproblematic in theories, and are considered meaningful when supported indirectly through confirmation of the theory’s empirical predictions.

Regarding the nature of scientific explanation, the logical empiricists insist that science should provide explanations of phenomena and not just provide ad hoc predictions. They prescribed two specific forms under the general hypothetico-deductive structure, to which all proper scientific explanations should conform. These two forms are the deductive nomological (D-N) and the inductive probabilistic (I-P) model (Hempel & Oppenheim, 1948). These models consist of two parts: explanans (that include statements of initial conditions and universal laws) and an explanandum (a statement about some event we wish to explain, that is strictly deduced from the explanans, and that
could not be concluded by the mere observation of phenomena (Blaug, 1992). The only difference is that I-P models employ statistical laws in the explanans, rather than the general deterministic laws of D-N models. Hempel further inferred two important conclusions from these covering law models of scientific explanation that have drawn serious criticism. First, explanation and prediction are structurally symmetrical operations, different only in their timing; with explanation taking place after the event and prediction occurring beforehand. Hempel’s second claim is that almost all proper scientific explanation can be represented by the D-N and I-P covering law models, even motivational or intentional explanation of human actions. The debate on these issues is a long one, but here it is sufficient to briefly mention that philosophers have advanced strong refutations against the symmetry of explanation and prediction. The history of science also testifies to the spuriousness of Hempel’s second argument, that all valid scientific explanations are structured according to the hypothetico-deductive model, with its D-N and I-P versions. This may be the dominant mode of explanation physics, but other disciplines display a variety of explanation modes. For example, in the biological sciences and some of the social sciences, functional or teleological explanations “...take the form of indicating either the instrumental role that a particular unit of an organism performs in maintaining a given state of the organism, or that individual human action plays in bringing about some collective goal.” (Blaug, 1992: 11) Intentional or motivational explanation is sometimes considered to be a kind of teleological explanation and Hempel insists that motivational explanation should also be in the form of covering laws, on the basis of which we should be able to predict actions and decisions of individuals based on their motivations and intentions (Caldwell, 1982). Even more recent
scholars and especially many economists still subscribe to this view (Elster, 1988). This narrow view misses the rich complexity of factors, including desires, beliefs and others, that are intermingled in issues of motivation and intention, which render this type of explanation, by its very nature, not amenable to prediction (Caldwell, 1982: 57). Further, historical explanation is particular in that it produces an explanation that is sufficient but not necessary, meaning that many alternative theories could possibly explain the historical events. Positivists would consider such historical explanation as “pseudo-explanation” as long as it is not based on even some loose generalization (Blaug, 1992).

In a very general manner, we can say that the dominant methodological basis in economics follows the positivist model outlined above. Although this positivist model is fashioned primarily on the basis of the scientific model of physics, economists aspire to make their theories as deductively rigorous as those theories explaining inanimate physical elements, and this is, to varying degrees, carried over in economic approaches to management and strategy applications by scholars taking an economic approach to strategic management. I consider here the possible implications of this positivist methodology for strategy research, particularly as it pertains to the study of organizational resources and competences. Three main issues are discussed: first, the importance of fundamental assumptions that underlie theories; second, modes of scientific explanation; and third, empirical methodology.

The first issue, which constitutes an important basis of the general approach taken in the present study, is the importance of basic assumptions upon which the theories are built. In general, there are two main positions in the philosophy of science regarding the extent to which basic axioms are realistic. The nominalists and instrumentalists argue
that a theory by definition is a simplification of reality, and is therefore expected to hold assumptions that are somewhat unrealistic (Mahoney, 1993). The mark of a good theory is that it is able to predict fairly well and as long as accurate predictions are being generated, the underlying assumptions are of secondary importance. This is the position generally taken according to the hypothetico-deductive model, which does not prescribe the empirical testing of axioms and primary statements, and reserves empirical testing only for the results of the model. This is also the argument advanced in defense of the hard core of mainstream economic theory based on the rationality assumption, which has been refuted empirically. If the deduced results find empirical support, the whole model is supported (Blaug, 1992). This forgiving stance regarding basic assumptions of theories may not be so problematic in the physical sciences, since the validity of basic assumptions will not change the phenomenon under study. However, the same is not true of the social sciences, to which strategic management belongs. When premises about individual behavior and cognition in organizations are treated as basic assumptions rather than testable propositions, this exempts them from falsification and immunes them from being discarded no matter how distorted they are. This calls for concern especially when these initial premises have been employed for the sole purpose of facilitating the use of particular methods (such as optimization) rather than being motivated by the particular problem that is the subject of the research. The plausibility of the results of such theories, when lent empirical support, confers excessive truth value to the initial premises that have not been questioned. Ghoshal (2005) and Hühn (2007), albeit in the context of management ethics, show that these implicit truth claims do not stop at the theoretical level, but eventually shape managerial practice through the process of double-
hermeneutic. This self-fulfilling character of theorizing in the social sciences is further clarified below in the context of social construction. The argument is similar to Berger and Luckmann’s (1971) explained below, except that legitimization here occurs through science. Accordingly, the present study aims to make explicit and question the basic assumptions underlying the various theories put forth to explain the relation between firm capabilities/competences and competitive advantage.

The second issue relating to positivist methodology is the covering law mode of scientific explanation, which is invoked by economists to represent relationships of causation, even in the sphere of human intentional and motivational explanations (Elster, 1988). This is also an area where the social sciences differ from the physical sciences and biological sciences. In physics, causal explanation under general laws functions well in explaining phenomena pertaining to inorganic matter. For organic matter, as in biology, functional or teleological explanation is used, but there is no intentionality involved. According to the theory of evolution, natural selection is governed by random mutations, so it is unintentional. When economists borrow the evolutionary metaphor from biology, it is helpful in explaining macro-level phenomena, as that level of analysis is an aggregated level where intentionality does not govern the behavior of populations of firms. At that level of explanation, actions by individual actors (or firms) that produce a disproportionate effect on the population of firms can be treated as random, as done in evolutionary economics. However, when we go down further in the level of analysis, the individual behavior of managers and firms at the micro level is necessarily governed by intentional and motivational factors. This is the level relevant to management (and strategy) research. Humans do not just mindlessly act according to general laws, for then
they would be robots. Ghoshal (2005) has argued that the causal determinism that accompanies invoking covering laws in the explanation of managerial and organizational behavior eliminates the basis for choice as even intentions and motivations are assumed to follow covering laws. Hoppe (1997) elaborates the important distinction between explaining behavior in the aggregate and explaining individual behavior, or what he terms, following Ludwig von Mises, class versus case probability. The deductive-nomological and inductive-probabilistic models, explained above, produce deterministic laws or statistical patterns that apply to whole classes of events, and as such, we cannot, based on such explanation, say anything about the individual cases making up these classes, except that they are members of a particular class. This is the realm of economic theorizing, or what Mises calls praxeology, which produces general patterns about the outcomes of certain actions or events, like exchange, prices, taxes etc. In this realm, we cannot but assume that the future will be like the past, so that we depend on these laws or patterns until they prove inadequate or are in need of revision. Case probability is a categorically different matter. What is likely to happen in an individual case, as a result of human choice and creative action, cannot be predicted or explained in such a deterministic or probabilistic manner, as it involves individual choice and action based on learning, which could never be anticipated beforehand, and thus can never follow the single rationality of a covering law or statistical pattern. The realm of individual human (or firm) behavior is that of history and entrepreneurship, where the assumption that the future will be similar to the past is highly mistaken (Hoppe, 1997).

The third issue concerns the empirical research that feeds the theory building and testing, and here we focus specifically on the substantive area that is relevant to the RCC
literature. In order to derive general patterns or test covering laws, a large number of observations is needed and therefore objective statistical techniques using large samples are the primary empirical methodology. As discussed above, these wide generalizations may work well at a certain level of aggregation, where it is acceptable to abstract from the individual case. However, if the study concerns the micro level, as is the case when researching managerial and organizational behavior and cognition in strategy-based studies, these broad generalizations mask the rich details that give each firm and each manager their individuality. This is logically opposed to the search for the micro-foundations of competitive advantage and superior performance, which the RCC literature set out to explain. To understand how a company was able to build certain competences and beat the market leader for a sustained period of time, it will not do to examine the average performance of the average firms in a large population. It is rather the outlier firm that provides the boundary conditions for this study of competitive advantage. Further, if one could propose an overarching hypothesis to convey the essence of the RCC perspective in strategy, it would be the proposition that the competitive advantage of firms is rooted in internal factors related to the firm’s creation and use of its unique resources, capabilities and competences. To propose covering laws and general patterns is to generalize about uniqueness, which logically is an impossible feat (Connor, 1991). A further problem with positivist large sample statistical methods is the challenge of operationalizing abstract theoretical constructs, which in many instances leads to distant proxies. In and of itself this is not problematic if its limitations are consciously acknowledged. It becomes problematic when, through repeated use, researchers forget that the statistical results confer plausibility on the tested propositions,
and not truth value (Campbell, 1984). Therefore, normative prescriptions derived from such studies should be taken with caution and qualified by common sense (Ghoshal, 2005) and by the firm’s understanding of its unique circumstances. An alternative approach presents itself in the qualitative empirical methods directed to single case studies, and particularly those which take the subjective perspective of the individual firm. These interpretative methods are highly suited to the particular issues examined in the RCC approach to strategic management. Generalization beyond the single case happens when authors examine several such outlier (outstandingly successful) companies in different industries and find commonalities in their strategies (Peters & Waterman, 2004; Collins & Porras, 1997; Prahalad & Hamel, 1994; Kim & Mauborgne, 2004). These patterns are not in the form of deterministic or statistic covering laws, but rather in the form of temporary and contingent heuristics that work in practice and therefore aid in the development of practice-relevant theory. This methodology allows researchers to avoid the use of distorting and unrealistic assumptions which are often necessitated by the use of formal analytical methods and is supported by an epistemology based on social construction, which is reviewed next.

2.3 Social Constructionist Epistemology

During the 1950s, systematic criticism of modern positivist philosophy of science dealt harsh blows to the positivist view. Gradually the dominant positivist view was replaced by the contemporary heterodoxy, as Blaug (1992) calls it, which is saliently characterized by the plurality of views and approaches to the growth of scientific
knowledge, and the absence of a single dominant prescriptive view of scientific practice.

Blaug states that

“...just as there is no logic of discovery, so there is no demonstrative logic of justification either; there is no formal algorithm, no mechanical procedure of verification, falsification, confirmation, corroboration, or call it what you will ... there is no certain empirical knowledge ... there is no sure method of guaranteeing that the fallible knowledge we do have of the real world is positively the best we can possess under the circumstances.” (Blaug, 1992: 26)

Underlying some of these alternative methodologies is a fundamental epistemological assumption that is entirely different from the basic epistemology underlying positivist methodology, one that is based on social construction of knowledge and of reality.

It was stated at the beginning of this chapter that the fundamental epistemological assumption underlying positivist philosophy of science holds the attainment of true and objective knowledge about the natural and social world as the possible and desired objective of the rigorous rules of scientific methodology. Utterly opposed is the epistemology of social construction, which springs from a basic belief that, as much as it is desired, gaining infallible knowledge about the world is at best a naive wish, because scientific knowledge is socially constructed. Therefore, instead of striving for an elusive goal of objective knowledge that mirrors reality, scientists are encouraged to acknowledge the multitude of subjective cognitive and social dimensions that necessarily influence their knowledge, and to trade objectivity for inter-subjective agreement (social construction) on what constitutes valid knowledge. This view finds support in cognitive science, in studies of the sociology of knowledge, and in the philosophy and sociology of science.
In the field of cognitive science, it is found that the human mind is not a passive receiver and processor of information about the surrounding world coming in through the senses. Rather, the mind actively constructs knowledge through an interaction between a person’s cognition and this information. Cognition as construction is determined by the selective and varying degrees of attention given to various pieces of information or stimuli, and further by the subjective interpretation the person attaches to this information. Interpretation depends on schemas, which are condensed forms for storing knowledge that individuals use to make sense of the world. When particular schemas are shared among a community of individuals, they are referred to as cognitive frames and they function as efficient conveyers of meaning and interpretation in interactions between individuals (Mintzberg et al., 1998). This cognitive dimension implies that although individuals may live in the same world or environment, they pay attention to different things, and may interpret the same things in different ways. In this sense, one may speak of different subjective realities being continually constructed as individuals make sense of the world, and construct their own version of reality. When cognition is examined in this light, it becomes quite futile to try to establish who is right, and who is wrong or to argue that one subjective reality is more rational, accurate or real than others. What we can do though is to try to understand the various influences that shape the construction of these multiple realities and explore how each helps illuminate a different problem or question. In addition, many experiments conducted in psychology, such as the gestalt experiments show how different people looking at the same picture see different things. The most popular of those experiments are the goblet and the faces, the young lady – old lady and the rabbit – duck pictures. When this cognitive dimension is extended to the
practice of science, it sheds some light on the above description of the epistemology of social construction.

In addition to the cognitive dimension, the construction of knowledge takes on a social dimension, as individuals negotiate and share their interpretations of reality within their relevant community. The first authors to explicitly tackle this issue from a sociological perspective were Peter Berger and Thomas Luckmann in their widely cited work “*The Social Construction of Reality: A Treatise in the Sociology of Knowledge*” published in 1966\(^7\). Berger and Luckmann do not refer to the construction of scientific knowledge, and they explicitly indicate that the knowledge they are dealing with is anything that passes as common sense knowledge in society, or the knowledge of the man in the street. Nevertheless, their work elaborates in interesting detail the processes by which institutions are established as a product of mutually accepted human thoughts and actions (externalization), and how these institutions take on an objective reality, or a life of their own and continue to exist beyond the temporal and spatial conditions that produced them (objectivation), and then how they come to influence human thought and action (internalization). These processes, or what Berger and Luckmann refer to as three moments in a dialectical process, give knowledge in society its dual nature of objective fact and subjective meaning. The social construction of scientific knowledge is a special case of Berger and Luckmann’s treatment of knowledge in society at large, and is the subject of study of the sociology of science. This takes us back again to the philosophy of science, in which we review in more detail several important ideas advanced by

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\(^7\) The first edition of Berger and Luckmann’s book was published in 1966, however, the edition I refer to here is a later one published in 1971. Berger and Luckmann coined the term “social construction of reality” in the title of their book, but they are part of a larger and historically rooted *sociology of knowledge* tradition concerned with the influence of social conditions on ideas.
Popper, Lakatos, Kuhn and Latour that, taken together, argue for an epistemology based on the social construction of knowledge. The argument is based on criticism of some of the basic premises of positivist philosophy, as well as advancement of alternative views on how science is practiced and how it progresses.

The first building block for an epistemology of socially constructed knowledge is the break with the positivist view of observation as an objective, impartial and accurate mirror of nature, or the world. When we consider that the way in which scientists directly observe an object in the world (light photons emitting from the object and impinging on the retina of the human eye) is itself a theory, then observability becomes a matter of degree, with observation through a magnifying glass, microscope, or telescope being different degrees of observation. Further, we need to ask the question: what are scientists observing? Does a scientist simply observe the whole of reality, and the facts just jump forth? Any scholar would concede that this is certainly not the case. The selection of which facts to observe is a basic prerequisite of observation.

“Data, then, are not anything observed, unless we take observation to involve some kind of discrimination. For no one observes the whole world but only some part of it which has been selected for that purpose. The problem of analyzing observation is complicated by the fact that in every object or event there is more observable than lies within the power of any one observer to detect. Existence is everywhere dense … What confronts the observer is usually a choice of facts. Events have a way of outstripping observations and there is a richness to existence that compels a selection.” (Feibelman quoted in Caldwell, 1982: 47)

Based on this, Popper, Lakatos, Kuhn and other contemporary philosophers of science have agreed that the mere selection of objects or events to observe suggests the prior presence of a theory that attaches importance to those particular observations. If we go a step further and assume that scientists are observing the same objects or events, then comes the role of interpretation, which also happens according to the different theories
scientists hold as to what is going on. In “The Structure of Scientific Revolutions” Kuhn gives numerous examples of the theory and paradigm dependence of observation. He explains how scientists ‘see’ what they set out to see, and may fail to ‘see’ things which do not fit within their paradigm. The ways in which scientists observe, the instruments and measurements they use, are similarly dependent upon the theory they hold and the paradigm they espouse.

“The operations and measurements that a scientist undertakes in the laboratory are not the ‘given’ of experience but rather the ‘collected with difficulty’. They are not what the scientist sees – at least not before his research is well advanced and his attention focused. Rather, they are concrete indices to the content of more elementary perceptions [theories or paradigms] ... Science does not deal in all possible laboratory manipulations. Instead, it selects those relevant to the juxtaposition of a paradigm with the immediate experience that the paradigm has partially determined.” (Kuhn, 1996: 126)

Kuhn does not suggest that vision constrained by a particular paradigm is the only possible vision for a particular scientist; there are numerous alternative ways to see a particular phenomenon. However, the alternative ways of seeing do not include amongst them one fixed vision that is the pure and objective portrayer of the impartial reality. The alternatives are ways of seeing according to alternative paradigms, in which the object or event observed is a different one every time. In this sense, the philosopher Rom Harré declares that “...in science, there are no brute facts,” (Harré quoted in Caldwell, 1982: 48) and Popper refuses to provide any explicit definition of the term ‘observable’ in his work, and stops at stating that it is a term that becomes clear in use (Blaug, 1992). Lakatos further explains that

“The problem is not what to do when ‘theories’ clash with ‘facts’. Such a ‘clash’ is only suggested by the ‘monotheoretical deductive model’. Whether a proposition is a ‘fact’ or a ‘theory’ in the context of a test situation depends on our methodological decision ... In the pluralistic model, the clash is not ‘between theories and facts’ but
between two high-level theories: between an interpretive theory to provide the facts and an explanatory theory to explain them.” (Lakatos, 1978: 44)

Thus contemporary philosophers of science agree that there is no neutral and unproblematic observation by which to judge the correspondence of theory to facts, and that theorizing necessarily comes prior to observation.

The next important argument holds that theories are not the products of purely rational, scientific and professional considerations. Contemporary philosophers of science take a more flexible position towards metaphysical considerations than positivist philosophers, and acknowledge that they cannot be totally eliminated from science (Lakatos, 1978). Blaug illustrates how higher level methodological decisions are necessarily made by scientists on the basis of pure preference, with no logically compelling argument to justify them other than the consideration that the decision must be made. A particularly interesting example of this comes from statistics, which is one of the disciplines based on high deductive rigor. In tests of statistical significance, one is obliged to attach a value judgment as to the relative cost of risking the acceptance of a false statement versus the rejection of a true one (Blaug, 1992: 22). Such methodological decisions and value judgments abound in scientific practice and are acknowledged by philosophers of science such as Lakatos (1978) and Kuhn (1996). In this sense, theories are far from simply functioning as impartial interpretations of the facts.

In summary, an epistemology based on social construction assumes that a community of scientists constructs a version of reality that is agreed among them, and that this scientific knowledge is not a mirror reflection of reality in pure form but an active construction shared among the group. To acknowledge this is not to say that science is devoid of reason. Rather, this view recognizes that rationality is not singular in
determining science, and that there are many ways of looking at the world. “This means that the truth does not exist anymore and thus, the search for theories which make the one truth visible is futile. What science can do – at least according to social constructionism – is to uncover consensual truths.” (Hühn, 2005: 298)

This view on the social construction of knowledge, both scientific and everyday knowledge relating to practice and perception of the world, has important implications for our examination of the RCC perspective. First, this epistemological grounding guides the analysis and appraisal of the different schools of thought I will delineate in the coming chapter, as well as the more focused comparison between dynamic capabilities and competence programs in subsequent chapters. It aids in characterizing the methodology of each school of thought or research program, and understanding what kinds of questions each is best suited to tackle. Secondly, in another sense, it supports our forthcoming arguments about the differences between a positivist and constructionist epistemology in looking at organizational capabilities and competences from a strategic perspective. The dimensions used to characterize the three schools of thought and to distinguish between the dynamic capability and competence programs are derived primarily from the epistemological distinction explained in this chapter. These dimensions constitute the basic assumptions and general theoretical framework that shape the way each research program examines the strategic role of organizational resources, capabilities and competence. It also results in an unexpected re-interpretation of Edith Penrose’s 1959 classic, and presents a view on her constructionist epistemology that is uncommon and barely acknowledged in the burgeoning literature that refers to her work as foundational for the RCC perspective. The delineation of the three schools of thought
in the RCC perspective and the examination of Penrose’s epistemology follow in the coming chapter. Before going on to Chapter 3, the final section of this chapter briefly reviews Lakatos’ methodology of scientific research programs, which, together with the epistemological grounding, provides a general guiding framework for analyzing the theoretical hard core of the three schools and comparing dynamic capability and competence theories.

2.4 The Methodology of Scientific Research Programs

Imre Lakatos (1978) prescribes some rational basis for evaluating scientific progress while acknowledging the limitations and actual practices of science from a historical perspective. Lakatos’ framework, which he called The Methodology of Scientific Research Programmes (MSRP), provides a tool for assessing the structure and progress of series of theories, or SRPs, rather than isolated theories (Lakatos, 1978: 33). The framework is described below, as it will be used in chapters four and five to assess the dynamic capabilities and core competence research programs respectively.

First, Lakatos emphasizes that the comparison in science is not between one theory and facts. Rather, it is between a series of competing theories, which are assessed according to the extent to which they can explain novel facts. In this respect, Lakatos differs from Popper’s naïve falsification, as he emphasizes that “…no experiment, experimental report, observation statement or well-corroborated low-level falsifying hypothesis alone can lead to falsification. There is no falsification before the emergence of a better theory.” (Lakatos, 1978: 35) He considers three angles to the process of scientific progress, which has an important time dimension; these are the series of
competing theories, a body of empirical findings that has been explained through past experiments and a body of novel facts yet to be explained as the SRP progresses. Lakatos’ approach is both more tolerant and more constructive than naïve falsification. The MSRP is more tolerant since it makes criticism more difficult, as emerging SRPs cannot be discarded solely on the grounds of disconfirming instances. Further, naïve falsification looks up alternatives only for those hypotheses that have been falsified, while Lakatos’ approach, which he calls sophisticated methodological falsification, seeks improvements to all existing hypotheses. Second, Lakatos acknowledges that observation is theory laden, that theory is value laden, and that the designation of which terms are observational and which are theoretical involves an extent of arbitrariness that is nevertheless inescapable.

2.4.1 Structure of SRPs

Lakatos stresses that a particular class of research programs, those which exhibit a marked continuity that connects their member theories, are very important for scientific progress. The continuity in these SRPs stems from the existence of some methodological rules that provide both positive and negative heuristics. A positive heuristic pushes research associated with a program in a particular direction, while a negative heuristic discourages research in specific areas that are inconsistent with the program. Any SRP, according to Lakatos, consists of a rigid hard core and a flexible protective belt. The hard core is the set of ideas that are essential for the existence of the research program, and may contain metaphysical statements. This hard “core is ‘irrefutable’ by the methodological decision of its proponents.” (Lakatos, 1978: 48) and the negative
heuristic works to direct empirical tests away from refuting the hard core. The positive heuristic encourages research towards tests of the protective belt, which consists of auxiliary hypotheses, initial conditions and observational (empirical) hypotheses. “It is this protective belt of auxiliary hypotheses which has to bear the brunt of tests and get adjusted and re-adjusted, or even completely replaced, to defend the thus-hardened core.” (Lakatos, 1978: 48) The hard core and the positive heuristic provide the conceptual framework of the research program, as well as a long term research policy, or a progression of research that increases in the sophistication of its models. Lakatos notes that the hard core does not emerge in full form all at once, but rather forms gradually. He further remarks that theoretical work in a research program progresses in relative independence of empirical testing that uncovers unexplained anomalies. Theoretical work proceeds unhindered by the rise of anomalies, many of which are anticipated by the theoreticians of the program. Thus, modifications to the protective belt and gradual resolution of anomalies progress according to a rational sequence and not in ad hoc response to empirical refutations.

2.4.2 The Dynamics of SRPs: Progressive versus Degenerating Problem-shifts

Lakatos uses the modifications that occur in the research program over the long term to assess its success or failure, and he stresses that this result is only obtainable with hindsight and cannot be assessed when the program is still young. The assessment of scientific progress is possible when we zoom in and take a detailed look at the successive theories that make up the program. Labeling the successive theories as T1, T2, T3 ... etc, each theory represents an addition to or an elaboration of the auxiliary hypotheses of
previous theories to account for some anomaly not explained by previous theories. A research program is said to be theoretically progressive (or to exhibit a progressive theoretical problem-shift) when a latter theory T2 is able to explain novel facts in addition to all the previously explained empirical content of a former theory T1. Further, if some of the novel facts explained by theory T2 are corroborated with empirical evidence, the theoretically progressive research program is also empirically progressive. Research programs are progressive if modifications to the protective belt result in both theoretically and empirically progressive problem-shifts; if not, then the program is degenerating. Modifications must at least be theoretically progressive if they are to be considered scientific; otherwise, they are rejected for being pseudo-scientific, and attempting to account for anomalies through mere semantic modifications or ‘conventionalist stratagems’ as Popper called them. To reiterate, the progress of SRPs is assessed by the ability of its successive theories to steadily account for more and more novel facts, hitherto unexplained or unexpected by earlier theories. Lakatos calls his criterion sophisticated methodological falsificationism, where a theory is falsified if followed by a theory that explains greater empirical content, while successfully accounting for all of the facts explained previously by the falsified theory, as opposed to naïve falsificationism, where a theory is falsified by crucial experiments that present facts refuting the theory (Lakatos, 1978: 31-34). Lakatos provides the example of the shift of physicists from Newtonian theory to Einstein’s relativity theory in the early twentieth century. This example fits neatly into Lakatos’s MSRP framework, as Newton’s program could be explained as a special case of Einstein’s, with the latter going beyond the former in a nice cumulative and progressive problem-shift. This ‘rational reconstruction’ of
scientific progress is only possible with the benefit of hindsight, and can only be done retrospectively.

Given this grounding in epistemology and philosophy of science, Chapter 3 provides a synoptic view of the literature on resources, capabilities and competences from a strategic management perspective.
3.1 Introduction

In the field of strategy, the resource/capabilities/competence perspective (henceforth the RCC perspective) has emerged as a powerful current with a sizable body of literature, whose proponents claim has the potential to offer a unifying paradigm for the highly fragmented field (Volberda & Elfring, 2001). Many writers refer to it as the resource-based approach, but other labels such as the capabilities-based approach, dynamic capabilities or competence approach have also been used. This chapter argues that the RCC approach, which is often portrayed as a single integrated school of thought, consists of three distinct schools, which exhibit some similarities, but also house non-trivial differences. The current reading of the RCC literature results in the delineation of three distinct schools that are differentiated according to a set of dimensions spanning several levels of inquiry, including the epistemological, methodological and conceptual (substantive) levels. The three schools are: (1) the rational-equilibrium school, which mainly consists of the literature of the resource based view of the firm; (2) the behavioral-evolutionary school, exemplified in the capabilities approach, and specifically the Dynamic Capabilities research program; and (3) the social constructionist school, which includes the Core Competence approach as well as other contributions. The schools are identified and labeled according to their epistemology, fundamental assumptions and methodology as these are considered to be the decisive factors that influence other aspects of the literature, such as the substantive focus as well as the
theoretical and empirical work. The latter aspects of the RCC literature are the ones most commonly handled in reviews of the various streams of research. A main goal of this study is to show how surfacing the fundamental assumptions, which are not always explicitly discussed, aids in deepening our understanding of the literature and our appreciation of subtle but important differences in the approaches taken. Further dimensions such as the assumptions about managers’ rationality, the portrayed relation of the firm with its environment, the degree of strategic choice imputed to firm management and the criteria under focus in managers’ strategic decisions are discussed for each school. In addition to presenting a useful structure that helps readers make sense of the vast literature within the RCC approach, the proposed typology produces some interesting findings that illuminate a hitherto unrecognized but critical aspect of Penrose’s contribution.

Discerning the schools and their characteristics is not a simple task, partly because the RCC approach is characterized by a proliferation of terms and concepts, and in most cases different authors are using different terms to describe the same concepts. The review provided in this chapter preserves each author’s original terminology. However, it contributes to reducing the confusion in terms by pointing out the similarities in the underlying concepts, so that one may discriminate the substantive from the merely semantic differences. This chapter also provides a nuanced review of the RCC approach, which builds on previous attempts at mapping the field (Sanchez, 2001; Schulze, 1994; Mahoney & Pandian, 1992). However, the current study goes beyond previous reviews in its recourse to epistemology, which allows the delineation of a constructionist stream that has not previously been recognized as a distinct school. The constructionist school
provides an explanation for the divide that some authors have sensed in the RCC approach (Schulze, 1994; Foss, 1997) for which no adequate explanation has been provided. Scarcely recognized in the literature is the insight that Penrose’s views on management and the growth of firms are intimately related to this constructionist school, which is the stream that can most accurately be considered a modern continuation of Penrose’s ideas. This constructionist school is in many instances incorrectly subsumed under the behavioral-evolutionary school due to some similarities in the substantive content of the two schools. This study further contributes in illuminating the differences and similarities among the two schools. This comparison is carried out in general terms in this chapter. The comparison is subsequently presented in a more detailed form in the remaining chapters of the dissertation, which review and compare the two most prominent research programs, namely the Dynamic Capabilities program (Teece et al, 1990; 1997), which springs from the behavioral evolutionary school and the Core Competence program (Prahalad & Hamel, 1990), which belongs to the constructionist school.

The current chapter proceeds as follows: Part 2 and 3 provide the foundational ideas of the RCC approach put forth by Edith Penrose in her 1959 masterpiece The Theory of the Growth of the Firm and show how she espoused a constructionist epistemology in her study. Each of Parts 4, 5 and 6 respectively focuses on one of the three schools. The review of each school covers its underlying epistemology, fundamental assumptions and salient methodological characteristics according to the base disciplines its authors draw from. In addition, the conceptual focus and main theoretical contributions of each school are outlined as well as the overall directions in its research
program, both theoretically and empirically. The final part of the chapter compares the three schools in light of some major debates that have taken place in the literature, concerning the role economics plays in strategic management as well as the variant interpretations of Penrose’s work and her contribution to the RCC approach.

3.2 Edith Penrose As The Foundation

The heterogeneity of firms with respect to their resources had been emphasized by Chamberlin as early as the 1930s (Fahy, 2000). However, it was Penrose’s landmark, *The Theory of the Growth of the Firm* (1959) that clearly laid out the foundational ideas of the RCC approach in strategy. For over twenty years, the work of Penrose was not recognized as a breakthrough and was not given due attention in economics and in management. However, a couple of decades later, the situation was entirely reversed. Several scholars published papers drawing on some of Penrose’s ideas and this stream soon came to be called the resource-based view of the firm (henceforth the RBV). The name was coined by Birger Wernerfelt in his 1984 article under the same title, however, the term is inspired by Penrose’s (1959) notion that the firm is usefully viewed as a bundle of resources. Work in the behavioral-evolutionary and the constructionist schools was also in part inspired by Penrose’s views. It is important to note that different authors drew on different aspects of Penrose’s book. Therefore, a brief review of the main ideas of Penrose is important, and will allow us later to return to the issue of how each school relates to Penrose. The foundation that Penrose established for the RCC approach consists of four basic ideas: (1) viewing the firm in terms of its resources; (2) explicating the sources of firm heterogeneity; (3) the creation process of idiosyncratic firm resources;
(4) the trigger behind firm expansion and the basis for diversification. These ideas are explained next with reference to the original contribution by Penrose.

Penrose defined the firm as a bundle of resources. The importance of this contribution from the point of view of strategy is that managing the firm is essentially managing a set of tangible and intangible resources. Penrose looks particularly to the productive services that are available to the firm from the use of its resources, and asserts that these are not the same for different firms, even if the resources are identical. This is because of a two-way interaction: “It is shown not only that the resources with which a particular firm is accustomed to working will shape the productive services its management is capable of rendering, ..., but also that the experience of management will affect the productive services that all its other resources are capable of rendering.” (Penrose, 1959: 5) These productive services depend on the “function” or “activity” for which the resources are used, as well as the type of other resources they are combined with and the manner in which they are combined. “…It is largely in this distinction [between resources and the services they render] that we find the source of the uniqueness of each individual firm” 8 (Penrose, 1959: 25) This heterogeneity arises from the possession of different resources, but more importantly from the varying services that firms derive from similar resources, as a result of the particular ways in which the resources are employed within the idiosyncratic circumstances of each firm. This view of the firm is a great leap coming from an economist and considering the classical view of the firm in mainstream economics, which employs the representative firm premise. In

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8 The idea of productive services is the precursor of the concept of ‘capabilities’, will be elaborated further in Part 3 below. The capabilities concept features in work of Richardson (1972), Nelson & Winter (1982), Teece, Pisano & Shuen (1997) and Dosi, Nelson and Winter (2000).
the economic theory of the firm, firms are typically seen as identical, represented by a production function, in which resources enter as quantities of homogenous inputs.

Regarding the creation process of idiosyncratic firm resources, Penrose put forth the key idea that new services are continuously being created out of the firm’s resources. Further, she argues that these services are never fully utilized by the firm’s productive operations, and that unused services exist in every firm. She gives three reasons why this is always the case: the indivisibility of resources; the specialized use of resources; and the observation that in the course of normal firm operations, new services from existing resources are continually being created (Penrose, 1959: 68) This happens because some resources, mainly human resources, exhibit services that are inherently heterogeneous. Every time the service is rendered it is unique, and with each unique exercise of a service, new knowledge is created. “The number of entrepreneurial man-hours has surely very little relation to the ‘amount’ of service rendered... An idea produced, a decision made, an important employee grievance settled, are each a unique operation of value in the organization of production – services performed which cannot be repeated.” (Penrose, 1959: 75) Since it is the human resources that put the organization’s material resources to use, the services rendered by the material resources are also heterogeneous depending on the various ways in which the organization’s members use them. The increase in knowledge and experience results in continuous creation of new productive services.

“The possibilities of using services change with changes in knowledge. More services become available, previously unused services become employed and employed services become unused as knowledge increases about the physical characteristics of resources, about ways of using them, or about products it would be profitable to use them for. ... That the knowledge possessed by the firm’s personnel tends to increase automatically with experience means, therefore, that the available productive services from a firm’s resources will also tend to change.” (Penrose, 1959: 76)
The fourth and last of Penrose’s foundational ideas is that the principal motive that lies behind expansion and diversification, and thus the root of firm growth can be found in the firm’s unique resources. Expansion and diversification provide profitable ways to utilize the unused services that the firm’s resources provide. Penrose suggests that the type of resources available in the firm, the utilization of which motivates expansion, determines the direction of expansion, or what kind of products/services the firm will consider producing when it expands or diversifies (Penrose, 1959: 82). In innovation, although entrepreneurs only develop products for which they anticipate considerable consumer demand, the prime force suggesting what new products to produce is not what customers want, but rather what the unique productive services rendered by the firm’s resources can produce. The following quote summarizes Penrose’s view on the growth of firms and the sources of their competitive advantage.

“There is a close relation between the various kinds of resources with which a firm works and the development of the ideas, experience and knowledge of its managers and entrepreneurs, and we have seen how changing experience and knowledge affect not only the productive services available from resources, but also ‘demand’ as seen by the firm. Such changes, together with the various special advantages accruing to a firm because of the availability of unused productive services within it create the special productive opportunity of a given firm. Unused productive services are, for the enterprising firm, at the same time a challenge to innovate, an incentive to expand, and a source of competitive advantage. They facilitate the introduction of new combinations of resources – innovation – within the firm. The new combinations may be combinations of services for the production of new products, new processes for the production of old products, new organization of administrative functions.” (Penrose, 1959: 85-86)

In addition to spurring growth, Penrose also proposes that the firm’s managerial resources impose limits on the extent of firm growth, which has been referred to later as the ‘Penrose effect’ (Marris, 1963; Shen 1970).

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9 This is what Teece refers to as the efficiency approach to strategy.
Each of the three schools identified in this study draws on some aspects of Penrose’s views albeit in varying degrees. This will become apparent in the following sections which review the main characteristics of each school. It is interesting to note that among the three schools, the rational-equilibrium school, which is popular by the name of the resource-based view, displays the least resemblance to Penrose’s growth theory, despite the common view in the literature that Penrose is the pioneer of the RBV. It is shown below that Penrose is truly a pioneer, but not of the RBV. The behavioral-evolutionary school bears a closer resemblance to Penrose than the RBV, but delving deeper than the surface leads one to conclude that the constructionist school shares a very similar philosophical view that underlies Penrose’s approach to management and firm growth. The following analysis of the three schools argues that the constructionist school is the modern (and fruitful) extension of Penrose’s insights, which is not currently recognized as such in the literature dealing with the RCC approach.

Some authors (Foss 1996, 1999, 2000; Schulze, 1994) have sensed a schism in the RCC approach (which they equate with the RBV) that separates a static, equilibrium-based version of the resource-based argument that draws on formal economics, from a dynamic, process-oriented version. Although the extant characterization of the divide shares some common elements with the analysis presented here, it is deemed inaccurate as it misses out on important epistemological distinctions to be revealed shortly. An alternative typology will be proposed that identifies a third school related to the RCC approach distinguishable from the other two by its constructionist epistemological framework. It is shown that Penrose employs an unmistakable constructionist epistemology in her *Theory of the Growth of the Firm*, an aspect that is at the core of her
argument. This dimension of Penrose’s thinking is at odds with the formal economic framework underlying the RBV and therefore had to be dropped in RBV accounts. This observation increases the gulf between Penrose and the RBV school of thought, and refutes the allegation that the latter is an outgrowth of Penrose. Another interesting finding concerns the surprising lack of recognition of the constructionist inclination of Penrose’s theory. With the exception of Foss (1999), it seems that this epistemological dimension has escaped the attention of the majority of prominent scholars working on the RCC approach, simply because Penrose preceded constructionism by a good twenty years. Accordingly, publications embracing the constructionist view, the salient example here being the work of Hamel and Prahalad on Core Competences, are mistakenly grouped in the behavioral/evolutionary school for their focus on dynamic aspects and for the absence of formal economic theorizing from their work. These issues will be clarified in the following sections, and expanded upon in the following chapters. First, however, our claim that Penrose is following a constructionist epistemological frame must be substantiated.

3.3 The Constructionist Epistemology of Edith Penrose

This philosophical interpretation of Penrose’s thinking underscores the importance of a constructionist epistemology for the study of internal firm attributes as a source of competitive advantage and firm growth. The constructionist inclination is apparent in the way Penrose explicates the relation of the firm to its environment, as well as her definition of the productive opportunity of the firm and her identification of the determinants of market demand. It is also accentuated in how she incorporates
knowledge, and particularly tacit knowledge in the determination of the productive services that firms extract from their resources. In the ensuing analysis, the prolific use of quotes from the original text is intended to help the reader witness first-hand the constructionist character of the arguments. It also calls to attention the deviation between this view of the firm and the assumptions upheld in both the rational-equilibrium RBV and the behavioral-evolutionary schools.

Penrose explicitly states that the environment relevant to her study of the growth of business organizations is the subjective environment created in the cognition of the entrepreneur/manager. For Penrose, the objective environment that scholars observe and measure is irrelevant given that the aim is to explain the behavior of firms and their managers.

“In order to focus attention on the crucial role of a firm’s ‘inherited’ resources, the environment is treated, in the first instance, as an ‘image’ in the entrepreneur’s mind of the possibilities and restrictions with which he is confronted, for it is, after all, such an ‘image’ which in fact determines a man’s behavior; whether experience confirms expectations is another story.” (Penrose, 1959: 5)

This by no means implies that taking a subjective cognitive view leads us to live in a dream world. Penrose emphasizes the importance of a subjective view because, similar to Weick’s (1969) arguments above, it is these cognitive constructions that determine the actions of managers. The collective enactments rooted in subjective individual and social cognition shape both the organization and the environment.

“In the last analysis the ‘environment’ rejects or confirms the soundness of judgments about it, but the relevant environment is not an objective fact discoverable before the event; economists cannot predict it unless they can predict the ways in which a firm’s actions will themselves ‘change’ the relevant environment in the future. In any event, what the economist sees may be very different from what an individual firm sees, and it is the latter, not the former, that is pertinent to an explanation of a firm’s behavior.” (Penrose, 1959: 41)
This view has profound implications for the way firm behavior and competitive advantage is researched. The objective methods of economics that attempt to derive covering laws and calculable outcomes will not work. According to Penrose, the focus should shift to managerial individual and organizational level cognitions about the firm and its environment, and the factors that influence them, and how cognition shapes the organization and its environment. This is the view taken in the social constructionist school. Accordingly, strategy starts from the inside of the organization first, and then proceeds to the outside.

“We shall be interested in the environment as an ‘image’ in the entrepreneur’s mind, for we want, among other things, to discover what economic considerations, as contrasted with ‘temperamental’ considerations, determine entrepreneurial judgments about the environment. The factors affecting the relation between the ‘image’ and ‘reality’ are not being ignored, but for an analysis of the growth of firms it is appropriate to start from an analysis of the firm rather than of the environment and then proceed to a discussion of the effect of certain types of environmental conditions. If we can discover what determines entrepreneurial ideas about what the firm can and cannot do, that is, what determines the nature and extent of the ‘subjective’ productive opportunity of the firm, we can at least know where to look if we want to explain or to predict the actions of particular firms.” (Penrose, 1959: 42)

In this view of strategy-making, the firm does not take the environment as a given. Rather, firms and their managers enact the organization and the environment. Thus, the organization is an active creator rather than a reactive adapting entity that is continuously struggling to shape itself according to the dictates of a forceful environment.

“Firms not only alter the environmental conditions necessary for the success of their actions, but, even more important, they know that they can alter them and that the environment is not independent of their own activities. Within the unknowable limits placed by the environment on successful action there is a wide scope for judgment.” (Penrose, 1959: 42)
This view brings back a great deal of strategic choice to the organization and its members and managers. It stands in stark contrast with the extreme form of environmental determinism implied in such theories as population ecology (Hannan & Freeman, 1977), institutional theory (Meyer & Rowan, 1977) or neoclassical perfect competition, where the activities of organizations and their members are depicted as mere reactions to powerful environmental forces that determine the correct behavior of a surviving organization. Other approaches, such as the classical SWOT approach, the positioning approach (Porter, BCG), or approaches originating in organizational economics (industrial organization, TCE, evolutionary theory) take on a milder form of environmental determinism where the organization is portrayed as acting and being acted upon (Cockburn, Henderson & Stern, 2000). Penrose does not take the middle of the road here, but sways to the constructionist side that puts more emphasis on what the firm does with its environment, how it enacts itself and its surroundings and the power it has to construct this environment. This view is apparent in the following quotes, in which Penrose explains that the productive opportunity of the firm is a purely subjective matter, rather than the objective exhaustive technical production frontier commonly used by economists. Even market demand, which is normally treated as an exogenous variable, and a force that determines a firm’s strategic marketing and production plans, is considered in the constructionist approach an endogenous variable.

“Although the ‘objective’ productive opportunity of a firm is limited by what the firm is able to accomplish, the ‘subjective’ productive opportunity is a question of what it thinks it can accomplish. ‘Expectations’ and not ‘objective facts’ are the immediate determinants of a firm’s behavior, although there may be a relationship between expectations and ‘facts’ – indeed there must be if action is to be successful, for the success of a firm’s plans depends only partly on the execution of them and partly on whether they are based on sound judgment about the possibilities for successful action.” (Penrose, 1959: 41)
“The really enterprising entrepreneur has not often, so far as we can see, taken demand as ‘given’ but rather as something he ought to be able to do something about.” (Penrose, 1959: 80)

“Once it is recognized that the ‘demand’ with which an entrepreneur is concerned when he makes his production plans is nothing more nor less than his own ideas about what he can sell at various prices with varying degrees of selling effort, then we ought to consider what influences the development of those ideas. For if entrepreneurial notions about what consumers ought to like have some influence on what is offered to consumers and therefore on what they do in fact like, or learn to like, a mere inquiry into the ‘state of demand’ will not enable us to understand the productive activity of entrepreneurs and, in particular, their innovating activity.” (Penrose, 1959: 81)

It is expected to find various interpretations of a classic such as *The Theory of the Growth of the Firm*. However, what is unique here in the case of Penrose, is that a very important (and at the time she wrote, novel) dimension of her work is virtually dropped, as it was nearly impossible to fit within the dominant economic frame that shaped the resource-based literature subsequently. While the approaches based on economic methodology (both equilibrium and evolutionary) looked to objective and measurable dimensions that could be fed into formal models, this limited the set of issues that could be factored in and could only be used retrospectively to make sense of past firm performance and growth. Penrose has made it clear that this is not what she sought to study. She had a prospective outlook, and was interested in the factors that *ex ante* influenced the growth of firms and the actions of entrepreneurs/managers. She emphasizes, as shown in the quotes above, that *ex ante*, it is the subjective outlook of the entrepreneur that should take precedence, and that scholars need to examine more seriously the notion that the direction of causality may flow more forcefully from the ‘inside’ to the ‘outside’ of the organization, or in other words from the individual and
collective actions of organizational members to the world. That this is scarcely recognized in the RCC literature reaffirms Kuhn’s notions about the power of the frame and the influence of the paradigm on what scholars can possibly ‘find’ when they ‘observe’ the world. From the perspective of strategy, analyzing the categories of the past is at best a preparatory task that assists the strategy-making process. However, in strategy, prediction, not explanation, is important. Penrose made it clear that prediction based on the categories of the past is inadequate; rather it is based on the active creative powers of the firm’s members.

After this overview and re-interpretation of Penrose’s thinking on the growth of business organizations, I proceed to structure the RCC literature into three distinct schools of thought, each with its unique epistemological foundations and set of fundamental assumptions that shape its theoretical framework. As mentioned in the introduction to this chapter, I try to maintain a delicate balance between seminal classics and state of the art contributions in each school. In reviewing this vast literature from an epistemological perspective, it is necessary to devote substantial space to the foundational contributions, as they are used to distill the unique underlying framework of each school. This may come at the expense of providing a more comprehensive review of the most recent work in each school. However, this tradeoff is justified, in my view, since the deep understanding of the theoretical foundations of each school offered in the current study, allows a better understanding of the most recent literature. This task of taking stock of the deep underpinnings of the field has not been carried out as thoroughly prior to the current study.
3.4 The Rational – Equilibrium School

During the 1980s and early 1990s, several authors from different backgrounds wrote papers in business policy focusing on the heterogeneity of firm resources as an explanation for sustained economic rents, and as grounds for diversification. These scholars were either economists or strategy scholars who researched strategy from an economic perspective. This collectivity of ideas was eventually dubbed the resource-based view (RBV) of the firm, and of strategic management, after the title of Wernerfelt’s seminal article (1984), which is (arbitrarily) taken to mark the birth of the RBV. This section first presents a review of the basic ideas and logic of the RBV, followed by an analysis of its fundamental assumptions, epistemology and methodology. The extent to which the RBV draws on Penrose’s thinking as well as its strong and weak points are discussed. In this research, I present the rational-equilibrium school as being synonymous with the RBV, which provokes a question: Why the need for a fancy label? The reason I insist on the ‘rational-equilibrium’ label is two-fold. First, the label is in harmony with the core criteria I use to differentiate the three schools; these criteria identify the underlying epistemological and methodological framework. The second reason is the confusion that abounds in the literature concerning the resource-based view and the work that constitutes it. Some authors equate the RBV with the whole RCC approach, and consider all the literature described under the three schools to belong to the RBV (Spender, 1994; Foss, 1997). However, I agree with Jay Barney, who argues that the RBV is more limited in its origins, which is rooted in the interaction among economists and strategists at UCLA and is specifically characterized by its economic origins.
3.4.1 A Conceptual Outline of the RBV

Wernerfelt’s seminal article (1984) proposed a view of the firm that focuses on resources rather than products, in line with Penrose (1959). RBV scholars viewed firm resources as causes of monopolistic or efficiency advantages, and thus differential performance across firms (Wernerfelt, 1984; Rumelt, 1991). The firm-specific resources were also viewed as a reason for firms to diversify into markets in which these resources were important inputs (Teece, 1980; 1982). The most important theoretical contributions in the RBV sought to describe the characteristics that resources need to display to earn rents, which in economics refer to profits over and above the price of obtaining the resource. They also explain the different types of rents and sketch the factors that account for the sustainability of the rent streams in equilibrium.

Although various definitions have been advanced for what is meant by resources, Barney’s definition captures most of what is found in the RBV literature. According to Barney (1991) “…firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (Barney, 1991, p.101) This definition is in line with the strengths that feature in the internal analysis part of the classic SWOT model of strategy, and from it is derived the first characteristic of rent generating resources, namely that they must be valuable to the firm\textsuperscript{10}. Barney further classifies resources into physical (capital equipment, physical technology, geographic location, raw materials), human capital “…training, experience, judgment, intelligence, relationships and insight of individual

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\textsuperscript{10} Barney offers ‘Valuable’ as the first attribute of his VRIN framework, which specifies that resources must be Valuable, Rare, Imperfectly Imitable and Non-substitutable to qualify as potential generators of sustainable competitive advantage.
managers and workers in the firm” and organizational, “…a firm’s reporting structure, its formal and informal planning, controlling and coordinating systems, informal relations among groups within a firm and between a firm and those in its environment” (Barney, 1991: 101) This comprehensive definition of resources implies that almost anything inside a firm can be a source of advantage, and hence the importance of further specification of the characteristics of rent generating resources. These characteristics were deduced using the basic economic logic of neoclassical price theory. In line with the structure-conduct-performance framework of Bain/Mason style industrial organization and its application to strategy in the form of the industry structure approach of Porter and Caves, the competitive conditions affecting the supply and demand of resources in strategic resource (factor) markets determined which resources would command monopoly rents due to market power considerations (Wernerfelt 1984). As in product markets, competitive imperfections in factor markets may result in rents accruing to certain factors, as in the case of a unique resource (Barney, 1986). Besides being valuable to the firm in implementing strategies, Barney proposed that strategically valuable resources had to be rare, because the fewer the number of firms possessing the valuable resources, the higher the degree of competitive advantage that accrues to a firm possessing the resource (of course relative to demand) (Barney, 1991). The rare resource commands what economists call Ricardian rents (Castanias and Helfat, 1991), such as the case of a superior location of a store at the corner of two main streets. Connor (1991), on the other hand, emphasizes asset specificity as a salient feature of rent generating resources. She explains a situation in which an asset is available on the market, yet is a source of rent due to its specificity to a particular firm’s resource base, meaning that a
particular asset may yield more productive value when combined with the asset base of a specific firm, than when it is used in other firms. In this case, although the firm can sell its resource on the market, it will not do so because its price on the market will be less than the value it yields by being combined with other resources inside the firm (Connor, 1991). Economists refer to the extra return as a quasi-rent, which is the difference in rent between the first and second best uses of the resource\textsuperscript{11} (Castanias and Helfat, 1991). These specific assets are said to be imperfectly mobile, because although they can be sold on the market, they earn a higher value when used in the firm. Imperfect mobility assures that the resources are ‘sticky’ to the firm and can thus be a source of competitive advantage (Peteraf, 1993). If resources are mobile (not sticky to the firm) their price is bid up and extra rents are appropriated by the resource owner, rather than by the firm. In this case, mobile resources that can easily be deployed in many firms, cannot be a source of sustained rents. In a widely cited article, Dierickx and Cool (1989) take these ideas one step back, and ask a more fundamental question: Are all strategic factors bought and sold on markets? They claim that indeed the most important strategic resources, such as reputation, are not readily bought and sold, and no markets exist for them. The authors disagree with Barney and assert that it is not strategic factor market imperfections that are important. Rather, the incompleteness of strategic factor markets is the key issue, as some factors are simply not traded on a market. “Being non-tradable, the firm-specific component is accumulated internally... by choosing appropriate time paths of flows over a period of time.” (Dierickx & Cool, 1989: 1505) This means that a firm with an accumulated stock of valuable resources must deploy them in product markets in order to

\textsuperscript{11} A similar notion is described by Teece in the case of co-specialized assets which must be used with other specific assets in the firm (Helfat et al., 2007).
acquire their rent potential. It also means that firms lacking these resource stocks cannot simply buy them; they must expend the time, effort and investment to build them internally (Dierickx and Cool, 1989). Relevant examples here are customer loyalty, goodwill, trust between the firm and its suppliers or customers, and teamwork among members of the firm.

The RBV does not explicitly deal with the processes by which firms can endogenously create, build or otherwise acquire valuable, rent generating resources. Barney (1986) assumes the existence of markets for strategic resources, albeit imperfect markets. Peteraf (1993) emphasizes the necessity of ex ante limits to competition in the relevant factor markets for acquiring particular resources (Peteraf, 1993). These imperfections may be monopolistic and related to market power, which is consistent with Bain style industrial organization, or they may be informational in nature, consistent with the new industrial organization of the Chicago school (Connor 1991). Barney (1986) states that if the value of resources needed to implement successful strategies was perfectly known, their potential return would be competed away in their price, and there would be no abnormal returns. Barney mentions several important causes of competitive imperfections in strategic factor markets (such as uniqueness). However, he reduces all of the causes to a simple dichotomy of perfectly accurate expectations about the future value potential of the resource versus pure luck. According to Barney, a firm buys a resource because it is able to accurately forecast the future value of the resource better than other firms (due to information asymmetries and the costs of acquiring information), or it acquires a resource by luck, which (happily) turns out to have superior value in the future (Barney, 1986). Dierickx and Cool propose another way to acquire strategic
resources, which is accumulation internally in the firm by deliberate investments, such as the case of R&D (Dierickx & Cool, 1989). “It takes a consistent pattern of resource flows to accumulate a desired change in strategic asset stocks.” (Dierickx & Cool, 1989: 1506) The authors thus take the stock of accumulated strategic assets at any point in time as an indicator of the competitiveness and potential profitability of the firm, while strategy formulation entails making decisions about investment in optimal flows for the accumulation of strategic assets.

Besides understanding the characteristics of rent-generating resources, contributors to the RBV have elucidated several mechanisms that enable firms to sustain the superior returns from their unique resources. The RBV justification for persistent heterogeneity in firm returns rests on two main pillars: the first consists of competitive conditions and strategic factor market imperfections; and the second comprises factors that deter imitation or substitution of strategic resources that generate rents. According to conventional economic thinking, in a competitive market, it is expected that firms owning rent-generating resources can earn superior returns in the short run. Eventually (in equilibrium), increased demand for the resource will bid its price up and dissipate any extra returns that may accrue from owning it. Superior return can be sustained in equilibrium only when competitive imperfections exist, such as concentration and market power, which result in monopoly rents, or scarcity in the supply of resources, which results in Ricardian rents. Peteraf (1993) explains four necessary conditions in her “Cornerstones of Competitive Advantage”. Besides heterogeneity in firm resource sets, Peteraf explains that ex ante limits to competition in acquiring the valuable resource are necessary, so that the cost of acquiring it does not offset the rents it generates. Ex post
limits to competition over these rents once a particular firm has acquired them guarantees
the persistence of heterogeneity and prevents the dissipation of monopoly or Ricardian
rents. Finally, imperfect mobility makes these resources specific to the firm so that the
rents are shared by the firm and the resource owner (Peteraf, 1993). Wernerfelt
approaches the sustainability question from the strategic positioning perspective, utilizing
Porter’s Five forces model and the BCG growth-share matrix, but applying them to
resources rather than products. Wernerfelt concludes that for a resource to obtain a
sustainable rent stream in the long term, the firm must build resource position barriers,
similar to entry barriers in product markets (Mason, Bain) and mobility barriers in
strategic groups of firms (Porter, Caves). Resource position barriers place the firm at an
advantage vis-à-vis other firms that find it more difficult to build a similar resource
position, primarily due to first-mover advantages, and are also closely associated with the
nature of the resource. Wernerfelt also presents an analytical tool, which is really a
‘resource-based’ version of the BCG growth-share matrix, and calls it the resource-
product matrix. By means of the resource-product matrix, Wernerfelt examines a
portfolio of firm resources according to their importance in different markets, and looks
to acquisition and merger as means of acquiring whole bundles of resources\(^\text{12}\). Although
market imperfections and incomplete markets (for non-tradable resources) prevent
competitors from buying the rent-generating resource, they may try to imitate resources
of strategic importance (Peteraf, 1993). Hence, Barney emphasizes that if resources are
to yield sustained advantage, they must be imperfectly imitable to make replication

\(^{12}\) Wernerfelt, 1984. It is important to note that Wernerfelt’s analysis rests on the basic economic
assumption of actor rationality. Wernerfelt states that “…a holder of a resource is able to maintain a
relative position vis-à-vis other holders and third persons, as long as these act rationally.” (P.173) The
importance of this note will become clear later on in the context of analyzing the framework underlying the
RBV.
difficult for competitors. Sometimes a competitor may be able to achieve similar strategies by inventing an alternative way rather than trying to replicate exactly the firm’s way. In this case, a ‘valuable’, ‘rare’ and ‘imperfectly imitable’ resource does not yield sustained competitive advantage unless it cannot be substituted by another resource. Thus ‘non-substitutable’ completes the four conditions of the Barney’s VRIN framework for sustainability of advantage based on resources (Barney, 1991). Accordingly, RBV scholars have elaborated a set of factors that make it difficult or impossible for competitors to imitate or substitute the rent generating resources. These factors are explained next.

Lippman and Rumelt (1982) present a formal model of uncertain imitability, which is based on the idea that uncertainty plagues the sources of potential rent, such as technological changes, discoveries and inventions, changes in consumer tastes or changes in laws and regulations (see Table (1) below). With uncertainty, Lippman and Rumelt propose a list of isolating mechanisms, such as causal ambiguity, which preserve the disparities in firm profits in the long run due to prevention of entry or imitation. Causal ambiguity here reduces the possibilities for new entrants into the industry as well as imitation by incumbents because the relation between actions and efficiency outcomes is not clear.

“The assumption of uncertainty in the creation of new cost functions explains the origins of efficiency differences. The fact that the same uncertainty applies to all imitative and entry attempts explains their persistence despite free entry and raises the possibility that entry will cease before industry profits are eliminated. Nevertheless, in neoclassical theory efficiency differences are also eliminated by competition among incumbents; techniques are imitated and the prices of factors found to be especially effective are bid up. If efficiency differences persist, they are traceable to imperfections in the factor markets. In general, markets for factors will be imperfect under conditions of uniqueness, ambiguity, or enforceable property rights to special factors.” (Lippman & Rumelt, 1982: 420)
Rumelt further elaborates on the importance of uncertainty in this explanation.

“Although isolating mechanisms provide (ex post) stable streams of rent, the opportunities to create, ‘jump behind’, or otherwise exploit them must arise from unexpected changes. Without uncertainty there is no wedge between the ex ante price of an asset or market position and its ex post value. It is the juxtaposition of isolating mechanisms with uncertainty that permits the modeling of heterogeneity in an equilibrium framework.”\(^{13}\) (Rumelt, 1984/1997: 141)

Table (1) below shows Rumelt’s theory, where the sources of rent are on the left column and the mechanisms through which they are sustained on the right.

<table>
<thead>
<tr>
<th>Sources of Potential Rents</th>
<th>Isolating Mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in Technology</td>
<td>Causal ambiguity</td>
</tr>
<tr>
<td>Changes in relative prices</td>
<td>Specialized assets</td>
</tr>
<tr>
<td>Changes in consumer tastes</td>
<td>Switching and search costs</td>
</tr>
<tr>
<td>Changes in law, tax and regulation</td>
<td>Consumer and producer learning</td>
</tr>
<tr>
<td>Discoveries and Inventions</td>
<td>Team-embodied skills</td>
</tr>
<tr>
<td></td>
<td>Unique resources</td>
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<td></td>
<td>Special information</td>
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<tr>
<td></td>
<td>Patents and trademarks</td>
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<tr>
<td></td>
<td>Reputation and image</td>
</tr>
<tr>
<td></td>
<td>Legal restrictions on entry</td>
</tr>
</tbody>
</table>

*The table is adapted from Rumelt 1997, p.141, which is a reprint of the original article by Rumelt, 1984.

While causal ambiguity deters imitation by challenging competitors’ understanding of the important links among resources and sustainable competitive advantage, social complexity is another deterrence mechanism that poses a challenge to competitors’ ability to control a resource, even if they can understand how it relates to the achievement of superior performance. “A wide variety of firm resources may be socially complex. Examples include interpersonal relations among managers in a firm, ... a firm’s culture, ... a firm’s reputation among suppliers, ... and customers.” (Barney, \(^{13}\) Rumelt, 1984, is reprinted in a collected volume in 1997.)
Although there may be no causal ambiguity in these examples, the managers of firms that do not enjoy these valuable resources cannot simply “...engage in systematic efforts to create them.” When value-creating resources are socially complex, they are “…beyond the ability of firms to systematically manage and influence,” (Barney, 1991: 110) and are therefore extremely difficult to imitate. Castanias and Helfat (1991) present the firm’s top management (the CEO and the team of top managers) as a rent-generating resource that embodies both causal ambiguity and social complexity. In case the firm’s management exhibits rare skills, it commands Ricardian rents. As for firm or industry-specific skills and knowledge, these command quasi rents (defined as the difference between the returns to the first and second best uses of the resource). The authors explain how causal ambiguity is a primary isolating mechanism for top managerial skills, as they are intangible and involve a lot of tacit knowledge and skill (Castanias & Helfat, 1991). The social complexity arises out of the interpersonal relations, teamwork and relations of the top management team with other members of the organization.

Dierickx and Cool (1989) offer four additional factors that deter imitation, namely time compression diseconomies, asset mass efficiencies, interconnectedness of asset stocks and asset erosion. The presence of time compression diseconomies means that time plays an important role in asset stock accumulation, and no shortcuts can be taken. Therefore, competitors who want to quickly catch up with the level of accumulated resources that a company has built over the years will not be able to do so. For example, a given amount of R&D spent over a six year period produces a higher stock of knowledge than double the amount spent in half the time. Asset mass efficiencies mean
that the higher the resource stock level, the easier it becomes to accumulate further resource stocks. An example is learning; the bigger your stock of knowledge, the easier it is for you to acquire new knowledge. Interconnectedness of asset stocks refers to the situation where the accumulation of a particular rent-generating resource is dependent upon the level of stocks of other complementary resources. Without these complementary asset stocks, would-be imitators find it more difficult to imitate a firm’s rent-generating assets. Lastly, any asset stock erodes over time unless maintenance costs are incurred. For example, the value of knowledge may decrease as new knowledge is created and the old knowledge gradually becomes obsolete. Brand awareness also erodes because the customer base is not static; it changes, and also because customers forget. Rapid erosion rates and high maintenance costs of certain types of resources decrease the duration and/or extent of advantage a firm gains by owning them (Dierickx & Cool, 1989).

3.4.2 The Underlying Framework of the Rational-Equilibrium School

The above review has covered the main conceptual building blocks of the resource-based view, which comprises the rational-equilibrium school of the RCC approach. In what follows, a more in-depth analysis of the school is presented, according to dimensions that will also be used to analyze the other two schools of the RCC approach (the behavioral-evolutionary and the social constructionist schools). This analysis strives to go beyond the concepts, to examine the underlying epistemology and basic assumptions. This provides for a deeper understanding of the school and facilitates the comparison with the other schools.
As explained above, the central concern in the school is to describe the characteristics of resources that command rents, and to account for the sustainability of those rents under equilibrium. The resource-based explanations draw primarily on neoclassical price theory, but present a more sophisticated picture, in which several types of market imperfections produce the possibility for different types of rent. Equilibrium is at the core of the analysis, as it serves as the benchmark against which above-normal returns are measured – normal here referring to the return under near-perfect competitive conditions. Equilibrium also marks the horizon for when an above-normal return (competitive advantage) is considered long lasting, or sustained. According to Barney (1991), sustained has nothing to do with calendar time. Sustained advantage means it survives even after attempts at duplication by competitors have ceased. As such, RBV contributions such as Wernerfelt (1984) and Barney (1991) may be considered an extension of mainstream industrial organization economics and of Porter’s industry structure approach, applied to the case of resource or factor markets instead of product markets. This work focuses on monopoly or Ricardian rents, arising from such factors as government regulations or patents. The concepts of resource position barriers (Wernerfelt 1984) and isolating mechanisms (Lippman & Rumelt, 1982; Rumelt 1984/1997) are analogous to entry barriers at the industry level in Bain industrial organization and mobility barriers at the strategic group level in Porter and Caves’ industry analysis framework. Other theoretical contributions such as Lippman and Rumelt (1982) and Peteraf (1993), which do not depend on market power explanations, and which allow for information asymmetries and differences in efficiency among firms, are inspired by the Chicago school industrial organization (Stigler; Demsetz, 1973). This
tradition of the RBV focuses on efficiency or quasi rents. In keeping with Chicago IO, neoclassical price theory and competition are central concepts, in which costly information and differences in production and distribution efficiency are used to explain firm size and scope (Connor, 1991). Foss (2000) emphasizes the influence of Harold Demsetz of UCLA, who is a prominent contributor to Chicago style IO, and whose 1973 article “Industry Structure, Market Rivalry, and Public Policy” anticipates several of the main RBV ideas. Therefore, in terms of base discipline, the RBV stems from industrial organization economics, in either of its two versions (the Bain – Porter – Caves IO or the Chicago – Demsetz IO). Jay Barney, who is a key contributor to the RBV, has argued against rational reconstructions of the RBV that tie its literature of the eighties and nineties to Selznick (1957), Penrose (1959) and Chandler (1962), which he calls ‘a myth’. He clarifies that the RBV actually “…owes its origin to the interaction, mainly at UCLA, between such economists and strategy scholars as William Ouchi, Michael Porter, Richard Rumelt, Oliver Williamson, Sidney Winter and Barney himself.” (Foss, 2000, p. 21) This interaction resulted in two seminal contributions, which played an important role in shaping the RBV; those are Lippman and Rumelt’s (1982) model of uncertain imitability and Barney’s (1986) article on strategic factor markets. Foss (2000) postulates that the influence of Demsetz style IO trickled over to the RBV through the concurrent presence of Demsetz in the economics department at UCLA, and thus the general flavor of economics done there, and not through direct interaction with Harold Demsetz. Foss (1997) adds to this account of the RBV’s birth, the contributions of Berger Wernerfelt (1984) and David Teece (1980; 1982).
To summarize the above argument, two traditions within the RBV are noted; one drawing on market power explanations in keeping with Bain IO, the new IO based on game theory, and consistent with the Porter/Caves industry structure approach to strategy; and the other drawing on efficiency based explanations in the Chicago IO tradition and in Harold Demsetz’s work. These two traditions are considered to be highly differentiated within IO economics, and according to strategy scholars such as Teece et al. (1997). However, there is adequate reason to argue that despite these differences, there are important commonalities in the underlying analytical logic, as well as in the epistemological basis.

The disciplinary base of IO economics and the analytical framework provided by neoclassical price theory displays a system of assumptions about the industrial and business world and about the actors that constitute it. This system of assumptions starts out with the portrayal of an almost perfectly competitive and predictable world, and subsequently starts to introduce some imperfections that explain certain aspects of firm behavior. Schulze describes this system of basic assumptions as follows.

“Consistent with neoclassical economics, this school describes economic activity as occurring within efficient markets whose parameters of behavior are presumed to be known, or at least, knowable. Important sources of change are presumed to be exogenous – since that which is endogenous is presumed known or knowable and is thus reflected in current conduct ... The portrait is not that of static markets – perpetually at or near equilibrium – but rather of a stable system in which competitive advantage is quickly eroded and in which previous conduct is a valuable guide to future conduct.” (Schulze, 1994, p.134)

Foss (1999) argues that the core logic is the same in both traditions of the RBV, based on competitive advantage being conceptualized as rents sustained in equilibrium. Further, “...the ‘trick’ with which these rents are generated is in both cases the time-honoured
one of throwing one or two spanners into the works of an otherwise perfect world ... these spanners in the works are essentially informational in nature,” and are chosen by the analyst as the relevant factor market imperfections that underlie product market advantages (Foss, 1999, p.93).

The view presented by the RBV (rational-equilibrium) school, and consistent with IO economics as its base discipline, displays a positivist epistemology and methodology, as described in the previous chapter and portrayed in the above quote by Schulze. Objective knowledge of the relevant parameters is obtainable and accurately displayed in precise mathematical forms according to the hypothetico-deductive methodology outlined in the last chapter. Accordingly, firms (and their managers) are assumed to behave rationally, according to the precise maximization of profit functions and minimization of cost functions subject to the technological constraints of the firm’s production function, where the parameters are objective and measurable. All firms and managers are presumed to choose the best out of all possible alternatives according to this single optimizing rationality, and thus their behavior is highly predictable, as well as the market behavior, which is described by the concept of equilibrium. The whole system can be expressed in a deterministic mathematical model that is accurate in explaining and predicting its outcomes – the prices and quantities of products in the market system. This determinism eliminates the capacity of management to produce superior performance (Helfat et al., 2007) except for identifying and acquiring control over those assets that command rents. Barney proposes that a firm either acquires rent generating resources as a result of pure luck, or as a result of superior information at the time the resource is acquired (Barney, 1986). There is no discussion of how these resources can be applied in
different ways or how firms can create rent generating resources endogenously. This gives the RBV a primarily retrospective focus and results in a view of the competitive environment where there is one technically optimal way to act to obtain sustainable rents, and where emphasis is placed on imitation and appropriation (rather than substitution). Thus, competition leads to isomorphism (Schulze, 1994), which leads to unhealthy hyper-competition (Porter, 1996: 61-62). The assumption of rationality and the use of equilibrium-based analysis assume away complexity since the calculative powers imputed to actors allow the computation of an optimal decision, and the only complexity allowed is that introduced at the discretion of the analyst in the form of market imperfections. When admitted, uncertainty takes the form of information asymmetry and costly search (Connor, 1991).

The RBV under the rational-equilibrium approach has made significant contributions in elucidating the characteristics of resources that yield sustainable rents and outlining the market imperfections that account for the rents. This allows managers to analyze their resource markets (albeit retrospectively), to identify rent generating ones and to gain better understanding of their resources and their firm. On a theoretical level, several authors commend the RBV for its integrative potential, as its literature has brought together concepts from several fields in strategy and economics (Foss, 1997; Mahoney & Pandian, 1992; Mahoney, 1995). Mahoney and Pandian (1992) argue that resource-based theory is able to sustain a conversation among different disciplines, which is the mark of a good theory. The authors discuss the commonalities that the RBV shares with mainstream strategy research, industrial organization and organizational economics with its sub-disciplines (agency theory, property rights and transaction cost economics).
Connor (1991) shows how the RBV provides the seeds of an alternative theory of the firm in place of the flawed neoclassical model. The RBV provides an explanation for the existence and scope of the firm, as opposed to purely market transactions. According to the RBV, the firm exists to assemble valuable resources for productive opportunities that would otherwise be difficult or very costly (transaction wise) to utilize through market transactions. This means it is more efficient to organize these productive activities within the firm. For the firm’s scale and scope, Connor mentions the resource based explanation based on the specificity or relatedness of the new project to the firm’s existing resource base. High degrees of relatedness provide inducements for the firm to expand into the related areas (Connor, 1991).

The contributions of the RBV are not without costs, and as there are advantages to the framework, there are also drawbacks. The RBV has drawn criticism typical of the theory of the firm in mainstream economics. The combination of the rationality assumption, the modeling of the firm in terms of optimization of profit functions and the utilization of equilibrium analysis have led to a static, abstracted view of the firm that misses out on the rich organizational and managerial dimensions. The RBV fails to account for dynamic issues pertaining to the origins of competitive advantage and deemed to be central to treatments of firm strategy and growth (Cockburn et al., 2000). Empirical tests conducted at the industry level are deemed inadequate for testing phenomena that take place at the level of the individual firm and below.

Foremost is the critique of the rationality postulate, which, to say the least, has proven to be glaringly detached from managerial decision making reality. Mahoney (2005) considers the issue to be settled beyond dispute.
“There can no longer be any doubt that the micro-analytic assumptions of neoclassical economic theory – the assumptions of perfect rationality – are contrary to fact. It is not a question of approximation; the assumptions of perfect rationality do not even remotely describe the processes humans use for making decisions in complex business situations. Moreover, there is an alternative. If anything, there is an embarrassing richness of alternatives.” (Mahoney, 2005: 52)

Extensive critique of the rationality assumption of neoclassical economics can be found in the work of Herbert Simon on bounded rationality, for which he was awarded the 1978 Nobel Prize in Economics, as well as other heterodox economists’ work, such as Nelson and Winter (1982). As for the drawbacks of employing models based on the rationality assumption in management and strategy research, authors such as Hühn (2005; 2007) and Bromiley and Paupenhausen (2001) have discussed the issue extensively. These discussions will not be repeated here, and the interested reader may go back to the original sources. Suffice it to say here that the rationality assumption is a conceptual distortion imposed on managerial behavior for the sole reason that it renders possible the mathematical modeling of economic phenomena under optimization methodology.

Besides employing the rationality assumption, analysis in the rational-equilibrium school, which utilizes equilibrium methodology based on comparative statics, is inadequate “... because it involves applying a timeless equilibrium model to an inherently dynamic reality.” (Foss, 1996: 181) The equilibrium-based methodology of the RBV fails to capture important dynamic aspects such as learning and innovation, and cannot account for the process of creation of competitive advantage. Long ago, Schumpeter, with piercing insight, criticized this aspect of economic equilibrium analysis. Schumpeter bemoans that “… the problem that is usually being visualized is how capitalism administers existing structures, whereas the relevant problem is how it creates
and destroys them.” (Schumpeter, 1942/1994: 84)\textsuperscript{14} Even resource-based analyses which do not draw on neoclassical economics, and use the new industrial organization methodology based on game theory suffer from the same shortcomings. Foss (1996) elaborates that in such studies, heterogeneity among firms arises from differences in resource endowments or market environments, and are thus fixed and given. There is no room for learning or for deliberate actions by managers that may differentiate firms. The calculative powers of agents enable them to foresee all possible moves in current and future stages of the game, and calculate the optimal solution. Therefore, “...there cannot be any failed strategies and wrong conjectures, no need for restructuring organizations in the face of, for example, new competition from innovative entrants, no ‘emergent’ (unintended) strategies (Mintzberg 1994), and no accumulation of resources (except in a trivial way by learning by doing) – in short, there can be no process.” (Foss, 1996: 186)

This abstraction of dynamics and of the managerial role is exacerbated by the use of market level explanations related to strategic factor market imperfections to account for phenomena that essentially take place and assume importance inside the business organization. Accordingly, empirical studies are conducted at the industry level and comprise cross sectional analyses based on secondary, publicly available data (Montgomery & Wernerfelt, 1988) intended to measure aspects that are supposed to be idiosyncratic and specific to the firm (Schulze, 1994). This shortcoming is again due to the nature of the tools that economic theory utilizes to look at the phenomenon of sustained competitive advantage. Finally, formal economic models fail to capture important qualitative differences among resources as well as soft factors that are central

\textsuperscript{14} This is a new edition of Schumpeter’s classic Capitalism, Socialism and Democracy, which was first published in 1942
to strategy such as vision, intuition and creativity. Penrose’s important distinction between the objective characteristics of resources and the specific manner in which they are deployed within a particular firm is not emphasized in the structure school (Schulze, 1994). Interestingly Penrose, the purported source of resource-based ideas, has explicitly criticized the use of neoclassical price theory for the study of firm growth. “We shall be dealing with the firm as a growing organization, not as a ‘price and output decision maker’ for given products; for this purpose, the ‘firm’ must be endowed with many more attributes than are possessed by the ‘firm’ in the [economic] theory of the firm, and the significance of these attributes is not conveniently represented by cost and revenue curves.” (Penrose, 1959: 14). In a footnote on the same page, Penrose states that “The economist’s ‘main conceptual schema’ is designed for the theory of price determination and resource allocation, and it is unnecessary and inappropriate to try to reconcile this theory with ‘organization theory’” (Penrose, 1959: 14).

Overall these naive assumptions lead to a theory that seems to be more concerned with ex-post explanations than prediction. One may ask how such a theory can claim to be useful for strategy, when strategy undoubtedly is concerned with the future, not the past. Scholars of the RBV who would agree with the above critique of the rational-equilibrium approach tend to find the solutions to its problems in the approach taken by the behavioral – evolutionary school, which is described next.
3.5 The Behavioral – Evolutionary School

The literature of the behavioral-evolutionary school is less homogeneous as a group than the rational-equilibrium school (RBV) literature. The school’s identifying characteristic is its attempt to focus on the dynamic and process aspects of the RBV, by relaxing some of the limiting assumptions of mainstream industrial organization economics and adopting alternative forms of economic analysis. Authors belonging to this school include, Amit and Schoemaker (1993), Teece et al. (1990, 1997), Helfat et al (2007) and many other prominent scholars. The theoretical contributions in this school draw on the behavioral theory of Simon’s *Administrative Behavior* (1945/1997), Cyert and March’s *A Behavioral Theory of the Firm* (1963/1992) or on the evolutionary economics of Nelson and Winter (1982). Work in this school is consistent with strategy process research (Schulze, 1994; Helfat et al, 2007) and includes a vast amount of literature, comprising several identifiable research streams such as resource-based research, capabilities based literature (Kogut & Zander, 1992; Dosi, Nelson & Winter, 2000), dynamic capabilities (Teece, Pisano & Shuen, 1997; Helfat et al., 2007) and some of the literature on the competence perspective (Foss and Knudsen, 1996). A comprehensive review of this massive literature is a considerable task that is beyond the scope of this small section. Rather, the aim here is to provide an outline of the main substantive considerations explored in research belonging to the behavioral-evolutionary school, and from there to examine the underlying assumptions, methodology and the general perspective from which this school springs. The analysis elucidates areas of overlap with the rational-equilibrium RBV as well as areas where the behavioral-evolutionary school improves on the shortcomings of the RBV.
3.5.1 A Conceptual Outline of the Behavioral-Evolutionary School

The substantive content of the behavioral-evolutionary school is distinguished from the rational-equilibrium RBV by its focus on dynamic process aspects, both technological and organizational in nature. In this respect, it draws on some of Penrose’s ideas and overlaps with the rational-equilibrium RBV on some of the latter’s foundational ideas, but also goes beyond it. After Penrose, early contributors to this school include Richardson (1972), Teece (1980, 1982) and Nelson and Winter (1982). Richardson argues that “organizations will tend to specialize in activities for which their capabilities offer some comparative advantage” (Richardson, 1972 p.888), in other words, activities that require the same or very similar sets of knowledge, experience and skills. These similar activities may lead the firm into diverse markets. For example,

“Du Ponte ... moved from a basis in nitro-cellulose explosives to cellulose lacquers, artificial leather, plastics, rayon and cellophane and from a basis in coal tar dyestuffs into a wide range of synthetic organic chemicals, nylon and synthetic rubber. Similarly, Marks and Spencer, having acquired marketing and organization techniques in relation to clothing were led to apply them to foodstuffs.” (Richardson, 1972: 889)

Similarity in this sense, is distinguished from the complementarity of activities, especially in cases such as car tires and cars, where there needs to be a high degree of harmonization. In such a case, the activities of designing and making an engine are dissimilar (in terms of capabilities) to those of making car tires, so they are produced by different firms. Due to the need for harmonization, there are forms of intense cooperation and coordination among automakers and parts subcontractors that transcend the market. Although this argument bears some resemblance to analysis in transaction cost economics dealing with inter-firm relations, Richardson considers
capabilities/competences as the central factor motivating cooperation rather than the minimization of transaction costs and opportunism. Similarly, Teece (1982) proposes an explanation for diversification based on efficiency considerations, showing that the assets organized by a firm have greater value when assembled internally than when they are externally coordinated through the market. The higher efficiency of internal organization is due to the nature of organizational knowledge, which contains a tacit component that is exercised without conscious deliberation within the specific organizational context, and is therefore irreducible to individual knowledge. Other reasons include the generation of excess managerial and technical resources through learning and the interchangeable or ‘fungible’ characteristic of organizational capabilities, which allows their use in various products without impairing their functioning for any of the products. Teece emphasizes that market failure prevents a firm from selling its usable inputs to other firms, which makes it more efficient for a firm to diversify, than for two firms to specialize and trade on the market (Teece, 1980). He further elaborates four classes of scope economies (based on internal firm resources) that result in higher efficiency for diversified firms, using economic transaction cost logic (Teece, 1982).

“It is important to note that diversification based on scope economies does not represent abandonment of specialization economies in favor of amorphous growth. It is simply that the firm’s comparative advantage is defined not in terms of products but in terms of capabilities. The firm is seen as establishing a specialized knowhow or asset base from which it extends its operations in response to competitive conditions.” (Teece 1980: 233)

As can be noted from Teece’s and Richardson’s contributions, the concept of organizational capabilities is a central one in the behavioral-evolutionary school. While the RBV scholars use the concept of ‘resources’ in broad terms, the emphasis on
processes and interactions among human, material and intangible resources gives rise to the capabilities concept. Nelson and Winter, who devote a part of their (1982) landmark, *An Evolutionary Theory of Economic Change* (1982), to an “Organization-Theoretic Foundation” of their evolutionary theory, propose that the essence of organizational capabilities is organizational knowledge (Nelson & Winter, 1982; Dosi, et al., 2000). Organizational capabilities involve knowledge of how to accomplish “*...a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs.*” (Nelson & Winter, 1982: 73) This knowledge may exist in a codified form such as blue prints, manuals or firm documentation, or it may exist in a more tacit form in the minds and actions of experts, and is manifest in the form of organizational routines. An organizational routine can be defined as a “*...coordinated activity*” (Nelson & Winter, 1982: 97) performed by one or more subunits in the organization, which involves “*...behavior that is learned, highly patterned, repetitious, or quasi-repetitious, founded in part in tacit knowledge*” (Winter, 2003: 991). Nelson and Winter have provided a detailed discussion on organizational routines in their evolutionary theory. They draw the metaphor that organizational routines to firms play the role of skills in individuals. According to evolutionary economic theory, organizational routines are repositories of organizational knowledge, and thus represent organizational memory. This organizational knowledge is embedded in the routines operating in the organization, which also function as the genes that transmit and preserve through time the underlying organizational knowledge (Nelson & Winter, 1982: 99-106). Organizational capabilities are made up of bundles of organizational routines (Dosi et al., 2000). However, organizational capabilities are also
made up of individual skills, competences and other organizational resources. Winter defines an organizational capability as “...a high level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization’s management a set of decision options for producing significant outputs of a particular type.” (Winter, 2003: 991)

The focus on capabilities in the behavioral-evolutionary school is intimately related to the types of economic rents, or competitive advantages that are under focus in this school. As Teece (1980, 1982) and Richardson (1972) explain, firms are heterogeneous with respect to the level of efficiency their particular capabilities confer upon them, and this accounts for heterogeneity in firm performance. In addition to efficiency rents, Teece explains that some resources may be of higher value when employed inside the firm, possibly due to complementarity advantages in combination with other firm-specific capabilities, as in the case of co-specialized assets. In such situations, quasi rents accrue to the firm, which represent the difference in returns between the first and second-best use of the assets.

Work in the behavioral-evolutionary school is distinguished by its focus on the dynamics of firm capabilities and resources. Consistent with evolutionary theory, scholars of the behavioral-evolutionary school emphasize the importance of path dependence and history in the emergence of capabilities underlying superior performance. Path dependence implies that search regarding problem-solving (Nelson & Winter, 1982), seeking new opportunities, or further development of capabilities (Cohen & Levinthal, 1990) will lie in proximity to previous organizational knowledge and experience. Empirical studies have shown that companies that enter markets in which
they have previous related knowledge tend to perform better than ones whose experience is not close to the new markets they enter (Holbrook et al., 2000; Klepper & Simons, 2000). As a result of path dependency, scholars have examined incremental changes in capabilities and how they are related to the evolution of products offered by the firm (Helfat & Raubitschek, 2000). Others have examined the effects of radical technological or market changes on organizational capabilities and the carry over to performance. Tushman & Anderson (1986) show that such changes may be enhancing or destructive of a firm’s competences, as in Schumpeter’s notion of creative destruction (Abernathy & Clark, 1985). Moreover, some technological changes may be advantageous to some firms, whose capabilities are suited to conditions brought about by the radical change. In this way, the co-evolution of capabilities and industry structure constitutes a main focus of the school (Nelson & Winter, 2002: 35-36). The school overlaps with some of the literature on technology strategy, in which some studies go beyond the firm level, and examine trends at the meso-level, like the literature on technological innovation systems (Carlsson, 1997; 2002) and technological regimes (Malerba & Orsenigo 1993, 1997; Pavitt, 1984). Other authors examine capabilities and their evolution at the industry level (Helfat & Peteraf, 2003). One particularly influential strand of this school examines the notion of Dynamic Capabilities, which are higher order routines or capabilities that operate on other organizational capabilities to modify, develop or reconfigure them (Teece et al., 1997; Helfat et. al., 2007). The literature on dynamic capabilities will be the focus of the coming chapter, and Chapter 6.

Diversification and inter-firm alliances are also main concerns of the behavioral-evolutionary school, allowing an organization to tap on capabilities and resources that
reside in other organizations. Due to the tacit, embedded and co-specialized nature of organizational capabilities and their underlying routines, acquisitions are viewed as ways of acquiring whole bundles of resources and capabilities through the acquisition of firms or business units. These acquisitions may have a path-deepening effect on the acquirer when the acquired unit’s capabilities are related to the acquirer’s (Karim & Mitchell, 2000). Acquisitions may also function to reconfigure a firm’s base of routines and capabilities (Teece et al., 1997; Karim & Mitchell, 2000) in case a firm is not looking for incremental improvements, and wants to gain new bodies of knowledge that are unrelated or path-breaking (Karim & Mitchell, 2000; Helfat & Raubitschek, 2000). Inter-firm alliances and networks are also viewed as sources that may augment the organization’s capabilities. Dyer and Singh (1998) refer to this stream as the ‘relational perspective’ and distill from the theoretical and empirical literature four factors that influence the extent of rents generated from alliances or networking relations. These sources of relational rents are inter-firm asset specificity, complementary assets, inter-firm knowledge sharing routines and effectiveness of governance. Singh (2003) suggests the utility of systematic management of alliances by setting up a specific function that oversees and enhances relational capabilities. This function assumes importance given the high record of failure in strategic alliances, which Singh attributes to heterogeneity in relational capabilities. Organizations vary in the degree to which they are aware of the sources of relational rents in their specific case and also in the degree to which processes are in place to systematically manage the alliance to reap the associated rents (Singh, 2003).
3.5.2 The Underlying Framework of the Behavioral-Evolutionary School

In terms of epistemology, this school is quite similar to the rational-equilibrium school regarding its fundamental belief in the existence of an objective reality facing managers and firms, which if known to them, would dictate optimal solutions to their problems and decisions. In other words, the behavioral – evolutionary school also subscribes to a positivist epistemology. However, this school is more modest regarding the perceptive powers imputed to managers. According to Simon, managers are presumed to be boundedly rational and to make decisions based on satisficing rather than optimizing. The following passage from the fourth edition of Simon’s *Administrative Behavior* clarifies his views and how they differ from classical assumptions of economic theory.

“Whereas economic man supposedly maximizes – selects the best alternative from among all those available to him – his cousin, the administrator, satisfices – looks for a course of action that is satisfactory or ‘good enough’ ... Economic man purports to deal with the ‘real world’ in all its complexity. The administrator recognizes that the perceived world is a drastically simplified model of the buzzing, blooming confusion that constitutes the real world ... Administrators (and everyone else, for that matter) take into account just a few of the factors of the situation regarded as most relevant and crucial. In particular, they deal with one or a few problems at a time, because the limits on attention simply don’t permit everything to be attended to at once.” (Simon, 1945/1997: 119)

Nelson and Winter follow Simon in proposing that managers make decisions based on heuristics, or crude rules of thumb (Nelson & Winter 1982). Thus, behavioral assumptions following the contributions of Simon (1945, 1982) differentiate between the ‘real’ objective environment that exists independently of managers’ perceptions of it, and the perceived environment, which is plagued with the flaws and biases of human cognition.
In the behavioral-evolutionary school, the middle way is adopted concerning the issue of environmental determinism. Unlike the theory of population ecology (Hannan and Freeman, 1977) where organizations are subject to strong forces of inertia and environmental factors are the prime determinants of firm survival, evolutionary theory allows for a two-way interaction between the organization and its environment. While some degree of inertia exists and preserves heterogeneity among firms in initial capabilities and historical trajectories on which future paths are dependent, organizations can also alter their capabilities (Helfat, 2003). Since firms act and are acted upon, evolutionary theory makes possible the endogenous generation of heterogeneity in organizational capabilities. Accordingly, managers play an important role because investment in strategic capabilities is “... a highly complex uncertain process that cannot be reduced to algorithms.” (Schulze, 1994, p.13) Amit and Schoemaker (1993) emphasize that it is the presence of uncertainty, complexity and conflict that gives strategy and managers such important roles in bringing about heterogeneity in firm capabilities and performance. An interesting stream of research regarding the role of managers examines the shortcomings of human cognition. Decision biases and flaws in perception are factored in (Tversky & Kahneman, 1974; Mintzberg et. al., 1998), and their effects on organizational capabilities and outcomes are explored (Helfat et. al., 2007). In this cognitive stream of the behavioral-evolutionary school, the gaps between managerial cognitive biases and the objective reality of the situation gleaned by researchers (retrospectively) account for unfavorable organizational outcomes (Tripsas & Gavetti, 2000; Barr, Stimpert & Huff, 1992). Overall, the behavioral-evolutionary

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15 It is important to note that this stream of objective cognitive research is distinct from the subjective stream under the social constructionist school. Mintzberg et. al., (1998) elucidates on the distinctiveness of
school relaxes many of the limiting and unrealistic assumptions of the rational-equilibrium school. This provides for a richer view of organizational resources and capabilities where there is no single best (optimal) way for all organizations. Rather, organizational capabilities are equifinal, which means that different organizations can reach similar outcomes by various means (Eisenhardt & Martin, 2000).

“Given the competitive and changing context in which managers must decide which R&C [resources and capabilities] to develop as their firm’s basis for competition, it is doubtful that decisions about which SA [strategic assets] to develop and deploy can be optimally deduced from a general normative theory. More likely, continually changing heuristics will emerge that strive to better incorporate the uncertainty, complexity and organizational conflicts confronting managers.” (Amit & Schoemaker, 1993: 40)

The evolutionary-behavioral school also takes account of the effects of extra-managerial considerations (Schulze, 1994) such as organizational learning (Zollo & Winter, 2002), organizational culture (Barney, 1986) and politics (Amit & Schoemaker, 1993). These factors compound the complexity and uncertainty that plagues managerial decisions regarding capabilities as well as judgments about the performance outcomes of certain configurations of capabilities. As such, the relation between resources and productive activities is not highly deterministic and the theory offered is less parsimonious than its RBV counterpart (Schulze, 1994).

Commensurate with the wide range of issues considered in the behavioral-evolutionary school, the empirical work displays a rich diversity. Empirical studies include quantitative statistical research carried out on both primary survey as well as secondary data; some studies also feature simulations. There is also qualitative research and single or small sample case studies focusing on intangibles such as skills and capabilities that cannot be fully owned or controlled. A large part of the empirical work these two varieties of cognitive research.
in this school takes the form of firm performance being a function of the interaction between capabilities and organizational processes or a function of qualitative differences in resources and capabilities (Schulze, 1994).

The behavioral-evolutionary school is viewed as the promising way forward for the RCC approach, since it avoids many of the limitations of the rational equilibrium RBV (Foss, 1996, 1997; Schulze, 1994). The most commonly reiterated strengths lie in the school’s treatment of the dynamic and process-oriented facets of organizational capabilities, its realistic factoring of the uncertainty and complexity facing boundedly rational managers, combined with the rigorous formal theoretical tools offered by evolutionary economic theory. For scholars who look to formal economics as the exemplary model of a developed social science, the behavioral-evolutionary school offers the best of both worlds. The school does undoubtedly make important contributions to our understanding of organizational routines, capabilities, issues of path dependence and organizational inertia and the evolution of capabilities at both the firm and industry level. A very brief sketch of these contributions has been outlined in this section. More elaboration on the contributions of the school will follow in the coming chapter, which reviews the dynamic capabilities literature. It is worth noting here that the seminal contribution of Prahalad and Hamel on Core Competences (1989, 1990, 1993, 1994) is commonly presumed to belong to the behavioral-evolutionary school. It will be shown in Chapter 5 that Prahalad and Hamel more likely belong in the constructionist school. In addition, there is a notable lack of recognition for the constructionist school as a distinct approach in RCC literature. The following section argues for a social constructionist
stream with a prominent presence in the RCC literature, and unique fundamental assumptions and epistemology.

3.6 The Social Constructionist School

The literature belonging to this school is uniquely identified by its underlying epistemology that emphasizes the social construction of knowledge and of reality. While this epistemology was described in the last chapter, this section gives an overview of work relevant to the RCC approach which explicitly or implicitly espouses social constructionism. Most influential in this school is Prahalad and Hamel’s *The Core Competence of the Corporation* which is just one part of these authors’ more comprehensive view displayed in their book *Competing For the Future* (1994) as well as a couple of other influential articles published in the HBR\(^\text{16}\) (Hühn, 2008). Among the schools of the resource-based approach, the constructionist school and specifically Hamel and Prahalad’s ideas are the closest to Penrose’s (1959) insights. Their ideas also exhibit high resemblance to Itami and Roehl’s work on Mobilizing Invisible Assets (1987). Other authors featuring in this school include Schoemaker (1990), Nonaka and Takeuchi (1995), Spender (1996, 1998), Kim & Mauborgne (2005). The epistemic characteristics of this school are also related to several other important characteristics, including its forms of theorizing and empirical work, its focus on the dynamic aspects of competence/capability creation rather than sustenance of existing advantages, its depiction of the relation between firm and environment and its implications for the degree of strategic choice imputed to managers (Hühn, 2008). These features will be

\(^{16}\) The other two articles are Strategic Intent (1989) and Strategy As Stretch and Leverage (1993)
described briefly in the present section, and will be discussed in greater detail in Chapter 5, which reviews the competence program of the constructionist school.

3.6.1 A Conceptual Outline of the Social Constructionist School

Similar to the previous schools, the current one also concerns itself with RCC based explanations for superior business performance. The most prominent authors in this respect are Penrose (1959), Itami and Roehl (1987), Nonaka and Takeuchi (1995), Spender (1996, 1998) as well as CK Prahalad and Gary Hamel, whose contributions (1989, 1990, 1993, 1994) will be the focus of chapters 5 and 6. The constructionist school can uniquely be identified among the approaches dealing with resources by its focus on the creation of new competences or capabilities, most of which are intangible (Itami and Roehl 1987), knowledge-based (Nonaka and Takeuchi, 1995; Spender 1996, 1998) and collective in nature (Penrose, 1959; Prahalad and Hamel, 1990). In its focus on creation, it is the most dynamic among the resource-based approaches. The construction school acknowledges that competitive advantages are based on firm-specific resources such as technological competences, knowledge and other intangibles that are not quickly imitated and thus provide for an advantage that can be sustained. However, the school attaches prime importance to the continual regeneration of these sources of advantage as the only guarantor of superior performance in the long term. “The essence of strategy lies in creating tomorrow's competitive advantages faster than competitors mimic the ones you possess today ... An organization's capacity to improve existing skills and learn new ones is the most defensible competitive advantage of all.” (Hamel and Prahalad, 1989, p.69) This creation of new advantages is possible by means of
consistent focused investment in a few broad lines of expertise (core competences) that is infused with adequate ambiguity regarding the means and the short term goals, which allows for emergent organizational learning (Prahalad and Hamel, 1990). Particular importance is attached to those competences which enable the organization to provide exceptional value to the customer (Prahalad and Hamel, 1990; 1994; Kim and Mauborgne, 2005). Further, the focus on creation takes the discussion to the ex ante phase of managerial decision and action, where decisions have to be made about strategic directions and resource investments in the midst of highly uncertain and complex circumstances. Most empirical studies in the rational-equilibrium and behavioral-evolutionary schools that examine firm-specific resources and capabilities explain past firm performance. These studies reveal patterns of relationships among organizational capabilities and a host of other variables, some of which have been outlined in the previous sections reviewing the conceptual focus of the schools. These patterns reveal some possible regularities and plausible routes of causation, which may or may not be relevant to a manager making a choice for the future competence building in his/her organization. Illuminating as these patterns may be in understanding the events of the past, they are of limited value to managers ex ante because these managers need to act for the future (Amit and Schoemaker, 1993). These patterns may or may not be relevant, and even if they are relevant, they may or may not hold in the future. The benefit of hindsight, which researchers utilize to put together objective analyses ex post, is not available to managers ex ante. What complicates the matter further is that the actions of these managers will themselves shape the contours of the future that will unfold through their actions. Therefore, a manager who relies on the regularities of the past bases the
future of his organization on the extremely shaky assumption that the future will be structurally similar to the past. Moreover, by making this assumption, this manager surrenders all his organization’s ability to shape the future of his markets to competitors that look to the future with a more proactive outlook. It is for this reason that the constructionist school stresses creativity, resourcefulness and entrepreneurial qualities even for managers of big incumbents. It is also for this reason that phenomena of importance in the constructionist school are those related to managers’ subjective views and interpretations of their situation (Smircich and Stubbart, 1985; Daft and Weick, 1984), which are the prime determinants of their actions (Penrose, 1959), rather than with a set of objectively specified conditions that determine the optimality of managerial actions ex post, or specify how large the discrepancy is between managers’ flawed perceptions and the optimal actions.

3.6.2 The Underlying Framework of the Social Constructionist School

The identifying characteristic of work in this school is its underlying epistemology. While the rational-equilibrium school assumed an objective, separate world knowable with accuracy to actors, and the behavioral – evolutionary school acknowledged that the complexity and uncertainty characterizing the objectively existing real world rendered actors boundedly rational, the constructionist school takes on the assumption that a single objective world ‘out there’ exists only in the assumptions of theorists. The relevant world or environment is the subjective environment that is specific and idiosyncratic to the firm or manager of interest. The constructionist approach considers that the worlds or environments (markets) of managers and
organizational members are actively constructed by them, and represent their particular and subjective creation, to which they adapt and respond. As explained in the previous chapter, information from the surroundings of actors interacts with their internal dispositions or tendencies and the result is a creation and not a (flawed) mirroring of reality. In the words of Henry Mintzberg,

“...what is inside the human mind is not a reproduction of the external world. All that information flowing in through those filters, supposedly to be decoded by those cognitive maps, in fact interacts with cognition and is shaped by it. The mind, in other words, imposes some interpretation on the environment – it constructs its world. In a sense, the mind has a mind of its own – it marches to its own cognitive dynamics. Or perhaps we might better say they march, because there is a collective dimension to this too: people interact to create their mental worlds.”(Mintzberg, 1998, p.165)

This epistemology is markedly distinct from the behavioral-evolutionary school view that cognition is at best a highly simplified and flawed reflection of reality. “What the one sees as the basis for distortion, the other takes as the opportunity for creation.” (Mintzberg, 1998, p.170) Following the views of Berger and Luckmann (1966), within a collective context, these individual constructions of knowledge and of reality take on an objective or separate existence as they continue to exist beyond the time and place of their original construction, through socialization and internalization. Applying these ideas to the context of the business organization, we can say that the future markets in which companies compete are not an objective fact to be discovered by managers, as they do not exist in the present. The markets of the future are created by the ideas and actions of members of organizations, and these ideas are by definition subjective and creative.
The creation of novel markets is a dynamic and continuous process of construction, which implies that there is no logical inevitability to a given market or industry structure (a socially constructed reality), even with all of the inertial forces working to keep it in place. It is this ever present, but insufficiently acknowledged, capacity to create new reality in the form of new markets and industries that is the focus of the constructionist school.

The implications of a constructionist epistemology are discernible in this school’s view of actor (manager) rationality. There is no assumption of a singular form of rationality such as maximizing profit; however, multiple rationalities are assumed (Hühn, 2005; Schoemaker, 1990). This is manifest in the salient role of subjective managerial conceptions of the customer demand on real competitive outcomes (Penrose, 1959; Hamel and Prahalad, 1994). In addition, factors that fall outside the realm of conscious and calculable rationality, such as vision and intuition are realistically acknowledged as central features of management (Mintzberg, 1998). Lindblom’s (1959) work on how messy strategy making is in complex organizations\(^\text{17}\) as well as Mintzberg and Waters’ (1985) on emergent strategies are relevant to the depiction of managers under the constructionist perspective. In this school, strategy is conceived through incremental learning under a broad strategic direction, rather than through deliberate and rational choice. Nonaka and Takeuchi (1995) elaborate on how companies can create new knowledge through a process of continuous learning in their efforts to develop innovative products. In this process of organizational learning, the collective (social) dimension of organization features prominently in the constructionist school, as an interaction and

\(^{17}\) Lindblom (1959) specifically studied policy making in government, but his results are very relevant for business organizations.
negotiation among multiple subjective individual rationalities. Overall, the constructionist assumptions contradict the ‘rational’ management views described earlier, and present a realistic view to which most managers can relate (Mintzberg, 1998).

The constructionist school’s underlying epistemology has unique implications for describing the boundaries of the organization as well as the relationship of the firm with its environment. As emphasized earlier, social constructionism does not view the environment as a single objective existence discoverable by means of facts and governed by natural or social laws that dictate an optimal behavior that defines success in business. Rather, the delineation of organization from ‘not-the-organization’ is quite fuzzy as both the organization and its environment are created by the interactions among members of organizations. The concept of an organization’s environment, that is normally seen to consist of customers, suppliers, competitors and other stakeholders, becomes difficult to define with precision. The boundaries separating what is inside and what is outside are not clearly demarcated as

“… the actors themselves create the environment to which they adapt ... Rather than talking about adapting to an external environment, it may be more correct to argue that organizing consists of adapting to an enacted environment, an environment which is constituted by the actions of interdependent human actors ... This reasserts the argument that the environment is a phenomenon tied to processes of attention, and that unless something is attended to it doesn’t exist. While this is a rather radical turnabout in the way environments are usually discussed, there is precedent for this view in organization theory itself, ... in empirical research ... and in theories of how people discover knowledge.” (Weick, 1969, p.27-28)

The concept of an enacted environment suggests very different implications for strategy making from the objective and perceived environments of the rational-equilibrium and behavioral-evolutionary schools respectively. Smircich and Stubbart (1985) show that when managers view the environment and the organization as being enacted by their (and
others’) thoughts and actions, the traditional prescription that the organization must adapt to its environment ceases to be of importance. Managers start to see themselves as creators of their own opportunities and threats so instead of looking externally to allocate blame and find remedies to their problems, they look to themselves and how their perspectives and actions have contributed to their situation. In the work of Hamel and Prahalad (1994) the constructionist view manifests itself in the creation of future markets. The central theme of the book is how managers of highly successful companies have been able to envision and create markets that did not previously exist and how they went about investing in building the competences that would enable the firm to capture a significant share of these future markets. Hamel and Prahalad do not claim that creating the markets of the future is a straightforward task, and they do not provide simple step-by-step recipes on how to achieve it. However, they clarify the necessary conditions that need to be satisfied for a company to create new markets and show numerous examples of brilliant companies that were able to create a future market, set new rules for the competitive game and capture a disproportionate share of the markets they created. Hamel and Prahalad also show how this feat, which takes years to complete, needs to be accomplished time and again every few decades if a company wants to be a leader in the long term. This re-invention of the basis on which a company’s competitive advantage rests may be harder than creating the advantage the first time, since the second time around the company needs to challenge the rules of the game it set, and create new markets that may subvert its own extant products/services. Kim and Mauborgne (2005) emphasize a similar perspective, which encourages managers to creatively establish blue
oceans (virgin markets) rather than focus on cut-throat zero-sum competition in saturated red oceans.

The idea that the organization creates its own market brings empowering strategic choice back to managers and members of an organization. Other perspectives, that include some of the work in the behavioral – evolutionary school, allow for some influence by organizations over their environments, but they see that the organization must necessarily adapt to contingencies in the environment over which it has no control (Weick, 1969; Helfat et. al., 2007; Teece, 2007). However, Weick (1969) emphasizes that the constructionist view asserts the strong form of this argument, claiming that organizations are always actively constructing their environments. By choosing which environmental contingencies are important and attended to, and by producing action to change the course of events to its own advantage, the organizations widen their scope of choice and action rather than restricting it to deterministic reactions to set contingencies.

Despite some resemblance in the substantive problems tackled within the behavioral-evolutionary and social constructionist schools, the fundamental assumptions that shape the constructionist approach are reflected in the methodological choices which give rise to two distinct research programs and variant outlooks. The first and most salient difference is the reliance on economics as a base discipline. The constructionist school is unique among the RCC approaches as it does not draw exclusively on economic theory. Although the school’s ideas are based on Schumpeterian economics and Penrosian growth theory, beyond that it does not borrow from the dominant organizational economic theories coming from industrial organization, game theory, transaction cost or evolutionary economics. The work in the constructionist school draws
on a wider disciplinary base reaching into organization theory and other social sciences such as sociology, cognitive and social psychology. As a consequence of the underlying epistemological framework and the base disciplines, the form of theorizing in the constructionist school is what Nelson and Winter (1982) have referred to as ‘appreciative theorizing’. This means that theories in the constructionist school do not use formal mathematical theorizing based on axiomatic deductive logic, as is the dominant methodology in the range of economic approaches dealing with organizational issues. Further, appreciative theorizing is necessarily qualified by common sense and relevance to management practice. This methodological preference is motivated by the nature of the issues lying at the center of substantive focus of the constructionist school. The concern with the creation of new sources of advantage for the future, based on the firm’s specific body of specialized knowledge and organizational capabilities directs attention to factors for which there is no precedence to model. In the words of neoclassical economic theory, instead of optimizing a production function, the constructionist school is concerned with the creation of new production and cost functions. As Schumpeter notes, “Carrying out a new plan and acting according to a customary one are things as different as making a road and walking along it” (Schumpeter, 1934, p.85). The process is a highly uncertain and complex one involving an interaction among strategic directions of managers, human systems that involve social, psychological and political dimensions, material resources and organizational processes. Here, the qualitative attributes of organizational capabilities are of central importance and may become entirely distorted when quantified and operationalized, as quantification tends to dilute the descriptively rich nuances that make firms qualitatively different (Conner, 1991). In addition, factors
such as stretch (Itami and Roehl, 1987), leverage (Hamel and Prahalad, 1993), synergy (Penrose, 1959), vision, intuition and creativity (Schumpeter, 1934; Mintzberg and Westley, 2001) that are central to effectiveness considerations in the constructionist school defy mathematical modeling that can at best tackle issues of efficiency and treats these factors as chance events. Empirical work in the constructionist school is carried out from an interpretative perspective (Mintzberg et al, 1998), trying to capture the subjective views of managers, dealing with issues from multiple standpoints (Smircich and Stubbart, 1985), and preserving the incommensurability of quantitative and qualitative dimensions (Hühn, 2005). Large sample quantitative designs are ill suited for such purposes as they tend to look for general rules governing the behavior of groups or populations of individuals or firms, leaving out the random and idiosyncratic elements, as well as the outliers (Aharoni, 1993). The RCC approach to strategy emphasizes uniqueness, and thus empirical research would not seek out similarities between firms, but rather differences. “Thus in the best of all worlds, resource-based theory would be aimed at generalizing about uniqueness, which clearly is impossible” (Connor 1991, p. 144) In-depth qualitative designs as well as longitudinal and historical methods are more suited to the nature of the problems tackled from the constructionist perspective.

3.7 Conclusion

Table (2) on the following page summarizes the main characteristics of the three schools of thought delineated in this chapter. Authors who have reviewed the literature of the RCC approach have noted the similarity between the constructionist and the behavioral-evolutionary schools in taking a dynamic, process-oriented approach to the
creation of resources and of new competitive advantages (Foss, 1997; Mahoney & Pandian, 1992; Mahoney, 1995; Foss & Knudsen 1996; Schulze, 1994). However, most authors have not shown adequate appreciation of the differences between the two schools. For example, all of the above mentioned authors place the work of Prahalad and Hamel within the same category as research in the behavioral-evolutionary approach. This is understandable as there are substantive overlaps apparent in the common focus on technological and organizational capabilities, intangible aspects such as knowledge and learning, and collective processes. However, the central thesis of this research is that there is indeed a non-trivial distinction rooted in the epistemological and basic assumptions that shape the three approaches to the study of the sources of competitive advantage internal to the business organization. These differences may be muffled by the overlap in the substantive content. The more profound reason that the distinction goes by unrecognized is a general disinclination to subject research to deeper scrutiny that goes beyond the concepts. Few authors take the trouble to scrutinize the philosophy of science roots of the research they review. The approach taken in this research shows that it may well be fruitful to tackle epistemology and fundamental assumptions lying below the surface for both contemporary and classic contributions. Many researchers have complained about the terminological ‘flotilla’ (Dosi et al., 2000) that characterizes the RCC literature. The typology presented here will help researchers make sense of the broad literature by having a general but hopefully effective map. The effectiveness of this map (typology) presents itself in the relatively unambiguous criteria whereby researchers can place and characterize any piece of literature, regardless of the terminology used. Thus, a piece using the capabilities term, such as Schoemaker (1990),
or one using assets/resources such as Itami and Roehl (1987) may appropriately be placed in the constructionist school. On the other hand, pieces using the competence term, such as the majority of studies found in Foss and Knudsen (1996) would, according to our typology, belong to the behavioral-evolutionary school, even though the latter uses the capabilities term rather than competences. These examples illustrate the utility of the current typology in helping researchers go beyond terminology to the philosophical, theoretical and methodological essence of the research they are presented with.

To further emphasize the implications of the classification system presented in this chapter, the study proceeds to compare in detail two of the key contributions in the RCC perspective, one from the behavioral-evolutionary school (dynamic capabilities) and the other, the competence program, from the constructionist school. Chapters 4 and 5 focus on each of the programs respectively, and the final chapter provides a comparison that reveals the similarities, differences and implications of each perspective on conceptual developments as well as managerial practice. The choice of dynamic capabilities and competence-based programs is motivated by their apparently similar substantive applications, to the extent that they are seen to constitute one research program dealing with the dynamic aspects that are lacking in the resource-based view. Applying the dimensions of our typology to the two programs reveals their deeper differences, and suggests a unique domain of research for each.
### Table (2)

**The Three Schools of the RCC Approach**

<table>
<thead>
<tr>
<th></th>
<th>Rational – Equilibrium School</th>
<th>Behavioral – Evolutionary School</th>
<th>Social Constructionist School</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epistemology</strong></td>
<td>Positivist</td>
<td>Positivist</td>
<td>Constructionist</td>
</tr>
<tr>
<td><strong>Basic Assumptions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>Managers are rational; they optimize</td>
<td>Managers are bounded rational; they satisfice</td>
<td>Managers are entrepreneurs: they synthesize and create</td>
</tr>
<tr>
<td>Environment</td>
<td>Objective; independent; accurately measured by managers</td>
<td>Objective; independent; inaccurately perceived by managers</td>
<td>Subjective; enacted; created by managerial cognition &amp; action</td>
</tr>
<tr>
<td>Degree of Strategic Choice</td>
<td>Minimal: exogenous market forces determine firm behavior</td>
<td>Moderate: firms act on the market and are acted upon by its forces</td>
<td>Maximal: firms create themselves and their markets</td>
</tr>
<tr>
<td><strong>Implications of Basic Assumptions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantive Focus</td>
<td>Retrospective, static; Which resources yield sustained rents in equilibrium? What mechanisms sustain rents?</td>
<td>Retrospective, dynamic: How do markets co-evolve with firm capabilities and technologies?</td>
<td>Prospective, dynamic: How do firms create future markets through learning new competences and creating new knowledge?</td>
</tr>
<tr>
<td><strong>Methodology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theoretical</td>
<td>Hypothetico-deductive; formal mathematical modeling; optimization; game theory</td>
<td>Hypothetico-deductive; mix of formal mathematical and appreciative theorizing; evolutionary game theory;</td>
<td>Appreciative theorizing</td>
</tr>
<tr>
<td>Empirical</td>
<td>Quantitative; large sample statistical analyses; industry or</td>
<td>Mix of quantitative and qualitative methods; simulation and historical</td>
<td>Mostly qualitative; case study, anecdotal evidence</td>
</tr>
<tr>
<td>Base Discipline</td>
<td>Industrial organization economics</td>
<td>Behavioral economics; evolutionary economics</td>
<td>Schumpeter’s entrepreneurial theory; organization theory; social and cognitive psychology</td>
</tr>
<tr>
<td>----------------------</td>
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<td>---------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Theoretical Roots</td>
<td>Bain; Mason; Demsetz</td>
<td>Schumpeter; Simon; Cyert &amp; March; Richardson; Nelson &amp; Winter</td>
<td>Schumpeter; Penrose</td>
</tr>
<tr>
<td>Contemporary Authors</td>
<td>Wernerfelt; Barney; Rumelt; Helfat; Peteraf; Montgomery</td>
<td>Teece; Nelson; Winter; Dosi; Carlsson;</td>
<td>Hamel; Prahalad; Nonaka &amp; Takeuchi; Spender; Itami &amp; Roehl; Schoemaker</td>
</tr>
<tr>
<td>Current Research Streams</td>
<td>Resource-based theory &amp; research</td>
<td>Organizational capabilities; routines; dynamic capabilities; technology strategy; industrial dynamics and technological change</td>
<td>Core competence research; knowledge creation; organizational learning</td>
</tr>
</tbody>
</table>
Chapter 4

The Dynamic Capabilities Research Program

4.1 Introduction

“If correct, the framework suggests that private wealth creation in regimes of rapid technological change depends in large measure on honing internal technological, organizational, and managerial processes inside the firm. In short, identifying new opportunities and organizing effectively and efficiently to embrace them are generally more fundamental to private wealth creation than is strategizing, if by strategizing one means engaging in business conduct that keeps competitors off balance, raises rival’s costs, and excludes new entrants.” (Teece, Pisano and Shuen, 1997: 509)

The above quote from the paper by Teece et al. (1997), who coined the ‘Dynamic Capabilities’ term, presents the essence of this important stream of research within the behavioral evolutionary school. The current chapter reviews the Dynamic Capabilities (DC) research program, with an emphasis on how the core conceptualization has evolved and progressed over the past decade. The core hypothesis of the DC program is that differences in firms’ capacities to update their internal capabilities (managerial, organizational and technological) result in sustained differential performance (Zott, 2003). In developing the central concepts that constitute this hypothesis, I depict how the framework of basic assumptions constituting the hard core of the program has been modified to allow progress. In addition, I explain some of the difficulties that this research program faces, and relate these to its underlying framework.

In the founding article of the DC program, Teece et al. (1997) criticize Porter’s competitive strategy for its focus on monopoly rents created at the industry level, as well as the strategic conflict literature based on game theory because their basic logic rests on the exploitation of market power. These approaches fail to take account of the
entrepreneurial dimension of strategy, which is essential to the creation of new streams of rent (Teece et al., 1997: 512). Teece et al. identify the RBV and the DC programs as the two approaches that represent a different paradigm in strategy based on efficiency rather than market power. The authors claim that the RBV recognizes but does not explain the dynamic mechanisms through which new sources of rent are created and sustained. They claim that the DC program is unique among the economic approaches to strategy in filling this gap by integrating the management-based literature on R&D, technology strategy and organizational learning. It will be shown that it was quite difficult for an approach based on economic methodology with its positivist epistemology to adequately tackle the entrepreneurial, creative and future oriented dimension of strategy. Further, the DC program started out on the basis of the typical orthodox economic assumptions of the rationality postulate and the efficiency criterion, despite its ambitious intentions to focus on problems of a categorically different substantive nature. As the approach progressed, these hard core assumptions had to be relinquished in favor of bounded rationality and the wider performance criterion of evolutionary fitness.

The analysis in the current chapter takes Lakatos’ methodology of scientific research programs (MSRP) as the guiding frame of analysis. As elaborated in Chapter 2, the MSRP allows us to structure the DC research program into a hard core and a protective belt, and to assess progress as its theory and empirical testing have evolved. The hard core consists of the central concepts as well as the basic assumptions that constitute the underlying framework of the research program. This hard “…core is ‘irrefutable’ by the methodological decision of its proponents,” (Lakatos, 1978, p.48). As Lakatos notes, the hard core does not emerge in full form all at once, but rather forms
gradually. For this reason, I track the evolution of the concepts that make up the hard core of the DC program as it has progressed. These concepts include capabilities, their dynamic and process nature, the system of assumptions concerning managers, the firm and its relation with its environment, and how all this relates to strategic management. The protective belt consists of various substantive domains and propositions that augment the hard core and are subjected to empirical testing, such as organizational learning, knowledge processes, acquisition processes and alliance capabilities.

4.2 The Hard Core of the DC Program

Several of the concepts making up the hard core of the DC program have been elaborated in Chapter 3, in the context of the framework underlying the behavioral-evolutionary school. These concepts are discussed here in greater depth, with more focus on the dynamic capabilities literature and its development.

4.2.1 Organizational Routines & Capabilities

While the RBV scholars use the concept of ‘resources’ in broad terms, the capabilities literature focuses on processes and interactions among human, material and intangible resources. Nelson and Winter (1982) propose that the essence of organizational capabilities is organizational knowledge (Nelson & Winter, 1982; Dosi, Nelson & Winter, 2000). Organizational capabilities involve knowledge of how to accomplish “…a smooth sequence of coordinated behavior that is ordinarily effective relative to its objectives, given the context in which it normally occurs.” (Nelson and Winter, 1982, p.73) This knowledge may exist in a codified form such as blue prints,
manuals or firm documentation, or it may exist in a more tacit form in the minds and actions of experts, and is manifest in the form of organizational routines. Thus, routines are the basic building blocks of organizational capabilities. An organizational routine can be defined as a “…coordinated activity” (Nelson and Winter, 1982, p.97) performed by one or more subunits in the organization, which involves “…behavior that is learned, highly patterned, repetitious, or quasi-repetitious, founded in part in tacit knowledge” (Winter, 2003, p.991). Nelson and Winter have provided a detailed discussion on organizational routines in their evolutionary theory. They draw the metaphor that organizational routines to firms play the role of skills in individuals. According to evolutionary economic theory, organizational routines are repositories of organizational knowledge, and thus represent organizational memory. Routines also function as the genes that transmit and preserve through time the underlying organizational knowledge embedded in them (Nelson and Winter, 1982, p.99-106). Organizational capabilities are made up of bundles of organizational routines (Dosi, Nelson and Winter, 2000). However, organizational capabilities are also made up of individual skills and other organizational resources. Winter defines an organizational capability as “…a high level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization’s management a set of decision options for producing significant outputs of a particular type.” (Winter, 2003, p.991)

The conceptual literature distinguishes between two major types of capabilities at the level of the organization, which are highly overlapping empirically, namely technological and organizational capabilities. Technological capabilities/competences are defined as “…shared pieces of scientific and technological knowledge and routines
concerning essentially ‘the structure of nature’ and ‘how to handle it’ [such as for example] printing a circuit on a wafer of silicon.” (Coriat & Dosi, 2002: 285) On the other hand, organizational capabilities/competences are “…those shared pieces of knowledge and routines concerning the governance of coordination and social interactions within the organization and with outside entities (customers, suppliers, etc.)” (Coriat & Dosi, 2002: 285). The distinction is important because essentially equivalent bodies of technical knowledge may be put to use using different organizational arrangements and yield different outcomes for the organization. This is the essence of heterogeneity emphasized by Penrose (1959).

4.2.2 The Concept of Dynamic Capabilities

The term Dynamic Capabilities (henceforth DC) was coined during the early part of the nineties by Teece, Pisano and Shuen (1997). The DC approach attempts to get at the roots of sustained competitive advantage at the firm level, and argues that these roots are to be found in the ability of business firms to steadily modify and re-configure their internal capabilities. Thus, dynamic capabilities are considered to be a special higher-order class of organizational capabilities that are entrusted with the vital function of consistently updating the organization’s capabilities. Teece, Pisano & Shuen (2000) define a dynamic capability as

“…the ability to reconfigure, redirect, transform and appropriately shape and integrate existing core competences with external resources and strategic and complementary assets to meet the challenges of a time pressured, rapidly changing Schumpeterian world of competition and imitation. Dynamic

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18 Their seminal article “Dynamic Capabilities and Strategic Management” was submitted for publication in the Strategic Management Journal in 1991, but was actually published in 1997. However, the concept gained currency in the literature since the early part of the nineties decade, and therefore, we consider the concept to be roughly two decades old.
capabilities thus reflect an organization’s ability to achieve new and innovative forms of competitive advantage despite path dependencies and core rigidities in the firm’s organizational and technological processes.” (Teece et al., 2000: 339)

Zollo and Winter define a dynamic capability as “…a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness.” (Zollo & Winter, 2002: 340). In this definition, the authors specify operating routines as the object upon which dynamic capabilities operate and do not limit dynamic capabilities to highly dynamic environments as in Teece et al.’s original definition. Even in environments with lower rates of change, firms still need to modify and reconfigure their operational routines. Operational routines are those that govern the day-to-day operations in the firm and they include both line and staff activities (Zollo & Winter, 2002: 340). This definition of DCs is akin to the concept of search routines in evolutionary economics, which, according to Nelson & Winter (1982), are special types of organizational routines that work to update and modify existing operational routines. Search is the process by which firms probe their environment in the attempt to find better ways of achieving certain functions. As such, I find a contradiction in Zollo & Winter’s definition, as the incremental improvement in operational routines implied is primarily a matter of efficiency, not of effectiveness. The relation among DCs, efficiency and effectiveness is discussed in detail later on in the chapter.

The latest contributions in the DC program adopt a much more general definition of dynamic capabilities, thus avoiding some of the problems plaguing earlier definitions. Helfat et al. (2007) define dynamic capability as “…the capacity of an organization to purposefully create, extend, or modify its resource base.” (Helfat et al., 2007: 4)
authors here both generalize and simplify the definition of DCs. They adopt a very broad view of the resource base of organizations. “The ‘resource base’ of an organization includes tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis.” (Helfat et al., 2007: 4) This is a fruitful addition to the previous definitions, as the authors correctly note that employees and resources of alliance partners are not owned by the organization but comprise an important component of its capabilities. The definition also emphasizes the deliberate quality of exercising the dynamic capabilities. However, the authors reassure that this does not exclude emergent strategies (a la Mintzberg & Waters, 1985). Further, the definition implies nothing about the effectiveness or performance implications of the organization’s capacity to alter its resource base. This contrasts with the initial definition by Teece et al. (1997), which has been criticized as tautological because it specifies that DCs are those capabilities that enable an organization to attain new sources of competitive advantage.

“When the ... resources that drive competitive advantage are identified by observing superior performance and then attributing that performance to whatever unique resources the firm appears to possess, the theory becomes tautological. In contrast, by defining dynamic capabilities in terms of their functional relationship to resource manipulation, their value is defined independent of firm performance. This enables empirical falsification.” (Eisenhardt & Martin, 2000: 1108)

While operational capabilities enable the organization to function under the current resource conditions, dynamic capabilities involve change to the resource base of the organization. In order for that purposeful change to come about, the organization and naturally its managers, must have “... the capacity with which to identify the need or opportunity for change, formulate a response to such a need or opportunity, and
implement a course of action.” (Helfat et al., 2007: 2) In the terminology of evolutionary theory, this capacity serves two distinct functions: the function of search and selection, which takes place in both resource creation and alteration, and the function of resource deployment. However, changing the organization’s resource base is not only achieved by adding resources; change could also mean that an organization desires to destroy a particular resource; thus search and selection involve both selecting in and out (Helfat et al., 2007: 6). The initiation and implementation of such change involves decision-making, either at the individual or at the group level (subunits or teams) or both. Therefore, dynamic capabilities function at the individual as well as the group levels within organizations, and understanding the underlying managerial and organizational processes is of prime importance. Moreover, dynamic capabilities demonstrate a highly idiosyncratic and contingent nature, as they are very specific to the organizational context in which they develop (Zollo & Winter, 2002; Helfat et al., 2007). However, specific DC routines or processes exhibit commonalities across firms that allow the specification of some form of best practice. For example, the empirical literature shows that pre and post acquisition routines are an essential aspect of any successful acquisition. Pre-acquisition search and selection routines assess cultural and vision compatibility, while post acquisition routines facilitate the integration and reconfiguration of resources across the two firms (Eisenhardt & Martin, 2000: 1109). Collis (1994) explains that over a certain period of time, brand strength was the key to sustainable advantage in the soft drinks industry; in semiconductors, it is the ability to innovate better products faster than competitors.
Dynamic capability is in essence a repeatable process that may be technological (technical), managerial (individual) or organizational (collective) in nature. Dynamic capabilities of a technological nature consist mainly of research and development processes aimed at improving existing processes or developing new ones, as well as creating or updating technological knowledge in an area. Relevant processes include product development and design, or innovations in production processes. Knowledge creation is especially relevant in high tech industries such as pharmaceuticals, biotechnology and electronics. Organizational level dynamic capabilities include any stable and repeatable process aimed at improving coordination & integration mechanisms in the organization, such as process reengineering programs, or post-acquisition integration processes (Zollo & Winter, 2002). In addition, processes aimed at improving operative efficiency such as quality improvement programs are also considered to be prominent types of dynamic capabilities. At the managerial level, strategic decision making integrates business, functional and personal expertise of managers to direct the firm’s strategic choices. Dynamic managerial capabilities reconfigure various parts of an organization’s existing resource and competence base to better capture market opportunities (Pavlou & Sawy, 2005). This often entails a great deal of resourcefulness and creativity, whereby “... managers reconnect webs of collaborations among various parts of the firm to generate new and synergistic resource combinations among businesses” (Eisenhardt & Martin, 2000: 1107). Further, managers may decide to augment a firm’s resource base by employing dynamic capabilities that tap on resources existing outside the firm’s boundaries, such as in the case of alliances, prominent among biotechnology firms, and acquisitions (Helfat, et al., 2007). Finally, managerial decisions
about taking away from the organization’s resource base may be just as important as decisions to add to it. Thus in some cases, dynamic capabilities work to jettison unwanted resources or competences (Teece, 2007), in what has been referred to in the literature as “unlearning” (Hamel & Prahalad, 1994).

4.2.3 Dynamic Capabilities & Competitive Advantage

How can dynamic capabilities be sources of sustained competitive advantage to organizations? The theory of dynamic capabilities shows that DCs can in some cases bring sustained advantage, as they must be built and cannot be bought, are highly firm-specific and idiosyncratic and are difficult to imitate. The organizational processes by which management coordinates and integrates the various activities performed within the business organization are shown to have significant effects on important outcomes such as quality, cost and lead time, and are highly firm-specific. By developing and reconfiguring the organization’s resources and processes, dynamic capabilities lend coherence to the system of organizational activities that may likely be an important source of firm differences and strategic advantage. The system of activities is tightly knit via these integrating processes such that a competitor gains little by copying a part of it; competitors have to copy the whole system, which is impossible (Porter 1996; Teece et al., 1997). This explains why in many instances large incumbents are unable to compete with seemingly simple innovations introduced by new firms as they require systemic changes in highly interdependent systems. Competitive advantage that rests on such coherence is unlikely to be imitated away by competitors, and since they are embedded in the structures and idiosyncratic organizational processes, they cannot be bought and must
be built in the firm\textsuperscript{19}. Teece et al. (1997) emphasize that coordination and integration apply as much to incentives of various parties within the organization as to the implementation of the activities themselves.

\textit{Replication and Imitation of Capabilities}

The knowledge that underlies organizational capabilities is often tacit in nature, embodied in organizational processes and highly contextual and idiosyncratic. These characteristics make replication by an organization of its own successful routines difficult, especially that members of the organization may not be fully aware of all the relevant knowledge that underlies the organization’s skilled performance. If replication is difficult, this makes imitation by competitors nearly impossible. The barriers to imitation are a prime determinant of the sustainability of an organization’s competitive advantage.

Thus, the nature of dynamic capabilities displayed in such characteristics as network/systemic complexity, idiosyncracy, tacit nature of the underlying knowledge, as it well as it socially distributed dimension render DCs as eligible candidates for being sources of sustained advantage. These characteristics, if applicable, make DCs difficult to imitate. However, it has been shown in the literature that DCs are also equifinal, meaning that different firms may go about producing similar DCs in different ways (Collis, 1994; Zollo & Winter, 2002). This means that DCs are sometimes substitutable, which is a reason why they may not always be a source of sustainable advantage.

\textsuperscript{19}“The frequent failure of incumbents to introduce new technologies can thus be seen as a consequence of the mismatch that so often exists between the set of organizational processes needed to support the conventional product/service and the requirements if the new. Radical organizational re-engineering will usually be required to support the new product, which may well do better embedded in a separate subsidiary where a new set of coherent organizational processes can be fashioned.” (Teece et al., 1997: 520). See also Abernathy & Clark (1985).
Therefore, not all DCs confer upon the organization the same level of competitive advantage. Some DCs are more important than others, but this obviously is contingent upon the specific context and circumstances of each firm (Collis, 1994). Often, it is not one specific dynamic capability, but the way in which various factors are combined and configured that does the trick. This is referred to as ‘systemic innovation’ (Teece, 2007) or architectural innovation (Henderson & Clark, 1990; Galunic & Eisenhardt, 2001). This is also why it is often repeated in the literature that whatever the current source of advantage, the only sustainable advantage is being able to come up with new source of advantage by the time the extant leader erodes.

In the following section, I examine the basic assumptions of the DC program, with a view to how they progressed as the program has developed. I also examine the implications of the basic assumptions on the methodology of the program and the consequent strength, weaknesses and managerial implications.

4.2.4 Basic Assumptions: Manager Rationality

Similar to the RBV, the DC program was born from an economic theoretical background, and as such inherited the rationality postulate almost by default. This is apparent in the founding article of the DC program by Teece et al., 1997, in which the authors go to some length to set themselves apart from three other research streams, namely the RBV, the strategic conflict and the Porter positioning/industry structure approach. However, like all three economic approaches, Teece and his colleagues state that under the DC perspective, managers are assumed to follow the economic rationality
postulate (Teece et al., 1997: 527). At the same time, the authors state that the rents under focus in the DC perspective are Schumpeterian in nature. There seems to be a serious contradiction here, as according to Schumpeter, ‘rents’ result from entrepreneurial activity that is centered on innovation. Schumpeter’s description of the entrepreneur type is a far cry from the optimizing rational actor of economic theory.

Schumpeter defines the entrepreneur as the agent who carries out new combinations, whether this individual is an independent business person or a manager or major stockholder of a company. If this person ceases to carry out new combinations, he/she is no longer an entrepreneur. He uses the terms “initiative” “authority” and “foresight” to describe the entrepreneur (Schumpeter, 1934: 74-75). Schumpeter distinguishes clearly between regular managerial activities and entrepreneurial activities, and describes the special talents needed to perform entrepreneurial activities, which require stepping off the beaten path and sailing through uncharted waters. The entrepreneurial function requires leadership qualities, due to its highly uncertain nature, which no degree of calculation can overcome and where intuition is the main driving force.

“As military action must be taken in a given strategic position even if all the data potentially procurable are not available, so also in economic life action must be taken without working out all the details of what is to be done. Here the success of everything depends upon intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment, and of grasping the essential fact, discarding the unessential, even though one can give no account of the principles by which this is done. Thorough preparatory work, and special knowledge, breadth of intellectual understanding, talent for logical analysis, may under certain circumstances be sources of failure.” (Schumpeter, 1934: 85)

The initial adoption of the rationality assumption did not only contradict the alleged lineage of the DC program to Schumpeterian economics, but was also in conflict
with Nelson and Winter’s evolutionary theory, which is also considered a precursor of dynamic capabilities. Nelson and Winter explicitly denounce the rationality postulate of mainstream economic theory, and subscribe to Herbert Simon’s notion of bounded rationality and managerial decision making being based on heuristics (Cyert & March, 1963; Nelson & Winter, 1982). As the DC program progressed, this inconsistency was acknowledged, and the assumption of rationality was forgone in favor of the behavioral economic assumptions inspired by the work of Herbert Simon. In his most recent contribution on dynamic capabilities, Teece explicitly states his espousal of behavioral assumptions in the DC perspective (Teece, 2007: 1319). Further, he discusses the decision making biases and flawed perception of environmental signals that may lead to incorrect decisions (Teece, 2007: 1333).

4.2.5 Basic Assumptions: Epistemology, Entrepreneurship & the Cognitive Dimension

As elaborated in the previous chapter, both the rationality postulate and the behavioral economic assumptions based on bounded rationality are rooted in a positivist epistemological framework. Behavioral assumptions following the contributions of Simon (1945, 1982) differentiate between the objective reality that exists independently of managers’ perceptions of it, and the perceived reality, which is plagued with the flaws and biases of human cognition. However, positivist epistemology does not question the objective and knowable nature of the single reality that faces managers and organizations. As such, managers are encouraged to find ways to reduce the gap between their perceptions and reality and to minimize their biases. Recent theoretical contributions to the DC program have stressed the cognitive shortcomings of managers and the need to
address the limitations they impose on the ability of organizations to modify and reconfigure their capabilities (Helfat et al., 2007: 46-64; Teece, 2007). In addition, applied work by Lavie (2006) has attempted to formally model capability reconfiguration prompted by technological change, and to take account of the cognitive limitations affecting organizational decision making. He defines the cognitive gap as the difference between the actual value-maximizing capability configuration in the post change environment and what each incumbent perceives it to be (Lavie, 2006: 166). It is interesting to note that despite the adoption of bounded rationality and cognitive gaps, the maximization assumption nevertheless finds its way in to facilitate mathematical modeling.

“The capability reconfiguration model I develop assumes intended rationality—that is, decision makers attempt to make rational decisions, but their choices are not completely rational because of cognitive biases and limited availability of information (March, 1994; Simon, 1961). Yet the model deviates from pure bounded rationality by assuming a unitary decision-making unit and a maximizing rather than satisficing behavior.” (Lavie 2006: 162)

This model is illustrative of how the cognitive dimension is approached from a positivist epistemological and methodological framework. Empirically, if it is ever possible to accurately model and calculate such a value-maximizing capability configuration, it would only be in retrospect, after the technological change has occurred and businesses including producers, suppliers and customers have acted and market information is available to analyze. More generally, in DC research, researchers typically discern dynamic capabilities by looking historically at successful firms and searching for their core capabilities. Identification and measurement of DCs can only be done with hindsight after strategic actions have been taken and customer response produces an
advantage for the business firm in question. The problem is that the DC program claims to be addressed to strategists (managers) not economic researchers wishing to analyze the effects of technological changes and organizational capabilities with a historical perspective. For a manager looking to the future, anticipating a technological change and working out how his/her organizational capabilities can be reconfigured to adjust to the technological change, the situation is totally different. A high degree of uncertainty necessarily persists regarding how the technology will evolve and how markets and competitors will co-evolve. A manager will have hints and hunches based on external and internal information. If sophisticated analytical models are available to simulate scenarios and possible outcomes, these will at best describe possible routes of causation and possible alternatives under sets of restrictive assumptions. Ultimately, managers will make their reconfiguration decisions based on their opinions and best judgment. Teece (2007) is aware that this uncertainty regarding ex ante strategy making is a wholly different story from adjustments made in economic models for information costs and asymmetries. “The problem is not just about knowledge asymmetries and incentive problems as Alchian and Demsetz (1972) seem to suggest. Rather, it involves filtering and interpreting information about evolving technologies and marketplaces.” (Teece, 2007: 1323) Filtering and interpretation are necessarily subjective matters, where an acknowledgement of multiple views and therefore multiple realities is a useful epistemological framework. The importance of epistemology arises here because of considering what it is managers can know, and how they come to this knowledge. Even if hard objective data are collected, these data are subjected to interpretation and filtering from the subjective point of view of a particular manager, or negotiated among a group of
managers. Therefore it is this subjective cognitive activity of managers that researchers need to understand and study if they are to understand where good strategy comes from, and how firms build, reconfigure and modify their capabilities to remain ahead of their competitors. Researchers attempting to draw normative implications of DC research for strategic managers need to be alert to this crucial point.

“Failure to acknowledge the distinction between forward-looking and backward-looking frames of reference can lead to errors when attempting to apply the DCA [dynamic capabilities approach] to ex ante strategy formation. The cause of the mistakes is simple in nature—nothing more than a failure to grasp that what can be learned of the past might be a poor or misleading guide for the future—but can lead to fundamental errors, beguiling executives to believe that what worked in the past will work in the future’s new context.” (McGuinness & Morgan, 2000: 212-213)

As will be elaborated in the upcoming chapter on the competence approach, the constructionist epistemological framework looks to the flip side of the subjective cognitive dimension; it is looked upon as an opportunity for creation rather than as a distortion and constraint. Creative entrepreneurial foresight allows managers to imagine future markets that are fundamentally different from what they can find in existing markets and then try to create/implement these ideas as they grow. Hamel's (1997) idea that strategy is only strategic if it is revolutionary (both idea and implementation) may serve as a prime example of that kind of thinking. The future is not unchangeable in this view; it is what strategists make it. With regard to dynamic capabilities, creative managers can imagine new ways to combine the organization’s capabilities to bring about ground breaking results. In other words, they construct the future combinations in their minds before they construct them on the ground. The essence of creativity is the extra bits that the creative person adds, or the different way he/she combines factors that already exist. If seeing things in a different way from what they are is a distorted
perception in the view of the positivist cognitive perspective, it is the source of resourcefulness and ingenuity in the constructivist cognitive perspective.

It is worth noting that some of the main protagonists of the DC program have shyly begun to acknowledge this subjective cognitive dimension of entrepreneurial management. Teece (2007) concedes that the entrepreneurial creativity needed to shape new opportunities often arises out of right brain type cognitive capacities in individuals that have “...little to do with analyzing and optimizing.” (Teece, 2007: 1346) Helfat et al. (2007) also mention the importance of vision and intuition in the development and deployment of dynamic capabilities. Nevertheless, the overarching framework and methodology of the DC program remains firmly rooted in a positivist view of cognitive dimensions; the subjective perspective remains missing. Teece (2007) stresses the importance of employing analytical systems and organizational processes that scan the organization’s ecosystem including internal R&D, tapping supplier and customer innovation as well as external developments in science and technology. In this respect, he argues that an organization cannot only depend on the creativity of a handful of individuals, and that the sensing, interpretative and creative functions should be embedded in the organization via processes designed for such purposes, in other words, by instituting dynamic capabilities. The basic thinking here, similar to Igor Ansoff’s approach to strategic planning, is to design formal systems that structure the analysis of data to replace an unforeseeable and uncontrollable creative process. Employing a constructionist outlook doesn’t mean abandoning positive information gathering and analytical frameworks. These frameworks attempt to model and make sense of the past, and there is definitely no success in the future for one who does not learn the lessons of
the past. Rigorous modeling under restrictive assumptions and empirical testing of such
tools are useful for illustrating mechanisms of causation and plausible explanations of
erations between multiple variables, or between certain firm behaviors and performance
outcomes. Important as this function is, at the end of the day, both management theorists
and practitioners must acknowledge that these positive tools can at best be rough guides
and that a big area is left for a manager’s judgment regarding many important issues. For
example, a manager must judge to what extent the model results are applicable to the
specific situation he/she is facing by questioning the simplifying assumptions of the
model, and the extent to which they render it relevant. In addition, a manager would also
need to make judgments about a host of other factors concerning uncertain future
conditions of the market, customers, technology and competitors. This point is in need of
special emphasis because of a general impression, especially in the economics based
literature, that formal modeling is a sign of the maturation of theory in the field. An
understanding of the role played by positivist and constructionist methods and their
respective limitations brings some counter balance to this bias.

Our argument here extends similar arguments advanced long ago by Baumol
(1968) in his essay on “Entrepreneurship in Economic Theory”. Baumol clearly
emphasized that it is the calculative aspect of economic methodology that makes it unfit
to adequately deal with the entrepreneurial phenomenon. Attempts to make economic
models more realistic, such as introducing objectives of optimization other than profits,
including decision variables relevant to entrepreneurial initiatives, such as new product
attributes, and developing dynamic models by adding a time variable have not helped,
according to Baumol. Although he considers game theoretic and behavioral models to be
improvements over the neoclassical models, they remain inadequate in dealing with entrepreneurship. “At most I hope for more brilliant observations and descriptive insights such as those of Schumpeter … but I foresee for the immediate future no more formal, manipulatable engine of calculation and analysis.” (Baumol, 1968: 68-69) Methods based on game theory and evolutionary theory have advanced significantly since the time Baumol wrote, but I see that his verdict remains largely unchanged. Due to this, evolutionary theory has at best included the innovations resulting from entrepreneurial activity as stochastic (chance) events in their mathematical formulations. Otherwise, the entrepreneurial dimension is more adequately dealt with in a qualitative manner, using appreciative theorizing, which Nelson and Winter describe as being “…more intuitive and modified by judgment and common sense.” (Nelson & Winter, 1982: 9) They point to this essential caveat in formal evolutionary modeling with regard to the entrepreneurial dimension, describing it as “…a body of truth that has been recognized many times in the history of ideas, but that somehow always stands in need of rediscovery, reinterpretation, and persuasive illustration. Creative intelligence, in the realm of technology as elsewhere, is autonomous and erratic, compulsive and whimsical. It does not lie placidly within the prescriptive and descriptive constraints imposed by outsiders to the creative process, be they theorists, planners, teachers, or critics. To progress with the task of understanding where creative thought is likely to lead the world, it is therefore helpful to recognize first of all that the task can never be completed. Our evolutionary theory of economic change is in this spirit; it is … a scheme that may help an observer who is sufficiently knowledgeable regarding the facts of the present to see a little further through the mist that obscures the future.” (Nelson & Winter, 1982: viii)

This small acknowledgement in the preface of Nelson and Winter’s evolutionary theory does not of course do justice to creativity, which is the essence of entrepreneurship and the prime determinant of the future markets and industries. Since it is quite impossible to predict and model creativity, its crucial effects on markets and industries are treated as
mutations are in the theory of biological evolution. However, for real companies building the future, creativity is not a chance mutation, it is the heart and soul of their continuous striving; at least it should be so if these companies hope to achieve some measure of competitive advantage. It will be shown in the upcoming chapter that the competence-based research program provides this missing ingredient, which is really the essence of Schumpeter’s theory. In order to do so, the competence program sacrifices deductive rigor in exchange for effective treatment of the heart of strategic advantage.

4.2.6 Basic Assumptions: Firm and environment

One of the basic premises of evolutionary theory is that firms differ partly by choice, partly by chance and partly by historical and contextual circumstances (Coriat & Dosi, 2002: 291). At the core of the DC program is the notion that the firm and environment co-evolve as a result of a two-way interaction. However, more attention is given to the direction of causality flowing from the environment to the firm. In other words, the firm is seen to be subject to strong environmental forces concerning market demand, technological changes and competition and these forces require adaptation on the part of the firm. Adaptation to external change was the predominant assumption in the DC literature initially, with path dependency constraining the ability of firms to adapt (Teece et al., 1997; Zollo & Winter, 2002). This tendency is perhaps reinforced by the fact that DC scholars draw largely from evolutionary economics, which emphasizes the bounded nature of managerial rationality and the constraints it imposes on the organization. Nelson and Winter explain that studies in the tradition of evolutionary economics “...take for granted strong elements of continuity in firm behavior, so that a
firm's fate is determined in the first approximation by how the environment rewards its heritage of routines, and only in the second approximation do abilities to adapt and to change enter the story.” (Nelson & Winter, 2002: 36)

Recent contributions in the DC program have started to acknowledge that the direction of causality may also flow in the other direction, i.e., from the organization to its environment. Teece (2007) stresses that the main message of the DC program attaches higher importance to internal factors in shaping the success or failure of firms, and those firms may in some instances have the ability to shape certain aspects of their markets and ecologies.

“Dynamic capabilities include difficult-to-replicate enterprise capabilities required to adapt to changing customer and technological opportunities. They also embrace the enterprise’s capacity to shape the ecosystem it occupies, develop new products and processes, and design and implement viable business models ... The thesis advanced is that while the long-run performance of the enterprise is determined in some measure by how the (external) business environment rewards its heritage, the development and exercise of (internal) dynamic capabilities lies at the core of enterprise success (and failure).” (Teece, 2007: 1320)

“Dynamic capabilities assist in achieving evolutionary fitness, in part by helping to shape the environment. The element of dynamic capabilities that involves shaping (and not just adapting to) the environment is entrepreneurial in nature.” (Teece, 2007: 1321)

Here, Teece makes the link with entrepreneurial abilities, which allow a firm to shape its environment. I have earlier elaborated how the subjective cognitive dimension stemming from a constructionist epistemology is more useful in illuminating the entrepreneurial side of strategy. I consider Teece’s remarks in this regard to be a step in the right direction, despite the fact that it took the DC program more than a decade to realize what the CC program had emphasized since the early nineties. The reason I suggest for the delay is the positivist baggage the DC program has inherited from its economic roots,
which is biased towards analysis of past events for which hard data can be gathered. The entrepreneurial side of strategy that looks to an unknown future in which the organization can repeatedly re-create itself and create its markets was either dropped, left to chance or modeled as if it were not shrouded in uncertainty. Cockburn et al. (2000) also acknowledge this distinction between creating competitive advantage and merely responding to changes in the environment (possibly initiated by more active competitors) as a central question in strategy research.

4.3 Tensions in the DC program

There is consensus in the DC program that dynamic capabilities are about processes of change in organizations. However, beyond that, there are some conceptual tensions in the DC concept and little consensus exists as to how they can be resolved. These tensions are discussed in the following section, in the form of pairs of opposing logics regarding several dimensions. It is shown that most authors in the DC program choose to focus on one or the other of the logical opposites, and very few authors tackle both together. It is argued that these poles are incommensurable in a single dynamic capability, since they are categorically opposing. Nevertheless, these tensions must be managed if the organization is to survive and prosper in the long term. As with any conceptual analysis, the demarcation of such dimensions is a highly artificial matter, the purpose of which is to facilitate an appreciation of the various facets of the DC concept, whereas practically, these dimensions are intertwined and interwoven. I propose that closed systems theory provides a framework in which these dialectics can be handled (Lengnick-Hall & Wolff, 1999). This is further clarified in the following chapter.
### Table (3)

**Tensions in the Dynamic Capabilities Program**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Opposing Logics (Poles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Orientation</td>
<td>Leverage existing value potentials (exploitation)</td>
</tr>
<tr>
<td></td>
<td>Create new value potentials (exploration)</td>
</tr>
<tr>
<td>Underlying knowledge</td>
<td>Use existing knowledge</td>
</tr>
<tr>
<td></td>
<td>Create new knowledge</td>
</tr>
<tr>
<td>Nature of DC process</td>
<td>Structured, detailed, linear</td>
</tr>
<tr>
<td></td>
<td>Loose, heuristic, general</td>
</tr>
<tr>
<td>Degree of dynamism</td>
<td>Incremental change (path-dependent)</td>
</tr>
<tr>
<td></td>
<td>Radical (or step-function) change (path-breaking)¹⁰⁰</td>
</tr>
<tr>
<td>Level of learning</td>
<td>Single loop learning</td>
</tr>
<tr>
<td></td>
<td>Double loop &amp; deutero learning¹¹</td>
</tr>
<tr>
<td>Fitness Criterion</td>
<td>Efficiency (operational)</td>
</tr>
<tr>
<td></td>
<td>Effectiveness (strategic)</td>
</tr>
</tbody>
</table>

### 4.3.1 Routinization versus Dynamization

It has been established that capabilities consist of coherent bundles of organizational routines (Dosi, Nelson & Winter, 2000; Nelson & Winter, 1982). Capabilities resemble routines in their repeatable and patterned character (i.e., they are tried ways of going about solving certain problems or accomplishing specific ends) (Cyert & March, 1963). However, capabilities are also characterized by their deliberate and intentional dimension that contrasts with the automatic nature of routines. Dynamic capabilities are also deliberate, repeatable and patterned ways in which the organization brings about some purposeful change to its resource base (Coriat & Dosi, 2002; Winter, 2003). In this respect, DCs are categorically different from ad hoc problem solving arising as a result of external shocks, which often takes the form of “...a high-paced,

¹⁰⁰ Henderson & Clark (1990) and Helfat & Raubitschek (2000) show how the dichotomy of incremental versus radical technological change may be too stark, and that in the middle there are important forms of change represented by architectural innovations and step function learning, that represent a break from incremental learning, but are of comprehensive magnitude as radical change in technologies and industries.

¹¹ Deutero learning as used here refers to higher order learning or learning to learn. See Argyris and Schön (1996) and Visser (2007).
contingent, opportunistic and perhaps creative search for satisfactory alternative behaviors.” (Winter, 2003: 992).

The first tension that arises concerns the core of the DC concept itself, where there is fear that the term dynamic capability is an oxymoron. There is no doubt that the idea of an organization having set patterns of producing change and innovative outcomes is an attractive one given the rate and magnitude of change that organizations are faced with. Moreover, introducing a dynamic dimension to the capabilities/competences of organizations may seem like a good strategy to avoid falling into the paradoxical dark side of competence. This potential flip side has been referred to in the literature as ‘competency traps’ (Levitt & March, 1988) or ‘core rigidities’ (Leonard-Barton, 1992) where the very success of a particular way of doing things over time cripples the organization and prevents it from changing its ways when they no longer work. The paradox lies in the idea that the very cause of success, itself later becomes the cause of an organization’s demise. Thus, the idea of dynamizing an organization’s capabilities seems to provide the solution to this potential problem of capabilities. However, when one reflects deeper on the logic of the concept, it is not very clear how the notion of routine, repeatable process squares with the dynamic and continuous innovation aspect. Schreyögg & Kliesch-Eberl (2007) claim that the DC concept relies on two contradicting logics: the logic of capability/competence and the logic of change/learning. The authors argue that these two logics are incommensurable.

“Dynamizing ... attempts to transform reliable and routinized action patterns into flowing operations. Stable patterns are thought to provide their reliable service while at the same time continuously changing. Reliable and replicable patterns cannot, however, evolve without stabilization; patterns cannot be conceived in terms of continuous change. Making them subject to the continuous adaptation inevitably means dissolving their replicable essence. The very core of a capability ... would simply get lost and become
Several authors have tried to resolve this contradiction. Nelson & Winter (1982) explain that even in innovation, organizations have patterned ways of going about their innovative activities, and that in highly innovative companies, such as 3M, innovation becomes a routine occurrence. Another solution to resolve the contradiction, based on Nelson and Winter (1982) and emphasized in Zollo & Winter’s (2002) model of DCs is a kind of hierarchy of routines, where higher order search routines modify operational routines. However, this solution can only bring about incremental or first order change, meaning change that may improve operative efficiency, but that preserves the overarching framework under which the organization is operating. Change of a higher order of magnitude, which would be based on double-loop learning or frame-breaking, would not come about under such a conceptualization. The reason is that evolutionary paths or trajectories, which refer to the future opportunities open to the firm, are said to be path dependent, which means they are constrained by the capabilities the organization attained in the past (Teece et al., 1997). Thus, in modifying its capabilities, a firm cannot choose freely from an infinite menu of possible future technological and organizational alternatives, as is portrayed in standard textbook economics (Nelson & Winter, 1982). Path dependence implies that the opportunities a firm will most likely experiment with, are expected to lie in proximity to its current and previous knowledge\textsuperscript{22} and therefore, the decision to invest in a certain domain of competence is a “... long-term, quasi-irreversible commitment.” (Teece et al., 1997: 515)

\textsuperscript{22} This is similar to the idea of absorptive capacity (Cohen & Levinthal, 1990).
Another attempt by Eisenhardt and Martin (2000), at reconciling routinization and dynamization in the DC concept, construes the nature of DCs to be determined largely by the degree of market dynamism. Thus, in moderately stable markets, such as paints or chemistry-based pharmaceuticals, dynamic capabilities are complicated, detailed, structured, and their execution is linear, analytical, and consists of robust routines that are highly codified, inertial and evolve slowly. On the other hand, in high-velocity markets such as computing and biology-based pharmaceuticals, change is nonlinear, unpredictable and industry structure and players are ambiguous and shifting. In these environments, dynamic capabilities are simple, unstructured, and execution is iterative and experiential to allow for early testing, real time feedback and learning by doing. Dynamic capabilities depend on the generation of new situation-specific knowledge, and therefore need to be flexible, improvisational and unstable, meaning they are under constant peril of slipping into too much or too little structure (Eisenhardt & Martin, 2000).

“Simple routines keep managers focused on broadly important issues without locking them into specific behaviors or the use of past experience that may be inappropriate given the actions required in a particular situation. Often these routines consist of a few rules that specify boundary conditions on the actions of managers or indicate priorities, important in fast-moving markets where attention is in short supply.” (Eisenhardt & Martin, 2000: 1111)

Although this may be a solution for extremely dynamic environments, it is a radical view that almost strips DCs of their essence as organizational capabilities, and portrays organizational responses that are more in the realm of ad-hoc problem solving (Schreyögg & Kliesch-Eberl, 2007).
The literature on organizational ambidexterity provides yet another attempt at resolving this tension in the theory of dynamic capabilities (Adler, Goldoftas & Levine, 1999; O’Reilly & Tushman, 2004, 2007; Smith & Tushman, 2005; Tushman et al., 2002). This literature recommends a particular organizational design, which, according to their empirical evidence, allows a successful co-existence of exploitative and explorative ventures in an organization. The ambidextrous design is based on maintaining a separation between an exploitative unit built around efficiency targets and an explorative unit built for discovery and improvisation. The integration between these two opposing architectures is achieved via the senior management team. O’Reilly and Tushman (2007) consider ambidexterity, or the ability of an organization to maintain both exploitation and exploration, to be a dynamic capability.

The closed systems perspective deals with this issue in a different way. First, it does not see that innovation and higher order change can result from a deliberately detailed, linear, rational, step by step process. What can be done though is to provide the enabling conditions that allow innovations to flower in the organization and find the needed support and recognition. This view has been expressed in Hamel (1998) and Lengnick-Hall & Wolff (1999). In keeping with the closed systems view, Schreyögg and Kliesch-Eberl (2007) propose a dual process solution, where besides patterned DCs, a capability monitoring process works to alert the organization to the need for higher order change. The authors recommend that the monitoring process be left unstructured and non-routinized, and that the observation be kept as open as possible. Monitoring is an activity that should be designed to be distributed all over the organization, and thus

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23 Closed systems theory grew out of open or general systems theory. It is that branch of systems theory that deals with viable, autonomous and self-regulating & self referential systems, such as the human brain.
should not be limited to a person, unit or department. Since it is unknown where important information will appear, any person or unit may find themselves in

“...the situation where they are confronted with a most important signal of the threatened validity of the current capability. The scope of possibilities is extremely broad, ranging from international conferences, customer claims, negotiations with suppliers, and accreditation auditors to reading a newspaper or having a conversation with a partner in a golf club.” (Schreyögg & Kliesch-Eberl, 2007: 929)

The chapter on the competence-based perspective explains in detail how systems theory and the cybernetic approach to strategy resolve this tension between routinization and dynamization with regard to organizational capabilities/competences. In that perspective, strategic management plays the dual role of leveraging existing competences to exploit extant value potentials and developing new competences and new value potentials, without necessarily lumping them into one conceptual bundle.

4.3.2 Efficiency to Effectiveness to Fitness

Some DCs are highly structured, linear processes, where there are clear detailed steps and reliable data can be gathered. Examples of such DCs are those processes directed at continuous improvement and incremental change in production processes, quality improvement processes, and business process re-engineering. It may not come as a surprise that all the mentioned examples are directed at operative efficiency, where an organization attempts to get better at what it does, and produce its output at a higher quality and/or lower cost. This is an important and necessary function of dynamic capabilities, and in several instances in the literature (for example Zollo & Winter, 2002) one gets the impression that dynamic capabilities are all about operative efficiency. A possible reason is the neat and orderly nature of such processes that is readily amenable
to modeling and measurement. However, it has been repeatedly emphasized that the operational logic is only one side of the coin, a necessary but insufficient requirement for achieving superior performance. The strategic logic looks to as yet non-existent value potentials, and attempts to bring them about, and this is what I have referred to above as change of a higher order of magnitude than first order improvements to operative efficiency. The DCs required to bring about this type of change in the way the organization’s resource base is used, and further to build new competences that allow for realizing new value potentials, are a wholly different species than those DCs that work to steadily improve on existing operations. This can be explained by a simple equation that illustrates the economic value that an organization produces from its productive operations.

\[ V = P - C \]

The economic value an organization generates (V) is equal to the price customers are willing to pay for its product/service (P) less the opportunity cost it takes the organization to produce it (C) (Hoopes, Madsen & Walker, 2003). DCs functioning in the operational domain work on the right hand side of the above equation. By working on quality and differentiation, the price can be increased, and by re-engineering production processes costs can be reduced. Here, dynamic capabilities serve the goal of efficiency, or technical fitness (Helfat et al., 2007). A firm’s strategic management might aim at leveraging a particular value equation by making use of new technologies, for example, to offer its customers better functionality, thus taking its existing value equation to a higher level. However, strategy is entrusted with another different function besides leveraging existing value potentials, and that is the creation of new value potentials that
ensure effectiveness. Effectiveness is the high purpose of management and strategy (Drucker, 1964: 5), as it looks at whether the firm is going in strategic directions that allow its long term survivability and fitness. In terms of our value equation, we can say that strategic management works to imagine and create new value equations. Thus, it must necessarily go beyond the realms of current efficiency considerations, and there is an inherent tension here as the two goals of efficiency and effectiveness may be pulling the organization in different directions.

Since the DC program originated within an economic methodological framework, economic efficiency was initially the principle criterion which DCs were argued to serve, and its founding authors (Teece et al., 1997) called the DC approach one of the “efficiency based approaches to strategy”. The above discussion should suffice to clarify that the latter statement contains a contradiction in logic. As Porter (1996) stresses, operational efficiency is not strategy; the goal of strategy is achieving effectiveness, and operational efficiency is a necessary but insufficient condition. Effectiveness is sometimes mentioned as one of the objectives of DCs, but in our view, the literature of the program does not give adequate attention to this important aspect of dynamic capabilities. In most cases both conceptual and empirical discussions start by considering some aspect of dynamic capabilities taking for granted the existence of a particular strategic direction that guides the deployment or creation of DCs. However, recent theorizing in the DC program has moved from technical efficiency being the high criterion to evolutionary fitness, which is a more comprehensive criterion. Helfat et al. (2007) propose the concept of evolutionary fitness, which reflects the extent to which the dynamic capability contributes to the survival and growth of the organization. “...the
extent of evolutionary fitness depends on how well the dynamic capabilities of an organization match the context in which the organization operates,” (Helfat et al., 2007: 7) as it reflects the external selection environment. Evolutionary fitness of an organization may be reflected in such parameters as growth, survival, value creation and sustained competitive advantage\(^{24}\). The evolutionary fitness of a particular capability for an organization is dependent upon four factors, two of which are internal (quality and cost) and the other two are external to the firm (demand and competition). The two internal determinants of evolutionary fitness constitute what the authors label technical fitness, which denotes “… how effectively a capability performs its intended function when normalized (divided) by its cost” (Helfat et al., 2007: 7). The quality of a dynamic capability does not always go in the same direction as its cost; in some instances, quality enhancement is accompanied by lower costs, but in other situations, an improvement in quality entails greater costs. The third factor that influences a dynamic capability’s evolutionary fitness is (derived) market demand for the end product that results from the exercise of the capability. Finally, the competitive environment encompasses both competition and cooperation with other organizations (Helfat et al., 2007: 7-9). This reference to evolutionary fitness is an important amendment to the hitherto exclusive focus on efficiency as the high criterion for the DC program.

### 4.3.3 Resolving the Tensions in the DC Concept

In conclusion, I do not claim that there exists a simple way to diffuse the above tensions within the confines of the single construct of dynamic capability. However, I

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\(^{24}\) Competitive advantage is defined as superiority over competitors in relative value creation (Helfat et al., 2007).
think that understanding the limitations of the construct goes a long way in helping us to adequately deal with these tensions, as well as to understand in which areas the concept is of use. Collis (1994) classifies organizational capabilities that are likely to bring competitive advantage to an organization into three categories: static, dynamic and creative.

“The first category of capabilities is those that reflect an ability to perform the basic functional activities of the firm, such as plant layout, distribution logistics, and marketing campaigns, more efficiently than competitors ... The second category of capabilities shares the common theme of dynamic improvement to the activities of the firm [as for example] repeated process or product innovations, manufacturing flexibility, responsiveness to market trends, and short development cycles ... The third category of capabilities, although closely related to dynamic improvements, comprises the more metaphysical strategic insights that enable firms to recognize the intrinsic value of other resources or to develop novel strategies before competitors.” (Collis 1994: 144)

I hope that the above discussion of tensions has illuminated the difference between the dynamic and creative categories. I find that the DC program has so far been more successful in explicating the dynamic category. The argument I have tried to advance is that it has not been as successful with the last category, the creative strategic capabilities, despite claims by its proponents that it covers the two realms and provides both a positive (explanatory) and normative (guiding) framework for strategists. The reasons for this lack of success are obviously a failure or unwillingness to realize that the epistemological and methodological apparatus that allow us to impose some sense on the past behavior of managers and firms are lacking when it comes to applying human creativity to create future endeavors. The DC program thus needs to be embedded in a more comprehensive framework, whereby the dynamic capabilities are guided and directed by the creative, insightful judgment of future-looking strategists. I find that the competence program, based on closed systems theory, provides such a useful framework.
4.4 Organizational Learning and Managerial Implications of the DC Program

In this section, I discuss two important themes in the strategy literature as they relate to the dynamic capabilities program; these are: 1) the theme of organizational learning, 2) the normative dimension of DC theory, and the managerial implications drawn from its literature.

4.4.1 Organizational Learning

It has been established at the beginning of the current chapter that in essence dynamic capabilities are a genre of organizational capability entrusted with bringing about change to the resource base (in the broadest sense) of the organization. The essence of organizational capabilities is organizational knowledge that is stored in the form of routines. Therefore, it should logically follow that since dynamic capabilities are in essence bundles of organizational knowledge, then organizational learning lies at the root of the creation and development of any dynamic capability. It is very surprising that this simple logic is sometimes unclear and confused in the literature of the DC program, even among its most prominent protagonists, namely Teece et al (1997) and Helfat et al. (2007). The exception here is the contribution by Zollo and Winter (2002) that puts organizational learning at the center of the theory of dynamic capabilities. This contribution is reviewed first, followed by a brief review of the tangential treatment of organizational learning in the writings of the major contributors to the DC program.
Zollo and Winter propose a model of the evolution of collective knowledge in the organization that is based on the classic evolutionary logic of variation, selection and retention. However, they add a fourth phase which is replication.

**Figure (1) Activities in the Knowledge Evolution Cycle***

*Source: Zollo and Winter, 2002, p.343

The knowledge evolution cycle is a recursive cycle which describes a mechanism by which operating routines and dynamic capabilities may evolve over time inside the organization. The model does not explicitly consider external or environmental selection, which determines the success or failure of the organization’s performance outcomes. The role of the environment is important and enters in the form of stimuli that may inspire (or pressure) new ideas, as well as feedback on the effectiveness of the organization’s current practices with respect to the fitness/viability of the organization. However, the authors declare that their model deals with “… the set of internal processes located, from a temporal standpoint, between the two.” (Zollo & Winter, 2002: 344)
A cycle starts out with variation that is generated when members of the organization put forth new ideas directed at organizational problem solving, whether it involves new ways to solve old problems or the definition of new problems to deal with. Generating variation requires creativity and is influenced by information coming from the external environment as well as from inside the organization. The new proposals are subject to internal selection forces of two types, technical evaluation and political forces. The potential usefulness of the new proposals is discussed and evaluated through debates, which primarily involve articulation of knowledge. New ideas also have to succeed legitimization processes that are influenced by organizational politics and power structures. Proposals that survive internal selection are diffused to the relevant parts of the organization in the replication stage. Here, the authors point to the distinction between biological organisms and organizations, where the latter are capable of acting in diffuse spatial settings simultaneously, while the former cannot. In addition to the diffusion of knowledge, replication also generates variation that may lead to the initiation of a new knowledge cycle, since it provides the application context in which the proposals that survived the cognitive tests in the selection stage can be tested practically. The final stage is retention which involves routinization of the selected proposals. The problem solving that happens during enactment and routinization of tasks yields feedback that is used to stimulate another round of the knowledge cycle. Zollo and Winter stress the importance of the deliberate collection and processing of this feedback such that it may be used to generate new ideas. The reason they give is that with repetition, the routines become automatic and the underlying logic tacit, and so conscious cognitive
efforts are needed to analyze the feedback from retention and generate creative suggestions out of it.

Interestingly, the authors integrate their model of the knowledge cycle with previous literature on organizational learning, namely March’s (1991) notions of exploration versus exploitation and Nonaka & Takeuchi’s (1995) ideas about the tacit versus explicit nature of knowledge. The variation and selection phases deal with conscious cognitive mechanisms in which the knowledge is made explicit and these phases are associated with exploration. On the other hand, the replication and retention phases involve behavioral mechanisms associated with exploitation of previous knowledge, where repetition and skill render a significant portion of the knowledge tacit. Finally, Zollo and Winter “...suggest that exploitation can prime exploration, and propose that in addition to the familiar trade-off between exploration and exploitation processes, there can be a recursive and co-evolutionary relationship between them.” (Zollo & Winter, 2002: 344) A needed qualification here, which was mentioned in the previous section discussing the conceptual tensions in the DC program, is that exploitation can only prime exploration when learning is incremental or path dependent and the change produced is of the first order. Double loop or frame-breaking learning may not occur within the vicinity of past exploitation activities.

According to Zollo and Winter (2002) both operational routines and dynamic capabilities evolve over time as a result of learning processes. Zollo and Winter distinguish between two types of learning processes: automatic accumulation of experience on the job versus deliberate learning. Accumulation of experience happens through learning by doing and the knowledge that results most likely contains a highly
tacit part because with repetition, performance of tasks becomes automatic and the underlying knowledge implicit. On the other hand, deliberate learning refers to processes that require a conscious allocation of organizational time and effort towards achieving an improved understanding of the causal link between the organizational actions taken and the performance outcomes that result, namely knowledge articulation and knowledge codification. Zollo and Winter hypothesize that the less frequent the task involved, the more causally ambiguous, and the more heterogeneous it is with each repetition, the higher is the return to deliberate articulation and codification of knowledge.

Despite this fruitful focus by Zollo and Winter on organizational learning and its relation to the development of dynamic capabilities in organizations, the confusion regarding the role of organizational learning remains noticeable in the work of major contributors, such as Teece et al. (1997) and Helfat et al. (2007). Teece et al. (1997) devote a small paragraph to the issue of organizational learning, stating that learning is one among many functions accomplished through the deployment of dynamic capabilities. Thus, one class of organizational processes fulfills the dynamic function of organizational learning. The authors recognize that learning has an organizational and individual component, and emphasize the collective nature of learning in organizations that results from shared efforts directed at solving complex problems. The organizational knowledge that results from these learning processes takes the form of organizational routines or “...new patterns of activity” and interaction at the group level. Inter-organizational learning happens when these learning processes cross over organizational boundaries. At the time the founding article of the DC program was published, the organizational learning literature had mushroomed, yet one finds a questionable note in
the article about the limited size of this body of literature (Teece et al., 1997). Thus, the DC program started out with an inadequate appreciation of the central role of organizational learning in all kinds of change processes associated with the exercise or development of dynamic capabilities. This carries through to some of the latest contributions (Helfat et al., 2007; Teece, 2007).

In the book by Helfat et al. (2007), organizational learning is mentioned in brief instances, and when mentioned it is construed as merely one type of dynamic capability. “A dynamic capability for learning frequently helps to extend or modify dynamic as well as operational capabilities of all types.” (Helfat et al., 2007: 5) I would rather propose that learning lies at the root of any activity to create, change or develop organizational capabilities, whether they are operational or dynamic. Learning is not merely one type of DC that may sometimes be used. The phrasing quoted above implies that sometimes operational and dynamic capabilities may result from a process other than organizational learning, but they do not explain what other mechanisms organizations use to create and modify capabilities. The view that organizational learning is the essence of dynamic organizational capabilities is supported by the central place given to organizational learning in the competence based program, as well as by several authors, such as Stata (1989), Senge (1990), Williams (1992) and Mahoney (1995).

“In fact, organizational learning may be usefully considered a ‘meta-competence’ or ‘meta-skill’ that directs the resource conversion activities of the firm and is a source of sustainable competitive advantage .... Competence in organizational learning may involve both the content of knowledge and the rate of learning.” (Mahoney, 1995)
One argument that has been advanced against placing organizational learning as a higher-order or meta-capability is the claim that this leads to an infinite regress in the explanation of competitive advantage (Collis, 1994). Collis uses the logic of differential calculus, meaning that if dynamic capabilities are the first derivative of efficiency in resource deployment, then there will always be a second-order, third-order derivative … ad infinitum, which can be used to explain the preceding level. Substantively, if the first derivative of capabilities is dynamic capabilities, which are equivalent to organizational learning, this first order change can be explained by the second derivative, which represents the capability of learning to learn. The third derivative is the capability that modifies the structures of learning to learn, and thus we have an infinite regress. While this argument may be plausible in a mathematical sense, when the substantive implications of this are pondered, we find that it is highly unlikely that organizational processes governing high order change are highly patterned or routinized in the sense of dynamic capabilities (Winter, 2003: 992). I agree with Winter’s refutation of the infinite regress argument; however, I see that it also goes to show that dynamic capabilities as defined in terms of routines are not adequate for explaining creative strategic change in organizations. I would also like to add a further argument against the threat of infinite regress, which is that derivatives higher than the second-order, which corresponds to the notion of learning to learn, are void of substantive and meaningful counterparts in organizational life, and may thus not be of interest or importance.
4.4.2 Managerial implications: Uncertainty, Complexity & the Illusion of Control

Helfat et al., (2007) and Teece (2007) criticize extant economic theory for its total neglect of the manager’s role in facilitating the functioning of business organizations and thus of the economic system. Thus, the manager performs a fundamental economic function that is central for economic theory (as asserted long ago by Schumpeter, Penrose, Baumol and others).

“Seven particular classes of economic functions can be assigned in economic theory to management. They are: 1) orchestrating co-specialized assets; 2) selecting organizational / governance modes and associated incentive systems; 3) designing business models; 4) nurturing change (and innovation) processes / routines; 5) making investment choices; 6) providing leadership, vision, and motivation to employees; and 7) designing and implementing controls and basic operations. None of these functions can be performed well, if at all, by computers or by naked market processes. Managers are needed to make markets work well, and to make organizations function properly.” (Helfat et al., 2007: 21)

The authors emphasize that the first six of these seven functions are particularly relevant to the study of dynamic capabilities, and Teece (2007) elaborates on them at length. It is clear from the quote above that these six functions cannot be relegated to computer models, no matter how sophisticated. I would add that that the high degree of uncertainty regarding decisions about the future coupled with complexity arising from the environment and from the social dimension inside the organization make it quite difficult for a manager to be able to exert a high degree of control over the outcomes of the six processes. However, the DC program explicitly aims to provide both positive and normative contributions, and it is implied in the literature that managers are expected to be able to identify, change and shuffle their DCs to achieve various desirable outcomes. Formal models and simulation studies within the DC program (such as Zott, 2003; Lavie, 2006) may give the impression that such tight control is possible, and even desirable. It
has been argued previously that a positivist epistemology and a retrospective focus carry the danger of eluding managers into thinking that the future may be like the past. McGuiness and Morgan (2000) relate this issue of outcome oriented managerial control to the debate raised by Hayek (1974) in which he claims that by imitating the physical sciences in terms of quantification and precise calculation, the social sciences manifest a pretence of knowledge of the variables that enable men to control social systems. McGuiness and Morgan claim that the managerial implications commonly distilled from the DC approach give managers a similarly false pretence of knowledge and control over the organization and its outcomes. Like Hayek they propose that what a manager can do is provide the right kind of environment where innovative, creative and dynamic capabilities may flourish.

“To act on the belief that we possess the knowledge and power which enables us to shape the processes of society entirely to our liking, knowledge, which in fact we do not possess, is likely to make us do much harm. . . . If man is not to do more harm than good in his efforts to improve the social order, he will have to learn that in this, as in all other fields where essential complexity of an organised kind exists, he cannot acquire the full knowledge which would make mastery of the events possible. He will therefore have to use what knowledge he can achieve, not to shape the results as the craftsman shapes his handiwork, but rather to cultivate a growth by providing the appropriate environment, in the manner in which the gardener does this for his plants.” (Hayek 1974/1989: 7, original emphasis).

Hayek’s recommendation takes the same view on this issue as that proposed by complex systems theory, where elements of a system are seen to interact in non-linear and unpredictable ways. In this case, the manager works to create an enabling environment rather than attempts to shape specific outcomes. In other words,

“... management is presumed to have an important and influential role to play in designing the rules from which organizational behavior is socially constructed ... The complex systems view of management’s role is as a scene-setter, not as a scriptwriter. Taking this theatrical analogy a little further: what happens on the strategy stage
depends on how the players respond creatively, mutually and interactively to the scene—there is no conscious direction of them towards preconceived outcomes.” (McGuinness & Morgan, 2000: 217)

4.5 Conclusion: Dynamic Capabilities, Economics & Strategic Management

The DC approach started out with an initial underlying premise that the discipline of economics, with its highly developed theoretical apparatus should inform strategic management, a field lacking a rigorous theoretical base, and in many instances seen as an outgrowth of IO economics. Undoubtedly, economic and financial considerations are at the heart of strategic management as they constitute criteria for economic and financial viability, the lifeblood of business organizations. However, this is not the same thing as claiming that strategic management should be informed by the basic framework and underlying assumptions of economic theory. A positivist framework may be suitable for analyzing the past, as its categories are observable. Strategy is oriented towards the future, the future does not exist yet, it needs to be created and therefore, a constructionist framework is needed. Moreover, in analyzing trends above the micro level (as in evolutionary economics) the analysis necessarily abstracts from the individual unique and idiosyncratic circumstances of decision and action for individual managers. This is useful for discerning patterns and informing the macro-level as well as micro to macro links. In this realm, we cannot but assume that the future will be like the past, so that we depend on these laws or patterns until they prove inadequate or are in need of revision. However, it cannot be used to inform managers about their managerial conduct – again here the constructionist approach may be more helpful. Single individuals and firms constitute a categorically different problem. What is likely to happen in an individual case, as a result of human choice and creative action, cannot be predicted or explained in
such a deterministic or probabilistic manner, as it involves individual choice and action based on learning, which could never be anticipated beforehand, and thus can never follow the single rationality of a covering law or statistical pattern. The realm of individual human (or firm) behavior is that of history and entrepreneurship, where the assumption that the future will be similar to the past is highly mistaken (Hoppe, 1997).

The development in the thought of a major contributor to the DC approach, Teece, shows a gradual move in a fruitful direction. As economic theory has been widely criticized for being based on highly distorted micro–framework of the firm, while strategic management drawing from organization theory with its base in sociology and social psychology portrays a more realistic view of human managers, I have claimed that strategy should inform the microeconomic theory of the firm and not the other way around. In Helfat et al (2007) Teece contributes a whole chapter on some rudimentary outlines of a microeconomic theory that is informed by a management oriented view about the role of strategic managers, including the entrepreneurial role and traits of human nature such as vision, acumen and judgment (rather than self interest-directed opportunism that forms the basic human nature portrayed under TCE and agency theory). Teece explains that strategic managers are essential for the functioning of the economic system, through seven roles that cannot be left to the market. These essential roles have been recognized long ago by Schumpeter, Penrose and Baumol, and have been outlined above.25

Evolutionary theory has gone a long way in incorporating a more realistic micro-framework for the business enterprise as the nucleus to a more adequate economic theory.

25 The reader is referred to Teece (2007) for detailed elaboration on these functions.
In evolutionary economics, the “... diversity of firms in terms of strategy, structure and core competences is the necessary microfoundation for understanding macroeconomic change as an evolutionary process and vice versa, ... evolutionary economics provides a macro explanation for the resource based theory of the firm.” (McKelvey, 1998:160)

However, evolutionary theory has its uses and its limitations, and it is of utmost importance to keep these in perspective. Earlier in this chapter, in the section discussing ‘epistemology, entrepreneurship and the cognitive dimension’, I put forth a quote by Nelson & Winter in their evolutionary theory stating how it can only help in seeing a little bit farther in the future, meaning the close-in part of the future that is created through an incremental modification of the current practices. Where the creativity of the entrepreneur will take the organization and the world cannot be foreseen as an extrapolation of the present and the past. In the frantic search for the secrets underlying sustained competitive advantage, it is clear that any advantage is temporary, and that to stay on top, a business organization has to eventually undermine its own sources of advantage and imagine a future that forms a break with the rules that govern extant competitive advantage (Hamel & Prahalad, 1994; Hamel 1996). It is this dimension of strategy that cannot be captured by the rigorous analytical apparatus of economic theory, except as a stochastic process. However, if all we have in the way of advice to managers is to tell them that the future of their organizations is left to chance events, there is no need for strategy. There is certainly more to strategy than chance. But if meticulous calculation in the tradition of economics is not the whole answer, what is? The competence-based program uses a different lens to come up with an answer. The answer may not be satisfying enough for some, as it does not constitute a step-by-step
methodology that leads to a definitive solution. However, it is the answer that is, in our view, the most conducive to a forward oriented view of organizations as complex systems and of creative strategy as that part of strategic conduct that may lead to capturing competitive advantage.
Chapter 5

The Competence Program

5.1 Introduction

“In the 1960s, Japanese producers relied on labor and capital cost advantages. As Western manufacturers began to move production offshore, Japanese companies accelerated their investment in process technology and created scale and quality advantages. Then as their U.S. and European competitors rationalized manufacturing, they added another string to their bow by accelerating the rate of product development. Then they built global brands. Then they deskillled competitors through alliances and outsourcing deals. The moral? An organization’s capacity to improve existing skills and learn new ones is the most defensible competitive advantage of all ... The essence of strategy lies in creating tomorrow’s competitive advantages faster than competitors mimic the ones you possess today.” (Hamel & Prahalad, 1989: 69)

When Gary Hamel and CK Prahalad wrote these words, there was a revolution in the making as far as strategic management thinking was concerned. The seeds to this revolution had been planted long before by early visionaries such as Schumpeter and Penrose. However, the tipping point happened with the first trickle of publications by Hamel and Prahalad in the early nineties. Their article “The core competence of the corporation” (1990) is the most reprinted article ever in the Harvard Business Review (Hamel & Heene, 1994) and arguably represents a watershed between two eras of strategic thought, representing two different paradigms (Hühn, 2008). In several prominent articles in HBR as well as their book “Competing for the future” (1994), Hamel and Prahalad laid out the foundations of the constructionist school of the Resource-Capability-Competence Approach, explained earlier in Chapter 3. By doing so, they pulled the rug from underneath the classical approaches to strategy, and provided a fresh view, based on qualitative anecdotal research they conducted on some of the most successful companies in the world (Hühn, 2008). Prahalad and Hamel’s ideas had
profound ramifications on both the theory and practice of strategy. Wernerfelt (1995) acknowledges that the two authors were singlehandedly responsible for disseminating the basic ideas of the resource perspective to practitioners, both consultants and managers.

I think there are several reasons that explain the broad success and thorough influence of Hamel and Prahalad’s ideas. First, on a theoretical level, the competence program represents a bridge between important classic thinkers, such as Selznick, Schumpeter and Penrose and contemporary contributions in the RCC perspective. Second, the competence program springs from a unique framework of basic assumptions that connect with rich bodies of theory deemed highly relevant to strategy, such as systems theory and cognitive psychology. Third, this theoretical depth is complemented by a high degree of practical relevance. Gleaned from the success stories of top notch companies, Hamel and Prahalad’s insights resonated strongly with practitioners, especially that the authors addressed their prime audience in a language that is accessible and highly workable for them. Fourth, their insights offered better strategy prescriptions than previous traditional approaches such as planning and positioning, which had failed to bring competitive advantage to American firms in the face of Japanese competitors.

This chapter provides a review of the competence program. I recount the main ideas starting from the initial work of Hamel and Prahalad, and going through later developments contributed under the banner of the ‘competence-based approach to strategic management’ (Hamel & Heene, 1994; Sanchez & Heene; 1997). In addition, contributions to the program by management cyberneticists are reviewed. Following the general thrust of the current research, I examine the underlying framework that forms the hard core of the program by analyzing its basic assumptions and worldview.
5.2 Core Competence

Writing in the Harvard Business Review for a practitioner audience, Prahalad and Hamel (1990) do not provide a formal definition of core competence. However, their work is replete with statements of what core competence is, what it is not, and how we can identify the core competences of a company.

“Core competences are the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies.”

“If core competence is about harmonizing streams of technology, it is also about the organization of work and the delivery of value.”

“Core competence is communication, involvement, and a deep commitment to working across organizational boundaries”

“Core competence does not diminish with use” as is the case with physical assets. (Prahalad & Hamel, 1990: 82)

“A core competence is a bundle of skills and technologies rather than a single discrete skill or technology ... The core competence Federal Express possesses in package routing and delivery rests on the integration of bar-code technology, wireless communications, network management, and linear programming, to name a few.” (Hamel & Prahalad, 1994: 202)

The above definitions emphasize several key characteristics of core competences: they are people-embodied, collective, based on learning over the years, and involve integration of several skills/technologies. In order to qualify as ‘core’, skills or competences must satisfy three conditions:

“First, a core competence provides potential access to a wide variety of markets ... Second, a core competence should make a significant contribution to the perceived customer benefits of the end product ... Finally, a core competence should be difficult for competitors to imitate. And it will be difficult if it is a complex harmonization of individual technologies and production skills.” (Prahalad & Hamel, 1990: 84)
Prahalad and Hamel show the serious consequences of failing to view companies from the competence-based perspective. Traditionally, senior managers view their corporations as portfolios of strategic business units (SBUs) that are more or less independent bubbles that compete against each other for investment funds and qualified human resources. In failing to conceive of their organization as a portfolio of competences rather than a portfolio of SBUs, senior management foregoes its most crucial role in shaping the future of the corporation, which, as Hamel and Prahalad elaborate, rests on consistent building of competences that allow the company to compete in and create new markets in the future. Even though these corporate CEOs optimize over SBUs (primarily in terms of investment flows) they end up losing in the long term if they do not invest in the leverage and development of their core competences. Moreover, the SBU structure deprives the corporation from the synergy and leverage effects of sharing core competences across business units, as it traps talent and innovation into unconnected boxes. The competition for corporate funding makes large investment in the development of valuable competence building unjustified under individual business unit budgets. In this way, the SBU conception and structure work against the development of competence for the long term viability of the organization (Prahalad & Hamel, 1990).

Prahalad and Hamel emphasize that core competence is built over years of collective learning inside the organization, and therefore caution managers from taking subcontracting or divestiture decisions that may result in losing core competences. If a company forgoes investment in building a core competence for some time, it may be very difficult for it to hop back on board and enter emerging markets. For example, Honda has a core competence in engine design and manufacture. This allowed it to enter several
end product markets, such as cars, motorcycles, marine engines and lawn mowers. It also made engines for other automakers, such as Rover, the British car company, under OEM agreements. Sony has a core competence in miniaturization, Motorola in wireless communications, Toyota in lean manufacturing, Wal-Mart in logistics, Coca Cola in advertising, Marriott in catering and facilities management and the list goes on (Hamel & Prahalad, 1994).

Authors, who have developed a broad theoretical framework for strategic management based on the competence perspective, have attempted to give a definition suitable for scientific research purposes. Sanchez et al. “Competence [is] the ability of a firm to sustain the coordinated deployment of assets in ways that help a firm achieve its goals.” (Sanchez, Heene & Thomas, 1996: 9) Sanchez (2004) additionally identifies five competence modes, each of which points to the ways in which competences are manifest in specific activities and processes at different levels within organizations.

- **Competence mode I:** cognitive flexibility to imagine alternative strategic logics
- **Competence mode II:** cognitive flexibility to imagine alternative management processes
- **Competence mode III:** coordination flexibility to identify, configure and deploy resources
- **Competence mode IV:** resource flexibility to be used in alternative operations
- **Competence mode V:** operating flexibility in applying skills and capabilities to available resources (Sanchez, 2004)

Competence modes III to V overlap with the main themes of the dynamic capabilities program. It is competence modes I and II that set the competence program apart, for in them lies the essence of the competence program’s underlying epistemological and theoretical framework. As such, the competence program offers a more comprehensive view of strategic management, and explicates the central role that

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26 See Petroni, 1998; Rindova & Kotha, 2001; Ingelgard et al., 2002; Pavliou & El-Sawy, 2006 as examples of such overlapping literature.
the configuration and deployment of resources plays within the bigger picture. 
Abstracting from the more comprehensive framework, and restricting focus to the 
technicalities of reconfiguring and deploying resources, leads many scholars to 
mistakenly box both the dynamic capability and competence programs within the 
behavioral evolutionary school of the RCC perspective (as shown in Chapter 3). I think 
this is not correct, and in what follows I show how the competence program embeds the 
management of competence within a holistic view of the business organization.

Scholars of the competence program have specified four cornerstones that distinguish 
its theoretical framework. These four dimensions constitute the hard core of the program. 
The competence framework is dynamic, systemic, cognitive and holistic, and these 
dimensions give rise to a wholly different view of strategic management (Sanchez, 2001). 
In what follows, I review the main ideas of the competence program by explaining each 
of the cornerstone dimensions, and surfacing the underlying assumptions. In addition, 
the following review shows how the competence program produces a new view of 
strategy, that is based on ideas put forth long ago by pioneers such as Schumpeter and 
Penrose.

5.3 The Dynamic Dimension

This dynamic dimension in a nutshell refers to the ever changing nature of the 
organization’s internal and external environment, which results in dynamic complexity 
and uncertainty. In the external environment, consumer preferences may change as well 
as technologies, successful ways of organizing to capture opportunities, and even 
institutions, norms and infrastructures of organizational functioning may change. With
the inevitability of change, it is risky for managers to conceive of their companies in terms of product markets, and therefore, the competence program calls on managers to view their companies as portfolios of competences, that can serve in several product markets. Moreover, the competence program sees that the role of strategy in companies is to shape change inside and outside the organization to its advantage, rather than to react to changes effected by competitors. The quote at the beginning of this chapter even goes further to say that even if a company is able to shape its markets and gain competitive advantage once, the only way to sustain its advantage is to re-invent itself, by subverting its own advantages before competitors do. Empirical work on high velocity markets supports this dynamic perspective of the competence program (Brown & Eisenhardt, 1997). This dynamic aspect of the competence program connects Schumpeter’s thought to current strategy thought. Schumpeter, who placed the entrepreneur type at the root of the economic growth process, asserts that the central issue in the study of the capitalist engine of growth is not how the existing market structure is sustained, as is the tradition in equilibrium based economic analysis, but rather how existing market structures are destroyed and new ones created (Schumpeter, 1994/1942). The competence program, as suggested by Hamel’s opening quote, focuses on exactly this issue at the micro-level, and eventually links it to the industry level.

Hamel and Prahalad (1989) criticize classical approaches to strategy, such as the SWOT model, strategic planning and positioning, because they all rest on static analysis of current industry structures. The current industry structure is a reflection of the industry leader’s strengths, and a company that formulates its strategies based on the rules set by the industry leader is committing competitive suicide.
“Armed with concepts like segmentation, the value chain, competitor benchmarking, strategic groups, and mobility barriers, many managers have become better and better at drawing industry maps. But while they have been busy map making, their competitors have been moving entire continents. The strategist’s goal is not to find a niche within the existing industry space but to create new space that is uniquely suited to the company’s own strengths, space that is off the map.... An industry in upheaval presents opportunities for ambitious companies to redraw the map in their favor, so long as they can think outside traditional industry boundaries.” (Hamel & Prahalad, 1989: 73)

Re-drawing the map happens if a company is able to use its competences to invent brand new markets, that were hitherto non-existent, quickly enter emerging markets before competitors, or make dramatic changes in customer preferences in established markets by building superior functionality into extant products, or meeting needs unarticulated or even unrecognized by the customer (Prahalad & Hamel, 1990). By creating changes on the ground that depend on its unique strengths, a company in effect changes the rules of the competitive game in its industry. This kind of change is not brought about through a simple extrapolation of the company’s current practices.

In their cybernetic approach to management, Espejo et al. (1996) differentiate between first order and second order change in organizations. First order change involves more of the same, or quantitative growth that preserves the underlying framework of the organization’s functioning. Examples of first order change in organizations include many of the change processes that fit under the dynamic capability concept, such as quality improvement, productivity enhancement, re-engineering business processes and the like. Second order change produces something new, and involves qualitative changes that result from a shift in the underlying framework, either by creating or adopting a new frame. Examples of second order change include introducing novel functionality for the customer by using a new technology, opening up
new markets for existing products/services, or creating new products/services and new markets. Creating a new business model that enables the organization to create more value, or re-defining the industry or the customer needs are also important types of second order changes. In terms of competence, Sanchez and Heene (1997) have defined the activities related to the development of organizational competences in terms of first and second order, or qualitative and quantitative change.

“Competence building is any process by which a firm achieves qualitative changes in its existing stocks of assets and capabilities, including new abilities to coordinate and deploy new or existing assets and capabilities, while competence leveraging is a process through which a firm applies its existing competences to current or new market opportunities in ways that do not require qualitative changes in the firm’s assets or capabilities.” (Sanchez, Heene & Thomas, 1996: 8)

Espejo et al. (1996) explain that first order change is insufficient and second order change necessary for a company to have competitive advantage in the long term. In order to create new market space and re-draw the current industry maps, a company must part with established industry traditions, and even with its own established orthodoxies, which is easier said than done. Hamel’s seminal article “Strategy As Revolution” (1996) aimed at driving home exactly this point.

First order change is of course much easier to bring about than second order change, and this is why many managers may delude themselves into thinking they are making dynamic changes to their companies just by achieving important changes of the first order. This may be fine in the short term, but sooner or later the times will change, and if an organization does not take an active role in defining its place in the markets and
industries of the future, it is unlikely to flourish. However, second order change seldom happens overnight. The redefinition of industries and the invention of new markets happen over years, and therefore the road to second order change consists of taking smaller emergent steps in broad directions that the organization has set out for itself. The details of how an organization and its members determine their direction for the future are elaborated below in the section discussing the cognitive dimension, so I do not go into that now. The point taken up here is that as small steps are being taken, and as the future unfolds according to actions taken by firms bringing it about, an organization needs to amplify its dynamic nature by building strategic flexibility, and this is one of the main recommendations of the competence program. Rather than making strategic commitments to specific courses of action, the competence perspective emphasizes building competences that give the organization the strategic flexibility that renders it capable of pursuing several alternative courses of action and allows it to change course according to the evolving uncertainty and dynamism of the environment (Sanchez, 1997a). Some of the literature on flexibility draws from options theory in finance, and they liken the opportunities of value creation that competence confers upon organizations to real options. When an organization leverages existing competence to create value in extant markets, it is exercising strategic (real) options and when it builds new competences, it is creating new strategic options for the future, which it may exercise later to create value (Sanchez, 1997a). Strategic options are options for the organization to develop, produce and market products/services, and the viable organization continuously cycles between exercising existing options (competence leverage) and creating new options (competence building) (Sanchez & Heene, 1997). Empirical work
by Brown and Eisenhardt (1997) distills some of the basic insights of the competence program in its dynamic dimension from a grounded case study. The authors found that companies that change continuously to remain competitive in highly dynamic markets combine limited structure with intense interaction and freedom to improvise new products that are paced and connected over time. These new products are continuously tested through low cost market incursions. In this way, these companies neither follow a fixed plan nor are they completely reactive (Brown and Eisenhardt, 1997). These insights are very similar to the recommendations set forth by proponents of the competence program, particularly Hamel & Prahalad (1994).

Strategic flexibility consists of two types of flexibility in the use of organizational resources, which are resource flexibility and coordination flexibility. Resource flexibility is inherent in the nature of the resource and has to do with the technical dimensions of resource use. The extent of resource flexibility reflects in the number of alternative products or uses to which the resource can be put, the time and cost of switching uses. Coordination flexibility refers to how the organization puts the resource to different uses, and it is this aspect of flexibility where organizational members have the opportunity to exercise their ingenuity and resourcefulness (Sanchez, 1997a). The importance of this aspect of combining resources had been emphasized by Penrose (1959). Andrews (1971) describes coordination as synthesis, and synthesis is a creative process; and Barnard (1938) states that coordination is the creative part of organizing. Coordination flexibility manifests itself in imagining different uses for resources, configuring and structuring them into systems or networks, and deploying or putting them to targeted use. Sanchez emphasizes the systemic implications of resource flexibility and the possibility that the
whole system is constrained by its least flexible resources (Sanchez, 1997a). Inflexibility may result from the inability to imagine a range of feasible (re)configurations and (re)deployments. Strategic flexibility can be enhanced by modularity in product and process design (Sanchez 1997a).

To summarize, the dynamic dimension of the competence program stresses the inevitability of change in the internal and external environments of organizations. It stresses the importance of differentiating between first and second order change, and proposes strategic flexibility as a beneficial implication of conceiving the organization in terms of its competence, that lends it agility and dynamism in its march towards an uncertain future. Managing the dynamic nature of competence is facilitated by taking a systemic view of the organization. The following section shows how the systems view contributed by management cyberneticists allows the balancing of first and second order change inside the organizations, and infuses the organization with autonomy that allows for greater flexibility.

5.4 The Systemic Dimension

5.4.1 Organizations as Closed Systems

The competence program adopts a view of business organizations as closed systems (Hühn, 2008). Contrary to what most readers may think, closure here does not refer to an absence of exchange of organizational members, resources or communications with other parties or organizations. Rather, systemic closure refers to the quality that the relationships among the organization’s members or subsystems are sufficient to maintain its identity, cohesion and viability. The business organization is a closed network of
relationships (Espejo, et al., 1996: 75). Systemic closure is a property of all living systems, which contain within them the mechanisms that produce their own viability, i.e., that keep them alive (Hühn, 2005). The system theoretic concepts discussed in this section are all based on closed systems theory (also referred to as second order cybernetics)\(^{27}\). Closed systems exhibit both structural and dynamic complexity. Structural complexity arises from the number of elements that make up the organization as a system, and from the number, nature and intensity of interactions among these elements. Dynamic complexity arises because changes in one or more structurally complex system elements produce chains of reactions in other system elements (Sanchez & Heene, 2004). Dynamic complexity is a situation where systemic elements are changing, tightly coupled, exhibit feedback mechanisms and non-linear relations between cause and effect, and are self-organizing and policy resistant (Sterman, 2000). Dynamic complexity is a characteristic of closed systems and therefore, closure may also be understood in terms of the complexity of the system structure and interactions. The system is closed in the sense that its structure and interactions are not visible or analyzable to an observer, and thus the logic of cause and effect cannot be deducted. As such, closed systems, such as human beings, cannot be controlled by an outsider at will, as is the case with open (dead) systems like machines (Hühn, 2005).

\(^{27}\) For more on closed systems theory, the reader is referred to the following authors: Beer (1972; 1985); Espejo et al., (1996); Hühn (2005; 2008). The term ‘closed system’ theory is still not very well known, except among experts in cybernetics and system theory. As such, we find reference to organizations as open systems in the literature of the competence program, specifically by authors such as Sanchez and Heene. We believe that these authors are unaware of the cybernetic methodology, and that their usage of the term open system refers to the aspect of exchange across organizational boundaries, a characteristic that is also acknowledged in closed system theory.
5.4.2 Logical Levels of Management

According to management cybernetics, “[t]he supreme art of management lies in balancing constancy and change by orchestrating phases of organizational preservation and transformation, thereby maintaining viability and development. That is the maintenance of ‘organizational fitness’.” (Espejo et al., 1996: 63). There are three logical levels of management in any closed (viable) system: operational management; strategic management; and normative management, and each level has its relevant fitness criterion. Operational management is concerned with managing the daily operations that produce the unit-in-focus’s unique output, with which it is identified. The fitness criterion at the operational level is efficiency, which has been discussed in the previous chapters, and typically involves ‘doing things right’ in terms of producing the desired level and quality of output by making the most of the unit’s resources. Strategic management is management for the long-term or the future viability of the system-in-focus. At the strategic level, effectiveness is the relevant fitness criterion. Effectiveness entails building the organization’s competence for superior performance by choosing ‘to do the right things’ in the unit (system)-in-focus. Finally, normative management is charged with balancing the short-term and long-term, or the present needs with the future needs, by maintaining the identity of the system-in-focus. The fitness criterion at the normative level is legitimacy, which, by adhering to timeless principles such as ethics, aesthetics or customer orientation, satisfies the needs of all relevant stakeholders. Normative principles are constant amidst change, and they provide an intelligent way for

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28 In the analysis of systems, the system in focus is the system we choose to analyze, which could be anything from a small unit within an organization, a plant, the whole company, and going up to networks of companies or whole economies. The designation of the system in focus is an issue that it is at the discretion of the analyst, depending on the purpose of the analysis. Consequently, all lower level sub-units are the subsystems, and the higher level system in which the unit-in-focus in embedded is the meta-system.
organizational members at all organizational (systemic) levels to discern whether their actions are headed in the right direction. Being responsible for a unit (however micro or macro that unit may be) entails managing it at all three logical levels simultaneously. This is the core of recursive management, which is a prime prescription of management cybernetics that seeks to cultivate leadership at all levels, thereby avoiding the separation of formulation and implementation that plagues classical approaches to strategic management (Espejo et al., 1996). Management (control) is achieved not by tight coercion that produces mindless conformity and division of labor, but by designing an organizational structure that embodies autonomous units or self-managing processes.

The essence of cybernetic (recursive) management is to design organizations that can self-regulate and self-control through mechanisms of mutual negotiation and adjustment among its members (subsystems) (Espejo, et al., 1996).

In general, the management process cycles between the three stages of decision, implementation and control. In the control phase, data are gathered, verified and fed into a control unit that compares actual to target values, and based on this takes corrective decision and action. This is a feedback mechanism. However, just as important in management is feed-forward or steering, which entails the anticipation of disturbances and taking pro-active measures in prospect. Regarding the three levels of management, strategic management pre-controls operative management, and normative management pre-controls strategic management (Espejo, et al., 1996: 65-68).
Figure (2)

Logical Levels of Management & Fitness Criteria

Management Level

- Normative (viability)
- Strategic (effectiveness)
- Operative (efficiency)

Objective

- Develop -ment
- Viability
- New Value Potentials
- Extant Value Potentials

Reference Variables

- System Philosophy
- System Dynamics (learning)
- Core Competence
- Competitive Position
- Revenue, Costs
- Income, Expenditure

Data Type

- Higher System Elements Mostly Qualitative
- Lower System Elements Mostly Quantitative

Pre-control

Variable Types

- Higher System Elements Mostly Qualitative
- Lower System Elements Mostly Quantitative
5.4.3 Implications for Competence Management

An important implication of the systems view is that the whole should be larger than the sum of the parts. For the competence program, this means that a corporation’s strategy should be more than just the accumulation of individual product and market strategies of the various business units, which constitute the extant value potentials the company leverages. The way this is achieved is by referring to the variables that steer product and market strategies and these are the competences that allow the organization to build new value potentials (Espejo, et al., 1996). The competence program revolts against the traditional view of corporations as portfolios of strategic business units (SBUs), because it traps competence within the SBU, depriving the rest of the corporation from its benefits. Further, leaving the decisions to invest in building competence to SBU heads is a surefire method for underinvestment in new competence building. This is because the financial limitations and the competition among SBUs for corporate funding will leave large scale investment in competence building unjustified (financially) (Prahalad & Hamel, 1990). All this implies that competence needs to be managed at the corporate level, and achieving the balance between leveraging existing competences and building new ones is the prime responsibility of corporate management (Sanchez, 1997a).

The strategic management of competence in the business organization happens within a framework that guides investment in building new competences and leveraging existing ones. This guiding framework consists of an organization’s strategic architecture and strategic intent. A ‘strategic architecture’ is management’s “...point of view on which new benefits, or “functionalities” will be offered customers over the next decade
or so, on what new core competences will be needed to create those benefits, and on how the customer interface will need to change to allow customers to access those benefits most effectively.” (Hamel & Prahalad, 1994: 108) Strategic architecture offers a broad direction that points the way to which competences a company needs to build today in order to be able to compete effectively in the future, without detailing exactly how these competences will be achieved. In this sense, strategic architecture is not a detailed and precise plan, as it is impossible to plan for a period longer than a couple of years. It thereby allows for flexibility and emergence.

Strategic architecture changes as the organization learns – both in terms of intellectual learning (gaining better industry foresight) and in terms of learning by doing (such as making small market incursions, testing prototypes, making joint development agreements or alliances with competitors). The key to investing in the future without taking excessive and undue risk, as Hamel and Prahalad (1994) explain, is for management to balance its foresight and understanding with the investment and commitment it makes in a specific direction. The more assurances management gets of the relevance of its foresight, the more it invests and commits, but this is a process of gradual and emergent enactment; it cannot be foreseen and detailed upfront. In this way, strategic architecture is based on well-grounded industry foresight (see Box 1 below). The intellectual challenge of developing such industry foresight is discussed in the coming section.

While strategic architecture provides a map of the journey to the future, ‘strategic intent’ provides the fuel, which ignites the emotional and creative energy of all members of the organization to embark on the quest to capture the future. It is the dream that the
organization, with all its members, so passionately strive to capture. While classical strategy is based on fit, strategic intent is based on stretch, i.e., on intentionally creating a gap between ambitions and current resources and challenging the organization’s members to close the gap (Itami & Roehl, 1987; Hamel & Prahalad, 1989; 1993; 1994). This gap is very important because it engenders resourcefulness and unleashes the creative energy that exists within the organization’s members to come up with ingenious ways to close the resource gap – in other words, to leverage resources and realize their ambitions. The classical strategy prescription of fit results in curbing aspirations within the (perceived) limitations of current resources. These limitations will only truly limit the organization as long as it plays by the rules of the incumbent industry leaders. Stretch provokes the organization to play the game differently, so that it does not need to match the leader’s resources. Accordingly, Hamel and Prahalad criticize extant strategy theory for only looking at an organization’s resources to assess its competitive advantage, while the important thing to look at is the organization’s resourcefulness, which hinges primarily on the creativity and passion which the members bring to their work (Hamel & Prahalad, 1993). As with strategic architecture, strategic intent provides a sense of direction, as all managers are required to deliver on their part of achieving the company’s strategic intent. The ends are specified, however, so that members are free to exercise their utmost creativity with regard to the means.

The theory of management cybernetics proposes that the organization self-regulates through control variables that may contradict each other because they belong to different logical levels of management, as shown in Figure (2) above. The management of competence is one such instance. Management the ‘here & now’ at the operational
(control) level is often times in conflict with managing the future at the strategic (intelligence) level.

“The control function brings its issues and priorities into the process; they are by and large driven by the concerns of productivity ... On the other hand, ... intelligence strives to explore and create possible futures. Discrepancies between the actual and the possible are inherent in the discourse between control and intelligence. What intelligence considers to be ‘fit’ will often be perceived by control as a ‘misfit’ or, at least, as some suspicious form of ‘stretch’. We have here dialectic between ‘stretch’ and ‘fit’” (Espejo et al., 1996: 246)

The strategic level, which advocates stretch in building competence for leveraging existing value potentials and creating new ones, steers the operational level. This means that in order for the operational level to function properly in the long run (and make profits), competence must be managed at the strategic level, even though this may contradict the short-term profit goals of the operational level. As mentioned above, systems theory proposes that the tension is released at the higher logical level, the normative (policy) level, which pre-controls the strategic level. The consideration of viability brings balance to the strategic-operational tension, but this only happens through a dialogue between the two levels, moderated by the higher normative level to help create new value potentials. To be successful, this dialogue between strategic and operational management cannot be dominated by one or the other, and the people involved (individuals and groups) must be skilled at learning (Espejo et al., 1996).

The prescriptions of cybernetic theory for organizational design and structure have important implications for the role of top (corporate) management in the building and orchestration of competences. Instead of viewing management as a system that controls organizational processes, both theoreticians and practitioners may begin to see

29 It will be elaborated shortly in the section on organizational learning exactly what we mean by organizational members being skilled at learning.
management as a dynamic process that creates self-managing (autonomous) systems embedded within the organization, which is itself an autonomous self-regulating system (Sanchez, 1997b). This type of design is a recursive structure (Beer, 1985). Designing the organization in this way is one of the most challenging, but rewarding intellectual tasks top management is charged with. An organization functioning on a recursive structure has leadership and autonomy embedded at all organizational levels, where every autonomous sub-system is a self-contained self-regulating system with all three logical levels of management (Beer, 1985; Espejo et al., 1996). A recursive structure has the advantage of freeing up the energy and attention of corporate (top) management to the vital function of managing competence, which involves the cognitive task of setting the strategic boundaries and directions that guide the autonomous sub-systems and the whole organization (Espejo et al., 1996; Sanchez, 1997b). In such a structure, the relation between top management and autonomous sub-systems has two sides: one is following the progress of the autonomous units in meeting broad milestones agreed upon, without interfering in how they do so, and the second side is providing the previously agreed-upon resources that the autonomous units need to accomplish their milestones (Beer, 1985; Sanchez, 1997b). In addition to a supportive structure, the nurturing of competence at the corporate level requires that the organization be capable of learning. This will be elaborated shortly in a section dedicated to organizational learning; however, it is mentioned here to complete the systemic dimension of the competence program.

To summarize, the systemic dimension of the competence program provides a view of organizations as closed (viable) systems, which are based on a recursive structure

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30 The systemic and structural considerations discussed in this section are based on the brilliant model developed by Stafford Beer (1985) which he calls the Viable System Model (VSM).
with the three logical levels of normative, strategic and operative management, and are capable of learning. These are the enabling conditions in which top management is charged with the cognitive challenge of imagining the future by crafting a well grounded but prescient view expressed in its strategic intent and strategic architecture. Moreover, top management and all organizational subsystems are responsible for taking action to build the competences on which competition in the future will be based. In the following section, I examine the cognitive dimension of the competence program.

5.5 The Cognitive Dimension

As elaborated above, the systemic aspects of competence management provide the pre-conditions that support the role of senior management in creating the competences that will allow the organization to compete and lead in the future, a role that is primarily a cognitive one. The cognitive dimension of the competence program is one of its unique characteristics, that differentiate it from seemingly similar approaches such as the resource based view and the dynamic capabilities literature. Interestingly, the epistemological and philosophical underpinnings of this dimension are seldom recognized or explicitly discussed even by proponents of the competence program. As such, one of the main contributions of the current research is to help researchers working within the research programs be aware of the epistemological & philosophical dimensions of their work. The importance of this awareness has been mentioned briefly in Chapter 3, and will be picked up again in the final chapter.

The works of Hamel and Prahalad (1994), Hamel and Heene (1994) and Sanchez and Heene (1997) are all very clear on the notion that leveraging and building
competence involves a significant cognitive effort on the part of top management. Competition is no longer conceived to take place among products on the market. The organization is thinking today about how it will compete in a future that has not materialized yet, and the action it will take today to build competences and prepare for the future is based on the picture it imagines.

“Competition between organizations can therefore be seen as an ongoing ‘contest between managerial cognitions’ in devising processes for organizational sensemaking, for the development and exercise of a corporate imagination, and for articulating new strategic logics for improving the adaptive capabilities of firms” (Sanchez & Heene, 1997: 308)

The winner in this contest of corporate imagination (Hamel & Prahalad, 1991) is the company whose top management team is able to conceive a picture of its future that is both well-grounded in the current reality but that is also infused with a genuine dose of creativity and unconventional thinking. The only way to get there is for top management to be patient and disciplined in going through the cognitive process to learn about the organization, the industry, the customers, and to break free from the orthodoxies of the past, especially, their own orthodoxies. Imagining the future entails exercising sound judgment about which parts of the organization’s past need to be forsaken, and which parts will be used as pivots to get to the future (Hamel & Prahalad, 1994). In their interviews with corporate managers, Hamel and Prahalad have found that this cognitive process requires long, tedious and challenging hours (actually weeks and months) of debate and discussion, where the foresight of the company does not necessarily surface in an orderly fashion or even in time for the deadlines set. This process is very different from the routine analytical strategic planning process that produces a mere extrapolation of the past (Mintzberg, 1994).
It is often said that asking the right questions is more crucial than finding the answers. Effectiveness entails asking the right questions, and viability calls for asking the right questions about the future. Hamel and Prahalad (1994) have come up with a remarkable set of questions that top managers need to be able to answer if they are to take charge of future competitiveness, and not surrender it to more imaginative contenders (see Box (1) below). There is no easy way to come up with answers to the questions about the future of the industry presented in the box. However, in attempting to answer these questions diligently, management gets to form a well-founded point of view about the future of the industry; difficult as it is, doing so is only one half of the deal. Management’s point of view about the future must be infused with an imagination that is not inhibited by the industry dogma of the past and the present (Hamel, 1996), an imagination that taps the creative potential present in every corner of the organization, not just of a few individuals (Hamel & Prahalad, 1994). Moreover, the development of management’s industry foresight is not a onetime occurrence; rather, it is a continuous dynamic and evolving process (Sanchez, 1997b). Companies that succeed in forming a creative vision of the future of their industry and then succeed in building the competences that this vision requires eventually end up shaping the actual future of their industry and setting the competitive rules on the ground.

“Because managers’ cognitive processes are at the head of a chain of causality that can eventually reshape the nature of the competition in an industry, a central concern of competence theory is developing better insights into the ways managers conceptualize and communicate about new possibilities for competing and cooperating.” (Sanchez & Heene, 1997: 308)

Given this dynamic outlook, the analysis of industry structure inherited from IO economics that for some time dominated strategy can no longer be the focus of strategy
making. It is important to understand the current industry structure to manage a company’s current competitive position. It is also important to understand the current industry structure as part of the background preparation to develop industry foresight. However, for strategies concerning the long term viability of the company, analyzing current industry structure is highly inadequate. In this respect, it is more relevant to look at managerial cognitions that shape managerial decisions to build competence according to strategic goals, which in turn cumulatively comprise the new asset structures in the industry (Sanchez, 1997b). Penrose had emphasized this central role of managerial cognition over thirty years earlier, as elaborated in Chapter 3 (see section on “The constructionist epistemology of Edith Penrose).

There are several reasons why the development of industry foresight is likely to be put on the back burner, while top managers are earnestly overworking themselves for their companies. First, formulating industry foresight is an important but not urgent matter, unless the organization’s management imbues it with a sense of urgency. If management lets down its guard in this matter, it is very likely that the urgent issues of the current competition, the current served market and the current production will crowd out any consideration of the future. Added to this is the sheer difficulty of coming up with creative answers to the challenging questions on the future (Hamel & Prahalad, 1994). This issue is exacerbated by the nature of the information needed for the task of imagining the future. Some of it can be gleaned with due diligence, but some of it simply needs to be created. The quantitative versus qualitative nature of the information is also a highly relevant matter here. As shown in Figure (2) above, the lower systemic elements of an organization are mostly amenable to quantification, especially those that measure
existing operations, stocks and flows of goods, services, cash flow, tangible assets as well as market data such as segmentation, market share and sales (Espejo et al., 1996). These tangible and measurable elements are more straightforward to manage and control, and can easily take up a big chunk of top management’s time and energy, if the system is not built on the basis of autonomous recursive structures, thus producing a bias against important strategic variables (Sanchez & Heene, 1997). As we go up to higher logical levels of management, intangible assets such as various bodies of technological, organizational and market knowledge become increasingly important, but are not easy to measure (Itami & Roehl, 1987). In managing competence for future competitiveness, it is these higher systemic elements including normative, ethical, culture and strategy related considerations that top management primarily deals with. These higher system variables are combined with industry foresight to develop the organization’s strategic intent and architecture, but their qualitative nature and the causal ambiguity that prevails at this level makes this an intellectually challenging task. This bias is not only rampant in practice, but also in scholarship, as the higher system variables are not easily factored into quantitative economic models31. The competence program seeks to counter-balance this tendency “…by developing better conceptual frameworks for managing the causal ambiguities in higher system elements and for discovering strategic gaps implied by qualitative data about emerging technologies, market trends, and other aspects of the firm’s environment.” (Sanchez & Heene, 1997: 308) The implications of these qualitative data point to potential discontinuities in current technological, demographic, regulatory and lifestyle trends that could be used by smart and imaginative managers to

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31 The issue of quantitative versus qualitative data and its relevance to the three schools of thought in RCC theory has been discussed in Chapter 3.
envision new competitive space and re-draw industry boundaries. This vision of the future is then rolled back to the present to determine what competences need to be grown and what action needs to be taken today to turn into a reality (Hamel & Prahalad, 1994).

Box (1) Questions that Shape Future Markets

Ask yourself:
- Does senior management have a clear and broadly shared understanding of how the industry might be different ten years in the future?
- Are its ‘headlights’ shining further out than those of competitors?
- Is its point of view about the future clearly reflected in the company’s short-term priorities?
- Is its point of view about the future competitively unique?
- How influential is my company in setting the new rules of competition within its industry?
- Is it regularly defining new ways of doing business, building new capabilities, and setting new standards of customer satisfaction?
- Is it more a rule-maker than a rule-taker within its industry?
- Is it more intent on challenging the industry status quo than protecting it?
- Is senior management fully alert to the dangers posed by new, unconventional rivals?
- Are potential threats to the current business model widely understood?
- Do senior executives possess a keen sense of urgency about the need to reinvent the current business model?
- Is the task of regenerating core strategies receiving as much top management attention as the task of reengineering core processes?
- Is my company pursuing growth and new business development with as much passion as it is pursuing operational efficiency and downsizing?
- Do we have as clear a point of view about where the next $10 million, $100 million, or $1 billion of revenue growth will come from as we do about where the next $10 million, $100 million, or $1 billion of cost savings will come from?
- What percentage of our improvement efforts (quality improvement, cycle-time reduction, and improved customer service) focuses on creating advantages new to the industry, and what percentage focuses on merely catching up to our competitors?
- Are competitors eager to benchmark us as we are to benchmark them?
- What is driving our improvement and transformation agenda – our own view of future opportunities or the actions of our competitors?
- Is our transformation agenda mostly offensive or defensive?

Ask yourself:
- Am I more of a maintenance engineer keeping today’s business humming along, or an architect imagining tomorrow’s businesses?
- Do I devote more energy to prolonging the past than I do to creating the future?
- How often do I lift my gaze out of the rut and consider what’s out there on the horizon?
- What is the balance between hope and anxiety in my company; between confidence in our ability to find and exploit opportunities for growth and new business development and concern about our ability to maintain competitiveness in our traditional businesses; between a sense of opportunity and a sense of vulnerability, both corporate and personal?
Does your company have a point of view on industry transformation?
- How do we want this industry to be shaped in five or ten years?
- What must we do to ensure that the industry evolves in a way that is maximally advantageous for us?
- What skills and capabilities must we begin building now if we are to occupy the industry high ground in the future?
- How should we organize for opportunities that may not fit neatly within the current business units and divisions?

How deep is your industry foresight?
- What are the forces already at work in this industry that have the potential to profoundly transform industry structure?
- For a given important industry trend, how might it influence our current customers?
- How might it influence our current economic engine?
- What are the dynamics of this trend – how fast is it developing, and what are the factors that may accelerate or decelerate the trend?
- Who is moving to exploit this trend, or indeed, who is causing it – essentially, who is in the driver’s seat, who is a passenger, and who is a bystander?
- Who has the most to lose and the most to gain from this discontinuity?
- What new opportunities – products or services – might be created by this discontinuity?
- What are our options for gaining further insight into this trend, influencing its direction and speed, or actually intercepting it?

Does your company have a strategic architecture?
To know if your company has a strategic architecture, pull a random sample of 25 senior managers, and ask them: “How will the future of your industry be different?”

Foresight:
How do managers interpret the word future?
Does it mean next year, year five of the plan, or a decade hence?
In other words, how far out do the headlights of your management team shine?
How much foresight does it actually have?

Breadth
How encompassing is management’s view of the future?
How broad is its conception of the industry and of the forces that might reshape it?
Is the team trapped in the myopia of currently served markets, or does it see a broad vista of opportunities?

Uniqueness
How competitively unique is its view of the future?
Would it surprise competitors or provoke a yawn?

Consensus
What degree of consensus exists about how the future might be different?
Without a fair degree of consensus, it’s easy to spend money on everything, but not really commit to anything.

Actionability
Have the implications of potential industry changes been considered in enough detail so the short-term implications for action are clear?
Is there agreement on what, precisely, must be done this year to prepare for the future?
Are competence acquisition strategies and opportunity approach strategies in place?

(Hamel & Prahalad, 1994)
5.6 The Holistic Dimension

The competence program takes a holistic view of the organization and of the role of competence leveraging and building within it. In doing so, it provides an integrated framework that overcomes some of the drawbacks of other strategy theories and is able to accommodate pairs of seemingly irreconcilable opposites so essential to management. Of these dialectics, most important are: leveraging the past and building the future simultaneously; embracing both deliberate and emergent qualities of strategy; integrating the structure and process views of strategy; and, reconciling autonomy and control in management.

First, the closed systems view and the designation of the three logical levels of management, their fitness criteria and the relations between them presents a more integrated view of the business organization. At the normative level, the identity and legitimacy of the organization is maintained by creating wealth for all stakeholders of the organization, not just shareholders and top management (Espejo et al., 1996).

Secondly, conceiving the organization in systemic terms as a collection of self-maintaining processes embedded in a recursive structure integrates the process and structure views of strategy in a dynamic framework and embraces both autonomy of the parts and unity (control) of the whole. This is achieved through the recursive structure, which entails that every sub-system or self-maintaining process contains the three logical levels of operative, strategic and normative management for its particular purpose of existence (identity) and at the same time links to a higher level of recursion that also contains the three logical levels and so on until we get to the whole organization\(^32\). This

\(^{32}\) We only touch the surface of closed systems theory here. For more details, the reader is referred to original authors in management cybernetics and closed systems theory, such as Humberto Maturana,
has special advantages for the competence perspective, as it allows the leverage and sharing of resources and particularly competences across the various divisions of a corporation. Hamel and Prahalad (1990) have drawn attention to the unfortunate effects of a divisional and SBU structure, which limits innovation by trapping competence in isolated quarters and preventing its leverage across the corporation. Further, in setting the strategic framework within which the organization develops its competence for the future (strategic intent and strategic architecture), the competence program integrates deliberate and emergent qualities of strategy making. The general direction of the organization’s future outlook is deliberate, as reflected in strategic intent. At the same time, it is broad and vague enough to allow for flexibility in interpretation and emergence. Strategic architecture also evolves gradually as the organization experiments and learns quickly over the course of its competence building.

Thirdly, the competence program takes a holistic view of talent and creativity in a business organization. Although top management is undoubtedly charged with the responsibility of identifying and nurturing competence, it is far from holding a monopoly on creativity and innovation. On the contrary, Hamel (1997) warns that top managers with extensive experience in the industry are most likely to wear the biggest blinders in terms of entertaining unorthodox possibilities. The competence program explicitly calls for drawing on the talent and creativity dispersed throughout the organization (Hamel & Prahalad, 1989; 1994) and Hamel (1997) specifically emphasizes the amplification of voices that would typically be marginalized, such as newcomers and industry outsiders, as they may likely bring unconventional wisdom to the organization’s intellect. Hamel

Francisco Varela; Stafford Beer; Raul Espejo; Markus Schwaninger. For a review of the evolution of the management discipline over the last century using the lens of closed systems theory, see Hühn (2005).
and Prahalad (1994) call for ‘harnessing the wisdom of the anthill’ in creating the organization’s strategic architecture, and in making it happen. Further, they emphasize that whatever the organization’s strategic intent is, it has to fire up the passion of the employees. In times of hardship, top management bears the burden as much as employees; Hamel and Prahalad criticize the tendency of the strategy industry towards downsizing and streamlining, as these practices may relinquish the most valuable of the organization’s resources – its people. The authors claim that downsizing in the face of economic slumps is the easy but the least creative and least useful way out. They recommend that managers exercise some more creativity in thinking of ways to increase revenues rather than slash resources. These practices, when added to the recommendations of embedding autonomy and tying the strategic and normative management of tasks to their operators at all organizational (systemic) levels, have the advantage of reversing the negative effects of the classic separation between formulation and implementation in strategy.

Fourth, the program integrates both continuity (the leveraging of existing competences and the extant value potentials in current market) and change (the creation of new competences in accordance with an imaginative but well-grounded view of the future. It is different from the RBV in that it views all sources of competitive advantage as temporary; no advantage is sustainable in the long term. Therefore, managers need to be mindful of the fact that industry leadership must be re-invented again and again. Hamel & Prahalad (1994) say that to be a challenger once, a company has to question the orthodoxies of the incumbent – the industry leader. To become a challenger twice, a company needs to question its own orthodoxies. That is why the competence program
emphasizes learning (and unlearning) as the basic process that underlies competence leveraging and building.

Fifth, the competence program integrates competition and cooperation. It views competition in terms of creating new market space and tapping un-contested markets, rather than in terms of cut-throat competition over extant markets. Competitors are also sources of learning when an organization engages in alliances or other cooperative activities such as joint ventures.

Finally, the competence program seeks to establish a body of theory that is both relevant at the level of scholarship and useful for practitioners. To achieve this, its proponents believe that practitioners should participate in the theory development process, which should yield insights highly relevant to practice (Sanchez, 1997a).

5.7 The Basic Assumptions

It is appropriate here to return to the system of basic assumptions underlying the competence program, which is one strand within a broader body of literature that I named the social constructionist school in Chapter 3. These assumptions were discussed in detail in the earlier chapter, and I recount them here briefly to link them up with the dimensions of the competence program. The epistemological framework in which these basic assumptions are embedded is that of social construction, as opposed to the positivist framework of the RBV and dynamic capabilities programs.

The first basic assumption concerns the degree of rationality imputed to managers in the theoretical framework of the program. The competence program does not assume that managers optimize like the RBV, nor do they satisfice as in the DC program. In the
competence program, managers are entrepreneurs, who synthesize and create novel opportunities by imaginatively combining existing elements and adding their dose of foresight. In this respect, the competence program descends from a Schumpeterian lineage. The manager/entrepreneur in competence based theory is no different from the manager/entrepreneur walking in the street. In other words, managers are realistically viewed as having imperfect and sometimes limited calculative and perceptive abilities, and may be subject to some perceptual biases; however, they are also viewed as capable of developing a piercing vision of the future based on experience, intuition and creativity, and capable as well of turning this vision into a reality through collective action in their organizations. As elaborated in the cognitive dimension above, the competence program places cognition at the beginning of a chain of causality linking managers’ imagination to future industry structures and markets. The dynamic capabilities program has started to recognize the importance of cognitive elements too, but there is a big difference between the positivist and constructionist epistemologies in this respect. This issue will be discussed in greater detail in the final chapter. Here, I limit the discussion to pointing out that the competence program takes a subjective cognitive view, which emphasizes the active role of managers, and members of organizations more generally, in directing their attention to certain aspects of their environment (both internal and external) and in the interpretation of information they notice. These interpretations are negotiated among members of the organization, and action is taken accordingly. It is in this sense that we say that organizational reality, markets and industries are socially constructed. In the terminology of the competence program, we can say that managers direct their attention to specific aspects of their industries, and actively attach interpretations to the events and
discontinuities taking place in their industries in the course of developing industry foresight. This subjective view of the industry’s future is negotiated among organizational members, as proponents of the competence program recommend wide participation in developing the organization’s point of view of the future. Since this view is subjective and idiosyncratic to the organization under focus, there is no single best way to gain competitive advantage in the future. Each organization builds its own picture of future markets (that is if its managers look ahead and not just under their feet). That is why scholars of the competence program (Sanchez & Heene, 1997) claim that competition for the future amounts to a contest among managerial cognitions. These are enacted in the organization’s activities that use existing competences in new ways, and in building new competences and learning to be prepared for playing a leading role in the markets of the future. Since these competences are at the core of an organization’s structure and relationships among its members, it is not farfetched to say that the organization creates itself and its (future) markets. This is a main implication of adopting the constructionist epistemology. As I elaborated previously in Chapter 3, this argument leads us directly to the second assumption, that the firm creates itself (internal environment) and its markets and industry (external environment). The third assumption on the degree of strategic choice also follows naturally; the competence program is very explicit regarding the active role of managers in imagining and creating new markets and industries, and therefore there is a high degree of strategic choice and a minimal degree of environmental and market determinism.
5.8 Organizational Learning

Organizational learning is placed in the center of the conceptual framework of the competence program. Prahalad and Hamel (1990) define core competences as being the result of a collective learning process in organizations. In exploring the question of why some firms are able to secure the competences that enable them to build layers of advantage over competitors and to be able to compete in several product markets, the competence program looks to the antecedent of competence, which lies in the organization’s capacity for learning faster than competitors (Espejo et al, 1996: 146). Learning is central because it is the essence of adaptation and change, and in the competence program learning consists of both cognition (conceptual learning) and effective action (operational learning).

The literature on organizational learning is vast and this brief section is only a reference to how it links with the competence program. The competence program draws on several of its key contributors, both classic such as Argyris and Schoen (1978; 1996), March and Olsen (1975) and more recent contributions such as Kim (1993), Senge (1990/2006) and Sanchez (2005), to name a few. Brief reference is made here to the most basic themes in organizational learning and how they relate to competence leveraging and building.

Learning by organizations is ultimately rooted in the learning of individual members of the organization. Individual single-loop learning happens when individuals experience discrepancies between the actual and expected results of actions, which lead to thought about the situation and further action to solve the problem within the bounds of the extant framework. Individual double-loop learning happens when individuals
inquire further and question the underlying assumptions of the extant framework. When this inquiry leads to modifications in their mental models of how their world works and action is taken according to a modified mental model, double-loop learning is said to have occurred (Argyris & Schön, 1978).

The link from individual to organizational learning happens through the sharing of mental models among the organization’s members which leads to organizational action based on shared understanding of the cause and effect linkages and organizational members’ worldview (Kim, 1993). Organizational double-loop learning occurs when members question the assumptions and norms of the organization which were previously not discussable or about which organizational members were simply unaware. The importance of double-loop learning lies in its potential for producing discontinuous changes and re-framing organizational problems at all logical levels of management (operational, strategic & normative) (Espejo et al, 1996; Argyris & Schoen, 1996; Kim, 1993). Espejo et al (1996) examine several problematic situations where individual learning is not turned into organizational learning.

The importance of mental models is that much of the organization’s knowledge can be found in these representations of the world. Further, they influence individual and organizational learning through their influence on how organizational members interpret and make sense of the world and what they see in the world. In many cases, people may fail to notice things which do not fit within their mental model. Since the sharing of mental models is primarily a social process, interpersonal issues, communication architectures and an enabling organizational structure that allows inquiry and effective action based on it are important conditions for organizational learning to occur (Espejo et
A special type of double-loop learning deals with inquiry into the learning structures and behaviors in organizations that either facilitate or hinder inquiry and learning. This type of second-order learning is termed organizational deuteron-learning (Argyris and Schoen, 1996) and is often referred to in the literature as learning how to learn (Visser, 2007).

The process of organizational learning described above underlies and applies to the various activities discussed in the dimensions of the competence program. For example, the development of industry foresight is a cognitive activity that consists of building a shared organizational mental model or world view of how the future of the industry will be and what competence needs to be built to provide customers with value. The evolving nature of the organization’s strategic architecture reflects the feedback loops that cycle between developing a certain view and investing in small experiments, making small market incursions and testing the soundness of these views by getting feedback from the environment. The arenas of pre-market competition represented in building new competences, creating and managing alliances for learning, experimentation in the market, setting the standards for the future industry all have the learning process at their core (Hamel & Prahalad, 1994: 186).

As it emphasizes learning, the competence program acknowledges the dangers of over-commitment to past knowledge, and stresses the need for un-learning the orthodoxies of the industry. The ability to imagine new market space that is based on extant competence or to envision brand new markets for which new competences need to be built, the organization must be capable of double loop learning.
5.9 Conclusion

The competence program has been criticized for its lack of attention to issues of organizational power and politics that may represent an obstacle in the face of efforts to create and compete for the future. It is claimed that the program portrays organizations as utopias that function based purely on competence (Coriat & Dosi, 2000). The challenges of implementation are acknowledged by Hamel and Prahalad; however, the general thrust of the program proceeds based on an implicit assumption that there is sufficient harmony in the organization to allow it to learn and build the competences that will enable it to compete in future markets.

A second shortcoming is that Prahalad and Hamel build their research on anecdotal evidence from huge multinationals that are global leaders in their respective industries. The problem is that not all firms in an industry aspire to be global market leaders, and if they all do, still not all will get there. Many firms will be content or forced to follow. This raises issues of generalization of the findings of the competence program.

This chapter has attempted to provide a review of the main conceptual contributions of the competence-based program and to surface its underlying assumptions and how they relate to its theoretical framework. The final chapter in this research will compare and contrast the dynamic capability and competence programs. The analysis will focus specifically on the main areas of similarity and difference, as well as the strengths and weaknesses of each program. The implications of the differences in underlying assumptions and theoretical frameworks are explored and the implications for progress in the field are considered.
Chapter 6
A Comparison of the DC & Competence Programs

6.1 Introduction

This final chapter presents the culmination of the conclusions drawn from the previous chapters, through a comparison between the dynamic capabilities and competence research programs. The comparison highlights the distinctive nature of the epistemological and theoretical frameworks underlying the two programs, and how this plays out in distinct research foci. The comparison also highlights areas of similarity. The main conclusions of the study and the implications of these findings for research directions are contemplated.

6.2 Epistemology and Basic Assumptions

Consistent with the analytical method followed throughout the study, I start by reviewing the distinct frameworks shaping the perspectives of the two programs. Coming from a positivist methodological base, dynamic capabilities theory assumes that managers and other members (actors) in organizations are boundedly rational, in that their perception of the objective facts in the real world is necessarily limited by various cognitive biases. Due to bounded rationality, actors are assumed to satisfice, or make choices and decisions that are good enough, given the extent of their knowledge. This frees the dynamic capabilities program from the limitations of the rationality assumption and static equilibrium-based methodology discussed in the context of the resource-based view in Chapter 3. Accordingly, the DC framework specifies that organizations sense opportunities or needs for change in their environment and modify and reconfigure organizational routines and capabilities in order to seize these opportunities (Teece,
Therefore, the organization mainly reacts to environmental changes, but in some cases, change stems from inside the organization (Zollo & Winter, 2002). The idea that a firm can shape its environment (its market, for example) is given marginal attention in the program. On the other hand, the constructionist epistemology underlying the competence program assumes that a single objective view of environmental opportunities or threats cannot be specified since this is a subjective matter, which depends on an active cognitive construction by each individual manager, or a negotiated construction among groups in organizations. More emphasis is placed here on the idea that organizations not only react to their environment, but, more importantly, act on the latter and shape them to the organization’s advantage. Attention and cognition (both individual and shared) are the subjective determinants of how the organization reacts to environmental contingencies and changes. The variance in the two perspectives (positivist versus constructionist) really stands out when we consider the creation of future markets in a strategic context. When a company invests in learning new capabilities today in order to create a novel market in the future, there is little in the way of objective analysis of current and past markets that will enable it to sense or discover future markets. Future markets do not exist somewhere and await discovery; they are created through imagination and action. However, future markets are not created from thin air; there are often roots and clues for them in existing industries, and this is what can be sensed or discovered. The constructionist perspective acknowledges these existing ingredients, but emphasizes that mixing them to create a new dish with a unique flavor is an act of creation that goes beyond analysis and discovery. The questions proposed by Hamel in Box (1) in the previous chapter clarify how this process is essentially one of developing a
well-founded but subjective point of view about the future markets and learning incrementally as action is taken to realize it. It is in this sense that the constructionist perspective looks to companies as creating their environments, or markets. Although scholars of dynamic capabilities are aware that it is this entrepreneurial dimension of strategy that enables firms to shape their environments (Teece, 2007), it remains marginal in the DC literature, while it is the central concern of the competence program.

These fundamental assumptions regarding the basis on which actors make strategic choices and the relation between the organization and its environment have important implications for the degree of strategic choice versus environmental determinism. Clearly, the constructionist school in general, and the competence program in particular enlarge the scope of strategic choice imputed to managers, by emphasizing in their empirical research the deliberate choices made that led to either exceptional success or failure to establish or sustain a competitive advantage. Notable examples here include the comparison between pairs of companies such as GTE versus NEC; Canon versus Xerox; Komatsu versus Caterpillar, among others (Prahalad & Hamel, 1990). As for the DC program, it takes the middle ground in the sense that it does not support a full blown environmental determinism (as is the case in neoclassical economics or population ecology for example). At the same time, DC research tends to see changes in organizational resource bases carried out primarily as a reaction to environmental changes and contingencies. Both DC and competence programs share the view that the company’s past choices affect its future ones. In dynamic capabilities, this idea is conveyed through the concept of path dependence, while the competence program uses the Dierickx and Cool’s (1986) notion of time compression diseconomies, which
basically says that if the firm has not historically invested in learning a particular competence by being in the market, it cannot jump back on bandwagon any time it chooses. Hamel and Prahalad (1994) specifically warn of the dangers associated with outsourcing, where a company may unwittingly give up its core competence by ceasing to invest in the competence learning associated with producing its own core products.

6.3 Methodology & Base Disciplines

Dynamic capabilities research draws primarily on behavioral and evolutionary economic theory, as well as Schumpeterian economics. The caveat here, as explained in the previous section, is that the creative and active role by which entrepreneurs shape and change the company’s environment are somewhat abstracted from view in formal models, as they are treated as stochastic events. The tools of evolutionary economics cannot formally model entrepreneurial behavior, and incorporate it in their models as mutations in biological evolution (Nelson & Winter, 1982). In other cases, formal models based on optimization are used, as for example Lavie (2006). Evolutionary economic theory takes the diversity of firms in their strategies, structures and competences and the basis for modeling macroeconomic phenomena as evolutionary processes. However, since it is impossible to study every single company individually, scholars have used two other methodologies besides model building, taxonomies and behavior patterns. Taxonomies often use dichotomies such as high tech versus low tech or established firms versus new entrants. Patterns of behavior resemble institutional analysis, and are not law like as individual actors (managers or firms) have degrees of freedom to act in a way different from the pattern, or even to change institutions.
(McKelvey, 1998). In modeling at the industry or macro-level it may be acceptable to abstract from the entrepreneurial element and treat it as a random or chance event. However, when the focus of study concerns strategic conduct of individual firms, this abstraction is unwarranted. This is because creative behavior, although unpredictable, is intentional and is therefore not a random happenstance. That is why empirical work in the DC program also includes numerous qualitative case studies, which are not limited by the mathematical tools used in formal modeling.

The competence program, on the other hand, stems from a wider disciplinary base in organization theory and other social sciences. The program does not draw from modern organizational economic theory, but has firm roots in the work of Penrose and Schumpeter. The previous chapter also highlights the connections the program shares with closed systems theory and management cybernetics; these links are generally less recognized in the literature, and therefore serve as one of the contributions of the current study. The entrepreneurial dimension of strategy is at the core of the competence program. It gets at the root of the subjective process responsible for the innovation dynamics that shape markets and industries. However, its main concern is strategy at the level of the firm, and not general market and industrial patterns as such. The competence program’s appreciative theorizing style is complemented with individual case methods, where the focus is on outliers rather than general tendencies. Thus, companies that have excelled in gaining competitive advantage and superior performance are compared, in terms of their competence building strategies, with comparison companies that had started out at similar or even superior resource and market positions.
6.4 Levels of management & fitness criteria:

Both dynamic capabilities and (core) competences are conceptualized as strategic level phenomena. The previous chapter has elaborated on the logical levels of management, where effectiveness at the strategic level of capability and competence building is pre-controlled or steered by normative managerial considerations that aim at long term viability of the company, and itself steers the operational level where the performance criterion is based on efficiency, both technical and economic. These logical levels are clearly set out in the competence program, where the strategic intent and strategic architecture (Hamel & Prahalad, 1994) steer competence creation, which steers layered operational level enhancements in quality, efficiency and resource leverage (Itami & Roehl, 1987; Prahalad & Hamel, 1990, 1993). On the other hand, the dynamic capabilities program does not present such a comprehensive view that gives dynamic capability development a contextual logic. Starting out from an economics inspired background, efficiency considerations coupled with conceptualizing DCs as systematic routines gave the DC concept a primarily operational flavor. Chapter 4 elaborates on how the hard core of the dynamic capability program has progressed with respect to fitness criteria, going from efficiency to evolutionary fitness (Helfat, 2007). However, effectiveness arising from strategic intent that ought to steer decisions to modify or reconfigure the company’s resource base remains a black box, which is assumed but not explicitly tackled in DC research.
6.5 The cognitive dimension

The cognitive dimension plays a central role in the variant epistemological perspectives of the DC and competence programs. The positivist epistemology of dynamic capabilities research reflects in a treatment of the cognitive limitations of managers from the perspective of bounded rationality. In this light, the lack of foresight, decision-making heuristics and cognitive biases of managers are viewed as constraints on optimal changes in the resource base of the company (Helfat et al., 2007: 117). These distortions in perception are formally modeled as gaps between perceived and optimal capability configurations (Lavie, 2006). The problem with this type of modeling is that there is an implicit assumption that there exists an objective optimal configuration of capabilities that is knowable at least to the researcher or modeler, and that the cognitive gaps can therefore be defined. This view is also reflected in qualitative empirical research on managerial cognition, such as that featured in Helfat et al. (2007) and Tripsas and Gavetti (2000). The competence perspective also shares concerns about the cognitive biases and distortions of managers; however, the view presented is rooted in a constructionist epistemology with a primarily subjective character. Hamel and Prahalad (1994) warn against the tendency of managers to be overly influenced by their past experiences, and Hamel (1996, 1998) specifically emphasizes that effective strategy must be unorthodox and innovative. In their comparison companies, they show how companies that based their strategy on a competence-based conception of the company obtained superior results over others that conceived of their companies as portfolios of SBUs. However, there is no assumption that there is an optimal strategy for building competences. Rather, the constructionist view emphasizes the creative side of subjective
cognition, emphasized by Mintzberg et al. in the context of comparing the objective and subjective cognitive perspectives in strategy: “...what the one sees as the basis for distortion, the other takes as the opportunity for creation.” (Mintzberg et al., 1998: 170). Hamel and Prahalad’s work (1994) and the contributions by Sanchez, Heene and their colleagues (Sanchez & Heene, 1997, 2004; Sanchez et al., 1996) echo Penrose’s view that the subjective views of the entrepreneur/manager on the future potentials are the prime determinant of actual future markets and industries. These subjective views are imaginative acts of creativity whereby managers engage in an intellectually challenging task of formulating a vision of future markets that is both well grounded in a deep understanding of various industry trends and revolutionary so as to re-draw industry maps and create new markets.

A very interesting piece by Gavetti & Levinthal (2000) on the relation between cognitive (forward looking thinking) and experiential search (learning) can help in clarifying the distinction between the positivist (objective) and constructionist (subjective) cognitive perspectives. Gavetti and Levinthal specify that experiential search is directed to learning from past experience, while cognitive search is forward looking and based on mental models or cognitive frames, which are simplified representations of the world (modeled as the fitness landscape). Figure (3) below portrays Gavetti and Levinthal’s complex fitness landscape, which is characterized by many local peaks or optima, reflecting the multiplicity of nonlinear interactions, which render boundedly rational actors limited in their ability to make out action-outcome linkages, given their simplified representation of the fitness landscape. The authors explain that experiential search tends to be localized to a restricted part of the landscape,
basically that part that is in the immediate vicinity of current and past practices, and consists mainly of hill-climbing. This type of search is constrained by the local topography in the form of competency traps, where incremental changes may worsen performance while more significant changes may lead them to better points on the fitness landscape. Cognitive search, on the other hand, may point the firm to more promising areas of the landscape, but unless actors have perfect knowledge, as that assumed in mainstream economic theory, there is no guarantee that they will find the global optimum. Their simplified representations of the fitness landscape (mental models) help them find promising areas on the fitness landscape with higher local optima, and changes in cognitive representations reflect modifications to the actor’s mental models based on improvements over previous representations or as a response to changes in the landscape. This view is consistent with the positivist cognitive perspective employed in dynamic capabilities research, such as Lavie (2006); Tripsas & Gavetti (2000) and Helfat et al.,

**Figure (3)**

*A Fitness Landscape With Multiple Local Optima*

Source: Gavetti & Levinthal, 2000: 120
The constructionist or subjective cognitive perspective would accommodate the above explanations for changes in cognitive representations (mental models). However, the cognitive dimension of the competence program emphasizes two very important aspects that are not taken into account in objective cognitive analyses such as the above. The competence program (and more broadly the constructionist perspective) looks to actors’ cognitive representations as not merely reflective of a subset of the real fitness landscape, but are also formative of the latter. This means that actors’ mental models may lead them to take actions that can actually change the shapes and local optima of certain areas of the fitness landscape, and even extend the existing landscape to include categories (markets) that were hitherto non-existent. This is what Hamel and Prahalad (1994) refer to when they encourage managers to re-draw industry maps, re-set the rules of the competitive arena and create the markets of the future. Sanchez & Heene (1997) also refer to this constructive cognitive dimension when they state that managerial cognition sits at the start of the chain of causality that eventually determines industry asset structures.

6.6 Retrospect versus Prospect

The empirical research which supports the propositions of both the dynamic capabilities and competence programs is necessarily retrospective (historical). The identification and measurement of DCs or core competences can only be done in hindsight when companies have implemented their internal processes and external feedback in the form of customer-perceived value and advantage over competitors can be discerned (McGuinness & Morgan, 2000). These analyses offer important understanding
of plausible action-outcome links and patterns of behavior. They also offer rough guides to patterns of capability/competence development, reconfiguration and their performance implications. However, analyzing these patterns in retrospect is a categorically different problem from making decisions concerning the future development or deployment of competences/capabilities. This is where where the contributions of the dynamic capabilities program stop and where the unique contribution of the competence program continues. Hamel and Prahalad (1994) provide some broad guidelines that help managers to develop their own idiosyncratic vision of the future, and to build their strategic architecture and competence creation activities around it. Due to the highly dynamic, uncertain and idiosyncratic nature of this task, the prescriptions cannot be precise, and they focus more on top management’s responsibility in providing the suitable conditions in which strategic innovation can flower through the vision and actions of the majority of organizational members (Hamel, 1998; Hamel & Prahalad; 1989). They also show managers how they can build flexibility into their competences to be agile as the future unfolds (Sanchez, 1997a).

### 6.7 Organizational learning & knowledge

According to the DC literature, a dynamic capability is any capacity that allows the organization to alter its resource base, and organizational learning is one type of dynamic capability. Other types of dynamic capabilities include alliances, acquisitions, quality improvement systems, new product development routines, process improvement and so forth. This idea that organizational learning is one type of dynamic capability features in the founding article of the program (Teece et al., 1997) as well as the latest
contributions (Helfat et al., 2007). According to the research presented in this study, I find that both dynamic capabilities and core competences are in essence bodies of knowledge that impart on the organization a particular skill or ability to accomplish certain ends. Whatever the content of this knowledge, the way it is created, propagated and developed in companies is through the process of organizational learning. Thus, organizational learning is the basic common factor that lies at the roots of any changes, reconfigurations or enhancements made to the resource base of the organization. As such, it is the basic process by which dynamic capabilities are created and deployed, and this understanding is consistent with the views expressed in the competence program and in managerial cybernetics.

6.8 Conclusion

The reviews presented in Chapters 4 & 5 and the above comparison emphasize the deep seated differences in the basic world views from which the dynamics capabilities and competence programs spring. Granted, it cannot be denied that the boundaries of the research programs are at best fuzzy in the landscape of strategy research. This may be because some scholars are unaware of the differences laid out in the current study, while others simply fail to think about and articulate the basic assumptions on which their work is contingent. It is also because the two programs study the same set of empirical phenomena within the broad RCC perspective, which looks to internal organizational capacities to explain the roots of competitive advantage. These similarities are extensively considered in the literature and alluded to in the earlier chapters, and thus I have not sought to elaborate them here. The deliberate emphasis on the differences is
deemed vital for showing the influence of the basic theoretical frameworks on the two programs and for drawing the attention of scholars who would mistakenly consider the programs to be two different styles of discourse giving the same core message. I hope to have shown that the DC program is not merely a more formalized and theoretically rigorous way of expressing the informal, practitioner-oriented views expressed in core competence literature. To the contrary, the comparison points to a distinct focus for each program, with dynamic capabilities emphasizing adaptation and response to environmental change in systematic ways and competence theory focusing on creating the change and shaping the environment to the organization’s advantage. The creation of change is necessarily anchored in past activities, and therefore flexibility and adaptation to external change are also an important part of competence research, but are viewed in quite a different light. Adaptation and response to contingencies is viewed as an integral part of realizing the company’s subjective view or its active shaping of the future of competition in its industry, rather than as a reaction to fixed opportunities or threats placed by external forces. Creation of advantage within the competence perspective goes beyond interpretation of what the company finds, to creating novel facts that others will later find.

6.9 A brief Recap

We have reached our final destination in the current study, where it is appropriate at this point to recapitulate the main results of the research and highlight its contributions, before I discuss its limitations and potentials for future research. The study is motivated by a desire to gain a deeper understanding of an important body of literature that has
become of central importance in strategy. The strategic role of resources, capabilities and competences is a central theme in both strategy theory and practice, and the RCC literature is sometimes looked upon as carrying the potential for a unifying paradigm in the field (Volberda & Elfring, 2001). In a very broad sense, the RCC perspective takes the view that the roots of competitive advantage should be sought inside the firm, in the idiosyncratic ways in which firms build and assemble their resources and capabilities that render them unique and inimitable. Within this broad view, I have used the distinction between positivist and constructionist epistemology in addition to a set of fundamental assumptions making up a worldview about the nature of managerial (actor) cognition and rationality as it relates to strategic choice and ability to influence and shape the firm’s environment, to analyze the sprawling RCC literature. The analysis has resulted in the identification of three distinct schools of thought. The first school is the rational equilibrium school, which consists mainly of the resource-based view of the firm. It has been explained in Chapter 3 that the resource-based view has contributed in elaborating the characteristics of resources that command sustainable rents in resource markets. However, due to its underlying assumptions and theoretical apparatus coming from Chicago or Demsetz style industrial organization, is not well-suited to tackle the richness of detail related to dynamics of capability creation and the complex phenomena related to intangible and knowledge-based processes, which are the focus of the two dynamic schools. The second school is the behavioral evolutionary school, which reflects a shift towards a more dynamic theoretical framework, which draws on bounded rationality and evolutionary economic theory. The second school contributes in illuminating many patterns related to the dynamics of firm capabilities and competences and how they relate
to technological and market changes, as well as how firms adapt to these changes over time. The school also analyzes various forms of firm behavior, such as diversification, in light of the underlying capabilities. The third school, uniquely based in constructionist philosophy embraces a theoretical framework that allows it to get at the core of new capability/competence creation and the development of novel markets. The work of Penrose on the growth of the firm (1959) is shown to carry the same constructionist epistemology with its accompanying set of assumptions about the subjective and constructive nature of managerial cognition, and its role in enabling firms to shape their future markets and industries.

The second part of the study focused on two highly important research programs that are often looked at as being part of one and the same research stream. The review and comparison between the dynamic capabilities and competence research programs serves to illustrate the utility and importance of the typology of schools presented in this study. I use these two research programs to show that the underlying epistemological and theoretical framework is tightly linked to the substantive focus and the possible contributions of the program. While dynamic capabilities can contribute significantly to understanding processes of incremental improvement in organizations, such as quality programs and process re-engineering systems, its underlying framework does not allow it to contribute in understanding the strategic entrepreneurial dimension of capabilities/competences creation and deployment, which lies at the core of the competence program. This explains the reasons for the independent existence of the two programs and helps in delineating their boundaries, which are often misunderstood. The work of Hamel and Prahalad, which initiated the competence program and was
responsible for propagating the RCC perspective widely in strategy practice, was initially thought to be a loose re-iteration of the more formalized ideas of the resource-based view and other contributions based on analytical economic methodology (Foss, 1997), which as I have shown is far from correct.

6.10 Contributions

The contributions of the current study can be summarized in the following points:

The study provides a map that helps researchers make sense of the vast terrain comprising RCC literature. By drawing on underlying epistemological and theoretical assumptions, this map of the literature is both broad and deep. The typology covers the overwhelming majority of work in the field and can help scholars situate any piece of research nicely in one of the schools of thought specified here. At the same time, by boxing any specific piece of research in one of the schools, the typology gives researchers a deep understanding of the most basic philosophical and theoretical foundations as well as a fairly accurate idea of the most important strengths and weaknesses of the perspective taken in the research. This improved understanding helps research to progress faster.

The study elaborates the links between philosophical and epistemological grounding on the one hand and theoretical assumptions, methodology and substantive focus on the other. It serves to show how much the deep-seated philosophical underpinnings determine the frame that shapes a program’s perspective, and thus the importance of philosophy of science grounding in research progress.
The characterization of the three schools of thought comprising the RCC literature will help researchers work through the terminological confusion that plagues the RCC literature and get past the semantic inconsistencies. The full epistemological and theoretical framework described for each school will facilitate the classification of a piece of research, regardless of whether its author(s) use resources, capabilities or competences to describe the internal firm phenomena that they study.

The study also takes stock of the progress and evolution of thought in the dynamic capabilities research program. The evolution of the program’s hard core assumptions and propositions reflects the initial influence of traditional economic methodology and assumptions, and how they needed to be changed so that the program could more adequately tackle its dynamic phenomena of interest. A similar contribution relates to the elaboration of the distinctive theoretical depth of the ideas that constitute the competence program and their roots in cybernetics and closed system theory. The review and comparison of the DC and competence programs helps in differentiating the two programs that have been previously treated as one stream consisting of a formal wing and a loose practice-oriented wing. The current study shows the distinctive focus of the competence program on the entrepreneurial and creative aspect of strategy, and that it is this focus that underlies the appreciative mode of theorizing. This does not make it less scientific, and it is actually more dynamic and more effective at tackling the real problem of managers trying to formulate strategies for building the competences that will yield advantages in future markets. The study also serves to bridge the economics-based literature on dynamic capabilities with that of managerial cybernetics and closed system
theory. This may aid in having researchers in the two camps talk to each other rather than past each other.

The reading and re-interpretation of Penrose’s thinking and its relations to constructionist epistemology and to the constructionist school of the RCC perspective is another important contribution of the current study. As mentioned in Chapter 3, while almost every piece of research in the RCC approach makes reference to Penrose’s *Theory of the Growth of the Firm* (1959), there is scarce recognition of the unique epistemology she employed in studying the entrepreneurial behavior that results in firm growth. This adds a new dimension of understanding attached to Penrose’s contribution and sheds a whole new light on the extent of her foresight, as she not only anticipated many of the key insights of the RCC perspective, but also brought constructionism into economic theory even before the philosophical debates on constructionism came to life.

This relates to another ongoing debate about the appropriate role of economic theory and methods in the field of strategy (Bettis & Donaldson, 1990; Rumelt, Schendel & Teece, 1991). From cries of concern with economic imperialism (Hirshleifer, 1985; Lazear, 2000) to views of strategy as a subset branch of industrial organization economics, there is need for a reasoned discussion of where economics stops and strategy starts. The current study contributes in shedding some light on the grey area where strategy and economics meet, and the distinction between positivist and constructionist epistemology is especially helpful in this regard. As elaborated in Chapter 2 on the philosophy of science, and alluded to later in the comparison of the three schools of thought and the two research programs, we find positivist methodology originating in economics suitable for analyzing past trends, patterns of behavior and for specifying
plausible routes of causation that apply at a certain level of aggregation. These patterns may help individual firms and their managers to understand and analyze past patterns, and that is where the role of economic methodology ends. In order to formulate strategy for the future of his/her company, a good strategist uses a well-grounded understanding of the past and blends it with his intuition and vision for the future. Creating a novel strategy is the essence of competitive success, and is primarily a creative act of synthesis. This entrepreneurial dimension of strategy defies prediction through the neat and rigorous analysis of objective models based on set categories; the entrepreneurial dimension starts as a subjective cognitive affair on which actions are based that produce the categories of the future. Economic analysis can only make sense of the latter in retrospect, after the future has unfolded and its categories have taken effect and produced results. Before the future unfolds, strategy is suitably explored using a subjective and interpretative methodology. As Penrose showed in her groundbreaking analysis of firm growth, it is this subjective interpretative (or constructivist) perspective that can fruitfully inform a renovated microeconomic theory of the firm.

6.11 Limitations

First, this study focuses mainly on the epistemology and underlying theoretical assumptions to delineate the three schools of thought and to compare the DC and competence programs. These are the particular dimensions under focus in the current study; however, there are many other theoretical dimensions over which distinctions and comparisons can be drawn. Although I only consider the broad outlines of the schools and the research programs and I pass the details of the specific theoretical propositions in
each, it is a choice motivated by the aim of the study. The dimensions I have chosen are deemed central in understanding the foundations and basic framework of the programs.

Second, the current study makes references to the empirical literature in so far as it provides examples for the epistemological, methodological and theoretical issues discussed. However, providing a comprehensive review of the empirical literature is a daunting task, and beyond the scope of the current study, although systematic reviews of the empirical literature are indispensable for a producing a well-founded assessment of progress in the RCC perspective and the DC and competence programs. This task is left for future studies.

6.12 Future Research

The most fruitful avenues for future research based on the work that has been accomplished in the current study is to continue with systematic reviews of the empirical literature of the research programs making up the RCC perspective. It would be interesting to examine whether the empirical research that tests the propositions of the dynamic capabilities and competence programs supports a progressive or degenerating problem shift, according to the methodology of Lakatos. As explained in Chapter 2, I have used Lakatos’ methodology of scientific research programs as a guiding framework for assessing the RCC literature as well as the DC and competence strands. The current study has focused on the hard core of the research programs, pertaining to the fundamental philosophical and theoretical frameworks underlying the core propositions. An examination of the protective belt of auxiliary hypotheses, as Lakatos calls it, which consists of various empirical tests, aids in assessing the progress of the research
programs. A meta-analysis or assessment of the empirical findings regarding the auxiliary hypotheses of each research program would constitute a potentially fruitful future research agenda.

Another direction for future research is to examine the interesting exchange between positivist and constructionist methodologies. One area specified above in the contributions of the study is the area where the micro-level and the industry levels meet. In other words, it would be interesting to examine how strategy theory based on subjective and interpretative methodology can be made a basis for a more realistic theory that examines the aggregate trends in the capabilities and competences of firms.
Chapter 7
An Empirical Application of the Theoretical Framework

7.1 Introduction

In this chapter, I present a brief application of the main theoretical insights of the three research programs reviewed in the study to an empirical case regarding software services companies in Egypt. The empirical application involves brief case analyses of three Egyptian software services companies. It is shown how the dominant resource/capability/competence advantage and strategy in each company exemplify one of the three research programs: the resource-based view, the dynamic capabilities or the competence program. The information used in the following analysis has been obtained through personal interviews with the founder/CEO of each of the companies. Two rounds of interviews were conducted: the first during the period of June to September of 2006, and the second in November 2008. Additional information was obtained from the companies’ websites. The identity of the companies has been kept anonymous upon the request of the founders/CEOs.

7.2 The software services industry in brief

The software services industry is an industry with relatively low entry barriers and low levels of initial investment requirements. The important factors for its thriving are a good information and communication technology infrastructure and the skilled human capital (software engineers). That is why some developing countries such as India and Egypt, have a good chance to excel in software services. The stages of software development start from conceptualization and follow through requirement analysis, high-
level design, low-level design, coding, testing and support. These stages roughly correspond to stages described in the waterfall model of software development (Arora et al., 2001). The first three stages are the high value added stages, and most software services firms in Egypt that export their services perform low level design and down, although some are also involved in the high value added stages. Knowledge of the business domain for which the software and services are being developed is considered a key capability in the industry, followed by customer engagement capabilities as well as project management capabilities. The technical software engineering capabilities are of course a key component of the talent required for a company to be competitive in this industry, but this is just a pre-requisite to be in the game.

7.3 Company A: A resource-based view

Company A is a value added reseller that customizes, implements and provides support services for generic software products geared toward applications in oil refining, production and transport as well as petrochemical and power plants. Company A was founded in Egypt in 2005 by two engineers who were former employees in two of the four major multinational technology companies selling the generic software products referred to above. These generic products enable clients to monitor, control, automate & optimize processes in a wide range of environments, like oil refineries, power stations and petrochemical plants. Company A offers its services to both local and global clients, but currently, the bigger share of its clients come from the Middle East.

Company A is specialized in developing and customizing generic software and solutions offered by the four multinationals to each client’s specific needs. In addition to
customization, Company A offers clients implementation services, training of client personnel on how to operate and maintain the customized software solutions, as well as continuous technical support for the customized systems. The company does three main types of customization: modeling for the design of new oil refineries, petrochemical or power plant layouts; optimization of factory processes; and simulation for training refinery and plant employees. The main business domains that Company A serves are oil production, refining and transport (pipelines), petrochemical factories and electrical power plants. The software services provided by Company A include low level design, coding, testing and support, related to modeling, simulation and software systems integration.

The founding of Company A happened at a time when the industry was going through a surge in competitive pressure among the major multinational players. Some companies started to buy out or merge with competitors to decrease the competition. In addition, there was a general trend towards lean operations through cutting overheads and downsizing. These tendencies in the industry opened up an opportunity for the founders of Company A, to turn what would have been their layoff into a major business opportunity. The two Egyptian engineers were able to convince top management in two of the major multinationals that they could set up an independent operation to customize and service the MNCs’ generic software products, and this way, the MNCs would save on overheads, downsize and still be able to provide their clients with reliable, high quality support services at a competitive price through outsourcing. The experience and reputation of the two engineers during their employment in the MNCs was a major factor
in the successful implementation of the business idea. It is worth noting that the same business model was being implemented elsewhere in Europe.

Company A started out with this symbiotic relationship with a couple of the major MNC sellers of generic software, and eventually started to offer its services to all the major MNCs in the industry. In many cases, the MNCs present Company A as their own service center rather than as an independent party. However, this does not mean that Company A remains to be totally dependent on the MNCs for its client base. It has been able to develop strong relationships with its clients, such that the clients request Company A’s services for a wide range of other software. In addition, Company A has attracted new clients, and is now considered a source of new customers for the MNCs, especially clients from the Middle East.

Company A’s advantage is exemplary of the resource-based view’s characterization of resources that yield a sustained competitive advantage. First, the generic software on which the company bases its customization and support services is an industry that has an oligopolistic structure, and is characterized by high entry barriers, due to the specialized nature of knowledge involved. The general software services industry, of which company A is a part, is dynamic and has relative ease of entry and exit. However, Company A specializes in a niche of that market, and its specialized knowledge of the particular business domain it serves, oil, petrochemical and power plants, has high isolating mechanisms (Lippman & Rumelt, 1997). The highly specialized and idiosyncratic knowledge was attained by the founders of the company during the years they were employed in a couple of the leading multinationals that produce the generic software, and this edge is valuable, rare, inimitable and only
substitutable for other ex-employees of the same multinational companies. This explains why Company A is the only company that provides software customization and support for this specific business domain in the Middle East. Of course, the Middle East is especially lucrative given the petroleum industry. Globally, there are competitors for Company A in Eastern Europe and India. However, the resource mix of Company A that augments its specialized knowledge, gives it an edge despite the competition.

The advantageous resource consists of two main factors: access to customers, and access to skilled engineers at a competitive cost. Company A enjoys a privileged access to a global customer base; the brand name and global presence of its partner MNCs is leveraged to Company A’s advantage. Again this position vis a vis leading MNCs in the industry is valuable, rare and inimitable. Of course the access to customers must be complemented by high interpersonal skills and customer focus on the part of Company A members. The company has been able to build and gain trust from both clients and MNC partners. Finally, the technical engineering and software programming skills are an important and basic ingredient in Company A’s advantage. In this respect, Company A enjoys the advantageous access to highly skilled Egyptian engineers with the well known salary differential as compared to engineers in Western markets. This is a common factor market advantage that is shared by companies operating in less developed countries, such as Egypt and India. In itself, it is insufficient as an explanation for sustained competitive advantage, but in tandem with the above mentioned factors, it provides a cost advantage for the company over global competitors. Company A experiences a smaller gap in terms of language and cultural barriers vis a vis clients from Western countries than its Indian
competitors. The human resource aspect also gives it a cost and price advantage over Eastern European competitors.

7.4 Company B: A dynamic re-configuration of capabilities

Company B is the largest indigenous software services company in Egypt. Established in 1994 and serving a primarily export market, it has established itself as a prime software services provider both locally and regionally (the Middle East). It also has a strong customer base in the U.S. The business domains that Company B serves are education, government, telecommunications, financial services and outsourcing for independent software vendors. The company takes on custom software development projects and in outsourcing, it has developed software for industry giants like Microsoft, Corel, and Adobe. Company B also works in software systems integration, implementation and application maintenance. Besides these services, it has a few software application products that it markets under its name.

According to an interview with the cofounder and president of Company B, their strategy is primarily adaptive in response to market needs and technical developments in software and computing, which present opportunities for the company. The president of the company acknowledges that there are many examples of companies, both big and small, that have redefined their market. However, he asserts that at Company B, it is the total opposite. They spend time and effort reconfiguring our capabilities in order to address market needs. Top management follows market developments closely as they attach high importance to understanding customer needs as an integral part of their responsive strategy. In addition, several technical groups within the company scan the
environment for advances in software and computing technology, to update the company’s processes and methodologies accordingly. The company’s top management team admittedly declares that their strategy is a follower strategy; however one in which they are highly successful, profitable and expanding. A key pillar of this adaptive strategy is the company’s agility in continuously re-configuring their resources to address market opportunities and satisfy client requests. Their flexible model enables them to respond quickly to independent software vendors (ISVs), such as Microsoft, Adobe and Corel, which outsource to Company B components of an existing system, or entire solutions.

For example, at Company B, they developed a service-oriented architecture and its tools and platforms to serve particular customers. Another example of capability re-configuration happened as a result of changes in technology from centralized systems based on mainframes to decentralized systems based on PCs to servers (relatively more centralized) and then web-based computing. Each of these changes required the company to reconfigure its capabilities in order to be able to take advantage of them. Other capabilities are more subtle. For example, at the beginning of Company B’s operation, typical projects were 18 months in duration, and the typical team size was 20 people. Now the typical project duration is 3 months and typical team size is 5 people. A lot of other processes (the least of which is invoicing) need to change to accommodate the change in the nature of projects. An example is resource management. All implementation processes needed to be re-configured. Another example of capability reconfiguration is that when the company first started, all development work was done in Egypt because customers were focused on cost saving. With more maturity, customers
started requiring people on site, and thus offices in New York and Dubai were established.

There are several systematic processes and groups responsible for implementing capability reconfiguration and incremental improvement in the company’s processes and methodologies.

Three groups whose primary roles are capability reconfiguration at Company B:

1) Software Quality Group, which takes care of systematic software process improvement and CMM\textsuperscript{33} (Capability Maturity Model) certification. The software Quality group is concerned with process design, implementation and audit. It does not actually implement anything itself and overlooks the implementation of others.

2) Technical Architecture Team (TAT), whose function is to help developers at Company B develop better software by scanning the knowledge space for new processes and technologies and pushing them through the organization.

3) Organizational performance management group, which looks at the company’s KPIs (key process indicators) and tracks process improvement in non-technical areas such as HR processes, invoicing, etc. Here the ISO standards are followed.

\textsuperscript{33} “The Capability Maturity Model (CMM) developed by the Software Engineering Institute (SEI) at Carnegie Mellon University is a widely adopted framework to improve software capabilities. Built on theories of quality and continuous process improvement, the CMM was first initiated to provide the Department of Defense a standard means for measuring contractor capability via its definition of process maturity (Humphrey, 1989). As the CMM became widely adopted as a standard quality process model in the defense sector, commercial organizations also began to investigate whether they could benefit from the approach to software process improvement expressed in the CMM. In the last few years software process improvement based on the CMM has emerged as an integrated solution to the software problems in various corporations and empirical evidence in support of the same has been reported.” (Ethiraj et al., 2005: 33)
In this way, we take Company B to be an exemplar of the dynamic capabilities approach, where the dominant strategy is reactive and stresses adaptation in response to market and technological changes. It maintains competitiveness through systematic processes of capability improvement and reconfiguration.

7.5 Company C: A competence perspective

Company C was established in 2005 in Boston, Massachusetts by an Egyptian engineer. The company offers a range of services to dentists including 3D model reconstructions of two-dimensional dental CT scans, radiographic interpretation services by U.S. Board Certified oral radiologists; virtual treatment plans, reviewed by a practicing implant specialist and online software training on computer guided surgery. These services are all built around the proliferation of small CT scan radiology equipment that is designed for in-clinic use by dentists. The reconstruction of 3D models based on these CT scans allows the dentist to take more measurements and simulate treatment and surgical protocols using the special computer software, before actual implementation on the patient.

Company C exemplifies the competence perspective as its story involves the creation of a brand new business model that opened up market space for the company, which did not previously exist in the industry. Prior to the establishment of Company C, the construction and processing of 3D models from CT scans was carried out by the companies that provided the software. Since their focus was geared more towards the software product, these services were not provided as effectively and efficiently as they
could be, or as the dentist clients would like them to be. It is here where the founder of Company C saw an opportunity to provide a higher quality service with faster turnaround time, cheaper prices and better customer support. Thus, Company C was the first to bring the software service outsourcing model to an application in the maxillofacial diagnostic imaging industry and its associated three-dimensional modeling. The company’s business model embodied a three-pronged innovative approach to the process.

First, Company C basically transformed the way three-dimensional reconstructions were being processed, therefore carving out a profitable niche for itself. In its new business model, the company established itself as a purely service oriented company, providing the reconstruction, modeling, reading, reporting, training and technical support related to CT dental imaging independent of the software producers. Secondly, Company C established an offshore operation in its Cairo office, thereby making use of the significant cost differential between Egypt and the U.S. in terms of pay for IT and radiology technicians as well as software engineers. Again, this model of operations was totally new to the image processing industry, as all processing took place in the U.S. prior to Company C’s operations. Tele-radiology (the reading and reporting on radiology scans and pictures) had been outsourced, especially to Indian companies, but doing so for 3-D models was a Company C innovation. Thirdly, Company C transformed the whole 3-D model building and processing to a web based procedure, where previously the CT scans were sent via airmail to be processed and modeled in the U.S. These innovative aspects of the company’s business model place it clearly in the constructionist school, as it was able to leverage its competences and take advantage of technological advances to produce a brand new space in the market for its services.
The elements of the above business model give Company C an edge over competitors. Initially, the only competing companies were the software product companies that provided these services as after sales support to the customers who bought their software products. At that time, Company C’s services were superior on all counts, including the quality of the 3-D models produce, the speed of delivery, the cost and the extent and quality of customer care and support. Recently, several companies have been established that have imitated the outsourcing and web-based dimensions of Company C’s business model and have thus started to compete. However, Company C remains in the lead in terms of price, speed, quality and extent of customer support. The off-shore operations dimension of Company C is the factor that enables it to stay ahead of its new competitors in the above mentioned aspects. The Cairo-based operations give Company C access to software engineers, technicians, customer support and sales personnel at a fraction of the costs of its U.S. competitors. Compared to other opportunities available in the Egyptian market, the pay and job environment is very rewarding to Company C’s staff, so it is far from a sweat-shop approach. Further, the excellent command of English and the fluency and lack of foreign accent that characterizes the caliber of Egyptian personnel enables Company C to approach customers and provide them with support at a comparable quality they can find elsewhere in the U.S. Further, and despite time zone differences, the cost advantage coupled with modern IT communications facilities enable the company to provide customer support around the clock, and to process and deliver orders much faster than the competition. In-depth knowledge of the software and the manipulation of the 3D-models, which the founder of the company gained through his experience in directly working with and
developing the software, allows it to deliver superior training for virtual surgical simulation and computer guided surgery. The only factor in which the new competitors are excelling over Company C is in the area of marketing and their wider network of connections to dentists in the U.S. Company is currently planning to increase its marketing and sales campaigns and is expanding its client base to other countries such as the U.K., Spain and Brazil.

The founder and CEO of Company C can see that the future of his company will be tied to the further diffusion of the use of dental CT scans for diagnostic purposes worldwide, and therein lies an opportunity for almost limitless expansion of the company and extension and upgrading of its services as the technology advances. The company continues to tap new geographical markets and their vision is to be biggest company specializing in their specific services worldwide.

7.6 Conclusion

This very brief analysis of three software services companies explains how each of the three research programs provides a useful perspective to understand and explain the sources of competitive advantage in terms of different combinations of resources and capabilities. Company A is best understood within the resource-based perspective, which portrays relatively stable resource advantages that are valuable, rare, inimitable and difficult to substitute. The case shows the isolating mechanisms which preserve the company’s advantage. Company B is usefully viewed through the dynamic capabilities lens, which highlights its adaptive strategy through an agile dynamic capability to continuously reconfigure and re-assemble its technical and organizational capabilities to
meet customer needs using the latest technologies. Finally, company C exemplifies the construction of new market space based on an innovative combination of existing competences assembled according to a fresh and creative business model that was applied to the dental CT scan diagnostic services for the first time. The existence of these three models in one market and during one historical period emphasizes the complementary nature of these theoretical lenses, where each may aid in illuminating a particular aspect of the complex business reality we experience.
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