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CORPORATE ENTREPRENEURSHIP AND THE MICRO-FOUNDATIONS OF DYNAMIC CAPABILITIES

Andrew C. Corbett, Rensselaer Polytechnic Institute, USA
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ABSTRACT

Corporate entrepreneurs and managers shape the evolutionary fitness of their firm by orchestrating firm assets to positively affect their firm’s dynamic capabilities. The extant literature emphasizes the important role of managerial cognitions to a firm’s dynamic capabilities but little attention is given to the linkages. This study explores the role of managerial cognition in dynamic capability development by investigating eleven of the world’s largest firms as they attempt to develop dynamic capabilities to support their radical innovation efforts. Our findings show that dynamic capabilities are not based upon a single cognitive antecedent but instead three distinct cognitive scripts. We also argue that firms developing dynamic capabilities need to have cognitive alignment in order to drive new innovative initiatives. Finally, we introduce the concept of dynamic capability cognitions.

INTRODUCTION

The ability of an organization to effectively adapt and meet the needs of a changing environment (Cyert & March 1963) is dependent on managerial dynamic capabilities – the capacity of managers to create, extend or modify the resource base of an organization (Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter 2007). These capabilities typically reside in the top management team of the organization and they allow these entrepreneurial managers to sense and often shape the future evolutionary fitness of the firm (Teece 2007). Dynamic managerial capabilities are a source of heterogeneous resource creation for the organization (Holcomb Holmes Connolly 2009) and when properly orchestrated (Sirmon & Hitt 2007) they can have a positive effect on firm performance (Adner & Helfat 2003; Kor & Leblebici 2005; Moliterno & Wiersma 2007).

Today, however, even with a burgeoning interesting in both managerial dynamic capabilities (Holcomb Holmes, & Connelly 2009; Sirmon & Hitt 2009) and the micro-level foundations of routines and capabilities (Lippman &Rumelt 2003; Felin & Foss 2005), researchers know relatively little about how managers and their individual processes interact with the development of organizational capabilities (Argote 1999; Felin and Foss 2005; 2006). Foundational work on dynamic capabilities (Teece, Pisano & Shuen 1997) has had a dramatic influence on firm-level research and other early work shed some light on the relationships between organizational adaption and the cognitions and capabilities of individuals (Rosenbloom 2000; Tripsas & Gavetti 2000). Additionally, we know that human capital investment may positively affect a firm’s dynamic managerial capabilities but scholars still do not understand the logic behind the orchestration of the assets that gird dynamic managerial capabilities (Sirmon & Hitt 2009) or how managerial decisions and actions “strengthens or weakens the effect of managerial ability on resource value creation” (Holcomb et al 2009: 480). In sum, little is known regarding the psychological and cognitive foundations of individuals that enable firms to develop the dynamic capabilities that drive strategic renewal and corporate entrepreneurship (Eesley & Roberts 2009).
Teece’s (2007) model of dynamic capabilities and their microfoundations explores some psychological and cognitive elements but he notes that an understanding of the decision-making that supports these microfoundations is still in its infancy (2007:1333). Further, while Teece focuses his efforts on building a cogent framework of dynamic capabilities, he states that other scholars should investigate the important role that leadership and other forms of individual behavior and action play in developing organizational dynamic capabilities and opportunities for innovation. Here we fill this breach in the extant research and augment Teece’s model work by examining managerial cognitions and their linkages to collective outcomes. Our work explores the cognitive antecedents of individual and organizational capability development and argues for their centrality to future theory building for managerial dynamic capabilities. In doing so our study puts another stone on the path toward understanding the linkages between micro-level activity and organizational capabilities.

The purpose of this paper is to better understand the micro-level cognitive antecedents to organizational capability development and to aid theory construction regarding managerial dynamic capabilities. After a review and discussion of pertinent prior scholarship on dynamic capabilities and cognition, we describe a three-year qualitative study of Fortune 500 firms that are in the process of developing breakthrough innovations. This field research allowed us to explore the cognitions of top managers charged with innovation development and the relationship of these cognitions to the firm’s innovation efforts. Based upon this work we then argue that there are three distinct individual-level cognitive scripts that provide a foundation for the managerial dynamic capabilities which act as the antecedents to the firm’s dynamic capabilities. Finally, we examine our results through in relief to the extant scholarship on managerial dynamic capabilities in order to further its theoretical development.

**Dynamic Capabilities & Managerial Dynamic Capabilities**

Teece et al.’s (1997: 516) seminal work on dynamic capabilities – “the firm’s ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments”– answers well the practical need in today’s world when firms deal with constant change and a need to renew and reconfigure. This focus on renewal and reconfiguration and the criticality of the concept of dynamic capabilities can be seen by how it has been synthesized in other domains to address important questions within strategy (Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003; Simon, Hitt, and Ireland, 2007), entrepreneurship (Deeds, DeCarolis, and Combs, 2000; McKelvie and Davidsson, 2009; Newey and Zahra, 2009), knowledge management (Easterby-Smith and Prieto, 2008), and organizational learning (Winter, 2000; Zollo and Winter, 2002; Zott, 2003).

As demonstrated by the research noted above, the dynamic capabilities perspective has primarily been utilized to focus on the firm-level phenomenon while examining routines, competencies and capabilities (Henderson and Cockburn, 1994; Kogut and Zander, 1992; Teece et al., 1997). More recently, scholars have begun to revive Grant’s (1996) plea to emphasize the role of the individual-level linkages in renewal and strategy by exploring the locus of firm knowledge (Felin and Hesterly, 2007), managerial abilities (Holcomb, Holmes, and Connolly, 2009), the knowledge structures of top management team members (Kabanoff & Brown 2008) and the antecedents to dynamic capabilities (Rothermal and Hess, 2007). Adner and Helfat’s (2003) introduction of the concept of managerial dynamic capabilities (MDC) – the capacity of managers to purposefully create, extend, or modify the resource base of an organization (Helfat et al 2007:24) – provides an important foundation for scholars to examine the micro-level origins of
organizational routines and capabilities. As such, the next section explains social cognitive theory and the related concept of cognitive scripts as points of departure for our empirical study.

A Cognitive Perspective

Social cognitive theory is particularly useful for our purposes because it can be used to illustrate how a manager’s behavior, his or her cognition, and the environment all operate as interacting determinants of each other. For example, a manager’s ability to sense, seize and reconfigure (Teece 2007) the firm’s assets [i.e., behavior] is working in a context that accepts a willingness to seek out new opportunities [i.e., environment] as well as individual characteristics such as her level of self-efficacy and expertise [i.e., personal factors].

Social cognitive theory (SCT) explains human functioning in terms of a bidirectional triadic relationship in which behavior, cognition, and the environment operate as interacting determinants of each other (Bandura, 1986; Wood & Bandura, 1989). Due to the bi-directionality of influence, people are both products and producers of their environment. Wood and Bandura (1989) explain that individuals develop their knowledge and skills on the basis of information they receive through interactions with others in the environment. Thus, individuals model their behavior based on what they have seen demonstrated in the environment and their behavior also shapes the environment. Simply stated, corporate employees work in environments that stress certain norms and routines some of which are counter to developing the dynamic capabilities required to renew the organization. In their daily interactions, managers are engulfed in a culture and organizational structure that champions mechanistic as opposed to organic management practices (Burns & Stalker, 1961) which can contribute to managerial cognition that undermines the development of dynamic capabilities and contributes to inertia and a lack of firm performance (Trispas & Gavetti 2000).

Trispas and Gavetti (2000) study of Polaroid and Helfat et al’s (2007) study of Rubbermaid are examples of the ‘failure’ of leadership’s managerial cognitions. Their work shows how managers’ cognitions shaped and misdirected Rubbermaid and Polaroid’s vision about the future direction of their firm’s industry. Trispas and Gavetti tell us that little emphasis has been devoted “to understanding the role of managerial cognition in driving the dynamics of capabilities” (2000:1157). What is required is an understanding of the cognitive underpinnings that drives the expertise and managerial ability that deliver resource value creation (Holcomb et al 2009).

Expertise and Cognitive Scripts. People who are expert at a particular task are able to outperform others because over time they develop domain specific knowledge structures or mental schemas (Lord & Maher, 1990) which confers an ability for superior performance due to continued mapping of ordered mental steps pertinent to a particular action, activity, or field of interest (Read, 1987). Leddo and Abelson (1986) explain that a script sequence includes three subscripts: arrangements, willingness, and ability. For an individual to execute a particular task successfully he or she must [1] have developed a clear mental map of the tools and resources required (arrangements), [2] be willing to take the steps necessary (willingness), and [3] have the skills required (ability).

Arrangement scripts are the knowledge structures people have about the use of specific arrangements at their disposal (e.g., tools, contacts, relationships, resources, and assets). For corporate managers this could include how they think about and envision using items such as certain materials, tools, equipments, suppliers, or networks at their disposal. Willingness scripts are the knowledge structures that lie beneath an individual’s commitment to take action. For
corporate employees this could include how they think about their firm’s eagerness to pursue new opportunities or their ability to deal with uncertainty. Ability scripts are knowledge structure individuals have regarding the skills, capabilities, and attitudes that are necessary to complete a task. For corporate employees this could include things such as their understanding of the capabilities of the organization to manufacture, market, or distribute a particular product or service. Theory tells us that when individuals have a clear mental model developed for each of these scripts and understand how they interact they can become expert and performance will rise (Leddo & Abelson 1986).

In this sense, arrangement scripts can be seen as being specific to understanding and organizing the external environment, willingness and ability scripts relate to how individuals perceive their internal motives and individual competencies. As such, we argue that exploring the cognitive scripts of managers will provide us with a much better understanding of the micro-level origins of organizational routines and capabilities. Porting the concept of expert scripts to the management literature is not unprecedented as expert scripts have been used to examine the decision making process of entrepreneurs who have started new ventures (Mitchell, Smith, Seawright, & Morse 2000). In their study Mitchell and colleagues (2000) demonstrate that the cognitions of individuals looking to start a new business are stable across cultures. Our goal here is to answer Trispas and Gavetti’s (2000) call to understand the role of managerial cognitions in the development of dynamic capabilities. Helfat et al (2007) states that managerial cognitions matter and that they can have either high or low evolutionary fitness. In our study we seek out the antecedents of these cognitions in an effort to uncover their evolutionary fit. Specifically, we want to understand connections between scripts, expertise (Sirmon & Hitt 2009) and how firms develop successful innovative capabilities at the organizational level.

Methodology and Research Design

Given the goals of this study we chose to undertake a qualitative design that consists of multiple interviews with managers attempting at developing radical innovations for their firms. By definition these individuals were in the process of developing firm level dynamic capabilities as they were charged with sensing, seizing, and reconfiguring the organizations capabilities (Teece 2007) in order to create new to the world products. We chose longitudinal interviews as our primary tool as this would best allow us to analyze and understand the actual cognitions of individual managers.

Interview Protocol. Over a three year period, 246 interviews were conducted, including screening interviews, initial on-site interviews, and follow-up interviews every six months. Internal company documents, reports, and news accounts supported the primary data collection method. All interviews were semi-structured, at least one hour in length, and followed a specific, predetermined protocol. A protocol was established for each phase of the project including the initial interview (full day with multiple informants), six month follow-up interviews (4-5 per company with corporate entrepreneur), and final interview (1 per company with corporate entrepreneur).

In the current study we focused our analysis on the interviews with the lead corporate entrepreneurs and their top aides (during many interviews the lead entrepreneur would have one or more people in the interview with him/her). This design allowed us to examine the cognitions of the people with the most direct responsibility for developing the organization’s dynamic capabilities. The lead entrepreneur for each firm was interviewed at least four times over the three
year period and some were interviewed as many as eight times. As a result, we analyzed a total of 53 interviews for this study.

**Data Coding.** Qualitative research is an iterative process demanding that researchers continuously build insights by exploring the data, going back to the theory, and then back to the data again (Strauss & Corbin, 1998). By its nature qualitative research provides rich detail, but it can also be a messy process (Denzin & Lincoln, 1998). In order to bring discipline to our process, we used NVivo, a computer aided text analysis software program, to facilitate coding and ensure additional rigor.

We began our initial investigation with a broad objective to better understand the links between scripts and dynamic capabilities. Given that dynamic capability development demands “entrepreneurial management” (2007) our initial coding was guided by the primary new venture creation scripts of arrangement, willingness, and ability as outlined by Mitchell et al. (2000) and defined earlier in our paper. Data were analyzed through multi-case analysis methods (Eisenhardt, 1989; O’Connor, Rice, Peters, & Veryzer, 2003; Yin, 1994) incorporating grounded theory methodology (Strauss & Corbin, 1998). This form of analysis is consistent with “extended” case methodology (Burawoy, 1991; Danneels, 2002) which is designed to allow researchers to integrate and synthesize existing bodies of research. The authors coded and analyzed all transcripts with assistance from graduate students who provided additional reliability checks. Inter-rater reliability was achieved by following procedures suggested by Miles and Huberman (1994).

**Findings & Implications**

Since the early development of the concept of dynamic capabilities, scholars have argued that the essence of a firm’s dynamic capabilities lie in its organizational processes (Teece, Pisano, Shuen, 1997). In the intervening decade since this seminal article, Helfat et al. (2007) note that many studies have examined the process aspect of dynamic capabilities but the majority of these studies have “emphasized the “doing” rather than the “deciding” aspect of processes” (2007:115). Helfat and her colleagues (2007) note that the processes that underlie the decision-making aspect of dynamic capabilities matter just as much as the doing-deployment processes but they are significantly under-researched. Our study partially fills this breach by exploring the cognitions of managers who are trying to shape their firms dynamic capabilities in order to bring out radical innovations for their organizations. Our study makes three primary contributions to the existing literature. First, our study shows that the cognitive antecedent to dynamic capabilities are not a singular skill or knowledge structure but instead dynamic capabilities are girded identifies by three distinct underlying cognitive scripts. Second, our qualitative inquiry provides us a foundation upon which to extend the current model and theorizes regarding dynamic capabilities. We do so by showing by developing the concept of dynamic capability cognitions. Third, by examining each of the eleven corporations we studied in depth we speculate about the linkages between balanced cognitive mindset regarding dynamic capabilities and firm performance.

**Cognitive Antecedents to Dynamic Capabilities.** Our data suggests that the managerial cognitions that support dynamic capabilities are not one construct but a set of three. Our data shows that managers attempting to developing new innovative breakthroughs for their firms displayed evidence of specific knowledge structures relating to (1) the arrangements the organization needs make or secure to changes in organizational processes; (2) the willingness to change current organizational practices; and, (3) the ability to affect change in organizational practices.
Arrangement Scripts. Arrangement scripts refer to the knowledge structures one has regarding the various tools, contacts, relationship resources, and assets one has at his/her disposal. Studying radical innovation within the corporate domain we found evidence of similar scripts but we also found that managers had to develop expert scripts around additional concepts. Corporate managers demonstrated evidence of arrangement scripts for culture, coaching, and the necessity of top management support.

The culture often dictated how governance structures were created which allowed dynamic capabilities to flourish (or not) in order to support innovative initiatives. A culture conducive to entrepreneurship encouraged experimentation and accepted small losses.

“Well, I think from the standpoint in doing it right is that we have always maintained our culture for team work, technology, sharing and transfer, bringing in technology from the outside and building on it for our needs. We have probably an unrealized strength that most people don’t realize, but our international structure is second to none and we create that same culture and environment in every country that we work in or do business in together with laboratories. … So it’s sort of a passion for business building. You know, it comes from that build a project, split it off, you know, grow it as a business kind of mind set that’s occurred over the years. So the foundation is very strong there.” – Company 8

In many of our companies, it was evident that few had entrepreneurial experience in terms of starting new ventures, entering new markets through the commercialization of breakthrough products. The entrepreneurial management that Teece (2007) speaks to being so crucial to the development of dynamic capabilities was often lacking. As a result, coaching was an initiative among some of the companies. Arrangement scripts focused on coaching were exemplified by the following:

“And her team is actually -- you know, has a little group of consultants that are out working with each of the emerging business opportunities coaching them and working with them through strategies and issues as an outbound little consulting arm.” – Company 4

Top management support is important for innovation efforts and critical for the development of new capabilities. Such support signals that it is acceptable to work outside the core or experiment with new technology. Without approval, R&D innovations efforts were often found underground and under resourced. Arrangement scripts focused on top management team support were exemplified by the following:

“In part, what does this mean? This actually means regular reviews involvement with those teams. So if [CTO name deleted] who would be in Iowa, actually once a month we’ve got ten corporate initiatives, he spends two hours a month at each one of them with the teams actually working through strategic issues. More of a rolling up sleeves and working through things, not a stand back, did you make your numbers kind of effect. So, active involvement”. – Company 4

The cognitive antecedents to dynamic capabilities rely on individuals having expert scripts about their firm’s resources, assets, contacts, and relationships. Teece notes that leadership and culture are an important part of the microfoundations of dynamic capabilities but recognized his model is deficient in this regard (2007:1334). Our findings here demonstrate the importance of these constructs and how they can be driven by managerial cognition.
Willingness Scripts. At the base of an organization’s dynamic capabilities resides the willingness scripts of individuals that collectively help push the firm toward new opportunities. Willingness scripts are the knowledge structures that show how individuals think about new opportunities, pursue those opportunities, and stay committed to them (Mitchell 2000). Our data suggest that corporate entrepreneurs, due to their past performance and organizational design, are sometimes constrained in their willingness to pursue opportunities due career conflict.

“You do have to provide protection and it is true that I do that overtly. But from a business side, they really think it is truly career limiting.”—Company 5

Even given some of these willingness concerns, most companies predominantly demonstrate willingness to sense, seize, and pursue opportunities (Teece 2007). The innovation hub leader from Company 7 explains how he attempts to change the willingness mindset to sense new opportunities.

“Another big part of it, I remember, was helping the innovator community, I guess, or specifically in my case, our team, to get beyond the current reality, if you will, to see opportunities that we wouldn’t otherwise see because of the mind sets, because of the nano models that we’re hemmed in by. So it has a lot to do, in my mind, with helping to manage mind sets, helping to manage paradigms, if you will, or break paradigms, helping to manage meaning in some sense. And at the same time then, what you’re trying to do is drive results…” – Company 7

Abilities. Ability scripts refer to the knowledge structures surrounding the abilities, norms, and knowledge required to complete a task. With respect to developing innovative capabilities ability scripts can take the form of knowing how to align complimentary parts of the organization, reshape organizational processes, and how to apply the knowledge base toward unforeseen markets. An executive from Company 3 explains the importance developing an ability to reshape the organization.

“See, when your scientists are developing projects, they are automatically aligned with the science. That’s, you know, your base. But when they’re coming from the market back, there are no constraints really. And so I think that is the biggest challenge we face is to deal with that, to figure out how to reshape the organization, to redirect people into areas maybe they are less familiar with, but where they can still be successful.” – Company 3

Lastly, one manager describes how to think about applying technology from one of their business units to another unit in a relatively distant industry. They know the industry will begin to die off rather quickly, so they are already focused upon how to protect critical assets using a different technological platform.

“But you know their market is disappearing. You know, their market at this point is in CDs is going away. So, you know, what we really have to work on here is how do we prevent piracy and all of that. Now we also have another acquisition in Vivendi Universal and so that means that we will be actually making products if not for NBC, then Universal and so on. So we want to make sure we protect that. You know the whole industry has been decimated and there is no industry left. So what we now have to think about is how do we prevent piracy with DVDs etc. It’s a fair amount of work. So maybe that involves photonics and maybe not.” – Company 10
Individuals who outperform others develop domain-specific knowledge structures around certain arrangement, willingness, and abilities, and they can see how to script these knowledge structures to achieve a task (Leddo & Abelson 1986; Lord & Maher 1990). The development of scripts is important because they lead to superior performance within a domain in comparison to those who have not developed a similar script (Ericson, Krampe, & Tesch-Romer 1993). In this section, we showed how the development of a firm’s dynamic capabilities is dependent upon not a single mental model but one that is founded upon arrangement, willingness, and ability scripts. These scripts allow individuals to shape the organization’s dynamic capabilities and sense and seize new opportunities for innovative products and services.

**Dynamic Capability Cognitions.** Helfat et al. (2007) state that the practical functions of a firm’s dynamical capabilities are search, selection, deployment, and coordination. These are the specific functions that managers perform as they attempt to drive their organizations in new fruitful directions. In their book, Helfat and her colleagues demonstrate that a firm’s organizational processes, its relational and acquisition-based dynamic capabilities, and the asset orchestration done by managers are the drivers of these functions. Here we augment this work by exploring the important role cognition plays in the development of dynamic capabilities.

Among other things, dynamic capabilities are contingent upon managerial expertise (Holcomb et al. 2009) and managerial cognition (Adner & Helfat 2003). Yet the prevailing models of dynamic capabilities and their foundations (Helfat et al. 2007; Teece 2007) provide scant detail despite an understanding that the cognitive elements that inform decision-making regarding dynamic capabilities is crucial to our understanding of the phenomenon (Helfat et al. 2007; Teece 2007). Our qualitative investigation of managerial cognition and expert script provides us with a unique opportunity to rectify this omission.

We augment Helfat et al.’s model of the process of dynamic capabilities by adding dynamic capability cognitions as a foundation. These authors note that much of the current work on dynamic capabilities processes focus on the “doing” as opposed to the “deciding” and their original model represent this realization. We argue that the microfoundations of organizational capabilities are reliant upon the cognition of individuals who drive the direction of the firm. For example, this quote illustrates how cognitive script regarding management ability can be infused across groups in order to help shape the future of the organization.

“So what we were trying to do was take the same approach that we were using in the corporate view and say, go out to the groups and say we really think that if you use the similar kind of approach for some major things that you’re probably already focused on in some way, shape or form that would help accelerate our progress. So this wasn’t really about, by and large, was not about creating new things. It was more around applying some of the management system to things that were out there and struggling a bit, or at least, you know, being focused on that in the groups.” – Company 4

Managers also need to have an ability to sense the future direction of an industry that may not yet exist. They need to have an understanding of the capacity of their organization to achieve technological milestones and also see how the script will likely play out in the future:

“And another important aspect around the technology side is the uniqueness. There needs to be a gap out there that we can fill with proprietary technology, and that’s another one of the principals, you know, of making money from Apex is uniqueness. In an early stage Apex project, one of the key things to demonstrate there as well as technical feasibility is
the uniqueness aspect. You need to be on a -- I call it, a projectory to, you know, a patent estate that gives you competitive advantage. You don’t have to have all your patents nailed down in two years, you know, but if you don’t have that sense of projectory that that’s where you’re going to be, that’s a problem.” – Company 3

For each of the firms we studied in our three-year long investigation we captured how the knowledge structures of individual informants link to the cognitive microfoundations of each firms’ dynamic capabilities. Table 1 provides a summary of the three dynamic capability cognitions and how they manifest themselves in each of the firms we studied. What seems clear from Table 1 is that while all of the companies had a need to develop dynamic capabilities in order to support their intent to develop radical innovations, the cognitive scripts of their management showed different paths and different outcomes to date. These summaries show us how managerial asset orchestration and organizational processes are affected by the cognitions of the managers in the organization.

Our argument here is that a firm’s search selection and deployment decisions are partially determined by the how individual managers view the arrangement, willingness and ability of the firm to successfully develop new initiatives. How managers think, envision and script action for the firm’s future is seeded in their cognition.

As noted, when examining each company case we were struck by the strong orchestration skills of Companies 4, 8, and 10. As you can see in Table 1 each of these firms also had strong willingness and arrangement scripts – each firm had developed a strong cognitive model about their resources and assets, how they would pursue opportunities and how their abilities might lead them toward success. They appeared to have strong orchestration skills across each of these cognitive dimensions. This insight led us to perform a post-hoc analysis of our data and directed us to a finding regarding the concomitance of scripts.

Concomitance of Scripts. Our insights regarding the three companies mentioned above spurred an inquiry about the importance of orchestration and balance. At the risk of the errors that can sometimes come from quantifying qualitative data (Pratt 2009), we performed some calculations on the passages we extracted from our transcripts. In total, we found 2,635 passages that were representative of the expert scripts of arrangement, willingness and ability. See Table 2.

We normalized the number of each type of script for each company by summing – for example all ability scripts per company – and then divided this number by the total number of ability, arrangement, and willingness scripts coded for the company. Standard deviations were then calculated using the percentage numbers per case. The standard deviation represents the distance from the mean so the closer the company’s standard deviation is to zero indicates a measure of concomitance and alignment between the three scripts. A lower standard deviation suggests that the firm is equally attuned to arrangement, willingness and ability scripts. For instance the Company 4 speaks to and gives attention to each of the three scripts equally. Figure 1 represents this graphically as each of the three dots representing the scripts are essentially in the same place for company 4. On the other end of the spectrum Company 1 is focused on their arrangements, less so on willingness, and almost to the detriment of ability scripts.

Again we recognize the preliminary nature of this post-hoc analysis but the results may have important implications for how firms develop their dynamic capabilities. What is most interesting is that each firm’s level of script alignment may be related their ability to develop dynamic
capabilities. Our most aligned firm was (Company 4) was the most successful of all of the firms in our sample.

"Revenue contributions, I mean. We've got -- one, two, three that we're already over two billion dollars in '04. Another two that were over one billion dollars. We've got -- just to give you some sort of other statistics, if you like, three of them grew 100 percent year to year." – Company 4

This data supports an argument that firms with leaders that are more cognitively aligned in their venturing scripts are likely to find success. Firms that lean too heavily toward one script over another(s) develop a “cognitive imbalance” that appears to be negatively related to dynamic capability development and eventually firm performance with new initiatives. For instance, all companies, except Companies 4 and 8, tilt most toward arrangement scripts (see Figure 1). And while arrangement scripts are necessary, without strong willingness and developed abilities it is not likely to lead to success. In fact, we argue that willingness and ability scripts are more in concert with the eventual seizing of opportunities and transformation of the organization so critical to dynamic capability development (Teece 2007). Our post-hoc findings suggest that the greater the cognitive alignment the more likely equal attention is given to all activities important to dynamic capability development. High variability in the expert scripts is not desired.

CONCLUSIONS

While there has been much progress made over the past decade regarding the unique role that dynamic capabilities play in an organization’s ability to refresh and renew their competitive advantage the cognitive microfoundations of these capabilities have scarcely been addressed (Helfat 2007). Here we answered the call to discover the role that domain expertise and resource expertise play (Holcomb et al. 2009) by examining the connection between managerial cognitive and organizational capability development. Our study suggests that dynamic capabilities are dependent upon three distinct cognitive scripts that allow firms to align their resources and assets, together with their willingness to pursue new opportunities, and their knowledge about how to execute.

The findings in this study are important because they shed light on the previously murky waters surrounding cognitive antecedents to dynamic capabilities. We augment current models of dynamic capabilities by introducing the concept of dynamic capability cognitions as a microfoundation for dynamic organizational capabilities. Finally, we suggest the need for cognitive alignment within organization striving to develop dynamic capabilities by detailing a link between a balanced mindset and successful capability development.

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REFERENCES


<table>
<thead>
<tr>
<th>Company</th>
<th>Age</th>
<th>Arrangement Scripts</th>
<th>Willingness Scripts</th>
<th>Ability Scripts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>Radical projects are vetted in a separate group, but each business unit has a product development committee for incremental innovation. No process to handle major capital advancement for later stage radical projects.</td>
<td>Culture is not conducive to entrepreneurship and there is no consensus around the need for change and/or innovation. Slow realization that the company will not realize its growth objectives through incremental innovation.</td>
<td>Little entrepreneurial ability within the company and most enthusiasm is coming from the junior, lower ranks rather than the senior people. Application of stage gate process to radical innovation projects will not likely work.</td>
</tr>
<tr>
<td>2</td>
<td>1 yr.</td>
<td>Several groups responsible for governance and evaluation of new entrepreneurial projects. Overall, there is strong interest in keeping innovation and projects teams with the business unit; process operates best when the project has a home in a business unit.</td>
<td>Culture of innovation and entrepreneurship is being built. Participation in high risk, entrepreneurial projects is being perceived as a good career move by younger employees. Organization is very good at coming up with new ideas and devoting some resources across an array of ideas, but have yet to face the challenge of having to go after one big thing in a very big way.</td>
<td>Heavy emphasis on market due diligence before funding the technical side of entrepreneurial projects. Innovation is not a disciplined process within the organization and they recognize the need to take a skills inventory to determine what is needed to move forward. Doing a lot of education and training.</td>
</tr>
<tr>
<td>3</td>
<td>2 yrs.</td>
<td>Two governing bodies for entrepreneurial projects: One does a technology review (stages 1 and 2) and the other does business review (stages 3-5). Working to increase focus on the early stage pipeline through exploratory marketing.</td>
<td>Trying to build a business creation culture and want to become more disciplined in how they identify opportunities. Due to the emphasis on exploratory marketing as well as the development of people in innovation ability, it’s clear that the willingness to engage is entrepreneurial activity through high risk innovation is present.</td>
<td>Given its technology orientation, the organization lacks marketing and business creation experience and ability. The innovation process is the company’s #1 business process on the technology side of the organization, but they falls short on business creation and commercialization. The gaps or weaknesses in the system are being filled by specific people rather than sustainable processes.</td>
</tr>
<tr>
<td>4</td>
<td>2.75 yrs.</td>
<td>Entrepreneurial projects reside in the business units but corporate group manages program and aligns cross unit opportunities. Regular, hands-on involvement of top management team with all projects.</td>
<td>Aggressively looks beyond the firm’s many existing cash cows to push for new opportunities and even cannibalize existing lines. Invests in research outside of firm and has permanent group stationed in Silicon Valley to work with VCs, get ideas, develop relationships, etc.</td>
<td>Strong technology and market-based abilities. Focused on getting all projects visibility with the firm’s systems which allows leaders to measure, managed, and communicate efforts. Power, influence and coaching from TMT helps move projects along.</td>
</tr>
<tr>
<td>5</td>
<td>1 yr.</td>
<td>Not a process oriented organization; therefore, a disciplined process around radical innovation does not bode well. A series of experiments led to a platform orientation and a focus on fewer but bigger innovation. A separate group evaluates and funds radicals</td>
<td>New CEO asked everyone to be entrepreneurial in their orientation. Innovation of fewer but bigger things became the mantra. A few stories of failure and the demise of careers permeate the organization and limit the risk-taking of individuals. Willingness has evolved in a positive way but there isn’t a sense of urgency.</td>
<td>The company generates many incremental innovations per year but lack entrepreneurial experience to generate the “next big thing.” Company makes big ideas small because they incorporate the same process for radical as they do incremental.</td>
</tr>
<tr>
<td>Year</td>
<td>Duration</td>
<td>Description</td>
<td>Key Actions/Outcomes</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>8 yrs.</td>
<td>A separate group manages entrepreneurial projects and different individuals are responsible for opportunity defining and market testing respectively. A venture board evaluates new opportunities (review board). Later, an accelerator was created to speed up the time to commercialization.</td>
<td>SBUs are not taking ownership of projects, so the accelerator was ended to encourage more accountability in the business units. Concerned about the breadth and depth of pipeline. Overall declining performance and layoffs does not contribute to a culture of high risk innovation.</td>
<td>Low success rate is driving the organization to work more closely with the business units. Very mature capability on the front end of the process and weaker on the back end, transition process.</td>
</tr>
<tr>
<td>7</td>
<td>3 yrs.</td>
<td>A separate group handles radical entrepreneurial projects. Budget was enough for seed funding only and the group was separate from the business units (tax on BU’s). Later, this group was folded into a larger Innovation and Strategy Group.</td>
<td>CEO has mandated that all new entrepreneurial projects must have a home in a business unit; therefore all new growth must come from existing businesses. Target areas (platforms) for innovation have been established.</td>
<td>Each project has a coach from the radical innovation group but most of the coaches have little entrepreneurship/commercialization experience. Given the political nature of the organization, the Game-changer admits to the need to develop the skill to sell ideas internally.</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>Entrepreneurial projects developed within the central R&amp;D group then transfer them to business units quickly. Strong belief that corporate entrepreneurship is a team activity and that sponsors must come from the VP ranks.</td>
<td>Fosters a culture of entrepreneurship – everyone is expected to aid in both innovation and commercialization. Focus in current business units should be on constantly reinventing themselves.</td>
<td>Focuses on the management of technology. CTO: “I’m really much more of a business builder, entrepreneur, than I am a chief technology officer…I’m a lightweight inventor.”</td>
</tr>
<tr>
<td>9</td>
<td>5 yrs.</td>
<td>Entrepreneurial projects are developed within the central R&amp;D group after lack of success having this activity based in the business units. Each project is managed by decentralized groups within the entrepreneurship hub; a board oversees progress, development and transitions.</td>
<td>Due to a previous corporate perspective that focused too much on cost reduction and productivity, the firm now is looking at high uncertainty-high reward projects to drive growth. Willing to take on risk and searches for ideas from all corners of the firm.</td>
<td>Entrepreneurship group leaders have diverse cross functional skills; deep reservoir of science and technical skills. Renewed focus on internal growth unleashed the leadership, power, and influence of TMT to help achieve entrepreneurial targets.</td>
</tr>
<tr>
<td>10</td>
<td>7 mo.</td>
<td>Entrepreneurship projects are initiated in corporate R&amp;D but parallel development of the project is also done in a business unit. Highly developed networks within the organization, financial resources extreme discipline in the systems</td>
<td>The following quote from the hub leader reflects the willingness of this firm to pursue new opportunities. “There’s no failure here because you discover something which doesn’t work.”</td>
<td>Highly diversified skill base and deep expertise within the infrastructure of what it takes not just to invent but to commercialize and then develop new businesses.</td>
</tr>
<tr>
<td>11</td>
<td>7 yrs.</td>
<td>Technology projects are incubated in a corporate group and then sent to the business units to be worked on. The organization is the aftermath of a recent merger of two diverse cultures. A strong technology push operation.</td>
<td>Early confusion about mandate of the program and projects led to more incremental product line extensions not a willingness to find new businesses. Willingness is evolving.</td>
<td>Strong technical base but still developing an appetite for all of the skills and attitudes necessary for launching new ventures.</td>
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Table 2: Expert Scripts of Corporate by Company

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<th>% WILL of total</th>
<th>TOTAL ABIL</th>
<th>% ABIL of total</th>
<th>Standard Deviation</th>
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Figure 2: Scripts by Case