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## Corporate Innovation Activism in a Multidivisional Firm: Rationale, Genesis, Evolution

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Graduate Program in Business

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## ABSTRACT

Various streams of foundational management literatures imply that corporate managers *can* play a role in the management of intra-organizational innovation processes. However, management scholars have largely assumed that corporate managers do not become actively involved in the management of intra-organizational innovation processes occurring within multidivisional firms. This assumption contrasts with the importance given in the management literature to innovation as an enabler of organizational long-term survival. To address this contrast, my dissertation explores why and how corporate managers adopt an active approach to the management of intra-organizational innovation processes in complex multidivisional firms.

In the first paper, I map extant knowledge of innovation mechanisms onto an evolutionary multilevel framework. I synthesize uncovered mechanisms into structural, behavioural, and routinized corporate approaches to innovation management. I conclude this paper by proposing a comprehensive research agenda for exploring complex interactions between top-down and bottom-up innovation processes occurring within a multidivisional firm.

In the second paper, I propose a mid-range theory of *corporate innovation activism* elaborating two novel concepts. The *corporate innovation synergy* concept encapsulates mechanisms available to corporate managers to *increase the efficiency* of intra-organizational innovation processes. The *corporate innovation value-added* concept concerns mechanisms available to corporate managers to *qualitatively improve* intra-organizational innovation processes in ways unavailable at the business unit level. I organize my arguments into a theoretical model and discuss limitations of my theory, offering important opportunities for future research.

In the third paper, I explore the genesis of corporate managers' capability to influence innovation management in a multidivisional firm; I call this the *corporate innovation function*. I combine proprietary narrative data with archival records to study the development of the corporate innovation function in 20 large multidivisional firms. Based on my observations of 17 corporate

innovation processes, I develop a corporate innovation function typology comprised of collaborative, parallel-capability, and sponsorship corporate innovation function models. I link differences across the corporate innovation function configurations to firm-level innovation performance.

In the fourth paper, I elaborate on the concept of *dynamic corporate innovation capability*, which enables a multidivisional firm to continuously discover, evaluate, and monetize innovations that are novel to the firm and the markets in which the firm operates. Exploiting further the proprietary narrative and archival dataset, I first establish the prototypical role of a senior innovation manager and identify four underlying mechanisms that enable the establishment of a dynamic corporate innovation capability: senior innovation manager legitimacy, corporate innovation ambition, corporate innovation processes, and corporate innovation routines. Using a system dynamics approach, I synthesize my findings in a dynamic model, disentangling the complex process of maintaining exploration in an organizational environment biased towards exploitation.

**Keywords:** Corporate strategy, corporate function, corporate manager, chief innovation officer, multidivisional firm, innovation management, innovation processes, strategy implementation, innovation routines, risk management, dynamic innovation capability

## **CO-AUTHORSHIP**

The fourth chapter of my dissertation is a result of some collaboration. I started to work on this chapter in January 2014 at the inception of my visiting research appointment at the Wharton School at the University of Pennsylvania. As a solo author, I identified the research opportunity, formulated the research question, conducted the literature review, selected the methodological approach, obtained competitive research funding for data collection, assembled the dataset, analyzed the data, interpreted results, and presented findings and conceptual models at two refereed academic conferences. Dr. Andreas Schotter joined the work on this chapter as a second author in October 2015. As the first and principal author, I continued to independently develop further all sections of this chapter, synthesized the findings into updated conceptual models, developed theoretical claims, produced complete manuscripts, and presented findings at another refereed academic conference. Dr. Schotter contributed by recommending the use of qualitative analytical templates from previously published research, suggesting additional literatures, and providing comments and edits on completed manuscripts. In acknowledgement of this collaboration, I use “we” and “us” throughout the fourth chapter. With the above exception, I certify that this dissertation is entirely the product of my own work.

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Dr. Subramanian Rangan guided me during my initial Ph.D. years at INSEAD. His critical questioning of my early work enabled me to identify from the pool of interesting ideas the ones with potential to make a significant impact. Dr. Rangan also provided support and understanding when my family responsibilities obliged me to work from various geographical locations, for which I am deeply grateful.

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I was fortunate to have the opportunity to present my early work to Dr. Anita McGahan during my first year at INSEAD. Since then, Dr. McGahan has become both my academic mentor and advisor during and beyond my time at Rotman, which gave me the unique opportunity to continuously learn from one of the preeminent scholars in the field. On numerous occasions when the production of original ideas slowed down and the proverbial banging-of-the-head-against-the-wall moments came, Dr. McGahan would always encourage me to keep on searching for research breakthroughs and discard easy ways out. As I have gradually discovered, independent Ph.D.-level scholarship tilting slightly more towards exploration over exploitation requires strong senior-level support, which, in my case, has been provided to me unconditionally by Dr. McGahan.

Dr. Phanish Puranam has equally impacted my doctoral research to a very large degree. When Dr. Puranam joined INSEAD at the beginning of my second Ph.D. year, I had the same experience as many of my INSEAD colleagues of naturally gravitating into Dr. Puranam's sphere of influence. Dr. Puranam's impactful scholarship, unique advisorship capabilities, and boundless breadth of knowledge made him a go-to person whenever I needed advice and/or faced a roadblock in my research. I also had the honour of serving no less than five times as Dr. Puranam's teaching assistant, and these experiences greatly contributed to my development as a teacher. Dr. Puranam's continuous support for my research program throughout my Ph.D. years has been invaluable.

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*In memory of Ivan*

*Although determining the optimal balance between exploitation and exploration is not ordinarily feasible in an organizational setting, it may be possible to anticipate some of these ways in which adaptive dynamics lead to imbalances. Such awareness is a basis for timely interventions based on knowledge about risk preferences, communication, and conflict in organizations.*

*- James G. March*

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## ACRONYMS

CEO - Chief Executive Officer

CIA - Corporate Innovation Activism

CIF - Corporate Innovation Function

DCIC - Dynamic Corporate Innovation Capability

KPIs - Key Performance Indicators

M&A - Mergers and Acquisitions

M-form - Multidivisional form of organization

NIH - Not Invented Here

P&L - Profit and Loss

R&D - Research and Development

SOPs - Standard Operating Procedures

TQM - Total Quality Management

VSR - Variation-Selection-Retention

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## CHAPTER 1 INTRODUCTION

### 1.1 TOPIC AND MOTIVATION

In this dissertation, I study the relationship between interventions by corporate managers in intra-organizational innovation processes and a multidivisional firm's capability to continuously discover, evaluate, and monetize novel ideas. Specifically, I explore the rationale, origins, and evolution of corporate managers' motivation and ability to engage in corporate innovation activism. I define corporate innovation activism as purposeful actions by corporate managers to manage intra-organizational innovation processes within a multidivisional firm. The key idea is that in a multidivisional organizational design, corporate managers' interventions in intra-organizational innovation processes *qualitatively differ* from interventions occurring at the business unit level. My core argument, which I support using both theory and evidence, is that corporate innovation activism increases organizational capability to use novel ideas for continuous adaptation to environmental changes.

My motivation for writing this dissertation is to advance scholarly understanding of the complex interactions between top-down and bottom-up innovation processes coexisting in a multidivisional firm. To achieve my research aim, I relax the dominant assumption held in the foundational management literature ascribing corporate managers a largely passive role in innovation management. In doing so, I am able to explore in depth the motivations and mechanisms surrounding corporate innovation activism.

### 1.2 THEORETICAL INTEREST

Whether innovation is primarily a bottom-up or top-down process has been an important topic of debate in the innovation literature. Proponents of the former argue that innovation principally stems from individual-level creativity, which should not be hindered by top-down bureaucracy (Amabile, 1983; Damanpour, 1991). This view of innovation as a bottom-up process

assumes that the main role of corporate managers in innovation is the establishment of an organizational environment that does not hamper individual-level creativity. Corporate managers create such an organizational environment by defining general rules for aligning innovation activities with corporate strategy, and limit their active interventions to resource allocation decision making based on inputs by trusted middle managers (Bower, 1970). When individual-level innovation activities result in value creation at the firm level, corporate managers retrospectively attribute the innovation success to corporate strategy (Burgelman, 1983).

While the bottom-up view of innovation is firmly established in the management literature, top-down influences on intra-organizational innovation processes have received less scholarly attention (Anderson, Potocnik, and Zhou, 2014). Daft (1978) considers a dual core model of organizational innovation, arguing that top-down influences are limited to organizational settings marked by low professionalization and concern mainly administrative (as opposed to technical) innovations. More recently, scholars studying open innovation (Boudreau and Lakhani, 2009; Chesbrough and Crowther, 2006) have argued that top-down involvement in innovation activities is necessary for sourcing high-potential novel ideas from outside of organizational boundaries. In the dynamic capabilities literature, Teece (2007) posits that corporate managers are directly responsible for the identification of high-potential innovation opportunities. Birkinshaw, Bouquet, and Barsoux (2011) research innovation management within several multidivisional firms and propose that active top-down involvement in innovation management is critical to the success of bottom-up innovation processes.

### **1.3 RELEVANCE**

The above suggestions in the literature that corporate managers can, in fact, play a more active role in innovation management stem from several limitations inherent in a primarily bottom-up innovation process, which can be rectified through top-down interventions. Below I provide

several examples of how these top-down interventions can address limitations in the bottom-up innovation process.

First, when novel ideas are distanced from a firm's core businesses, their vertical ascent through organizational layers can be hampered by a liability of illegitimacy (Criscuolo, Salter, and Ter Wal, 2014). Top-down interventions providing temporal sanctuary for nurturing novel ideas (Knudsen and Levinthal, 2007) can facilitate cognitive recognition of novel ideas' potential (Argote, 1999; Levinthal and March 1981; Levitt and March 1988).

Second, bottom-up novel idea transmission processes involve aggregation of information, reducing the richness of initial ideas and introducing distortions and biases (Csaszar and Eggers, 2013; Kahneman, Lovallo, and Sibony, 2011). Without top-down interventions mitigating the information transmission noise and decision-making biases, corporate managers are likely to be presented with a distorted view of the objective innovation opportunities available to the firm (Vuori and Huy, 2016).

Third, engaging in innovation activities exposes employees to risks which can be difficult to mitigate at the individual level, reducing individual-level novel idea expression and/or skewing lower-level decision making towards lower-potential/lower-risk innovation projects (Castañer and Kavadis, 2013); Rahrovani, Pinsonneault, and Austin, 2018). Corporate managers can introduce system-level mechanisms to mitigate individual-level innovation risks.

Fourth, corporate innovation activism is likely to increase the emergence of architectural innovation (Henderson and Clark, 1990), as corporate managers have a better overview of knowledge recombination opportunities (Hargadon and Sutton, 1997) than business unit managers (Ramachandran, Manikandan, and Pant, 2013).

#### **1.4 STATE-OF-THE-ART LITERATURE**

Several recent innovation research streams imply the potential for corporate innovation activism. Using a small, survey-based data sample, Argyres and Silverman (2004) find that

innovation processes confined within business units result in more locally and immediately applicable innovations, whereas innovation processes occurring at the corporate level lead to more generally applicable innovations relevant across business units. These findings, recently replicated using a larger data sample (Arora, Belenzon, and Rios, 2014), suggest that corporate innovation activism can result in the pursuit of more transformational innovation projects compared to the organizational set-up in which the innovation decision making lies mainly with business unit managers. Further, corporate managers can play an important role in continuously calibrating the proportion between more general innovations consuming organizational resources for extended periods of time before generating value and more local innovations with quicker conversion of resources into tangible outcomes.

Balancing exploitation with exploration is generally a complex process (March, 1991). Its complexity is increased further when a firm navigates challenging environmental conditions, increasing the managerial inclination to take actions that yield immediate results. Lim, Celly, Morse, and Rowe (2013) study the relationship between cost retrenchment and a firm's post-retrenchment performance. They find that in industries marked by high levels of exploration (Teece and Pisano, 1994), cost retrenchment significantly reduces a firm's later performance. This effect is exacerbated when the focal firm itself follows a highly exploratory strategy marked by the continuous pursuit of transformative innovations. This finding highlights the role of corporate managers in times of crises requiring downsizing and/or downscoping (Hitt et al., 2009), as they possess better agency than business-level managers to reconfigure resources to mitigate the negative effects of cost retrenchment on their firms' innovation ability.

The pursuit of higher-risk exploratory activities increases a firm's chances of finding and extracting value from transformative innovations to support its long-term competitive advantages. Austin, Devin, and Sullivan (2012) inductively study 20 cases of innovation processes in various settings, and find evidence of innovators deliberately incorporating accidents into their innovation activities. The authors note that while some accidents can be beneficial for generating variation of



knowledge, key challenges of an accident-seeking approach to innovation include the low yield of beneficial accidents and the generation of potentially destructive outcomes. Thus, the potential role of corporate managers is to create an organizational climate that allows accidental innovation to occur, while mitigating the resource waste and the contagion of system-level risks that endanger the organizational core (Thompson, 1967).

Relatedly, Criscuolo, Salter, and Ter Wal (2014) study how researchers in mature organizations challenge research project formalization to carve out autonomy for their unofficial innovation research activities. They find that scientists take their research underground (i.e., engage in bootlegging) to escape normative organizational pressures and allow their inventions to develop to a stage that facilitates legitimization and the provision of further organizational resources. Their study shows that this bootlegging activity is positively related to organizational acceptance of norm-deviant behaviour, and to the proportion of researchers engaged in bootlegging activities (compared to the overall organizational research community). The challenge for corporate managers is to increase organizational tolerance towards norm-deviant behaviour without relaxing the organizational discipline needed for efficient and effective exploitation of extant knowledge (March, 1991).

Both of the above-mentioned studies involve corporate managers potentially creating dysfunctional situations within their firms in the pursuit of exploration. Corporate managers can outsource some of this dysfunctionality to other firms by vicariously learning from external innovation failures (Maslach, 2016). Maslach, Branzei, Rerup, and Zbaracki (2018) explore this type of learning by analyzing failure data from the medical device industry. Using qualitative analysis, Maslach et al. (2018: 7) find that firms use public failure data to “identify aspects of experience that they had not seen in their own experience, to find more ways of seeing these adverse events, and to learn from events that would not have happened with their own products.” This research stream demonstrates that firms can generate variation of knowledge by studying

aversive counterfactuals documented in public repositories, thereby drawing on experiential learning from other firms without directly experiencing the negative consequences of failure.

## **1.5 THE FOUR PAPERS**

### **1.5.1 PAPER #1**

In my first dissertation paper, I survey extant literature on the active involvement of corporate managers in innovation. In particular, I aim to uncover, synthesize, and critique extant knowledge on innovation mechanisms operating in a multidivisional firm. First, I map this knowledge onto a multilevel evolutionary framework. The resultant “Variation-Selection-Retention X Individual Inventor-Team-Business Manager-Corporate Manager” matrix organizes the extant knowledge on innovation mechanisms. For each mechanism, I briefly discuss the potential role of corporate managers. Second, I synthesize uncovered innovation mechanisms into structuring, nudging, and routinizing activities. Third, I identify relevant knowledge gaps and tensions in the literature. I conclude by proposing a comprehensive research agenda for pushing the boundaries of innovation scholarship by exploring the complexity of interactions between top-down and bottom-up innovation processes operating in a multidivisional firm.

### **1.5.2 PAPER #2**

In my second dissertation paper, I develop a theory explaining why innovation is being increasingly elevated into the corporate domain and made into a distinct corporate function in the world’s largest multidivisional firms. Specifically, I argue that the active involvement of corporate managers in innovation is driven by the search for innovation synergies across business units and additional innovation value that is inaccessible to single-business organizational designs.

I propose that corporate managers seek to achieve the former aim of innovation synergies by incentivizing employees’ deeper involvement in the variation stage of the innovation process,

reducing selection biases that exist at the business unit manager level, and adopting a non-rigid approach to the innovation implementation process. I call this process “*corporate innovation synergy*.”

I argue that corporate managers pursue the latter aim of additional innovation value by attracting novel ideas from external actors unwilling to deal with business unit managers due to trust issues; engaging in temporal and cross-business unit idea recombination; leveraging their higher capacity to absorb innovation losses/flops to incentivize high-risk/high-reward innovation projects; and supporting innovation projects which transcend short-term/individual business unit utility. I call this process “*corporate innovation value-added*.”

### 1.5.3 PAPER #3

In my third dissertation chapter, I explore top-down influences on innovation management in large multidivisional firms to advance scholarly understanding of the genesis of organizational capabilities. I respond to several recent calls in the literature for considering corporate managers as active, rather than passive, actors in intra-organizational innovation management in the context of a multidivisional firm.

To that effect, I have assembled a novel dataset combining narrative and archival data, allowing me to trace the origins of active involvement of corporate managers in innovation management (i.e., *corporate innovation function*, or CIF) in 20 large multidivisional firms. Through an inductive analysis of the dataset using a case-ordered predictor-outcome matrix, I find 17 innovation processes initiated by corporate managers which operate at both corporate and business unit levels.

Based on these findings, I propose a corporate innovation function typology comprised of the collaborative CIF model, the parallel-capability CIF model, and the sponsorship CIF model. I explain how these different CIF configurations have a differential effect on the likelihood of type I innovation errors (i.e., selection of low-value innovation projects) and type II innovation errors

(i.e., rejection of high-value innovation projects). I synthesize my arguments by introducing the concept of the “innovation efficiency frontier,” which highlights the trade-offs that corporate managers must make when deciding whether to focus on minimizing the incidence of innovation failures or maximizing the likelihood of scoring innovation home runs.

#### 1.5.4 PAPER #4

In the concluding chapter of my dissertation, I explore how actions of corporate managers in large multidivisional firms lead to the establishment of innovation routines conducive to continuous discovery, evaluation, and monetization of distant innovations (i.e., *dynamic corporate innovation capability*).

Given that knowledge about the involvement of corporate managers in innovation management is limited (Garud, Tuertscher, and Van de Ven, 2013), I use an inductive multi-case research design (Eisenhardt, 1989). Large multidivisional firms provide a suitable research context for studying how dynamic corporate innovation capability is developed given the inherent complexity of managing various innovation maturity models across multiple markets embedded in different environments (McGahan and Silverman, 2001; Utterback, 1971). In total, I developed 14 in-depth case studies, providing a longitudinal and multilevel overview of the work of senior innovation managers.

The data shows how senior innovation managers foster distant innovations by establishing legitimacy for their role, building corporate-level innovation ambition, and designing corporate innovation processes, which gradually lead to the establishment of corporate innovation routines. Intriguingly, to establish corporate innovation routines, senior innovation managers combine well established mechanistic innovation processes with autocratic, resource-scaling, and experimental approaches to managing innovation from the top of the organization. Senior innovation managers use this corporate innovation process palette to leverage, bypass, and disrupt formal organizational

structures and associated behavioural manifestations as they work on transforming corporate innovation routines into a dynamic corporate innovation capability.

I synthesize my findings across cases in a grounded theoretical process model, explaining how senior innovation managers develop a dynamic corporate innovation capability without redirecting all exploration resources away from local innovations supporting core businesses. In my model, I conceptualize the work of senior innovation managers as consisting of three phases: (1) connecting past to present, (2) managing risk, and (3) connecting future to present. I use a system dynamics approach to disentangle complex interrelationships among these phases, and propose a holistic model linking actions by senior innovation managers with the development and maintenance of a dynamic corporate innovation capability.

The results of the study increase scholarly understanding of the interrelatedness between top-down and bottom-up innovation processes in two ways. First, while my findings confirm that the use of external knowledge (Chesbrough, 2003; Teece, 2007) is an important element of multidivisional firms' strategy for generating distant innovations, I find that the use of open innovation is hindered by its costs and long investment-benefit conversion cycles. As a result, senior innovation managers initially rely on leveraging internal bottom-up sources of knowledge, using open innovation as a weak complement to—rather than a strong substitute for—sourcing novel knowledge internally. Over time, as actions of senior innovation managers increase the internal capability to absorb external knowledge, the use of open innovation increases as well.

Second, I show how senior innovation managers' regulation of innovation risk across individual, business unit, and organizational levels of analysis weakens formal hindrances to self-organized grassroots innovation initiatives aimed at generating distant innovations. This result complements centralized research and development (R&D) innovation literature (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014), as it shows that the decoupling of innovation activities from the needs of core businesses can be induced at the business unit level, thereby reducing the need for innovation centralization.

## 1.6 PAPER INTERCONNECTEDNESS

Taken together, the four papers in my dissertation generate a comprehensive understanding of corporate innovation activism through a rigorous research program comprised of an in-depth literature review, a deductive theory, and two inductive empirical papers. In the first paper, I map the extant knowledge on intra-organizational processes in a multidivisional firm onto an evolutionary multilevel framework. Through this structured mapping exercise, I establish what is already known, and identify important tensions and knowledge gaps that guide the rest of my dissertation. The second paper uses the elaboration of two novel concepts – *corporate innovation synergy* and *corporate innovation value-added* – to deductively establish the rationale for corporate innovation activism. The third paper leverages a hand-collected dataset to open the black box of corporate innovation activism. It presents the concept of *corporate innovation function*, inductively examining the genesis of corporate managers’ ability to engage in corporate innovation activism. While the third paper is predominantly descriptive in nature, the fourth paper considers the system-level aspects of corporate innovation activism through the concept of *dynamic corporate innovation capability*. Understanding how corporate managers can use their agency to continuously calibrate the flow of various types of innovation generates important new knowledge about the organizational ability to use novel ideas to increase organizations’ chances of long-term survival.

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**2.1 INTRODUCTION**

A firm's resource endowment is a major source of competitive advantage (Barney, 1986; Peteraf, 1993; Wernerfelt, 1984), especially in industries with high innovation ferment (Jacobson, 1992; Schumpeter, 1934; Shilling, 2008). One key resource is a firm's capability to vary its knowledge base to gain access to novel ideas, enabling the firm to maintain or increase its environmental fitness (Teece, 2007). Firms can develop novel knowledge internally (Amabile, 1988) or acquire it externally (Chesbrough, 2006); however, the former option is slow (Gold, 1987) and risky (Shi, 2003), while the latter approach is expensive (Katila, Rosenberger, and Eisenhardt, 2008) and does not guarantee novel knowledge availability, as it can take several decades of fundamental research before novel knowledge is commercially exploitable (Van de Ven and Garud, 1994).

Regardless of the source of the novel knowledge, once it becomes available to a firm, its suitability for further development needs to be evaluated (Reitzig and Sorenson, 2013), as most firms do not have access to unlimited resources for innovation (Weiss, Hoegl, and Gibbert, 2011). The evaluation of novel ideas in a multidivisional firm is a complex multi-role and multilevel selection process. Its objectivity can be distorted by individual self-interest (Bower, 1970; Guth and MacMillan, 1986), political agendas (Burgelman, 1983a, 1983b), decision-making biases (Kahneman, Lovallo, and Sibony, 2011), inter-business unit rivalry (Galunic and Eisenhardt, 1996), and the divergence of innovation interests between the organization as a whole and individual business units (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014).

The retention of selected novel ideas within a multidivisional firm is another complex process marked by uncertainty and non-linearity (Klein and Sorra, 1996). The implementation phase for a specific selected innovation project is often delegated to a concrete business unit, which may disrupt its ongoing exploitation activities (March, 1991). In addition, resources which are

initially allocated to selected innovation projects through the formal budgeting cycle (Bower, 1970) may prove to be insufficient (Noda and Bower, 1996). Even when the implementation of an innovation project is initially successful, its diffusion and adaptation throughout the organization is far from certain (Klein and Knight, 2005). When the implementation of an innovation project fails, the repercussions of the failure can endanger core businesses (Austin, Devin, and Sullivan, 2012; Thompson, 1967).

Despite the criticality of innovation for a firm's long-term survival (Teece, 2007), the management of variation, selection, and retention of novel knowledge in a multidivisional firm remains poorly understood as scholars have mainly focused on studying bottom-up innovation processes (Anderson, Potocnik, and Zhou, 2014). Further, interactions among the variation, selection, and retention processes in a multidivisional firm result in a multilevel process; yet most extant literature studying innovation processes is single-level focused (Garud, Tuertscher, and Van de Ven, 2013). In consequence, our understanding of top-down interventions in innovation processes in a multidivisional firm remains largely undeveloped (Birkinshaw, Bouquet, and Barsoux, 2011). Gupta, Tesluk, and Taylor (2007: 886) comment that, "Many studies have sought to understand the innovation process (albeit not very often through a multilevel lens), but scholars have not yet been able to identify a clear prototypical process for the management of innovation."<sup>1</sup>

Given this lack of top-down multilevel focus in the management scholarship, three aims motivate this paper. The first objective is to map existing knowledge on innovation processes occurring within a multidivisional firm onto a multilevel evolutionary framework. The second objective is to conduct cross-level synthesis of uncovered innovation processes from the top-down

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<sup>1</sup> Clemens Thornquist (2005) argues that the management of innovation is less about finding a generalized innovation process and more about continuously finding ways to harbour spontaneous acts of innovation as they occur within the organization and enable these innovation acts to find their own paths. I thank Rob Austin for bringing to my attention Clemens Thornquist's work on the management of innovation processes.

perspective. The third objective is to identify important tensions and knowledge gaps to guide future research on the involvement of corporate managers in innovation management.

To achieve both depth and executability in my review, I adopted four complementary approaches to identify extant knowledge on innovation processes relevant to the management of innovation in a multidivisional firm. First, I reviewed references included in two recent reviews on the management of innovation (i.e., Anderson, Potocnik, and Zhou, 2014; Garud, Tuertscher, and Van de Ven, 2013). Second, I searched the Google Scholar interface for the following key words: “innovation routines,” “innovation processes,” “innovation capabilities,” “innovation management,” “corporate innovation,” and “corporate R&D.” Third, I created a secondary reading list based on references I encountered in the first and second approaches. Fourth, as a confirmatory check to ensure that no foundational literature has been left out of my review, I cross-checked reviewed literature against relevant reading lists from my doctoral studies at INSEAD, University of Pennsylvania, and University of Toronto.

My search yielded knowledge on 39 innovation processes. To organize these innovation processes from the perspective of top-down influences on innovation in a multidivisional firm, I used an evolutionary multilevel framework. Following the tradition of evolutionary thought in the management literature (e.g., Burgelman, 1983a, 1983b; Dosi, 1982; Levinthal, 1998; Nelson and Winter, 1982), one organizing dimension consists of three distinct evolutionary phases: variation processes (i.e., novel idea pool generation), selection processes (i.e., novel idea prioritization), and retention processes (i.e., implementation of selected novel ideas). Considering that the organizational context for this review is a multidivisional firm, the other organizing dimension consists of four levels of analysis: individual, team, middle manager, and corporate manager. My organizing approach is consistent with the accepted view in the literature that the intra-firm innovation process consists of stages (Amabile, 1988) and is multilevel in nature (Crossan and Apaydin, 2010).

The paper proceeds as follows. First, I map the uncovered 39 innovation processes onto the evolutionary multilevel framework. Second, I synthesize uncovered innovation processes into higher-order constructs operating across evolutionary phases and levels of analysis. Third, I conclude my review by proposing a comprehensive future research agenda.

## **2.2 MAPPING INNOVATION MECHANISMS IN A MULTIDIVISIONAL FIRM**

### 2.2.1 VARIATION OF KNOWLEDGE

Variation of knowledge in the context of a multidivisional firm involves gaining access to knowledge that is novel to the firm. The process of sourcing of this knowledge generates a pool of novel ideas from which the firm can draw in its quest to pursue innovation. Novel knowledge exists both inside and outside of organizational boundaries. The intra-organizational novel knowledge can be sourced through the extraction of novel ideas residing in employees' minds (Nonaka, 1994) and/or the recombination of extant intra-organizational knowledge (Clark and Henderson, 1990). External knowledge can be bought through M&A or borrowed using partnerships (Capron and Mitchell, 2012). In the following paragraphs, I map various variation mechanisms operating in a multidivisional firm onto different levels of analysis.

#### 2.2.1.1 Individual Level

##### *2.2.1.1.1 Unstructured Exploration Worktime*

Intrinsic motivation is the key driver of individual-level innovation pursuits (Amabile, 1988). Some firms (e.g., Google, 3M) support intrinsic motivation on a continuous basis by allowing employees to dedicate a portion of their worktime to unstructured, explorative activities based on their own interests (Steiber and Alänge, 2013). Unstructured exploration worktime results in conceptually richer innovations when compared to structured exploration activities (Davis, Davis, and Hoisl, 2013). In addition, unstructured exploration worktime has the potential to break

path dependencies that are detrimental to a firm's innovation capability (Hannan and Freeman, 1984; Levitt and March, 1988), and increases the causal ambiguity (Lippman and Rumelt, 1982) of intra-organizational innovation activities, delaying imitation by rivals (Reed and DeFillippi, 1990). One limitation for using this mechanism is the constrained ability of employees to make temporal mental transitions between structured and unstructured work environments (Jonassen and Henning, 1996). Another limitation is the varying responsiveness to unstructured work environments of different employee types (Rahrovani, Pinsonneault, and Austin, 2018). Thus, the challenge for corporate managers is to provide unstructured innovation worktime opportunities to employees who are capable of this mental switching, while customizing, to a certain degree, unstructured exploration environments to specific employee types.

#### *2.2.1.1.2 Bootlegging*

Bootlegging involves covert engagement by employees in innovation activities outside of the realm of officially sanctioned innovation projects and without access to official R&D resources (Augsdorfer, 1996). It is similar to unstructured exploration worktime activities in that bootleggers are intrinsically motivated to pursue an interesting idea. The main difference between the two is the illicitness of bootlegging activities, which can expose bootleggers to potential sanctions. Augsdorfer, (2005: 1) argues that bootlegging's "incremental trial-and-error learning" nature results in similarly valuable innovation outcomes when compared to officially sanctioned R&D innovation projects. In line with this reasoning, Criscuolo, Salter, and Ter Wal (2014: 1301) find that bootlegging "enables individuals to gain both explorative advantage over colleagues and more time and space to nurture and substantiate embryonic ideas before organizational assessment." As Criscuolo et al. (2014) further note, the challenge for corporate managers is to maintain an organizational culture within which bootleggers can pursue their activities without being constrained by high demands on behavioural conformity. On the other hand, an abundance of bootlegging is likely to decrease organizational exploitative capability as resources are detoured

for ad hoc exploration activities (March, 1991). Moreover, bootlegging activities result in the creation of social bonds among like-minded bootleggers, which can lead to an overall increase in organizational innovation capability (Courpasson and Younes, 2018), yet which may also undermine formal organizational structures established by corporate managers.

#### *2.2.1.1.3 Innovation Awards*

Innovation awards aim at inducing individual-level variation of knowledge, specifically targeting employees for whom variation of knowledge is not a formal requirement. Innovation awards vary along the monetary component spectrum depending on what type of motivational mechanisms they are intended to activate. Non-monetary innovation awards aim at eliciting employees' intrinsic motivation to pursue their innovation interests without the expectation of any rewards (Amabile, 1988). Monetary innovation awards act predominantly upon employees' extrinsic motivation, triggered by the expectation of a material reward in exchange for their innovation efforts (Amabile, 1997). The design of an effective innovation awards program is a non-trivial task due to the potentially conflicting interaction between intrinsic and extrinsic motivational factors (Benabou and Tirole, 2003).

#### *2.2.1.1.4 Accidental Innovation*

In their theory of organizational choice and control, Cyert and March (1963) assume that organizations aim at mitigating uncertainty. Similarly, Thompson (1967) argues that a firm's core businesses need to be insulated from random variation. Yet, early organizational theorists also allow for novel knowledge to originate from "accidental encounters with opportunities" (March and Simon, 1958: 204). To explore the origins of this accidental variation, Austin, Devin, and Sullivan (2012) inductively study 20 cases of innovation processes in various settings, and find evidence of innovators deliberately incorporating accidents into their innovation activities. The authors note that while some accidents can be beneficial for generating variation of knowledge,

the key challenges of such an approach to innovation include the low yield of beneficial accidents and the generation of potentially destructive outcomes. Thus, the role of corporate managers in accidental innovation is to create an organizational climate that allows accidental innovation to occur, while mitigating resource waste and the contagion of system-level risks that endanger the organizational core (Thompson, 1967).

#### 2.2.1.2 Team Level

##### 2.2.1.2.1 *Mitigation of Ideation Inhibitors*

Ideation researchers have studied team-level inhibitors reducing the variation of knowledge and searched for ways to mitigate the effect of these inhibitors. *Production blocking* refers to the air time for individual idea expression being blocked by other team members (Diehl and Stroebe, 1991). *Free riding* occurs when individuals can mask their intellectual laziness by hiding within the collective output. *Evaluation apprehension* can prevent individuals from expressing their ideas due to the fear of negative evaluation of their idea by peers and/or superiors (Diehl and Stroebe, 1987). Given that multiple ideation inhibitors that can suppress the expression of divergent thinkers operate at the team level (Guilford, 1962), the role of corporate managers is to become aware of these inhibitors and introduce mitigating mechanisms. Production blocking can be reduced by using a sequential variation process, allowing ideas to germinate in individual minds first (Valacich, Dennis, and Connolly, 1994). Free riding can be mitigated by incentives balancing appreciation of individual and group performance (Toubia, 2006). Interestingly, evaluation apprehension has not been found to be a strong ideation inhibitor within the context of a multidivisional firm (Reitzig and Maciejovsky, 2015).

##### 2.2.1.2.2 *Skunk Works Projects*

“Skunk works” projects involve small teams with limited resources working on exploratory projects, often within an operating unit focused on exploitation (Capron and Mitchell, 2012: 57).



Skunk works projects are effectively moderately resourced unstructured exploration worktimes. Skunk works teams can be officially sanctioned by managers or they can sometimes emerge informally, drawing on organizational resources without formal approval, especially when they start as a bootlegging activity which gets exposed to the wider organization. The variation of knowledge occurring within skunk works project activities is more likely to result in radical, as opposed to incremental, innovations (Fosfuri and Rønde, 2009). The challenge for corporate managers is to manage an organization within their firm's boundaries which operates in a highly unstructured manner, potentially creating conflict with other areas of the organization when skunk works activities require additional resource infusions (Rosneau, 1988). Such tension arises from the coexistence of highly resource-intensive innovation teams working alongside organizational functions focused on resource efficiency (Clark and Wheelwright, 1992). Essentially, a firm's ability to concurrently harbour skunk works activities alongside more formalized R&D activities, as well as exploitation activities, can enable its ambidexterity (Gibson and Birkinshaw, 2004).

#### 2.2.1.2.3 *Hackathons*

The Oxford dictionary defines a “hackathon” as “[a]n event, typically lasting several days, in which a large number of people meet to engage in collaborative computer programming.”<sup>2</sup> Hackathons involve typically short-term collaboration among computer experts and other professionals who are brought together to solve a particular problem using digital technologies (Briscoe and Mulligan, 2018). While initially hackathons were the domain of start-ups, large organizations have increasingly adopted the hackathon approach to lessen built-up rigidities and drive innovation (Grijpink, Lau, and Vara, 2015). The three main differences between hackathons and skunk works projects are hackathons' shorter temporal bracketing, focus on solving a concrete predefined problem, and the fluidity of the team composition. In the process of solving a concrete

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<sup>2</sup> <https://en.oxforddictionaries.com/definition/hackathon>, accessed on April 22, 2018.

problem, the hackathons' *creative and experimental environment* (Briscoe and Mulligan, 2018: 1) may lead to the discovery of novel ideas, which can then be further developed within the skunk works type of explorative environment.

### 2.2.1.3 Middle Manager Level

#### 2.2.1.3.1 *Explorative Key Performance Indicators*

The focus of middle managers is on maintaining the continuity of operations within their business units (Huy, 2002). The continuity of operations within a business unit requires mostly incremental variation of knowledge (Huy, 2001). Yet, in times of ferment, more radical variation of knowledge may be required to sustain a business unit's market relevance (Burgelman, 1983b). Given middle managers' role as guarantors of predictability of outcomes at the business unit level, their support for more radical variation of knowledge is contingent on the type of incentives they receive from corporate managers. When middle managers' key performance indicators (KPIs) incentivize primarily exploitation-related outcomes, middle managers are less likely to support the diversion of resources from exploitation to exploration (Hornsby, Kuratko, and Zahra, 2002). While corporate managers possess the agency to refocus middle managers' KPIs towards variation of knowledge, doing so may lessen middle managers' capability to deliver steady results. Further, as most middle managers are naturally inclined towards exploitation (Huy, 2001), introducing innovation-focused KPIs at the middle manager level may not be the most effective way for generating variation of knowledge. That possibility does not preclude that some middle managers may be highly capable individual-level innovators.

### 2.2.1.4 Corporate Manager Level

#### 2.2.1.4.1 *Founders' Imprinting*

Many multidivisional firms trace their origins to the innovation genius of their founders. Through the process of founders' imprinting (Stinchcombe, 1965), the initial innovation impetus continues beyond the founders' tenure. The challenge for subsequent generations of corporate managers is to leverage founders' innovation imprint to continuously generate variation of knowledge within and across business units. Further complications arise when multiple founders' innovation imprints coexist within a single multidivisional firm due to non-organic growth modes (Capron and Mitchell, 2012). Such plurality of founders' innovation imprints can potentially lead to clashes among orthogonal innovation cultures (Van den Steen, 2010). In addition, in times of corporate downscoping (Hitt et al., 2009), a firm can be stripped of business units harbouring a strong founders' innovation imprint.<sup>3</sup>

#### 2.2.1.4.2 *Problemistic Search*

Cyert and March (1963: 169) postulate that the act of searching is “problem-directed,” coining the term *problemistic search*. Problemistic search starts when managers identify an existing or emerging performance gap vis-à-vis an organizational goal. Problemistic search stops when a solution is found to increase the performance to attain the goal, or when the performance gap is closed by lowering the aspiration level related to the goal. Search is typically triggered by significant crises (e.g., a competitor's innovation breakthrough (Cyert and March, 1963: 170)). Problemistic search is marked by initially confining the search effort to the immediate neighbourhood of the problem. If this local search fails to address the problem, managers can either expand it to more distant search spaces or leverage organizational slack. The challenge faced by corporate managers is that the widening performance gap does not guarantee the triggering of a more distant search (Greve, 1998), as problemistic search is subject to individual- and organizational-level biases. Thus, a possible task for corporate managers is the introduction of

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<sup>3</sup> A recent example of such downscoping stripping a multidivisional firm of its historical innovation engine is General Electric's ongoing attempt to divest of its lighting businesses, founded by Thomas Edison in 1890. <https://www.ge.com/about-us/history/thomas-edison> accessed on June 15, 2018.

mechanisms which decrease the detection time of the widening performance gap and increase organizational focus on the more distant search by managing individual and organizational biases.

#### *2.2.1.4.3 Intra-Organizational Experiential Learning*

A multidivisional firm typically possesses a rich repository of past experiences acquired during its transformation from a single business unit enterprise into a multidivisional enterprise. As the history of a multidivisional firm is charted, activities generating positive outcomes are given further impetus by senior managers, while activities resulting in negative outcomes are suppressed (Levitt and March, 1988). Over time, this trial-and-error-based process leads to the establishment of intra-organizational routines (Nelson and Winter, 1982). As a stable set of intra-organizational routines can give rise to competency rigidity (Henderson and Clark, 1990; Leonard-Barton, 1992; Tushman and Anderson, 1986; Teece, 2007), which impacts a firm's innovation capability (Atuahene-Gima, 2005), the challenge for corporate managers is to recognize when intra-organizational routines are no longer aligned with environmental shifts, and to decide on corrective actions.

#### *2.2.1.4.4 Extra-Organizational Experiential Learning*

Experiential learning can also involve past experiences which occurred outside of a firm's organizational boundaries. Firms can learn by observing, absorbing (Cohen and Levinthal, 1990), and imitating (Greve, 2005) successful innovations introduced by rivals. Firms can also learn from competitors' innovation failures (Maslach, 2016). Maslach, Branzei, Rerup, and Zbaracki (2018) explore this type of learning by analyzing failure data from the medical device industry. Using qualitative analysis, Maslach et al. (2018: 7) find that firms use public failure data to "identify aspects of experience that they had not seen in their own experience, to find more ways of seeing these adverse events, and to learn from events that would not have happened with their own products." Employing quantitative analysis, the authors confirm the reliability of vicarious

learning. Overall, this pioneering research stream demonstrates that firms can generate variation of knowledge by studying aversive counterfactuals documented in public repositories, drawing on the experiential learning of other firms without directly experiencing the negative consequences of failure.

#### *2.2.1.4.5 Cognitive Learning*

As stewards of their organizations, senior managers must constantly evaluate the opportunity landscape surrounding their organizations (Teece, 2007). Yet, senior managers' bounded rationality (Simon, 1955, 1979) mitigates their capability to continuously and reliably identify and pursue the best opportunities. Gavetti and Levinthal (2000) use a computer simulation to explore cognition-based learning and its relationship with experiential-based learning. Their main finding is that cognition allows managers to identify new high-potential areas within the opportunity landscape, enlarging the pool of possible applications of experiential learning. Further, they find that while flexibility in managerial cognition increases organizational adaptation, new cognitive mental models can cause experiential wisdom obsolescence. Thus, a key challenge for corporate managers is to manage this trade-off between the introduction into the organization of vastly better opportunity sets and their negative impact on the exploitability of accumulated knowledge.

#### *2.2.1.4.6 R&D Centralization*

R&D centralization shifts the locus of *some* R&D activities from business units into the corporate realm. Scholars studying the effects of R&D centralization (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014) find that centralized R&D activities result in more general innovation outcomes, while business unit-level R&D activities generate innovations with narrower and more immediate applications. In this way, R&D centralization can be a useful tool for corporate managers to create conditions allowing for the concurrent pursuit of heterogeneous innovation outcomes (i.e., incremental, modular, architectural, and radical innovations). In doing

so, corporate managers create parallel innovation structures, potentially leading to tensions among various groups of researchers. Another issue is the difficulty of the intra-firm knowledge transfer (Szulanski, 1996), as the variation of knowledge achieved at the corporate level needs to be codified and transmitted (Zollo, 1998) to areas of the organization earmarked for further development of the new knowledge.

#### *2.2.1.4.7 Corporate Entrepreneurship*

Corporate entrepreneurship is another mechanism available to corporate managers for the discovery of new opportunity sets through “activities that enhance a company’s ability to innovate, take risk, and seize opportunities in the markets” (Zahra, 1991: 259). Using data from the chemical industry, Ahuja and Lampert (2001: 540) find that “the pursuit of novel, emerging, and pioneering technologies leads to breakthrough inventions.” They further suggest the existence of a “virtuous circle of corporate entrepreneurship,” whereby breakthrough innovations create slack resources (Penrose, 1959), supporting the next cycle of intra-organizational innovation experimentation with the aim to generate additional breakthrough innovations. Once the corporate entrepreneurship capability is developed, scaling it down can significantly reduce firm-level performance (Lim, Celly, Morse, and Rowe, 2013). Thus, corporate managers must continuously support corporate entrepreneurship, even during periods of challenging economic conditions—though this may prove difficult as funding for exploration can be vulnerable to budget cuts in times of crisis (Filippetti and Archibugi, 2011).

#### *2.2.1.4.8 Innovation Jams*

“Innovation Jams” are large-scale ideation events conducted using online networking platforms with the aim of generating many novel ideas over a short time period (Bjelland and Wood, 2008). The “IBM’s 2006 InnovationJam<sup>®</sup>” (IBM, 2018) provided a major impetus for other firms to employ Innovation Jams. Innovation Jams can involve multiple internal and external stakeholders, such as employees, suppliers, and clients. The key challenge with Innovation Jams

is that these large-scale innovation events mass produce innovation ideas which vary greatly in quality and potential. This mass production of heterogeneous innovation ideas requires substantial deployment of resources to conduct the post-Innovation Jam selection process. This selection process, which aims to separate innovation idea “unicorns” from low-potential ideas, is a non-trivial undertaking (Reitzig, 2011).

#### *2.2.1.4.9 Open Innovation*

Corporate entrepreneurship often takes the form of open innovation when a firm sources knowledge located outside of its boundaries (Chesbrough, 2006). Sources of external knowledge include consumers, individual inventors, other firms, or public institutions. A case of corporate entrepreneurship employing the open innovation approach is corporate venturing, whereby a firm acquires a start-up to gain access to its technological knowledge (Dushnitsky and Lenox, 2005). A firm can also buy non-controlling equity stakes in multiple start-ups to spread its bets on numerous emerging technologies (Puranam and Vanneste, 2016). There are several issues corporate managers face when they seek knowledge through open innovation. The knowledge sought by a firm may not yet exist externally. When it is available, external knowledge may be fully priced in the resource markets, lowering a firm’s capability to use it to gain a competitive advantage over its rivals. In cases when the external knowledge is available and can be sourced at an attractive valuation, the receiving firm may not have a suitable internal environment for developing the knowledge further. For instance, Puranam, Singh, and Zollo (2006) find that novel knowledge sourced through a start-up acquisition can be destroyed by an acquirer’s lack of capability to nurture an emerging technology prior to its commercialization.

#### 2.2.2 SELECTION OF KNOWLEDGE

A key managerial task is to continuously optimize the ratio between exploration for novel knowledge (i.e., variation) and exploitation of novel knowledge (i.e., selection and

implementation) to ensure the most effective use of organizational resources from the perspective of a firm's long-term survival. Variation of knowledge activities generate novel knowledge, which needs to be prioritized for several reasons. First, firms are resource-constrained systems (Kornai, 1979), requiring resource allocation prioritization (Bower, 1970). Second, some novel knowledge is not exploitable in the short term due to lack of immediate consumer interest. Third, some variation of knowledge with the potential for disrupting the organizational status quo may not be politically acceptable. Fourth, some novel knowledge may lead to innovation outcomes that are not socially acceptable.<sup>4</sup> Finally, some novel knowledge can simply be too costly to implement. Overall, "we have tended to treat the problem of evaluation as trivial or self-evident" (Knudsen and Levinthal, 2007: 51). In the following paragraphs, I review extant knowledge on the selection of novel knowledge at different levels of analysis.

#### 2.2.2.1 Individual Level

##### 2.2.2.1.1 *Temporal Sheltering of Novel Ideas*

The organizational form of a multidivisional firm tends to be characterized by high levels of hierarchy and the limited ability of employees possessing formal power to evaluate objectively novel ideas. Using a simulation, Knudsen and Levinthal (2007) find that such selection environments tend to be cautious, which increases the likelihood of the elimination of superior novel ideas (i.e., Type I selection error). Thus, corporate managers can support a *temporal sheltering of novel ideas*, delaying their exposure to the hierarchical/imprecise selection process. During this sheltering period, individual innovators can work on developing their novel ideas into more defensible projects, which are then harder to reject based purely on caution.

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<sup>4</sup> A recent example of such constraint is Facebook's decision to patent software allowing it to use a phone's microphone to record users' reactions to advertisements, but not commercialize it. <https://www.engadget.com/2018/06/28/facebook-patent-turns-phone-mics-on-to-record-reactions-to-ads/> accessed on August 12, 2018.



#### *2.2.2.1.2 Legitimization of Bootlegging Outputs*

Building on insights by Knudsen and Levinthal (2007), Criscuolo, Salter, and Ter Wal (2014) study how researchers in mature organizations carve out autonomy for their non-mainstream innovation research activities. They find that scientists routinely take their research underground (i.e., bootlegging) to escape normative organizational pressures and allow their novel ideas to develop to a stage that facilitates legitimization and the provision of further organizational resources. The challenge for corporate managers is to ensure that these bootlegging activities are eventually exposed to the formal selection process, as opposed to just fizzling out either due to a lack of resources or due to being spun outside of organizational boundaries.

#### *2.2.2.2 Team Level*

##### *2.2.2.2.1 Openness to External Ideas*

Intra-organizational teams are biased towards the promotion of ideas generated within the team at the expense of ideas from external sources (Katz and Allen, 1982). Internal sources of extra-team knowledge include teams operating in different functional, geographical, or cultural contexts. External sources of extra-team knowledge include suppliers, other firms, independent inventors, and public entities. The rejection of external knowledge stems from psychological biases resulting in the erroneous assessment of the utility of external knowledge (Antons and Piller, 2015). Even when biases causing the “not invented here” (NIH) syndrome (Katz and Allen, 1982) are overcome and a team actively seeks external knowledge, the tacit nature of novel knowledge makes its transmission, comprehension, and utilization by the recipient difficult (Szulanski, 1996).

##### *2.2.2.2.2 Hybrid Ideation Process*

Brainstorming refers to the generation and selection of novel ideas in a group setting (Osborn, 1963). Osborn’s initial argument suggesting that brainstorming is superior to individual

ideation has been subjected to several experiments in the psychology literature that suggest the contrary (Diehl and Stroebe, 1987). In innovation management scholarship, Girotra, Terwiesch, and Ulrich (2010) test the effects of temporal bifurcation of ideation into individual and collective components. They find that when the individual-level ideation precedes the team ideation, more novel ideas are generated which are, on average, of better quality compared to the brainstorming scenario. They further find that sequencing individual and group ideation processes results in higher idea-selection ability at the team level. Corporate managers face the challenge of creating organizational environments conducive to this *hybrid* (Girotra, Terwiesch, and Ulrich, 2010: 1) ideation process in order to allow for temporal separation between individual and collective ideation processes without separating them completely.

#### 2.2.2.2.3 *Rapid Prototyping*

The idea that a mature organization should incorporate start-up like environments into its organizational design has recently gained increasing popularity (Ries, 2011). One mechanism that can approximate a start-up like environment is rapid prototyping rooted in the trial-and-error type of experimentation (Thomke, 2001). The rapid prototyping capability allows innovators to quickly transition from the initial ideation stage into the proof of concept phase, while minimizing the use of resources. Rapid prototyping has become cheaper to execute due to the increased accessibility of simulation methods testing the “what-if” scenarios approximating laboratory settings (Thomke, 2003). When the proof of concept phase is unsuccessful, rapid prototyping allows an innovation project to fail fast, thereby mitigating the resource waste and failure risk contagion. One challenge with using rapid prototyping is the assumption that the ideal outcome is already known, and the novel idea is merely evaluated against a known desired state.<sup>5</sup> Yet, Austin and Devin (2003) find that creative thinkers search for emerging ideas which are truly original, as opposed to simply evaluating a possibly original idea against extant knowledge.

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<sup>5</sup> I thank Rob Austin for pointing this out.

#### 2.2.2.2.4 *Customer Feedback*

Ultimately, an innovation should create value for the end user, either internally or externally. A prototype solution can be subjected to feedback by end users to test its potential to generate value (Slater and Mohr, 2006). Products can be also tested in limited geographical markets (Fortune, 2015) and/or limited areas of a firm's operations; this way, should the novel idea prove to be a flop, the potential damage to a firm's core businesses is contained (Thompson, 1967).

#### 2.2.2.3 *Middle Manager Level*

##### 2.2.2.3.1 *Strategic Context*

Strategic context refers to “the political mechanisms through which middle managers question the current concept of strategy, and provide the top management with the opportunity to rationalize, retroactively, successful autonomous strategic behaviour” (Burgelman, 1983b: 1352). Through the process of strategic context, middle managers risk their reputations by pitching bottom-up novel ideas to corporate managers (Burgelman, 1983a; Noda and Bower, 1996). Thus, middle managers act as selection agents, evaluating the merit of ideas originating at lower organizational levels. Corporate managers can manage the strategic context selection environment by influencing decision-making biases operating at the middle manager level. Middle managers' decision-making biases include risk aversion (Kahneman and Tversky, 1979), self-interest (Bower, 1970), evaluation apprehension, and perceived lack of control (Reitzig and Maciejovsky, 2015: 1979). From the corporate managers' perspective, the challenge is to become aware of possible biases operating at the middle manager level and design effective mitigating mechanisms.

##### 2.2.2.3.2 *Hierarchical Layering*

Sah and Stiglitz (1986) argue that middle managers' willingness to submit an innovation project for further evaluation by their superiors is positively related with the number of hierarchical

layers installed above them. However, Reitzig and Maciejovsky (2015) test this prediction using simulation and experimental data and find the opposite result; the steeper the hierarchy above them, the less likely middle managers are to pass up novel ideas. Interestingly, they note that middle managers do not appear to be overly concerned about the quality of their selection skills (i.e., the risk of committing an error of commission damaging their reputation). Instead, Reitzig and Maciejovsky (2015) find that middle managers' behaviour can be explained by their fear of superiors giving them additional evaluation work. Based on this result, corporate managers face the challenge of designing incentive programs for middle managers to lessen their concern about unnecessarily generating additional work for themselves. Alternatively, corporate managers could reroute bottom-up idea flows so that they largely bypass middle managers.

#### *2.2.2.3.3 Emotions*

In his study of the role of emotions in a large multidivisional firm, Huy (2011) shows that by regulating middle managers' group-focused emotions, elicited by middle managers' perceived belonging to an identifiable group within the firm, corporate managers can steer middle managers' selection decision making. On the other hand, middle managers' emotions can distort the bottom-up information flow. By qualitatively studying the factors which led to the demise of Nokia, Vuori, and Huy (2016) find that middle managers' fear of peers and corporate managers reduced the amount of unfavourable information that they were transmitting to corporate managers. Consequently, corporate managers formed an overly positive view of the firm's performance, which reduced their focus on the need to sustain innovation activities.

#### *2.2.2.4 Corporate Manager Level*

##### *2.2.2.4.1 Structural Context*

Structural context is set by corporate managers and encapsulates administrative rules as well as the creation and staffing of formal roles within the organizational hierarchy to guide the

behaviour of lower-level employees without the need for continuous corporate-level managerial involvement (Bower, 1970; Burgelman, 1983a). The aim of corporate managers in determining the structural context is to align employees' activities towards the fulfilment of corporate strategy. As Burgelman remarks (1983c: 66), the contingency of structural context on corporate strategy supports Chandler's (1962) observation that structure follows strategy. Over time, corporate managers can adjust specific elements of the structural context (e.g., appointment of middle managers, changes to KPIs) to influence the selection of novel ideas (Bower, 1970). This gradual adjustment of the corporate context increases the likelihood that novel ideas deviating from the corporate strategy will be selected by middle managers and brought to the attention of corporate managers (Burgelman, 1983c).

#### *2.2.2.4.2 Direct Exposure to Innovation Activities*

Given that corporate managers are primarily focused on high-level decision making, they are unlikely to become involved in the origination of novel ideas on a continuous basis. Yet, their senior role does not preclude them from coming into proximity with innovation activities, and providing their endorsement or skepticism of novel ideas at early stages of their development. For instance, 3M's top executives regularly visit the company's research labs and engage in discussions with lab researchers (Berger et al., 2008). Another mechanism for reducing the distance between corporate managers and innovation activities is hierarchical flattening, whereby the number of layers of middle managers is reduced (Lerner and Wulf, 2007; Teece, 1996). Further, Teece (2007: 1335) argues that organizational decentralization "brings top management closer to new technologies, the customer, and the market." In line with Teece's (2007) argument, Gibson and Birkinshaw (2004: 223) note that in business units in which exploitation and exploration activities coexist, "senior executives [play] a more interventionist role, focused on recognizing and promoting new ideas and building energy for those ideas throughout the business."

### 2.2.3 RETENTION OF KNOWLEDGE

Retention of novel knowledge involves implementation of selected innovation projects. Retention of novel ideas necessitates the allocation of different types of knowledge retention resources over varying time periods. Knowledge retention resources include managerial attention, employee time, physical materials, tools and machinery, physical space, and software. These resources ultimately consume a firm's financial resources, which puts a time limit on how long a specific knowledge retention activity can be pursued without generating any value. In the following paragraphs, I review the existing scholarship related to retention of novel knowledge at different levels of analysis.

#### 2.2.3.1 Individual Level

##### *2.2.3.1.1 Individual-Level Failure Management*

Most innovation projects fail (Carr, Hard, and Trahan, 1996; Cozijnsen, Vrakking, and van Ijzerloo, 2000). Failed innovation projects can be potentially detrimental for firm-level performance (Austin, Devin, and Sullivan, 2012). Yet, corporate managers themselves are mostly shielded from the negative impact of innovation failures on their careers, unlike employees who engage directly in innovation activities (Birkinshaw, Hamel, and Mol, 2008). Thus, corporate managers face the challenge of creating an organizational climate which encourages individual-level explorative behaviour and concurrently mitigates innovation risks at the individual level. The creation of such an organizational climate is a non-trivial undertaking as most employees avoid situations which could associate them with a failed project (Cannon and Edmondson, 2005).

##### *2.2.3.1.2 Explorative Human Resource Management*

Human resource management systems can be configured to support explorative behaviour past the generation of a novel idea on the individual level. Drawing on human resource management systems in 3M and Motorola, Gupta and Singhal (1993: 41) identify human resources

planning, performance appraisal, reward systems, and career management as key pillars which could be used by managers to encourage individual employees to continuously engage in explorative behaviour. The tension arises when the top-down encouragement of exploration at the individual level conflicts with an employee's formal role focused on exploitation. Such tension is likely to be exacerbated when an employee's immediate superior perceives this employee's pursuit of explorative activities as a diversion of resources under his/her control. Corporate managers can protect emerging innovators from exploitative pressures by establishing a network of innovation mentors to nurture emerging innovation talent (Cohn, Katzenbach, and Vlask, 2008).

#### 2.2.3.2 Team Level

##### *2.2.3.2.1 Iterated Resource Allocation*

Resources that are released in large discrete amounts within the annual budgeting cycle exercise are typically earmarked for induced innovation projects which were given impetus by corporate managers (Bower, 1970). Yet, the implementation of innovation projects rarely follows a linear path as new obstacles are discovered, projected paths reach impasses, and internal frictions derail the implementation progress (Klein and Sorra, 1996). Further, autonomous innovation activities give rise to innovation projects for which no resource allocation was made in the backward-looking annual budgeting exercise. These factors combine to generate unplanned resource demands. In a qualitative study examining strategy making in the telecommunication industry, Noda and Bower (1996) find that corporate managers are more likely to respond to these unplanned resource demands—which the authors call “iterated resource allocation”—when they are informed of a specific innovation project's intermediary milestone attainments. Corporate managers face the challenge of receiving distorted milestone signals when these signals must pass through multiple hierarchical layers, as well as the challenge of noticing and overcoming their own signal interpretation constraints (Simon, 1955, 1979).

#### *2.2.3.2.2 Innovation Team Composition*

The development of each innovation project is likely to require a unique set of human resources (Tushman and Nadler, 1986). Thus, it is unlikely that a firm can optimize its innovation implementation process solely by relying upon a dedicated innovation implementation team without recourse to human resources scattered across the organization. A more realistic scenario is a tailored assembly of a team best suited for the development of a specific innovation project. Such a team can include dedicated innovation implementers, novel idea originators, subject matter experts, engineers, software developers, testers, project managers, and those in other roles. The challenge with this approach is that the assembly of such project-specific teams is likely to require pulling employees from their formal roles and temporally assigning them to these ad hoc innovation projects. Such an approach can generate tensions with employees' superiors, who may not be willing to relinquish (even on a temporary basis) control over these human resources. Further, managers run the risk of losing these employees permanently if the innovation project creates conditions for employees' permanent reassignment.

#### *2.2.3.3 Middle Manager Level*

##### *2.2.3.3.1 Sponsorship of Innovation*

The need for corporate managers to find sponsors for an innovation project hinges on the type of project. Incremental innovation projects are likely to already have a home within an existing business unit, whereas more radical innovation projects may need to be pitched to business units, or a new organizational structure may need to be set up for their development (McDermott and O'Connor, 2002). Yet, as the development of an innovation project often requires the dedication of resources initially earmarked for exploitation, middle managers may be reluctant to sponsor innovation projects. The NIH syndrome can be another factor biasing middle managers against the sponsorship of innovation projects that did not originate within their business unit.



#### *2.2.3.3.2 Managerial Style*

The primary role of middle managers is to ensure the efficient utilization of organizational resources to meet short-term performance targets (Huy, 2001). Aside from their role in exploitation, middle managers can also play a crucial role in ensuring that their organization adapts to environmental changes (Hornsby, Kuratko, and Zahra, 2002). To increase the support at the middle manager level for explorative projects, corporate managers can purposefully appoint middle managers inclined to support innovations. Kanter (1982: 96) studies 165 middle managers across five firms and finds that managers who are open to change, adopt a long-term orientation, can navigate internal politics, and are agreeable yet persistent are more likely to be open to novel ideas and proactively transmit information about bottom-up innovation activities to corporate managers.

#### *2.2.3.3.3 Promotion of Innovators*

Another mechanism operating at the middle manager level that can be enacted by corporate managers is the promotion of successful innovators into the middle management rank. Cohn, Katzenbach, and Vlak (2008) study innovation processes in 25 firms across industries and find that the promotion of internal or external innovators into the middle management rank gives rise to innovation networks. These innovation networks counterbalance the tendency of middle managers to support exploitation over exploration (March, 1991). The challenge for corporate managers in this regard is related to the difficulty of identifying employees who can successfully assume both innovation and managerial roles.

### **2.2.3.4 Corporate Manager Level**

#### *2.2.3.4.1 Resource Allocation*

The implementation of selected innovation projects requires the allocation of resources. Initially, corporate strategy scholarship assumed that corporate managers are “allocating the

resources that are expected to be available to the programs and organizational units that will require them” as part of a top-down budgeting process (Ackoff, 1970: 66). Based on several detailed field studies, Bower (1970) finds that resource allocation is a convoluted, multi-hierarchical, and longitudinal process infused by organizational politics. According to Bower (1970), corporate managers identify resource allocation needs, develop policies for governing the resource allocation process, and establish monitoring and reward systems to align the resource allocation process with the overall corporate strategy. The difficulty for corporate managers arises from the non-linear nature of innovation implementation (Klein and Sorra, 1996), which generates ad hoc resourcing needs outside of the formal resource allocation process studied by Bower (1970).

#### *2.2.3.4.2 Variation Control Technologies<sup>6</sup>*

Several approaches aimed at controlling the variation of process outcomes have influenced intra-organizational innovation processes. For instance, the Six Sigma approach “measures the degree to which any business process deviates from its goal” (Harry, 1998: 60). Many firms well known for their innovative products (e.g., 3M, Boeing, GE, and Motorola<sup>7</sup>) have adopted the Six Sigma approach when implementing innovation projects (Benner and Tushman, 2003). Six Sigma innovation implementation requires a certain degree of efficiency. Yet, that efficiency can also limit innovation activities. Therefore, the main challenge for corporate managers is not to stifle innovation by overemphasizing the Six Sigma approach, given that riskier projects are especially unlikely to follow a predictable path. George Buckley, CEO of 3M, commented, “There has to be a sprinkle of ‘magic dust’ to produce great products, or whatever it is you wish to call the inspiration that is the mother of invention. Serendipity, accidents, blind luck, and other things all play a part. You can’t put that into a can or a Six Sigma process.” (Berger et al., 2009: 66).

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<sup>6</sup> I thank Rob Austin for suggesting this more general label for approaches used to reduce variation of outcomes in innovation activities.

<sup>7</sup> The Six Sigma approach to process efficiency was elaborated by scientists working at Motorola (Harry, 1998).

#### 2.2.3.4.3 *Stage-Gate<sup>®</sup> System*

A Stage-Gate<sup>®</sup> approach to innovation management aims to structure the new product development process into distinctive phases (Cooper, 1990). In this approach, managers determine a prototypical development trajectory consisting of various *stages*. As a novel idea passes through these stages, its fitness for being commercialized into a viable new product is being systematically evaluated. Thus, the Stage-Gate<sup>®</sup> approach concerns both the selection and retention of novel ideas. The key challenge for corporate managers is to prevent the transformation of the Stage-Gate<sup>®</sup> system into a rigid project management tool that reduces the selection of, and/or retention support for, novel ideas which do not follow the expected developmental path (Benner and Tushman, 2003; Cooper, 2008). Another challenge is that the Stage-Gate<sup>®</sup> system focuses on the process of idea flow within an organization and neglects the complex emergence and development of an idea itself, which may not always follow prescribed trajectories nor conform to predetermined developmental expectations (Thornquist, 2005).<sup>8</sup>

#### 2.2.3.4.4 *Innovation Pipeline*

Many multidivisional firms aim at achieving a predetermined percentage of revenues and profitability by selling products and services introduced over a set period of time (Schilling, 2008). Accordingly, a vital issue for corporate managers is the management of the innovation implementation flow (i.e., the innovation pipeline) in terms of its distribution across different innovation types, degree of innovation novelty, and market and time diffusion. For instance, 3M's innovation pipeline is comprised of five innovation classes, which are monitored and resourced by corporate managers based on market demand and technological advancements available to 3M (Berger et al., 2009).

#### 2.2.3.4.5 *Codification of Knowledge*

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<sup>8</sup> I thank Rob Austin for pointing this out.

A key concern for corporate managers is the diffusion of innovation into other parts of their firms beyond the immediate area in which the initial implementation took place. The intra-firm diffusion of innovation knowledge is a non-trivial process (Klein and Knight, 2005), marked by knowledge tacitness (Polanyi, 1967) and stickiness (Szulanski, 1996). An important enabler of intra-organizational innovation diffusion is codification of knowledge pertaining to the implemented innovation (Zollo, 1998). Codification of knowledge is “the process of conversion of knowledge into messages which can be then processed as information” (Cowan and Foray, 1997: 596). Codification of knowledge enables both contemporaneous and temporal innovation diffusion, especially when members of the implementation team possessing the tacit knowledge can no longer be consulted (Kim, 1993). Corporate managers face the dilemma of codification of knowledge being both an enabler of its diffusion and a source of potential knowledge rigidity due to the path-dependent nature of the knowledge codification process (Cowan and Foray, 1997; Nelson and Winter, 1982).

### **2.3 SYNTHESIS ACROSS LEVELS OF ANALYSIS**

From the perspective of corporate managers, what are the main managerial approaches they can deploy to manage innovation activities within their firms? The above overview is somewhat limited by its discreteness because in a real-world multidivisional firm, most of the uncovered mechanisms operate across evolutionary phases and levels of analysis. Further, the uncovered mechanisms are unlikely to be deployed in isolation without managers considering inter-mechanism interactions. To reflect this complexity of the organizational reality, I synthesize the uncovered mechanisms into three higher-order classes of corporate interventions in innovation activities: the first class is comprised of structured approaches; the second class consists of psychological interventions; and the third class encapsulates interventions aimed at separating self-replicating behaviours.

## 2.3.1 STRUCTURING INNOVATION ACTIVITIES

### 2.3.1.1 Letting Innovation Follow Organizational Design

A specific organizational design choice by corporate managers can increase the probability of the generation of a certain type of innovation. For example, organizational design of a skunk works project aims specifically at generating radical, as opposed to incremental, innovations (Fosfuri and Rønde, 2009). Similarly, centralization of innovation activities is likely to result in more general innovations, while the delegation of innovation decision making to business unit heads often leads to incremental innovations centred around the core businesses (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014). Corporate managers can also vary the use of temporal organizational designs. When corporate managers aim at producing a large pool of novel ideas, they can organize an innovation jam (Bjelland and Wood, 2008). When they need creative solutions to a specific problem, they can sponsor a hackathon (Briscoe and Mulligan, 2018). Thus, while a specific organizational design choice does not guarantee a desired innovation outcome, organizational design choice can increase the probability of a desired innovation outcome.

### 2.3.1.2 Adopting Organizational Design to Innovation

In some cases, structure follows innovation. For instance, when an external innovation is introduced into a multidivisional firm from an acquired start-up, the multidivisional firm's rigid formal organizational structures can suffocate the acquired innovation before it develops into a viable innovation project (Puranam, Singh, and Zollo, 2006). Accordingly, when a novel idea emerges and/or is introduced into the organization, corporate managers often need to create a specific organizational design that is best suited for the development of the novel idea. More generally, after deciding on preferred types of innovations, corporate managers can adjust the structuring of the selection process along the hierarchy-polyarchy spectrum to manage the trade-off between Type I and Type II errors (Knudsen and Levinthal, 2007).

### 2.3.1.3 Pursuing Organizational Design Plurality

Given the multitude of available ideation modes and the constantly evolving external environment, it is unlikely that corporate managers can decide on a specific structuring approach without constantly adjusting it. One solution lies in the coexistence of a variety of organizational designs within the boundaries of a single firm to enable the simultaneous pursuit of various innovation types. Corporate managers pursuing such organizational design plurality are in fact aiming to achieve innovation type ambidexterity (Gibson and Birkinshaw, 2004).

One hurdle to achieving innovation type ambidexterity is the cost of maintaining organizational design plurality due to duplicity of resourcing (McAdam and Galloway, 2005), rivalry among various innovation units, or the cost of intra-organizational transmission of innovation knowledge related to complex coordination requirements. Another issue is the fact that variation presents itself sequentially and often unexpectedly. This sequential and ad hoc nature of the variation process can be addressed through organizational design sequential ambidexterity (Venkatraman, Lee, and Iyer, 2007). Further, creative employees are prone to identity crises when they are required to switch between creative and execution-focused roles (Gotsi, Andriopoulos, Lewis, and Ingram, 2010), which again highlights the value of organizational design plurality as a way to manage innovation identity transitions.

### 2.3.2 NUDGING INNOVATION ACTIVITIES

Corporate managers can influence the behaviour of employees by acting on employees' psychology across evolutionary phases and levels of analysis. "Nudging" innovation activities refers to subtle, purposeful psychological interventions by corporate managers to induce a specific innovation behaviour from employees. Some forms of nudging are open and known to employees, while others take the form of covert manipulations without employees' direct awareness of such manipulation taking place.

### 2.3.2.1 Stimulating Intrinsic Motivation

Intrinsic motivation has been found to be a powerful individual-level driving force that induces employees to pursue innovation activities (Zhang and Bartol, 2010). Corporate managers can induce intrinsic motivation in several ways. While intrinsic motivation stems from an employee's personal interest in an activity (Amabile, 1988), it can be increased by setting general achievement targets in the form of milestones which employees pursuing innovation activities through their personal interest are expected to achieve through individual-level effort. These general achievement targets further stimulate the self-efficacy (Bandura, 1982) of ideating employees who are capable of reaching them (Cameron, Banko, and Pierce, 2001).

Such general achievement targets can involve various degrees of complexity depending on the general level of employees' sophistication and capability, based on the organization type. For instance, employees working in a repetitive task environment may be asked for a one page summary of the innovation project, whereas in organizations comprised mainly of employees with advanced STEM degrees, employees may be required to produce a working prototype. Intrinsic motivation is associated with individual employees and the variation stage of the innovation process.

### 2.3.2.2 Managing Fear of Innovation

Innovation activities produce uncertain outcomes (Levine, 1980). Uncertainty of outcomes generates fear (Lee and Kelley, 2008). As Lee and Kelley (2008: 163) note in their study of innovation project leaders, this fear effect, in and of itself, is not necessarily undesirable as "fear of failure [tends] to weed out those lacking the drive to engage in high-risk activity." Further, the authors find that expertise acts as an insulator from the inhibiting effect of fear on innovation activities, which naturally draws employees with sufficient levels of self-efficacy to specific innovation projects (Bandura, 1982), which in turn increases their intrinsic motivation (as discussed in the above paragraph). Thus, from the corporate management perspective, maintaining

a certain level of fear of innovation within the organization may help this self-selection for innovation projects occur naturally.

Yet, fear can also reduce intra-organizational information flows, which can bias corporate managers' innovation-related decision making. In their study of the factors leading to the demise of Finnish mobile handset maker Nokia, Vuori and Huy (2016) identify middle managers' fear as a strong inhibitor of the information flow that is critical for allowing corporate managers to form an accurate picture of organizational needs. In this way, corporate managers face the challenge of designing an open information exchange climate within the organization to reduce their subordinates' evaluation apprehension (Cottrell, 1972) in cases where the transmitted information contains negative signals about the firm's performance.

#### 2.3.2.3 Influencing Innovation Behaviour

Corporate managers can influence employees' innovation behaviour by acting on employees' psychology through direct motivators and indirect environmental factors. One of the key issues in a multidivisional firm is knowledge stickiness (Szulanski, 1996). Knowledge stickiness prevents the intra-organizational diffusion of knowledge that already exists within the organization, often within minds of individual employees as opposed to being codified in easy-to-transfer blueprints (Zolo, 1998). To examine factors which increase employees' willingness to share their knowledge, Bock et al. (2005) surveyed managers at South Korean firms. The authors find that several aspects of organizational climate within corporate managers' realm are conducive to employees' willingness to share knowledge. These organizational climate aspects (Bock et al., 2005: 107) involve the establishment of fair and stable intra-organizational practices, the encouragement of individual-level exploration of frontier knowledge areas, and the generation of the common belief that the organization as a whole values individual-level innovation-related risk taking.



Just as corporate managers can influence innovation behaviour through the manipulation of the organizational climate, they can also influence innovation behaviour by manipulating inter-employee social interactions. Huy (2011) studies how corporate managers influence middle managers' support for innovation projects through social identity manipulation. He finds that corporate managers can induce group-focused emotions to generate support for an innovation activity, even in cases when the supporting middle managers did not have a vested interest in supporting such innovation activity. Based on this finding, it can be inferred that corporate managers can purposefully create social groups of employees to support innovation activities. Such group social engineering by corporate managers can involve the creation of innovation-friendly networks.

### 2.3.3 ROUTINIZING INNOVATION ACTIVITIES

Corporate managers' ability to actively manage innovation is bounded by their cognitive limitations (Simon, 1955, 1979), attention spans (Ocasio, 1997), and hierarchical distance from market-facing employees (Lerner and Wulf, 2007). This finding implies that some actions by corporate managers aim at routinizing some of the intra-organizational innovation processes occurring at lower hierarchical levels. Thus, routinization of innovation activities refers to the transformation of ad hoc approaches to innovation into reliable and replicable innovation behaviour across the organization and across time, without the need for continuous involvement by corporate managers.

#### 2.3.3.1 Increasing the Reliability of Innovation-Driven Value Generation

As a resource constraint system, a multidivisional firm cannot sustain long periods of resource allocation to innovation projects which do not create value above and beyond resources dedicated to exploration. While it is inherently difficult to reliably govern variation processes,

corporate managers have at their disposal several mechanisms for improving the reliability of selection and retention processes.

In terms of the selection process, corporate managers can focus on mitigating various kinds of biases to ultimately shift the nature of the selection process towards a rules-based process to increase the objectivity of evaluation of novel ideas. One such rule could aim at decreasing the power of formal hierarchy to shut down innovation voices (Diehl and Stroebe, 1991). Corporate managers can create virtual and physical spaces supporting individual ideation so that novel ideas can develop at the level of individual minds before facing the initial selection environment (Girotra et al., 2010; Knudsen and Levinthal, 2007). Such innovation behaviour can be institutionalized through top-down creation and promotion of these innovation spaces earmarked for individual ideation. Another rule related to the selection can concern the bias self-awareness routine (Kahneman, Lovallo, and Sibony, 2011) mandatory for employees involved in the selection of novel ideas. Similar to a take-off check list used by airplane pilots, corporate managers can create a “bias beware” checklist for evaluators across hierarchical levels.

In terms of the retention process, corporate managers can introduce innovation-related components into KPIs across hierarchical levels and business units. While individual-level innovation-related performance goals can vary significantly as a function of the main formal role an employee occupies, KPIs at the managerial level can more uniformly include innovation-related performance targets. Such managerial innovation-related components of KPIs are likely to incentivize managers to search for opportunities to convert the implementation of innovation projects within their realm of influence into tangible results. Another routine corporate managers can use is to set the minimum threshold criteria that an innovation project must meet or exceed before being granted further funding (Noda and Bower, 1996). This type of progress threshold criteria can incorporate financial metrics, availability of a functional prototype (Von Hippel, 1994), or qualitative assessments. Such an approach would automatically flag problematic

innovation projects running into implementation hurdles, bringing them to the attention of corporate managers (Ocasio, 1997).

Ultimately, this routinization of selection and variation processes allows corporate managers to channel their attention to innovation activities requiring more of a hands-on approach (i.e., structuring innovation activities, nudging innovation activities). Further, managers can manage the innovation pipeline (Schilling, 2008) by periodically recalibrating the rules' parameters.

#### 2.3.3.2 Creating and Evolving Corporate Innovation Capability

Over time, corporate managers can transform the portfolio of routinized top-down innovation activities into a corporate innovation capability (Atuahene-Gima, 2005). Corporate managers' role then shifts from the micromanagement of specific innovation activities to the orchestration of a portfolio of routinized innovation activities. Corporate managers can focus on adjusting innovation activities already present in the portfolio, deleting innovation activities that prove to be unnecessary and/or detrimental to the achievement of organizational innovation objectives, and adding new innovation activities which can be successfully routinized after corporate managers become more experienced with them through an initial, hands-on approach. Gradually, such a corporate innovation capability can become increasingly independent of specific sets of corporate managers as routinized innovation activities become embedded in the organizational culture (Barney, 1986).

## **2.4 AN AGENDA FOR EXTENDING RESEARCH ON CORPORATE INNOVATION MECHANISMS**

### 2.4.1 UNDERSTANDING CORPORATE MANAGERS' RATIONALE FOR THE ACTIVE INVOLVEMENT IN INNOVATION MANAGEMENT

Why would corporate managers actively participate in innovation management? While my survey uncovered multiple ways in which corporate managers can get actively involved in innovation management across hierarchical levels and evolutionary phases, it is unclear why corporate managers would not simply delegate innovation management to individual business units and concentrate on the more traditional corporate-level focal areas, such as management of the business portfolio (Hitt et al., 2009), organizational legitimacy vis-à-vis the external environment (Collis, Young, and Goold, 2007), and/or resource allocation (Bower, 1970).

Several possible motives emerge in my survey. Findings by Argyres and Silverman (2004) and Arora, Belenzon, and Rios (2014) suggest that delegation of innovation responsibility to business units skews the composition of the innovation pipeline (Shilling, 2008) towards less radical and more incremental innovation projects. Thus, corporate managers may need to become involved in innovation management to gain greater agency over the types of innovation projects pursued in their firms. Another issue with the delegation of innovation management to business units is the existence of multiple innovation-related decision-making biases at the business unit level, such as the NIH syndrome (Katz and Allen, 1982), middle managers' personal agendas (Bower, 1970), and/or middle managers political agendas (Burgelman, 1983a, 1983b). Therefore, corporate managers may want to get involved in innovation management in order to mitigate these decision-making biases. Other motives can be discerned in my survey. However, future research can consider more holistically why it makes sense for corporate managers to get actively involved in innovation management, as opposed to just delegating innovation management to business units.

#### 2.4.2 TRACING THE ORIGIN OF CORPORATE MANAGERS' AGENCY TO MANAGE INNOVATION

Considering it can be established that it makes sense for corporate managers to become involved in innovation management, how do corporate managers gain the agency to actively manage innovation? Given the complexities of intra-organizational innovation processes in a

multidivisional firm, it seems unlikely that such agency can be established by simply declaring the existence of a new role at the corporate level and attaching some resources to that role. Assuming resource constraint at the firm level, a corporate innovation function is likely to be diverting resources from other corporate-level and business unit-level activities earmarked for non-innovation-related activities. Thus, the establishment of a corporate innovation function is likely to be a highly political process. Once the political pressures get resolved and some resources are allocated to the corporate innovation function, how are top-down innovation actions prioritized? Is the focus largely on fixing broken bottom-up innovation processes, designing new innovation processes, or a combination of both? At which levels of analysis, in which evolutionary phases, and in which sequence should these top-down actions be deployed? Answering these and related questions will likely require a detailed study examining the process of establishing agency of corporate managers to meaningfully influence how innovation occurs across hierarchical levels and evolutionary phases.

#### 2.4.3 MANAGING UNCERTAINTY IN A MULTIDIVISIONAL FIRM

Many of the reviewed mechanisms aim to increase certainty of outcomes in what is an inherently uncertain process. The pursuit of innovation activities is uncertain at the individual level, as personal careers can be derailed by an innovation project's failure. Dedication of teams to innovation projects ties up significant resources with no guarantees of future returns. At the middle manager level, promoting innovation projects that ultimately fail can cast doubt on middle managers' judgment and ability to effectively and efficiently govern resources under their control. Corporate managers can endanger the future of the whole organization when they over-allocate resources to innovation activities that consume resources at a rate above that of the organizational resource replenishment.

Given these innovation-related risks in multidivisional firms, which cross several levels of analysis, what is the role of corporate managers in addressing different types of innovation-related

risks? At one extreme, corporate managers can channel most of their agency, attention, and resources to minimize innovation-related risks across hierarchical levels. Individual employees can be told to limit their innovation activities to those projects that build substantially on existing knowledge. Innovation teams can dedicate their effort to innovation projects that are likely to succeed. Middle managers' risks are then reduced as well, given the certainty of outcomes at the team level. Finally, at the corporate level, resource allocation can prioritize those innovation projects that have already shown significant promise.

The likely outcome in such a limit scenario is an organization which is successful at avoiding costly innovation mistakes (Knudsen and Levinthal, 2007), even as its innovation output remains highly incremental in nature (Henderson and Clark, 1990). The opposite extreme scenario, in which corporate managers maximize uncertainty in the pursuit of breakthrough innovations, can deplete organizational resources prior to the discovery and commercialization of such breakthrough innovations. Hence, corporate managers must balance the need to mitigate risk taking with the need for controlled uncertainty, allowing their firm to maintain environmental fitness (Teece, 2007). While some of the surveyed mechanisms can be helpful in terms of managing innovation-related risk at discrete levels of analysis and specific evolutionary phases, further research should consider developing models of innovation uncertainty management at the system level.

#### 2.4.4 ENABLING THE COEXISTENCE OF MULTIPLE APPROACHES TO INNOVATION

How does an organization create innovation ambidexterity (Gibson and Birkinshaw, 2004), allowing for the simultaneous pursuit of different approaches to innovation? The coexistence of legal and illegal innovation activities within the same organizational boundaries is likely to create tensions. Employees working on legal, officially approved innovation projects are likely to view illegal bootlegging activities (Augsdorfer, 1996, 2005) with suspicion. Further, middle managers may view bootlegging as misuse of resources. On the other hand, employees engaged in

bootlegging are likely to envy their official counterparts their resource access and official status. Similarly, innovators actively incorporating accidents (Austin, Devin, and Sullivan, 2012) into their approaches to innovation may be viewed as potential disruptors of the organizational status quo and/or as outright dangerous to the organization and their fellow employees. Yet, as Austin, Devin, and Sullivan (2012) show, a highly experimental approach to innovation can be a source of major innovation breakthroughs. How corporate managers address these tensions appears to be an interesting research avenue. In addition, future research can build on work on micro-level innovation ambidexterity (Austin, Hjorth, and Hessel 2017) to explore how corporate managers manage innovation-related conflicts at the innovation front line.

#### 2.4.1 BALANCING CREATIVITY/EXPLORATION VERSUS EFFICIENCY/EXPLOITATION

Within the key managerial task of managing the trade-off between exploitation and exploration (March, 1991), my survey shows that a similar tension exists even within exploration activities. Some of the surveyed mechanisms aim at increasing the efficiency of the innovation process (e.g., rapid prototyping, Stage-Gate<sup>®</sup> process, Six Sigma). The problem with introducing efficiency into innovation processes is that the efficiency can become the goal in itself, reducing the chance for a firm to discover and develop innovations that generate significant value. On the other hand, exploration activities need to transition at some point from the phase of pure exploration for novel knowledge into the phase of exploiting this new knowledge. Issues surrounding the management of this tension within exploration activities warrant further research.

#### 2.4.2 UNDERSTANDING THE RELATIONSHIP BETWEEN INTERNAL IDEATION AND OPEN

##### INNOVATION

The pursuit of open innovation (Boudreau and Lakhani, 2009; Chesbrough and Crowther, 2006) has become a mantra among scholars and practitioners alike. The argument regarding the limits to knowledge variation at an individual firm level is sound. But how should the sourcing of

open innovation be managed in the case of a multidivisional firm, and what should be the role of corporate managers in this process? Should open innovation be delegated to the team, business unit, and/or corporate level? What is the process of finding and negotiating the acquisition of external knowledge? Given that a specific external knowledge is likely to be available to several potential bidders, and is therefore likely to command a full market price, how does a company create a competitive advantage through open innovation? Once an open innovation is acquired, what is the process of absorbing it? Further, what is the relationship between internal knowledge generation and open innovation? Does one complement the other, are they substitutes, or should they be managed in parallel? Another issue is the management of intellectual property issues. All of these questions can be partially addressed through research efforts delving into previous research opportunities, but the holistic understanding of the complex relationship between external and internal knowledge sourcing in the context of a multidivisional firm is likely to require a comprehensive research program.

#### 2.4.3 THE ROLE OF A FIRM'S HISTORY IN INNOVATION MANAGEMENT

What role does founders' imprinting play in the involvement of corporate managers in innovation management? Is there such a mechanism as innovation founders' imprinting operating similarly to organizational imprinting (Stinchcombe, 1965)? More generally, what role does organizational innovation history play in the degree of corporate managers' involvement in innovation management? These questions relate to the organizational capability to retain knowledge about past innovation activities and utilize this knowledge for present innovation endeavours. On another related note, how does a history of divestment of once highly innovative business units affect the parent company's present and future innovation capability? Given the dispersion of knowledge across business units forming a multidivisional firm and intra-organizational stickiness of knowledge (Szulanski, 1996), corporate managers are likely to play



an important role in linking past, present, and future innovation exploits, projects, and opportunities; this concept offers another promising research stream.

#### 2.4.4 ETHICAL BOUNDARIES OF TOP-DOWN INNOVATION MANAGEMENT

Under which conditions can corporate managers drive their innovation agenda by manipulating the behaviour of individual employees with or without their consent? My survey uncovered several mechanisms which can be used by corporate managers to induce an employee's desire to pursue innovation activities. It may be beneficial for the firm to have a particular employee concentrate more on explorative activities as opposed to pursuing an exploitative role. Yet, given the inherent riskiness of an explorative career, this may not be in the best interest of the specific employee. From the organizational perspective, an employee whose explorative career ended in failure is not a significant loss, as a new employee can be hired to fulfil the original exploitative role. In a sense, the organization can consider each employee as a cheap option (as the employee is already working for the firm) to gain access to novel knowledge. From the employee perspective, the switch from an exploitive to explorative career within the firm can significantly increase the risk of a career failure—a risk that can be difficult to hedge against on an individual level. This ethical conflict between an organization's interest in innovation and the interests of individual employees can be a fruitful avenue for future research.

Relatedly, under which conditions can corporate managers support innovation activities by manipulating the behaviour of end users without their consent? For instance, social media companies have used knowledge about human psychology and factors increasing addiction to make their products highly addictive. More recently, Facebook patented software for tracking end users' reactions to advertisements.<sup>9</sup> Such innovations are likely to be driven from the top down, with full consent and awareness of corporate managers. Given that some large multidivisional

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<sup>9</sup> <https://www.engadget.com/2018/06/28/facebook-patent-turns-phone-mics-on-to-record-reactions-to-ads/> accessed on August 12, 2018.

firms are capable of innovating well ahead of governmental attempts to regulate the outcomes of their innovations, the ethical considerations surrounding the involvement of corporate managers in driving innovations that impact and/or exploit human behaviour comprise another interesting research opportunity.

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## **CHAPTER 3                    A MID-RANGE THEORY OF CORPORATE INNOVATION ACTIVISM**

### **3.1 INTRODUCTION**

Does it make sense for corporate managers to actively influence how innovation occurs in their firms? In a multidivisional firm, corporate managers exert control over several business units operating in distinct markets under the stewardship of middle managers (Chandler, 1962). Through this agency, corporate managers have a significant impact on a firm's performance (McGahan and Porter, 1997, 2002).

Scholars suggest several roles of corporate managers to provide partial explanations for the existence of this link between the actions of corporate managers and firm-level performance. Several scholars have proposed that corporate managers substitute for market mechanisms of capital allocation through intra-organizational coordination and resource allocation decision making (Bower, 1970; Chandler, 1962; Williamson, 1975). Eisenhardt (1989) suggests that corporate managers reduce agency costs by better aligning the interests of shareholders and middle managers in charge of running individual business units. Collis, Young, and Goold (2007) argue that corporate managers provide legitimacy function to satisfy regulatory demands and drive efficiencies by providing centralized back-office services to business units.

None of these roles of corporate managers assume "corporate innovation activism" (CIA), defined as purposeful actions by corporate managers to actively manage intra-organizational innovation processes. Proposed top-down mechanisms influence intra-organizational innovation processes indirectly through organizational structure (Chandler, 1962), organizational purpose (Selznick, 1957), organizational slack (Penrose, 1959), rules and procedures (Allison, 1971; Bower, 1970; Cyert and March, 1963), or organizational identity (Kogut and Zander, 1996). Recent empirical findings on the ignorance of corporate managers about business unit-level

innovation activities lends support to this assumption about corporate managers' passivity in innovation management (Ciabuschi, Forsgren, and Martin, 2012).

Yet, the assumption of corporate managers' passivity in innovation management is incongruent with the importance given to innovation in foundational strategy literatures such as organizational learning (Cohen and Levinthal, 1990; March, 1991), resource-based view (Barney, 1991; Rumelt, 1984; Teece, 1984; Wernerfelt, 1984), and dynamic capabilities (Eisenhardt and Martin, 2000; Teece, Pisano, and Shuen, 1997; Teece, 2007). Further, there is mounting evidence from strategy consulting firms as well as scholars publishing in practitioner journals (e.g., Birkinshaw, Bouquet, and Barsoux, 2011) that suggests that corporate managers *do* actively influence intra-organizational innovation processes through direct top-down mechanisms.

This dissonance in the literature is reflected in the recent call to rethink the role that corporate managers play in innovation management. Gupta, Tesluk, and Taylor (2007: 886) observe, "Many studies have sought to understand the innovation process (albeit not very often through a multilevel lens), but scholars have not yet been able to identify a clear prototypical process for the management of innovation." Similarly, recent innovation literature surveys note that mechanisms through which corporate managers influence how innovation occurs in their firms are largely unknown (Anderson, Potocnik, and Zhou, 2014; Garud, Tuertscher, and Van de Ven, 2013). Given this tension in extant scholarship, the main purpose of this paper is to develop a mid-range theory explaining why it makes sense for corporate managers to engage in CIA.

The rest of the article proceeds as follows. First, I review foundational management literatures to uncover different perspectives on the roles that corporate managers *can* have in innovation management. Second, I combine insights from these foundational building blocks with the innovation, decision making, psychology, and finance literatures to theoretically elaborate two novel concepts: *corporate innovation synergy* and *corporate innovation value-added*. I frame my theorizing within the evolutionary model of innovation, decomposing intra-organizational innovation processes into variation, selection, and retention stages (e.g., Burgelman, 1983; Dosi,

1982; Levinthal, 1998; Nelson and Winter, 1982). Third, I discuss the generalizability of the developed theory together with its boundary conditions. I conclude with implications for theory and practice, as well as several suggestions for testing and extending the CIA theory.

### **3.2 FOUNDATIONAL PERSPECTIVES ON THE ROLE OF CORPORATE MANAGERS IN INNOVATION**

In the following paragraphs, I review foundational perspectives in the management literature on the role of corporate managers in innovation. Foundational management scholarship which does not specifically address the role of corporate managers in innovation is not within the scope of this literature review (e.g., the positioning school). As most of these management literatures are contextualized within the realm of complex organizations, I consider the terms “senior managers” and “corporate managers” as synonymous. In addition, by “the role of corporate managers in innovation,” I mean actions taken by corporate managers to influence intra-organizational innovation processes.

#### **3.2.1 INCREASING MANAGERIAL EFFICIENCY**

Barnard (1938) draws insights about the role of senior managers from an empirical study conducted at Western Electric on worker motivation. He defines organizations as systems of inter-employee cooperation which allow employees to overcome their individual limitations. These limitations make it necessary for employees to cooperate to reach goals unattainable by individual action. Pondering the ephemeral nature of organizations, Barnard (1938) argues that the main conditions for organizational survival include cooperation readiness, communication capacity, and the existence of purpose. These survival conditions define the functions of a senior manager as the creation and conservation of the sense of organizational purpose encapsulated within an organizational moral code, the establishment of formal and informal communication channels, and the inducement of organizational members to cooperation. In order to fulfil their functions in an

efficient way, Barnard (1938) proposes that senior managers must continuously leverage innovations.

### 3.2.2 RECOGNIZING AND MITIGATING MANAGERIAL COGNITIVE CONSTRAINTS

Building on work by Barnard (1938), Simon (1945/1997) posits that senior managers' bounded rationality limits their ability to solve complex problems. Simon (1945/1997) suggests that the consequence of bounded rationality is that senior managers' decision making leads to satisficing as opposed to maximizing outcomes. Once senior managers decide on the course of action, their decisions need to be communicated downwards so that the process of administration can take place. For that purpose, senior managers employ organizational influences such as authority, organizational loyalties, and advice. The combination of senior managers' bounded rationality and the process of administration can hinder the intra-organizational transfer of ideas, without which, "nothing will happen" (Simon, 1945/1997: 235) in terms of the development of new products. Thus, from the bounded rationality perspective, the role of senior managers is to design mechanisms to recognize and mitigate their cognitive limitations hindering intra-organizational knowledge flows.

### 3.2.3 CREATING AND UTILIZING ORGANIZATIONAL SLACK

Penrose (1959) moves the theory of the firm discussion away from prices and quantities to consider a firm as a portfolio of resources functioning within an administrative framework delineating firm boundaries. According to Penrose (1959), a firm's growth is related to managers' desire to transform human and other resources controlled by the firm into productive uses. Consequently, a firm's rate of growth is a function of a firm's growth of knowledge and of the ability to manage the associated change process with current (i.e., efficient, but fully allocated) and new (i.e., initially underutilized resources creating organizational slack) human resources. Therefore, from this perspective, senior managers' implied role in innovation is to create an

administrative framework that allows for the emergence of organizational slack and its transformation into productive use.

#### 3.2.4 MAINTAINING INNOVATION IN PERIODS OF OVERPERFORMANCE<sup>10</sup>

In resonance with Simon's (1945/1997) and Penrose's (1959) arguments, Cyert and March (1963) reject the classic economic theory of the firm and examine the actual behaviour of business organizations, drawing on ideas of bounded rationality, imperfect environmental matching, and unresolved conflict. Cyert and March (1963) argue that a firm can be viewed as a coalition having a series of independent goals which exhibit a certain degree of inconsistency. Goals represent constraints imposed in the short term by bargaining among potential coalition members. Goals evolve in the long term due to changes in coalition structures. The decentralization of decision making, the consecutive attention to goals, and the modification of organizational slack permit a firm to tolerate perpetual conflict and respond to environmental variations despite the inconsistency of goals. Organizational choice is embedded in standard operating procedures (SOPs) that reflect organizational learning and determine short-term decisions employing concrete but inaccurate estimates. Thus, implicitly, corporate managers influence intra-organizational innovation processes indirectly by setting organizational goals. When a performance discrepancy materializes between organizational goals and organizational performance, innovation occurs through problemistic search. The role of corporate managers in innovation is then to design mechanisms which can alert them to the need for conducting search even in periods absent of triggers inducing the problemistic search.

#### 3.2.5 DETERMINING THE IMPORTANCE OF INNOVATION WITHIN THE ORGANIZATIONAL PURPOSE

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<sup>10</sup> This paragraph is based on the seminar discussion within Dr. Harbir Singh's Corporate Strategy class held at the Wharton School in 2014 and in particular on insights expressed by Andrea Contigiani.

Selznick (1957) analyzes organizations through the theoretical lens of institutional leadership. He examines the process of organizational transformation from a rational into a social system defined by distinct competencies and character, arguing that the overemphasis on efficiency obscures the process by which available resources lead to organizational goals. Whereas the concept of efficiency applies to individual business units having well defined purpose and position within the organization, it does not fully account for the role of organizational leadership. Selznick identifies leadership as a key concept that allows goal setting and resource mobilization and alignment for reaching these goals. Leadership creates an organizational structure capable of linking organizational purpose to daily activities by providing a long-term sense of purpose through organizational *myths*. According to Selznick, senior managers' main function as leaders is to exemplify the organizational purpose, guard institutional integrity, and manage internal differences. Hence, from Selznick's perspective, senior managers influence innovation activities indirectly by regulating the importance of innovation within the process of determining the organizational purpose.

### 3.2.6 DESIGNING ORGANIZATIONAL STRUCTURES CONDUCIVE TO INNOVATION

Chandler (1962) studies the interconnections in modern corporations between structure and strategy. In the 1930s, the multidivisional form of organization (M-form) started to be employed by U.S. corporations as a response to top management's overload caused by increased complexity of decision making. This increased complexity was due not simply to the increase in a firm's size, but to the broadening of the scope of a firm's activities requiring diverse managerial knowledge. Thus, business unit managers became responsible for the market share related profits, whereas corporate managers focused on monitoring, planning, and resource allocation processes. In general terms, adjustments to organizational structure were made to support a strategy of growth into new product and geographical markets, making structure follow strategy. In terms of innovation, Chandler (1962: 287) notes that within the M-form, research is confined into "functional



departments.” Therefore, from Chandler’s (1962) perspective, corporate managers are responsible for the creation of appropriate organizational structures within which innovation can take place in support of strategic goals.

### 3.2.7 SIMULTANEOUSLY PROTECTING AND NOURISHING THE ORGANIZATIONAL CORE

Thompson (1967) considers how organizations handle uncertainty stemming from technologies and environments. Rational firms aim at protecting their technology core from environmental influences by enveloping it with input and output components. The residual variation which firms cannot control is handled by smoothing of input and output transactions and by preparation for anticipated changes, thereby achieving a degree of self-control and reducing dependency on the environment. The result is an organizational design that seeks to place boundaries around activities which may become crucial contingencies if exposed to environmental influences and that reflects interdependencies of the organization with the environment and its technology. From the perspective of Thompson (1967), the role of senior managers is to manage the degree of organizational openness so that the technological core is protected from being maligned by environmental influences, yet nourished sufficiently to withstand environmental shocks from which a firm cannot be completely insulated.

### 3.2.8 GUIDING ENVIRONMENTAL ADAPTATION

Andrews (1971) builds on arguments put forward by Barnard (1938) in his discussion on the role of senior managers. He argues that a senior manager’s main function is to lead the perpetual process that defines the nature of an organization and ensures that the organizational purpose is meaningful and fulfilled. Senior managers are therefore responsible not only for the formulation of the overall business strategy, but also for its successful implementation by creating appropriate organizational structures and providing leadership. Andrews (1971) distinguishes two strategy activities. Business strategy is concerned with a business unit’s competitive strategy

in the context of the competitive environment enclosing the business unit. Corporate strategy determines organizational purpose. Through organizational purpose, senior managers define organizational identity and character, formulate actions to be undertaken, mobilize resources, and guide adaptation to environmental variations. Implicitly, Andrews (1971) assumes that senior managers have a good understanding of future innovation opportunities relevant to maintaining their firm's environmental fitness.

### 3.2.9 UPDATING PROCEDURES FOR PROCESSING NEW INFORMATION

Allison (1971) describes decision making during the 1962 Cuban Missile Crisis, drawing on the rational actor model (i.e., national interest is defended by government), organizational behaviour model (i.e., security apparatus follows routines), and governmental politics model (i.e., an agreement is possible through bargaining and compromise among actors) to fully explain decision making during the crisis. The deadlock was reached as adversary organizations stuck to their codified routines prescribed for dealing with crisis situations. On a general level, the Cuban crisis provides an example of organizations ending up in deadlock due to slow adaptation to an environmental variation. This adaptation rigidity stems from the processing of new information by unchanged procedures and routines. Based on Allison's (1971) findings, the role of corporate managers in innovation is to constantly update SOPs (Cyert and March, 1963) to keep them current with information processing demands stemming from environmental evolution. In doing so, corporate managers need to make decisions regarding the degree of local versus global optimization of SOPs, as well as the degree of divisionality versus centralization of intra-organizational authority flows.

### 3.2.10 COUNTERING DECISION-MAKING BIASES INHIBITING INNOVATION

Kahneman and Tversky (1979) propose the prospect theory, which is concerned with decision making under risk as an alternative to the utility theory, which is concerned with rational

benefit maximization. The key difference between these theories concerns carriers of value being changes in wealth (i.e., gains and losses) as opposed to being final asset states. Further, decision weights are replaced by probabilities. Kahneman and Tversky (1979) note that empirical evidence is inconsistent with axioms of utility theory; specifically, people exhibit a tendency to underweight uncertain outcomes when having the option of a certain outcome, resulting in the “certainty effect.” Moreover, people tend to not consider elements shared by all prospects under assessment, resulting in the “isolation effect.” These two effects influence decision making in real-life situations. The resulting value function is habitually concave for gains and usually convex and steeper for losses (i.e., people perceive less utility in gain than in loss avoidance). Failure to update the positioning of the reference point can induce incremental risk seeking. Given the inherent riskiness of innovation pursuits, prospect theory implies that the main role of corporate managers in innovation is to identify biases negatively impacting decision making related to innovation and design mechanisms to lessen the impact of these biases (Kahneman, Lovallo, and Sibony, 2011).

### 3.2.11 KEEPING ORGANIZATIONAL IDENTITY CONDUCTIVE TO INNOVATION

Kogut and Zander (1996) argue that the integration of activities through a firm drives coordination and learning from which a firm’s shared identity—constituted by shared norms and language—emerges. A firm is demarcated from the market as learning, communication, and coordination are not only physically integrated, but also get imprinted in the shared identity. Over time, a firm’s shared identity creates distinct boundaries between its businesses and markets. The key function of a firm’s shared identity is the decrease in the costs of coordination and communication. Yet, this shared identity may also instil rules limiting organizational search as it may be reinforcing established SOPs (Cyert and March, 1963) and legitimizing employees’ tendency to reject outside influences (Katz and Allen, 1982). Thus, from Kogut and Zander’s (1996) perspective, the role of corporate managers in innovation is to continuously identify and weaken elements of a firm’s shared identity which may inhibit the pursuit of innovation.

### 3.2.12 MAINTAINING ENVIRONMENTAL FITNESS THROUGH INNOVATION

Building on foundations laid out by scholars investigating value creation through organizational-level efficiency (e.g., Rumelt, 1984; Teece, 1984; Wernerfelt, 1984) and those examining organizational responses to changing environments (e.g., Nelson and Winter, 1982; Penrose, 1959; Teece, 1976), scholars in favour of the dynamic capabilities framework argue that a firm's competitive advantage stems from unique processes, specific asset positions, and inherited path dependency (Eisenhardt and Martin, 2000; Teece, 2007; Teece, Pisano, and Shuen, 1997). A firm's capacity to maintain its competitive positioning hinges on the permanence of the market demand, the easiness of expansion through internal replication, and the difficulty of imitation of its activities by rivals. As such, the dynamic capabilities framework suggests that the maintenance of competitive positioning is contingent mainly on a firm's ability to identify and exploit new profitable ventures, allowing it to maintain environmental fitness. In resonance with Andrews (1971), Teece (2007) proposes that senior managers are directly responsible for the identification of innovation opportunities that sustain their firm's environmental fitness.

## 3.3 CORPORATE INNOVATION SYNERGY

As shown, a review of the foundational literature uncovers several arguments supporting the notion that the active involvement of corporate managers in innovation can render intra-organizational innovation processes more efficient. In the following paragraphs, I build upon the foundational corporate strategy scholarship, the scholarship on managerial decision making, and the innovation scholarship to propose several sources of efficiency gains within intra-organizational innovation processes achieved by CIA.

### 3.3.1 VARIATION

#### 3.3.1.1 Reduction of Voice Suppression by Formal Power

Diversity in the pool of novel ideas increases a firm's chances of gaining access to *impactful* novel ideas (Girotra, Terwiesch, and Ulrich, 2010). The key obstacle to obtaining diversity from intra-organizational ideation sources is the domination of the idea generation process by a few opinion leaders, causing the groupthink effect (Coser, 1956). Superiors can use their power rooted in hierarchy to silence innovation voices which steer too far from extant core businesses and/or commonly held beliefs about what would work and what would fail (Van de Ven, 1986).

To reduce instances of voice suppression by formal power, corporate managers can deploy pan-organizational technological platforms enabling idea sharing and networking among spatially and hierarchically distributed employees. The introduction of such idea-sharing platforms is likely to be more efficient when it is spearheaded from the corporate level as opposed to consisting of discrete initiatives occurring at the business unit level. For instance, IBM used its intranet infrastructure to facilitate novel idea exchange on a continuous basis even before conducting its inaugural “IBM’s 2006 InnovationJam<sup>®</sup>” (IBM, 2018).

*Proposition 1: The pan-organizational deployment of idea-sharing platforms reduces voice suppression by formal power.*

### 3.3.1.2 Increase in the Expression of Grassroots Novel Ideas

Another hurdle to obtaining diversity from intra-organizational ideation sources is employees' perception that their voices do not count, resulting in the mind-level suppression of novel ideas (Reitzig and Maciejovsky, 2015). From the ideating employees' perspective, the higher the likelihood that their ideas will be given attention by their superiors, the more likely they are to express their ideas (Sah and Stiglitz, 1986).

The active involvement by corporate managers in the facilitation of grassroots ideation can increase employees' perception that their idea has a chance of getting noticed and appreciated, as opposed to being dismissed by their immediate supervisors. For instance, IBM CEO Samuel J. Palmisano actively participated in IBM's 2006 InnovationJam<sup>®</sup> involving more than 150,000 internal and external contributors (IBM, 2018). Bjelland and Wood (2008: 39), who researched IBM's 2006 InnovationJam<sup>®</sup>, described the event: "Cartoon-like avatars of IBMers from all over the world, meeting in Second Life, created the IBM Virtual Universe Community, and even Palmisano joined the conversations. (You could recognize his avatar right away: While most avatars are funky or outrageous, Palmisano's was a cartoon man wearing a conservative blue suit, the kind for which IBM salesmen were once famous.)"

*Proposition 2: The perception by employees of corporate managers' direct engagement in the variation process increases employees' grassroots novel ideas expression.*

### 3.3.1.3 Increase in the Generation of High-Potential Grassroots Novel Ideas

An increase in grassroots novel ideas is not of great value to a firm unless the grassroots novel idea pool contains a few high-potential innovative ideas over many mediocre ones (Girotra, Terwiesch, and Ulrich, 2010). This organizational preference is well demonstrated across different industries. In the area of pharmaceutical research, novel drugs need to have significant potential in the marketplace to offset the mostly invariable costs related to the drug discovery and commercialization processes. In academic research, emphasis is given to producing a few articles with high citation runs over many poorly cited papers. Similarly, private equity firms strive to uncover a few exceptionally high-return investments as merely average returns would not justify the risks taken by fund providers.

The likelihood that the grassroots ideation process generates a few high-potential ideas can be increased when corporate managers provide employees with high-level clues about challenges and opportunities relevant to their firm. This assertion is based on the seminal study by Ward (1994) on the role of cognitive structures in the individual ideation process. Using a series of experiments, Ward (1994) found that without any direction, experimental subjects resorted to known knowledge frameworks when imagining novel ideas. Yet, instructions and task constraints increased subjects' willingness to depart from current cognitive schemas and employ expansive knowledge frameworks, leading to more original novel ideas in Ward's (1994) case animal species. Corporate managers can achieve such ideation nudging by suggesting high-level topics for ideation centred on the maintenance of existing core technologies (Thompson, 1967) or the exploration of emerging technologies (Teece, 2007).

*Proposition 3: The transmission from corporate managers to employees of information about key challenges and opportunities facing the organization increases the likelihood of the grassroots novel idea generation process periodically producing a high-potential novel idea.*

### 3.3.2 SELECTION

#### 3.3.2.1 Reduction of Middle Managers' Selection Biases

Middle managers have considerable agency in deciding which grassroots ideas get endorsement and attention from corporate managers (Bower, 1970; Burgelman, 1983). As middle managers engage in the selection of grassroots ideas, their selection process has been found to be distorted by several selection biases. One such bias is the tendency to eliminate ideas which may be harmful to their personal interests (Bower, 1970; Guth and MacMillan, 1986). At a more aggregate level, middle managers can exhibit the tendency to the promote interests of their own

business unit without taking into consideration a novel idea's potential benefit for the whole organization (Birkinshaw and Hood, 1998; Galunic and Eisenhardt, 1996; Guth and MacMillan, 1986; Rietzig and Soreson, 2013). Such biases are particularly harmful to the innovation output in a diverse multidivisional firm in which corporate managers lack the attention span to continuously monitor innovation activities occurring at lower hierarchical levels (Ocasio, 1997). To counter these biases, corporate managers can deploy several mechanisms.

First, corporate managers can increase the novel idea dismissal threshold by establishing a curatorial approach to managing grassroots innovativeness (Litchfield and Gilson, 2013). Similar to a museum managing a collection of artworks, generated grassroots ideas can be catalogued through an online interface, tagged with key attributes, and retained within a central registry. Registration access can be made available to all employees without the involvement of middle managers. Registered ideas are initially sponsored by their originators, who pitch them to their superiors. When superiors dismiss a novel idea, they would be required to comment on their decision within the registry. This paper trail linking a middle manager's selection decision to a specific novel idea not only increases the likelihood that a middle manager's selection decision can be scrutinized, but also creates a firm-level knowledge database. Corporate managers can appoint a curator of grassroots novel ideas whose role would be to periodically review the content of the knowledge database as well as the selection decisions made by middle managers.

Second, corporate managers may introduce a set of objective selection criteria (Cooper, Edgett, and Kleinschmidt, 1999) to be used by middle managers in their selection process to decrease the likelihood that a novel idea is dismissed due to personal preferences, inter-employee relationships, or business unit-specific agendas detrimental to the whole organization. Such criteria can include financial analyses of the novel idea's potential (e.g., net present value, payback time, investment intensity) or qualitative assessments (e.g., fit with existing capabilities, relevance to present and anticipated client needs, degree of novelty, and degree of replicability across the organization).



Third, corporate managers can introduce an appeals process allowing employees who had their ideas dismissed to have their rejected ideas evaluated by an independent referee panel (March, 1994).

*Proposition 4: The creation of a grassroots novel idea registry, the introduction of a set of objective selection criteria, and the establishment of an appeals process for dismissed ideas all reduce the chances that middle managers' selection biases will prevent a high-potential grassroots novel idea from reaching corporate managers.*

### 3.3.3 RETENTION

#### 3.3.3.1 Reduction of Implementation Derailments Due to Incremental Resource Scarcity

Once a novel idea is selected, the duration and path of its implementation are hard to estimate (Klein and Sorra, 1996). When additional innovation funds are required, managers at business units tasked with the implementation of selected innovation projects may be reluctant to accommodate an implementation extension and provide additional resource funds due to resource constraints and rigidities embedded in the budgeting process (Bower, 1970). Thus, when decision making regarding the resourcing of the implementation phase is confined to the business unit level only, promising innovation projects may be at risk of being cancelled due to the lack of incremental resourcing required by unexpected implementation hurdles (Mattes, 2014).

The bifurcation of implementation resourcing between the business unit and corporate levels can reduce this risk. Once the implementation of an innovative project is allocated to a specific business unit, managers from that business unit make an implementation budget estimate and the initial implementation resource funds are allocated. If this initial resource allocation proves to be insufficient, corporate managers can establish a procedure for the

allocation of incremental implementation resources subject to a formal review of a project's progress (Noda and Bower, 1996). If the need to allocate incremental resources gets approved, corporate managers are in a better position than business unit managers to procure these additional resources from general purpose funds located at the corporate level, raise additional capital, or reshuffle resources among business units (Froot, Scharfstein, and Stein, 1993).

*Proposition 5: The bifurcation of the implementation resourcing decision-making processes into business unit-level initial resourcing request and corporate-level incremental resourcing evaluation and provision reduces the chances that a high-potential innovation project will be cancelled due to incremental resource scarcity.*

### 3.3.3.2 Reduction of Innovation Failure Contagion to Core Businesses

Most innovations fail (Levine, 1980). When the failure of an innovation is confined to an economic loss in the form of wasted resources earmarked in advance for the failed project, the organization is likely to withstand the failure as the organizational resource allocation process accounts for the high innovation failure rate (Klingebiel and Rammer, 2014). Yet, an innovation failure can have repercussions beyond the failed innovation project itself, and even beyond organizational boundaries, when it negatively impacts the organization's core businesses (Thompson, 1967). For instance, several in-flight failures of Rolls-Royce's innovative Trent 1000 engine (used by Boeing to power its Dreamliner 787 aircraft) caused Rolls-Royce to reallocate significant organizational resources to fix the faulty design (BBC, 2018). Similarly, information about an innovation failure involving a major financial institution can rapidly erode clients' trust in the organization's long-term stability. For this reason, traditional banks have been reluctant supporters of the fintech revolution in the finance industry (Forbes, 2017). In the agile software development movement, while it is beneficial to continuously rethink potential

new uses of an extant software code, such explorative activity generates reconfiguration costs as well as exploration costs in the form of potentially undesirable outcomes (Austin and Devin, 2009).

Corporate managers can deploy several mechanisms to reduce the risk of innovation failure contagion beyond the innovation project itself. First, they can temporally structurally ring-fence the innovation failure contagion risk by establishing specialized organizational units dedicated exclusively to the pursuit of innovations (Siggelkow and Levinthal, 2003). An innovation is then diffused into the rest of the organization only after it passes a certain threshold of reliability. Any innovation flops can be fully contained within these separate organizational structures, with legal barriers preventing innovation failure spillovers from affecting core businesses. Second, corporate managers can constrain the initial implementation of risky innovation projects to markets of lesser importance (Klompaker, Hughes, and Haley, 1976), even when this is initially a suboptimal solution from the perspective of a single business unit. For example, global firms often test their new products in Australia before introducing them in other markets (Fortune, 2015). Third, when an innovation failure occurs, corporate managers have a better overview than middle managers of how the innovation failure contagion can impact core businesses across the organization, and are therefore in a better position to enact a pan-organizational containment plan (Tufano, 1996).

*Proposition 6: Corporate managers are in a better position than middle managers to reduce the risk of innovation failure contagion to core businesses.*

### 3.3.3.3 Reduction of the Number of Late-Stage Innovation Flops

The outright failure of an innovation project is easier to recognize and deal with early in the innovation implementation stage. However, many innovation projects keep showing some

promise, but on the balance of probabilities, their value creation within a reasonable timeframe becomes unclear. The decision to push on with a failed project by managers and employees who have championed it is due to several decision-making biases. The confirmation bias (Nickerson, 1998) reduces the innovation implementation team's search for information which would undermine its project's continued viability. The availability bias (Tversky and Kahneman, 1973) reduces the innovation implementation team's effort to update fundamental premises upon which the project was selected. The anchoring bias (Northcraft and Neale, 1987) reduces the innovation implementation team's willingness to consider the feasibility of its innovation from new angles.

Corporate managers are not immune to letting these biases cloud their own decision making, even when they are aware of the existence of these biases (Kahneman, Lovallo, and Sibony, 2011). Yet, several factors stemming from their position within the organizational hierarchy reduces their susceptibility to these biases relative to middle managers. First, corporate managers oversee a large number of innovation implementations across the organization, making it easier for them to let go of any one of these projects. Second, corporate managers are less personally invested in the innovation implementation projects, reducing the likelihood that they will favour one over another due to their own personal agendas (Bower, 1970). Third, given their position at the top of the organizational hierarchy, corporate managers possess the ultimate authority to stop a particular project (Cyert and March, 1963; Finkelstein, 1992; Thompson, 1967). Further, the decision to abandon an innovation implementation may be harder to make at the business unit level due to the sunken cost effect increasing the implementation team's reluctance to terminate the project (Garland, 1990).

*Proposition 7: Corporate managers are in a better position than middle managers to reduce the number of late-stage innovation flops.*

#### 3.3.3.4 Reduction of Innovation Duplicity

Innovation duplicity refers to the simultaneous pursuit of similar innovation projects within the same organization (McAdam and Galloway, 2005). Innovation duplicity can occur geographically, among spatially distributed business units; structurally, among distinct functional areas; or temporally, when an innovation project which recently failed is attempted again without an increased probability of success. Innovation duplicity not only wastes organizational resources, but can also give rise to destructive rivalry among innovation teams (De Clercq, Thongpapanl, and Dimov, 2009).

Corporate managers are in a better position than business unit managers to reduce innovation duplicity. First, corporate managers can use their helicopter overview of innovation projects to detect innovation duplicity occurring across business units, geographies, and/or functional areas. Second, corporate managers are likely to have better insight into whether a specific innovation duplicity is desirable or wasteful. In some situations, innovation duplicity can be desirable when several innovation teams work concurrently, yet independently, on an innovation project crucial for the organization's long-term survival.

*Proposition 8: Corporate managers are in a better position than middle managers to reduce innovation duplicity when it is wasteful.*

### 3.4 CORPORATE INNOVATION VALUE-ADDED

When the innovation function is elevated to the corporate level in a multidivisional firm, is the organization better able to add unique elements to the variation, selection, and retention innovation processes than when the innovation function is delegated to individual business units only? The difference between the corporate innovation synergy concept and the corporate innovation value-added concept is that without the active involvement of corporate managers in innovation, corporate innovation value-added is unlikely to manifest itself as it is generated by the

unique position occupied by corporate managers within a multidivisional firm. In contrast, some elements constituting corporate innovation synergy are likely to occur to a certain degree even when corporate managers are not actively involved in intra-organizational innovation processes.

### 3.4.1 VARIATION

#### 3.4.1.1 Generation of Architectural Innovation

The concepts of bounded rationality (Simon, 1955, 1979), experiential learning (Levitt and March, 1988), and cognitive learning (Gavetti and Levinthal, 2000) are closely related to the managerial capability needed to recombine knowledge already existing within organizations. Henderson and Clark (1990: 10) term such recombination of existing knowledge “*architectural innovation*.” According to Henderson and Clark (1990), architectural knowledge differs from the component knowledge about a product’s various parts required for its functioning. Specifically, architectural knowledge refers to knowledge about how these different components work together as a system.

The identification of architectural innovation opportunities requires a holistic overview of different component knowledge bases that may be scattered structurally, geographically, and temporally across the entire organization. Corporate managers have, on average, longer tenure than middle managers and can connect past, present, and emerging knowledge available to the organization. For instance, innovations that failed in the past can be a source of inspiration for future innovations (Drucker, 2008). Corporate managers are also continuously concerned about emerging technologies that may disrupt their core businesses (Teece, 2007). Further, corporate managers have the formal power to change the way things are done and overcome the path-dependent nature of experiential learning (Levitt and March, 1988) that increases the rigidity of organizational routines (Nelson and Winter, 1982). In addition, corporate managers can facilitate intra-organizational information flows, enabling the discovery of architectural innovation

opportunities. Such intra-organizational information flows are less likely to occur at the business unit level due to the stickiness of knowledge (Szulanski, 1996).

*Proposition 9: Corporate managers can generate architectural innovations by leveraging their holistic overview of organizational knowledge, using their formal power to lessen organizational rigidities, and facilitating intra-organizational information flows.*

#### 3.4.1.2 Sourcing of External Novel Ideas

External knowledge sourcing is an important source of variation (Chesbrough, 2006). Yet, external knowledge holders may be reluctant to share their knowledge because they worry about a disproportionate economic value appropriation by the knowledge seeker (Chatain and Zemsky, 2011). Another issue arises when the external knowledge holder is reluctant to share the knowledge out of fear of disrupting established business relationships (Birkinshaw, Bouquet, and Barsoux, 2011). For example, suppliers may be concerned that their asset-specific investments may be devalued by revealing that novel ways of cooperation in the buyer-supplier relationship exist. Even when external knowledge holders are willing to share their knowledge, the “not invented here” (NIH) syndrome (Katz and Allen, 1982)—whereby the value of external knowledge is discounted in favour of internally generated ideas (Katz and Allen, 1982)—may prevent external knowledge from gaining acceptance at the business unit level.

Corporate-level managers can mitigate external knowledge holders’ concerns by establishing trust between their organization and the external knowledge holders at the corporate level (Mayer, Davis, and Schoorman, 1995), as opposed to letting business units negotiate with external knowledge holders directly. Establishing trust at the corporate level can mitigate external knowledge holders’ fear that middle managers may disseminate the acquired external knowledge to other organizations, especially in industries marked by high middle management

turnover (Wooldridge and Floyd, 1990). Similarly, corporate managers can extend the corporate-level trust to address the concerns of existing external partners about the protection of their asset-specific investments to encourage them to express their innovative ideas. The establishment of trusting relationships with external knowledge holders is likely to motivate corporate managers to push the utilization of the acquired external knowledge, countering the NIH bias (Katz and Allen, 1982).

*Proposition 10: The establishment of trusting relationships with external knowledge holders at the corporate level generates external novel idea sourcing and increases the acceptance of external knowledge at lower hierarchical levels.*

### 3.4.2 SELECTION

#### 3.4.2.1 Selection of Riskier Innovation Projects

An innovation project's failure can negatively impact the careers of the involved employees at the business unit level as they have limited project diversification options (Hitt et al., 1996). Consequently, middle managers involved in the selection of innovation projects tend to select less risky projects over projects with higher value creation potential, but also higher likelihood of failure (Castañer and Kavadis, 2013).

Corporate managers benefit from several mechanisms that decrease their risk aversion towards high-potential/high-risk innovation projects. First, corporate managers can spread their bets over multiple innovation projects, thereby diversifying away their individual-level risk. Second, the nature of corporate managers' employment contracts often provides them with a safety net should a failure of a particular innovation project negatively impact their own personal career. Third, given their position within the organizational hierarchy, corporate managers are less likely to be subjected to hierarchical checking (Sah and Stiglitz, 1986), which increases



their ability to infuse analytical decision making based on available data with intuitive decision making rooted in their experiences (Barnard, 1938) and gut feeling (Dane and Pratt, 2007).

*Proposition 11: The involvement of corporate managers in the selection of innovation projects will increase the proportion of riskier innovation projects in a firm's selected innovation pool.*

### 3.4.3 RETENTION

#### 3.4.3.1 Creation of Organizational Innovation Memory

As successful innovation projects are implemented and diffused across the organization, innovations become increasingly routinized (Nelson and Winter, 1982). Once innovations become implemented and routinized, the tacit knowledge about their origins erodes through employee turnover (Massingham, 2008) and downsizing (Schmitt, Borzillo, and Probst, 2012). Gradually, organizations forget knowledge they once generated internally or acquired externally (Argote, Beckman, and Epple, 1990; Darr, Argote, and Epple, 1995). Even when the tacit knowledge still exists within the organization, the process of accessing it, understanding it, and reusing it is non-trivial (Alavi and Leidner, 2001).

As corporate managers become actively involved in intra-organizational innovation processes, the innovation knowledge involved across the innovation pipeline gets centralized at the corporate level. The centralization of various innovation knowledge bases at the corporate level is likely to trigger the need for innovation knowledge codification (Zollo and Winter, 2002). Continuous innovation knowledge codification at a centralized corporate location triggers the need for a more systematic way to archive codified knowledge to make it useful for existing innovation projects as well as future innovation endeavours. Over time, in conjunction with the curatorial approach to managing grassroots innovativeness (Litchfield and Gilson,

2013), a knowledge management system gets established, within which codified and catalogued innovation knowledge resides. This knowledge management system sets the foundation for the creation of organizational innovation memory, making innovation knowledge across the full spectrum of outcomes accessible across the organization in the present and future (Hargadon and Sutton, 1997).

While useful for present and future innovation endeavours, such organizational memory is, by definition, comprised of knowledge that has been generated in the past about undertaken innovation activities. For instance, this kind of codifiable information can relate to tested and/or deployed processes, tools, materials, shapes, and innovation organizational set-ups.<sup>11</sup>

*Proposition 12: The active involvement of corporate managers in innovation creates organizational innovation memory.*

#### 3.4.3.2 Generation of Architectural Innovation Implementation

Architectural innovation implementation builds upon the concept of architectural innovation (Henderson and Clark, 1990) and refers to the active optimization of ongoing innovation implementation processes across the organization. Ideally, managers continuously evaluate and periodically reconfigure distributed innovation modules constituting various innovation implementation projects to gain efficiencies and generate value. These are non-trivial tasks as different elements of innovation knowledge are often distributed temporally, geographically, and structurally (i.e., among separate business units and/or among functions).

Benefiting from their centralized overview of all innovation projects across the organization, corporate managers can often connect the dots and generate architectural innovation

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<sup>11</sup> I thank Rob Austin for pointing out the backward-looking nature of the organizational innovation memory and suggesting its content.

implementation. Ramachandran, Manikandan, and Pant (2013: 114) provide the following example from Tata Group: “Although household water purifiers were widely available in India for many years, they were unaffordable to the poor, who didn’t have access to clean drinking water. Then in 2009, Tata Swach, a low-cost water purifier, was launched. (...) The company developed an early prototype but declared it unviable and not a fit with its software business, and shelved the project. In 2006, R. Gopalakrishnan, a senior member of Tata’s group executive office, stumbled across the prototype (...). He revived the project, suggesting that Tata Chemicals, with its expertise in chemical-processing technologies, take the lead.” This example demonstrates how organizational innovation memory—in this case, enacted by an individual corporate manager—can generate instances of architectural innovation implementation.

*Proposition 13: Organizational innovation memory enables architectural innovation implementation.*

### **3.5 DISCUSSION AND AVENUES FOR FUTURE RESEARCH**

I have developed two novel concepts: corporate innovation synergy and corporate innovation value-added. Corporate innovation synergy refers to mechanisms that can be deployed by corporate managers to make existing intra-organizational innovation processes more efficient. Corporate innovation value-added concerns mechanisms that can be deployed by corporate managers to improve intra-organizational processes in ways which are hard to achieve at the business unit level. I have synthesized my propositions into a theoretical model which depicts the interdependencies among these mechanisms as their deployment increases a firm’s innovation output. I conclude by discussing important boundary conditions of the CIA theoretical model and suggesting several areas for future investigation.

#### **3.5.1 CIA BOUNDARY CONDITIONS**

The CIA theory is mid-range in nature. Several important boundary conditions apply, and are discussed below.

#### 3.5.1.1 Degree of Diversification

The need for CIA is likely to be contingent on a firm's degree of diversification. Less diversified firms tend to have flatter organizational designs (Rajan and Wulf, 2006), reducing innovation decision-making distortions caused by hierarchical layering (Reitzig and Maciejovsky, 2015), and in turn reducing the need for CIA. Further, in a less diversified firm there is less need for specialized corporate-level roles as the administrative complexity decreases and the roles of corporate and business managers overlap.

On the other hand, in an excessively diversified firm, several factors are likely to lessen the effectiveness of CIA. First, due to the increased organizational complexity of an excessively diversified firm, less managerial attention (Ocasio, 1997) at the corporate level will be available for innovation related matters. Second, the cognitive limitations (Simon, 1955, 1979) of corporate managers limit their ability to comprehend innovation issues, needs, and opportunities across many diverse industries. Third, the cause of excessive diversification is often an aggressive M&A program stemming from managerial motivation to reduce employment risk (Amihud and Lev, 1981), as opposed to internal growth through deployment of organizational slack (Penrose, 1959). The resulting portfolio of businesses each having their unique innovation cultures makes the deployment of CIA difficult due to strong path dependencies of innovation trajectories at the business unit level.

In sum, CIA is likely to be most effective in firms in which the degree of diversification is congruent with owners' interests (as opposed to with the interests of managers exercising their managerial discretion) (Hoskisson and Turk, 1990).

#### 3.5.1.2 Turnover Differential of Corporate Managers versus Middle Managers

One of the premises on which the theory of CIA rests is the turnover differential between corporate and business unit managers. I assume that corporate managers have significantly lower turnover rates than business unit managers. I argue that the lower turnover of corporate managers versus business unit managers enables corporate managers to create organizational innovation memory and build trusting relationships with external idea holders, among other effects. In companies in which the turnover of corporate managers is high, some of the CIA model's propositions are likely to be weakened.

#### 3.5.1.3 CIA in Crisis Periods

When organizations encounter a period of financial turmoil, placing them under the purview of stakeholders providing financial backing, corporate managers are likely to refocus their attention away from CIA to manage more pressing tasks required for their firm's short-term survival. Paradoxically, corporate managers' abandonment of CIA in times of crisis may provide short-term relief, but may also set the stage for a gradual erosion of a firm's capability to remain competitive in the long term (Filippetti and Archibugi, 2011; Lim, Celly, Morse, and Rowe, 2013).

#### 3.5.2 POSITIONING OF CIA MECHANISMS WITHIN THE EVOLUTIONARY FRAMEWORK

Most of the propositions concern the variation and retention phases of intra-organizational innovation processes. This CIA focus suggests that corporate managers have multiple avenues for shaping novel idea generation and supporting implementation of selected ideas, while being more limited in intervening in the selection process.

This imbalance in the CIA model is consistent with recent observations in the literature (Reitzig and Maceijovsky, 2015; Reitzig and Sorensen, 2013) regarding the lack of knowledge about the sub-processes that shape the selection decision making in a multidivisional firm. I argue that corporate managers can play an important role in reducing middle managers' selection biases and increasing the selection of riskier projects with higher expected returns.

Future research can test these propositions using randomized control trials in companies which have not yet experienced CIA. Further, future studies might employ recent advances in the understanding of a neurobiological basis for decision-making biases (e.g., De Martino et al., 2006) and apply these insights from neuroscience to theoretically and empirically push the boundaries of knowledge on influences shaping the selection of novel ideas.

### 3.5.3 TYPE OF INNOVATIONS SUPPORTED BY CIA

Corporate managers are likely to be effective in enhancing organizational capability for architectural innovation (Henderson and Clark, 1990), as they possess a holistic overview of all innovation projects. Given corporate managers' lesser risk aversion compared to middle managers (Castañer and Kavadis, 2013), CIA is also likely to contribute to the generation of radical innovations. On the other hand, corporate managers are less likely to contribute to innovations at the component level, given their lack of detailed expertise-level knowledge. Similarly, employees closest to core businesses (Thompson, 1967) are better equipped at ideating on incremental improvements than are corporate managers, who are often separated by several hierarchical levels from the underlying business processes run by lower-level managers and/or market-facing employees. Thus, an interesting empirical research question relates to the effect that CIA has on changing the representation of different innovation types post CIA's deployment.

### 3.5.4 CIA INTENSITY

Is it always beneficial for organizations to pursue increased innovation output? Wouldn't corporate managers' energy and attention be better spent on other activities? When too many resources are diverted to exploration/innovation that does not yield economic rents in the short term, the organization's long-term survival prospects can decline due to insufficient generation of funds to support ongoing operations. This point brings us back to the issue of exploration/exploitation balance (March, 1991). Under the assumption of resource constraints at

the firm level, exploration diverts resources from exploitation, which can undermine organizational ability to survive as the pursuit of innovation depletes resources at a higher rate than the rate at which innovations generate new resources (i.e., negative resource replenishment rate due to investments in exploration/innovation pursuits).

During periods with a negative replenishment rate, resource providers can turn away from a firm. A case in point is the satiation of IBM, which has been struggling to transition into cloud computing while its traditional business has been declining. Investors responded by selling IBM's stock, which limited IBM's access to public markets. The case of GE is even more striking. The company was deselected from the Dow Index, its last original constituent, and had to fire-sell assets to pay off debt and shrink itself. Yet, its debt load remains high while its ability to generate profits to service/pay off its debt greatly diminished. This example leads to an important research question: how do firms sustain CIA during negative resource replenishment periods due to major restructuring efforts involving heavy resource allocation to exploration?

### 3.5.5 THE DARK SIDE OF CIA

Limited periods of increased CIA intensity causing a *temporal* negative replenishment rate, especially during organizational restructuring, are unlikely to cause a firm to become structurally biased towards exploration at the expense of exploitation. Yet, CIA continuously applied across various hierarchical levels could potentially give rise to a *structural* negative replenishment rate. Over time, a structural negative replenishment rate can deplete organizational ability to support exploration through exploitation of core businesses (March, 1991; Thompson, 1967). Another potentially negative aspect of sustained high levels of CIA is the generation of intra-organizational conflicts among different organizational charters (Galunic and Eisenhardt, 1996). In the following paragraphs, I discuss this possible dark side of CIA across hierarchical levels.

#### 3.5.5.1 Individual Employees

At the individual employee level, CIA is likely to increase the provision of unstructured exploration worktime (Steiber and Alänge, 2013) by supporting the allocation of a portion of employees' time towards intrinsically motivated exploration pursuits (Amabile, 1988). An overemphasis on the importance of unstructured exploration worktime could dilute employees' focus on their formal responsibilities, negatively affecting a firm's capacity for exploitation of its core businesses. Further, overprovision of unstructured exploration worktime could disrupt employees' cognitive focus on generating incremental innovations related to core businesses, leading to an accelerated depreciation of core businesses' value-generating potential (Thompson, 1967).

Another potential issue with sustained high levels of CIA intensity at the employee level is the erosion of negative perceptions of failure. Destigmatization of innovation-related failure could lower employees' focus on ultimately generating valuable and replicable outcomes of their innovation efforts and decrease the overall productivity of employee-level innovation efforts. At the extreme, CIA could encourage employees to engage in exploration activities that endanger core businesses (Austin, Devin, and Sullivan, 2012).

The over-application of CIA at the employee level could also generate conflict between employees for whom it is natural to engage in exploration and employees who require more structured working environments in order to be productive. CIA could furnish exploration-oriented employees with a licence to decrease their collaboration on projects related to exploitation under the pretense of needing to focus their efforts on innovation projects harboured within their minds. Such uncollaborative behaviour legitimized by CIA could prove to be difficult for the exploration-minded employees' immediate superiors to rectify.

#### 3.5.5.2 Teams

The over-application of CIA could lead to the emergence of a multitude of semi- to fully autonomous teams operating outside of the realm of formal organizational authority structures.



CIA could facilitate the emergence of such teams by providing them with ad hoc resources and a degree of legitimacy for their independent pursuits. Given the lack of formal approval of actions undertaken by these semi-autonomous innovation teams, these teams could tie up valuable organizational resources without accountability for meaningful outcomes. At the extreme, such teams could disrupt formal command and control structures.

Sustained high levels of CIA intensity could also lead to the emergence of competing innovation teams. Such team-level competition could be conducive to finding valuable innovation outcomes faster, yet it could also become counterproductive if the inter-team rivalry were to diminish the ability and willingness of teams to collaborate and leverage knowledge and outcomes. Instead, the over-application of CIA could generate more innovation-related behaviour that is rewarded from the CIA perspective reducing the motivation at the team level to collaborate and build upon the efforts of other teams. Still another potential CIA-related conflict could arise if a rivalry emerged between CIA-sponsored innovation teams operating at the corporate level and innovation teams embedded within business units.

#### 3.5.5.3 Middle Managers

The main issue with the over-application of CIA at the middle manager level relates to incentives. Middle managers' role has been traditionally understood in the literature as being closely related to exploitation (Huy, 2002). CIA could skew middle managers' incentives towards innovation, which could hamper efficient and effective exploitation of core businesses. Further, as middle managers play an important role in evaluating the merit of innovation projects originating within their business units (Bower, 1970; Reitzig and Sorenson, 2013), tilting middle managers' incentives more towards exploration could increase the riskiness of innovation projects earmarked for implementation.

#### 3.5.5.4 Corporate Managers

CIA has the potential to create a conflict within the C-suite as corporate managers start to fight over control of the innovation voice and direction. Multiple corporate-level managers (e.g., the chief marketing officer, chief innovation officer, chief strategy officer, and even the CEO) could consider top-down innovation decision making as belonging to their sphere of influence and decision making.

Another issue related to sustained, high-level intensity of CIA is corporate long-term support for projects which may never have commercial application, and/or their commercialization is only possible in the distant future. Given that these innovation projects would enjoy endorsement and resourcing from the very top of the organization, they could become a significant drag on organizational resources.

Limited periods of increased CIA intensity causing *temporal* negative replenishment rate, especially during organizational restructuring, are unlikely to cause a firm to become structurally biased towards exploration at the expense of exploitation. Yet, CIA continuously applied across various hierarchical levels could potentially give rise to *structural* negative replenishment rate. Structural negative replenishment rate can over time deplete organizational ability to support exploration through exploitation of core businesses (March, 1991; Thompson, 1967). Another potentially negative aspect of sustained high levels of CIA is the generation of intra-organizational conflicts among various organizational charters (Galunic and Eisenhardt, 1996). In the following paragraphs, I discuss this potentially dark side of CIA across hierarchical levels.

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#### 3.5.6 CIA GOVERNANCE

A key factor when considering the role of CIA during negative resource replenishment periods is the conversion rate of innovation effort into economic rents. The determination of the optimal conversion rate of innovation effort into economic rents is ultimately a managerial task as managers make resource allocation decisions (Bower, 1970) among lower-risk/lower-potential/faster-conversion-rate innovation projects and innovation projects that take longer to generate economic rents. Rowe (2001) argues that visionary leaders (who are much more likely than managerial leaders to fund innovations) are more likely to cause a firm to go bankrupt if they will not allow themselves to be supported by a managerial leader. Rowe's (2001) insight leads to another interesting research question: how should CIA be governed in terms of managerial styles?

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## **CHAPTER 4                    THE DEVELOPMENT OF CORPORATE INNOVATION FUNCTION IN MULTIDIVISIONAL FIRMS**

### **4.1 INTRODUCTION**

A firm's innovation capability consists of sourcing of novel ideas (Hamel, 2006), selection from among the novel ideas of the best ones (Girotra, Terwiesch, and Ulrich, 2010), and the implementation of the selected ideas (Klein & Sorra, 1996). The concept of innovation capability is particularly relevant to strategy scholars since innovation is often associated with competitive advantage (McGrath, Tsai, Venkataraman, and MacMillan, 1996; Van de Ven, 1986). Hitt, Hoskisson, and Kim (1997) argued that, due to increasingly globalized markets, failure to innovate can lead to a sudden reversal of fortunes of well-established firms.

Little is known about the role that corporate managers, who exert control over separate business units in a multidivisional firm (Miller, Fern, and Cardinal, 2007; Rumelt, 1974), have in influencing intra-organizational innovation processes (Anderson, Potočnik, and Zhou, 2014; Garud, Tuertscher, and Van de Ven, 2013). In his seminal research on the resource allocation process, Bower (1970) portrayed corporate managers as passive influencers of innovation processes occurring at the business unit level through the establishment of corporate context. Bower (1970) defined corporate context as a static system of reporting structures, performance metrics, and monitoring procedures aligning bottom-up innovation initiatives with corporate strategy. Corporate managers approve bottom-up innovation initiatives based not on their detailed knowledge of each initiative, but on their trust in the judgment of middle managers responsible for the performance of individual business units (Bower, 1970). Corporate managers are thus dependent on middle managers' sensemaking of innovation initiatives and selection choices, which constitute the strategic context (Burgelman (1983a).

The strategic context can be a source of type I and II innovation errors. Type I innovation

errors occur when an approved innovation initiative turns out to be a failure, whereas type II innovation errors occur when an innovation initiative is rejected, yet turns out to be a success elsewhere (Garud, Nayyar, and Shapira, 1997). Middle managers' bias toward innovation initiatives presenting low risk for their own careers (Bower, 1970) increases the incidence of type I innovation errors when a low-value innovation initiative is selected, even though it does not earn sufficient return on the deployed resources necessary for its implementation. More recently, Reitzig and Maciejovsky (2015) found that middle managers are prone to eliminating promising yet high-risk innovation initiatives when they sense that their selection capability could be questioned by their superiors. Middle managers' cognitive constraints (Simon, 1955, 1979), limiting their ability to comprehend innovations that transcend their areas of expertise (Bower, 1970), contribute to the incidence of type II innovation errors. A further source of type II innovation errors occur when middle managers resist the introduction of external ideas seeking to protect their sphere of influence, authority, and relevance (Bouquet & Birkinshaw, 2008; Chesbrough, 2006).

Type I and II innovation errors can occur even before innovation initiatives reach the selection process. Burgelman (1983b) distinguished between autonomous and induced innovation initiatives. Induced innovation initiatives follow corporate strategy formulated by corporate managers. When corporate managers lack foresight about future high-impact innovation opportunities, induced innovation initiatives are likely to have low success potential (Noda & Bower, 1996). Even when high-value innovation opportunities are identified by corporate managers, lack of codification of the corporate strategy in a comprehensive manner can hinder its diffusion among employees with the potential to contribute to innovation (i.e., individual innovators) located several hierarchical levels below corporate managers (Zollo, 1998). Both of these limitations stemming from ignorance or inaction by corporate managers are likely to increase

the incidence of type I innovation errors at the individual innovator level. Autonomous innovation initiatives are driven by individual innovators' intrinsic motivation, as opposed to being induced by corporate strategy. This increases the hurdle rate that autonomous innovators face to get resources to further develop their novel ideas into defensible projects (Knudsen & Levinthal, 2007), which increases the incidence of type II innovation errors, again at the individual inventor level.

Some researchers have started to recognize that corporate managers can influence the incidence of type I and II innovation errors. For example, Noda and Bower (1996) extended the original Bower-Burgelman model by suggesting a more active role for corporate managers through repeated resource allocation process. More recently, Birkinshaw, Bouquet, and Barsoux (2011) suggested that proactive corporate intervention in innovation is complimentary to bottom-up innovation processes, as corporate managers are well-positioned for managing the penetrability of the strategic context for bottom-up innovation initiatives. For instance, innovators in one business unit could attempt to transfer and use knowledge resources that already exist in a different business unit to achieve a certain innovative outcome (Birkinshaw & Lingblad, 2005; Galunic & Eisenhardt, 1996). While middle managers responsible for the financial performance of the business unit may consider such activity as a misallocation of resources under their control, corporate managers could view it as desirable (Gruber, Harhoff, and Hoisl, 2013) for increasing their firm's ambidexterity capability (Zimmermann, Raisch, and Birkinshaw, 2015).

Despite this gradual relaxation of the corporate manager passivity assumption in the literature, there has been a lack of multi-level innovation studies exploring how corporate managers (i.e., at the organizational level) impact innovation processes occurring at lower hierarchical levels (Anderson, Potočnik, and Zhou, 2014; Gupta, Tesluk, and Taylor, 2007). Thus, the main aim of our study is to investigate processes if and through which corporate managers

actively influence how innovation occurs within their firms (i.e., the CIF). Further, we associate corporate processes with resources needed for their enactment. These corporate innovation resources are both tangible (e.g., innovation funding, innovation spaces, corporate innovation teams) and intangible (e.g., corporate innovation strategy, corporate involvement in ideation, corporate endorsement of individual innovators) in nature.

The remainder of the paper proceeds as follows. Given the inductive nature of our study, we entered the field with openness to discovering innovation processes and relationships among these processes so far underexplored in the literature (Eisenhardt, 1989). For presentation purposes, we adopted the post-positivistic research convention (Suddaby, 2006) to present literature up front, followed by a description of the methods, findings, and the discussion. Similar to Schotter and Beamish (2011), this choice was made to provide clarity to the reader, rather than to reflect the chronological uncovering of new insights and theory development. We thus first provide a synthesis of the conceptual background on the variation, selection, and retention processes operating within a multidivisional firm. Second, we outline our methodological approach, including a description of the data. Third, we describe our findings with an emphasis on results obtained through the inductive theory-building process. Fourth, we develop a typology of CIFs and theorize about how their attributes affect a firm's innovation output. We conclude by discussing future research opportunities and the managerial relevance of this study.

## **4.2 BACKGROUND LITERATURE**

### **4.2.1 VARIATION OF NOVEL IDEAS**

Novel ideas emerge from the creativity of individual employees (Amabile, 1996; Campbell, 1960), especially when their personal traits are conducive to innovation, when work is challenging, and when supervision is relaxed (Oldham & Cummings, 1996). When internal

generation of novel ideas (i.e., variation) involves a team effort, the likelihood of generating high-quality novel ideas increases in cases where team variation is preceded by individual ideation effort (Girotra, Terwiesch, and Ulrich, 2010). External idea sourcing further enhances the firm's chances of having access to high-quality novel ideas (Boudreau & Lakhani, 2009; Chesbrough, 2006; von Hippel, 1988; von Hippel & von Krogh, 2003).

The existence of multiple business units under one corporate umbrella increases the complexity of innovation variation due to the compartmentalization of novel ideas within business units (Tsai, 2001) and across geographies (Gerybadze & Reger, 1999). Innovation cross-fertilization among business units (Carlile, 2004; Dougherty, 1992) is difficult to achieve, as novel ideas are often largely tacit in nature, and their transfer requires prior articulation and codification (Szulanski, 1996; Zollo & Winter, 2002). The potential of novel ideas for disrupting existing organizational structures can generate intra-organizational opposition toward novel ideas (Garud, Tuertscher, and Van de Ven, 2013). As a result, novel ideas can be denied initial organizational support (Abernathy & Clark, 1985), decreasing the chances of their transformation into innovation initiatives (Knudsen & Levinthal, 2007).

#### 4.2.2 SELECTION OF THE BEST IDEAS

A key feature of a multidivisional firm is a layer of middle managers (Kanter, 1981), which acts as an interface between corporate managers and bottom-up innovation processes (Burgelman, 1983a, 1983b). This interface is prone to personal (Bower, 1970) and behavioral (Reitzig & Maciejovsky, 2015) biases, which may hinder the organizational ability to recognize and select the best novel ideas (Girotra, Terwiesch, and Ulrich, 2010). Middle managers can also disrupt diffusion of awareness about available novel ideas among business units (Reitzig & Sorenson, 2013), further decreasing chances that the best novel ideas will be selected. Formalization of the selection process by corporate managers decreases middle managers' agency to (un)intentionally



prevent the selection of the best novel ideas (Hansen & Birkinshaw, 2007).

#### 4.2.3 RETENTION OF SELECTED IDEAS

The transformation of selected ideas through the proof of concept and prototype stages (Quinn, 1985; Thomke, 2003) into valuable innovation outcomes requires the commitment of scarce organizational resources (Bower, 1970; Repping, 2002). Even when resources are made available, retention of selected ideas is a complex process marked by several challenges (Klein & Knight, 2005), including (1) unreliability of technological solutions underpinning the innovation, (2) need for cognitive effort by users of the innovation, (3) resistance by users of the innovation to top-down directives, (4) reluctance by more senior users to collaborate with more junior innovation users, (5) short-term negative effect on firm performance, and (6) stickiness of existing routines. Intervention by corporate managers has the potential to mitigate some of these retention inhibitors (Klein & Sorra, 1996).

### 4.3 METHODS

We deployed an inductive iterative research approach, similar to Basu, Phelps, and Kotha (2016), in order to generate new theory from multiple cases and the extant literature (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Strauss & Corbin, 1990; Yin, 2013). An inductive research design is well-suited for exploring how and through which mechanisms corporate managers get involved in innovation processes at the business unit level, given the complexity of the interaction between corporate and business unit levels (Burgelman, 2011). We draw on conceptual arguments from the evolutionary view of intra-organizational processes (Burgelman, 1983a) in order to develop new theory from empirical insights (Eisenhardt, 1989).

#### 4.3.1 DESIGN AND SAMPLE

#### 4.3.1.1 Design

While the starting point of our inquiry is activity at the corporate level, in order to generate deeper theoretical insights, we adopted a multi-level design incorporating corporate and business unit levels in our analysis. The multi-case/multi-level design was employed in other recent inductive studies concerning related topics such as integrated innovation management (Bernstein & Singh, 2006) and external innovation sourcing by mature organizations (Basu et al., 2016). We treated each case individually first, but then went back iteratively to individual cases with the purpose of identifying common processes across all cases (Yin, 2013), as well as processes linked to differing rationales for establishing the CIF. Further, we also isolated case-specific processes throughout the theory development work and drew from them when they offered a new insight.

#### 4.3.1.2 Sampling Approach

We purposely selected cases in which we could observe the process of corporate involvement in innovation at both corporate and business unit levels of analysis (Miles & Huberman, 1994). We sought established multidivisional firms with at least three decades of operational history and three divisions to ensure that our sample firms have distinguishable corporate and business unit levels, yet retained a high enough degree of across-case comparability. The sampled companies showed variance in terms of industry, size, age, ownership structure, and organizational complexity<sup>12</sup> (Miles & Huberman, 1994). The heterogeneity of our sample along these dimensions enabled us to observe the creation and deployment of the CIF in various settings. This allowed us to draw meaningful comparisons across cases (Yin, 2013).

#### 4.3.2 DATA SOURCES AND TRIANGULATION

Our main primary recorded data source are oral presentations and supporting PowerPoint materials from ten summits of chief innovation officers organized by the Innovation Enterprise, a

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<sup>12</sup> We operationalized organizational complexity as the number of divisions under corporate control.

private UK firm organizing summits on topics of concern to senior executives. These summits took place between December 2013 and February 2016 in major global cities. Narrators were senior innovation executives and consultants discussing corporate involvement in innovation. The average presentation was 30 minutes in length. The supporting PowerPoint slides offered additional levels of detail, and were also available for the majority of the presentations. Each summit comprised on average 30 distinct presentations. The heterogeneity in hierarchical levels among presenters enabled us to obtain diverse perspectives on corporate involvement in innovation processes across different levels of analysis, as well as contrast internal versus external perspectives. From the initial sample comprising over 200 distinct firms, we selected 20 firms that fit our sampling criteria. Our sample did not suffer from impression management issues (Graebner & Eisenhardt, 2007), as the presenters were not made aware of our specific research project at the time of delivering their presentations.<sup>13</sup> Table 1 provides an overview of our sample firms, with information on key variables.

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<sup>13</sup> From an ethical standpoint, all presenters were made aware by the Innovation Enterprise that the content of their verbal and written presentations could be used for research purposes.

**Table 1: Corporate Innovation Function Data Sample**

Code name	Core industry	Number of divisions	Latest reported revenues (USD m)	Age (Years)	# of employees	Narrator
<b>Asteria</b>	Airlines	7	33,832	100	95,000	Vice President, Innovation
<b>Atlas</b>	Asset Management	9	15,692	230	50,000	Managing Director, Strategic Growth Initiatives
<b>Crius</b>	Asset Management	11	1,300	80	5,000	Senior Vice President, Innovation
<b>Cronus</b>	Insurance	7	13,900	130	10,000	Vice President, Global Innovation
<b>Dione</b>	Housewares & Accessories	4	5,700	100	8,000	S Vice President, Chief Innovation Officer
<b>Eos</b>	Textile Apparel, Footwear & Accessories	5	1,560	40	3,000	Vice President, Innovation
<b>Eurybia</b>	Auto Manufacturers	15	126,839	90	22,600	Head of Innovation
<b>Hyperion</b>	Drug manufacturers	3	36,568	300	97,000	Senior Director of Consumer Health R&D
<b>Lelantos</b>	Food manufacturing	5	18,218	90	23,000	Vice President, Breakthrough Innovation
<b>Metis</b>	Department stores	3	15,744	130	83,000	Head of Innovation & Quality
<b>Oceanus</b>	Food manufacturing	5	5,719	60	19,000	Vice President, Global Innovation
<b>Ophion</b>	Investment brokerage	5	37,950	80	56,000	Lead, Global Innovation Program
<b>Pallas</b>	Biotechnology	4	51,914	120	89,000	Head of Central R&D Services, Innovation&IP
<b>Perses</b>	Drug manufacturers	5	44,576	40	112,000	Director, Innovation
<b>Phoebe</b>	Diversified machinery	9	83,949	170	348,000	Head of Innovation
<b>Prometheus</b>	Retail	6	7,942	60	4,300	Head of Innovation
<b>Rhea</b>	Fashion, Glass	6	4,026	120	31,000	Director, Open Innovation Networks
<b>Tethys</b>	Confectioners	3	7,421	120	15,000	Director of Innovation Center of Excellence
<b>Thea</b>	Wireless communications	4	64,535	40	101,000	Head of Innovation
<b>Themis</b>	Appliances	13	20,900	100	97,000	Director, Strategic Innovation
	<i>Max</i>	15	126,839	300	348,000	
	<i>Min</i>	3	1,300	40	3,000	
	<i>Mean</i>	6	29,914	110	63,445	
	<i>Median</i>	5	16,981	100	40,500	

To triangulate our primary data (Yin, 2013), we collected additional data through the review of firms' web sites and annual reports published between 2006 and 2015. The focus of this triangulation was to create longitudinal stories of the evolution of corporate involvement in innovation in each firm, which significantly augmented our ability to interpret the narrative data.

#### 4.3.3 DATA CODING AND ANALYSIS

To facilitate theory-building based on our research questions, we developed a protocol for systematically capturing data relevant for our inquiry along 10 dimensions, including the rationale for establishing the CIF, CIF attributes, CIF charters/mandates, CIF objectives, CIF relationships with other corporate functions, the process of establishing the CIF, the process of deploying the CIF, the nature and degree of CIF involvement in business unit-level innovation processes, CIF results, and long-term evolution of the CIF. We followed a three-step analytical procedure for coding and analyzing our data (Miles & Huberman, 1994), which we elaborate on below. In terms of coding, we initially deployed atlas.ti software to aid the qualitative data analysis. Atlas.ti's benefits are its visual and spatial features and its flexibility in developing interlinkages. Further, we did manual coding in Excel in a matrix form to remain close to the underlying data sources. The combination of the aggregation power of atlas.ti and the granularity of manual coding in Excel allowed a more comprehensive development of coherent theoretical ideas (Barry, 1998).

##### 4.3.3.1 Step 1: Within-case Analysis of Processes Related to Corporate Involvement in Innovation

We first recorded information about the innovation activities as they were described in our data. Out of these activities, we formed our second-order processes (Strauss & Corbin, 1998). We distinguished between processes occurring at corporate and business unit levels. We grouped these processes into more abstract innovation processes constituting our first-order processes. Finally,

we aggregated first-order processes into three main processes observed in our data related to the generation of novel ideas, selection among these ideas, and retention of selected ideas. We ended the single-case review process when we had reached theoretical saturation (Glaser & Strauss, 1967).

#### 4.3.3.2 Step 2: Assessment of the Rationale for Corporate Involvement in Innovation for Each Case

When conducting the within-case analysis, we uncovered important differences in corporate managers' motives for influencing innovation processes in their respective firms. In some cases, robust innovation processes were already in place, and the objective of corporate managers was to evolve organizational capability to innovate to a substantially higher level in terms of the impact of innovation activities on the firm's overall performance. The main issues evoked by managers in these companies included lack of attention to innovation by the most senior executives, insufficient exploitation of emerging technologies, and innovation activities being conducted too close to the core activities of the firm. In other cases, the motive was a turnaround, as the overall innovation process was broken and needed to be fixed. Common problems included lack of high-quality ideas coming from the ideation programs, strong resistance to innovation embedded in the formal organizational structure, organizational culture a priori hostile to innovation activities, and lack of replicability of innovation processes within the firm. In some intermediate cases, partial fixes were needed to an otherwise solid innovation capability foundation. Accordingly, we classified organizations into turnaround, evolution, and improvement cases. We identified seven eight evolution cases, seven turnaround cases, and five improvement cases, as reported in Tables 2, 3, and 4 respectively.

**Table 2: Corporate Innovation Function Evolution Cases**

Code name	Motivation	Trigger for top-down involvement in innovation processes	Issues with existing innovation processes	Dimensions of new innovation processes
<b>Dione</b>	<b>Evolution</b>	- The 2009 crisis hit us hard and created the need for reinvention. We needed to innovate beyond our core products which began to shrink.	- We had solid innovation foundations (i.e., disciplined portfolio management, disciplined stage-gate development, multi-disciplined teams, technology brokerage), which we needed to evolve to the next level.	- The next level of innovation management incorporates more aggressive innovation goals, wider and deeper innovation processes, a deeper innovation mindset, integrated structures supporting innovation.
<b>Eurybia</b>	<b>Evolution</b>	- We aimed at increasing innovation value generation potential and speed at which innovation occurs in an organization having a lot of divisions and operating globally.	- We recognized the need to move from a Research Center to a Global Research & Innovation network management.	- We decided to create a large network which includes: our divisions, suppliers, universities, public and private center of competency as partners for innovation.
<b>Oceanus</b>	<b>Evolution</b>	- The growth of our organization has been based on innovation. Yet continuous growth based on global possibilities required changes to the current innovation management system.	- Regional based innovation was marked by several limitations: it required top skills in every region, it resulted in making a lot of the same cakes, it traded-off complexity for growth, it did not necessarily generate ideas big enough for investment in breakthroughs.	- We established a global R&D function to tackle new opportunities that include big, different and breakthrough ideas that wouldn't be achieved locally. The main goal was to introduce global innovation processes to remove duplication of projects in markets with similar key consumer attitudes and opportunities. The new challenge was to link and sync throughout the organization the role of innovation, type of innovation and organizational design to deliver this innovation.
<b>Phoebe</b>	<b>Evolution</b>	- We decided to develop a technologies division focusing innovation on customer needs, while keeping innovation consistent with our aim to be a pioneer in all our businesses to secure the most competitive edge.	- Our innovation management system was focused on exploiting present opportunities and we strived to develop a Corporate Innovation Process capable of identifying and preparing our organizations for opportunities which will convert into financial results a decade or further ahead.	- We set several goals for Corporate Innovation Process (CIP): to ensure a timely identification of disruptive commercialization challenges, to realize their strong potential business impact, to have a stringent and holistic capital allocation decision, to set-unclear operational ownership and a continuous process, to ensure top management attention. In general, CIP will push organic growth in support of organizational growth targets.
<b>Rhea</b>	<b>Evolution</b>	- Innovation has been embedded in CEO's vision since the start of the company: "Every new era offers new possibilities for action and development. Development never stands still. Innovations in one field inevitably lead to innovations in others. One must remain alert at all times, always ready to make the very best use of what emerges."	- Our organization has a long history of innovations. A continuous challenge has been how to leverage new technologies on both our B2C and B2B businesses.	- We incorporated more of open innovation mindset into our innovation management systems to identify disruptive technology innovations. We work closely with Global Foresight to identify and understand current and future customer needs.
<b>Tethys</b>	<b>Evolution</b>	- Not available	- The previous innovation system relied on innovation teams embedded within business units. A different approach was needed beyond core and beyond product.	- We decided to embed innovation in the corporate strategy and create a global innovation center of excellence to consider technology innovation, generate innovation foresight, consider innovation options beyond Product portfolio and drive innovation excellence/ capabilities.
<b>Thea</b>	<b>Evolution</b>	- Not available	- Key challenge for our innovation system is the ability to drive transformation globally to respond to shifting customer expectations.	- We designed an innovation management system based on co-creation with continuous executive input and support: discovery (innovation workshop, innovation forum, executive support), selection (co-creation workshops, high level feasibility and impact, selection proposal to executive level), executive commitment (co-creation agreement, steering committee, joint resources & funding, executive sponsorship), design & validation (business impact validation, joint location & resources, user experience validation, design team, scalability plan, rapid prototype creation), decision go-big/stop (transition/stop plan, steerco review, executive decision), result (transfer, redesign, stop).
<b>Themis</b>	<b>Evolution</b>	- [We asked ourselves] how do we move from "us" making all innovation decisions to an organization that is managing and delivering innovation goals in a sustainable basis?	- We lacked a global innovation governance and management structure enabling continuous innovation.	- We made innovation part of the enterprise business process starting with planning and goal setting and resulting in innovation pipeline and innovation revenue.

**Table 3: Corporate Innovation Function Improvement Cases**

Code name	Motivation	Trigger for top-down involvement in innovation processes	Issues with existing innovation processes	Dimensions of new innovation processes
Asteria	Improvement	- We recognized that innovation landscape in our industry changed through disruptive new business models, rapid product/service innovations, innovations moving from corporates to start-ups, open innovation.	- We had difficulty persuading the Board of Directors about innovations that will not bear immediate fruit. Further, after a recent merger two distinct innovation cultures co-existed. Organizational silos hindered innovation.	- We focused on the following drivers of innovation success: innovation strategy and ownership, innovation friendly culture, balanced portfolio, internal and external collaboration, innovation execution: process and tools, innovation competencies, central steering and support.
Crius	Improvement	- Not available.	- We needed to create a structured approach to innovation in a conservative organizational environment.	- We established two long-term goals: generate meaningful revenue from new businesses and build a stronger culture of innovation.
Metis	Improvement	- We realized that most employees became designers and merchandisers working with very short of timeframes making the concept of innovation difficult for them to embrace. We needed an updated innovation management system to allow innovation to co-exist with mindsets not focused on innovation.	- We were a little like civil service: an old and rigid organization. Our organization was defined by ideation silos without opportunities to cross-fertilize ideas. Yet during our 100+ year old history we had been aiming at achieving balance between operational vs. innovation worlds. All the past innovation ideas got recorded in company's archive.	- Our updated innovation management system consisted of agreement on what type of innovation is required, acquisition of capabilities required to achieve desired innovation type, training of employees in innovation thinking by surely changing the organizational culture, embracement of experimentation and failure increasing willness for risk taking, assembly of diverse innovation teams allowing involved employees to assume distinct innovation roles, creation of physical environment conducive to innovation.
Pallas	Improvement	- We needed an innovation management system supporting our strategic pillars: delivering value for end users and testing efficiency for business customers.	- We did not have a uniform understanding of what innovation represented for the organization. We also lacked an integrated approach to innovation.	- We invested in developing a holistic innovation and intellectual management system incorporating innovation into strategy, organizational structure and culture. The innovation management processes included ideas, IP and Portfolio management, product and process development, market preparation and launch. System is supported by program and project management, awards and incentive systems, IT and knowledge management systems and improvement processes. In the next phase we aim to develop a corporate venturing program.
Perses	Improvement	- Intrapreneurship is hard and we wanted to get better at it recognizing that current innovation management system is not enough to deliver our 10 year vision to be the most innovative provider of our clients' health needs in our geography.	- We had a standard stage-gate innovation process in place supported by the following capabilities: project delivery, innovative thinking, medical/scientific expertise, strong cross-functional understanding of our organization and opportunity identification.	- We needed to incorporate in our innovation management system new capabilities: lean start-up experience, innovation process, broader understanding of the healthcare and industry (including start-ups), expertise in building a health service and monetize it, data driven insights generation focused on customers and consumers, deal conversion (i.e., licensing, M&A, partnering, financial).



**Table 4: Corporate Innovation Function Turnaround Cases**

Code name	Motivation	Trigger for top-down involvement in innovation processes	Issues with existing innovation processes	Dimensions of new innovation processes
<b>Eos</b>	<b>Turnaround</b>	- CEO wanted an innovation governance system mitigating risks of personal negative outcomes for employees who engage in innovation.	-Most people were empowered to say NO to innovation across the organization. Further these people were never held accountable for saying NO as nobody got ever fired for saying NO to a great idea.	- Our main objective was to install an innovation governance system headed by a senior executive reporting to the CEO and empowered to push through the organization good ideas, with an independent budget, freedom to fail and mandate to source ideas externally.
<b>Hyperion</b>	<b>Turnaround</b>	- Senior executives decided that "Consumer is at the heart of everything we do".	- Previous innovation system was characterized by Limited to no consumer focus within R&D, Product design and aesthetics not core to product development, Link of R&D to commercial not embedded and established, Technology pipeline not necessarily linked to commercial ambition, No clear pathway/process for product development, No sensory/consumer science for product evaluation and claims support	- We aimed at adding a function to Consumer Health R&D that ensures consumer focused R&D efforts delivering superior products that not only are science based but consumers also love to use them. A more concrete goal was to develop a consumer focused innovation pipeline (5-10 years) by setting a stretching goal and a working hypothesis that will provide a distinctive, life-improving experience; identifying the target consumer's ideal experience; defining the ideal product, package or device benefits
<b>Lelantos</b>	<b>Turnaround</b>	- After going public we realized that we needed to conduct an innovation turnaround to drive innovation in our large established multidivisional company.	- Our large organization got in the way of innovation resulting in inconsistent innovation processes, which were difficult to replicate and which did not lead to sustained success.	- We first used workarounds using new venture team, breakthrough team, SWAT team, CEO-sponsored team and front end teams. Main issue with these approaches was difficulty to establish a repeatable innovation capability. We approached this issue by establishing a common "What" is innovation for our organization and "How" are we going to achieve it. Our ultimate goal was to develop innovation capability that was repeatable across the organization, led to consistency in introducing new products and resulted in high level financial performance.
<b>Ophion</b>	<b>Turnaround</b>	- Innovation was scattered throughout the organization, made through passion without a coherent framework.	- We needed a global framework as nobody knew what other people were doing. There was disconnection among innovation activities and duplication of ideas.	- The new innovation management system mostly provided structure around the innovation activities: it got senior managers involved in innovation, recognized that individuals contribute to the innovation process differently and took that into account when assigning innovation roles, created a safe environment for experimentation by changing the organizational culture, broke down organizational silos by providing a common innovation platform
<b>Prometheus</b>	<b>Turnaround</b>	- Our innovation model generated a lot of bad ideas lacking strategic alignment.	- We implemented management idea system which again generated a lot of bad ideas, with the responsibility to select among them a few good ones delegated to business units, which again did not work. It was discontinued after 1.5 years.	- We introduced Corporate innovation Function responsible for supporting and accelerating the innovation process at the business unit level by providing the right methods, tools and conditions so that everybody can innovate. This new approach to innovation management is focused on creative problem solving with a more top-down approach.
<b>Atlas</b>	<b>Turnaround</b>	- Not available.	- Our conservative, process driven and siloed organizational environment hindered innovation.	- We needed to break internal barriers to innovation to start generating meaningful innovation revenue without disrupting organizational DNA.
<b>Cronus</b>	<b>Turnaround</b>	- We analyzed the database of 3000 ideas from 1000 employees on two dimensions: contributions per person and quality of submitted ideas. We found that few people submitted a lot of low quality ideas while a lot of people submitted few but high quality ideas.	- Our top-down dictated innovation hyperactivity is best described as "innovation carnival". We found that innovation carnival leads to the generation of very few good ideas whose implementation is further hindered by rigid innovation processes resulting in episodic innovation outcomes.	- We strived to change from centralized innovation management to the creation of decentralized business-unit level innovation ecosystem which is always on and allows for exploration of ideas which would never get attention under the top-down system you test them and possibly implement them.

To increase the confidence level in our case classification, we also coded data on triggers for corporate involvement in innovation processes and included them in Table 2. We expected triggers for the evolution cases to be more abstract and forward-looking compared to the turnaround cases. For the eight evolution cases, six had triggers that concerned either the need to extract more value from innovation or to incorporate into the innovation processes a capability to identify and prepare ground for exploiting new opportunities. For two evolution cases, data on triggers were not available. In contrast, seven out of eight turnaround cases had concrete triggers concerning the need to refocus innovation activities on existing customer needs or to fix fundamental issues with existing innovation processes.

#### 4.3.3.3 Step 3: Cross-case Analysis Employing a Case-ordered Predictor-outcome Matrix

The final stage of our analysis was the creation of a case-ordered matrix (Miles & Huberman, 1994; Table 5) to uncover processes specific to either the turnaround or evolution rationale for establishing the CIF. We termed these as *turnaround-specific processes* or *evolution-specific processes*.<sup>14</sup> Further, the cross-case analysis allowed us to identify common processes deployed in almost all firms, as well as contingent processes, manifested in some firms without a clear distributional pattern across the sample, based on the rationale for establishing the CIF.

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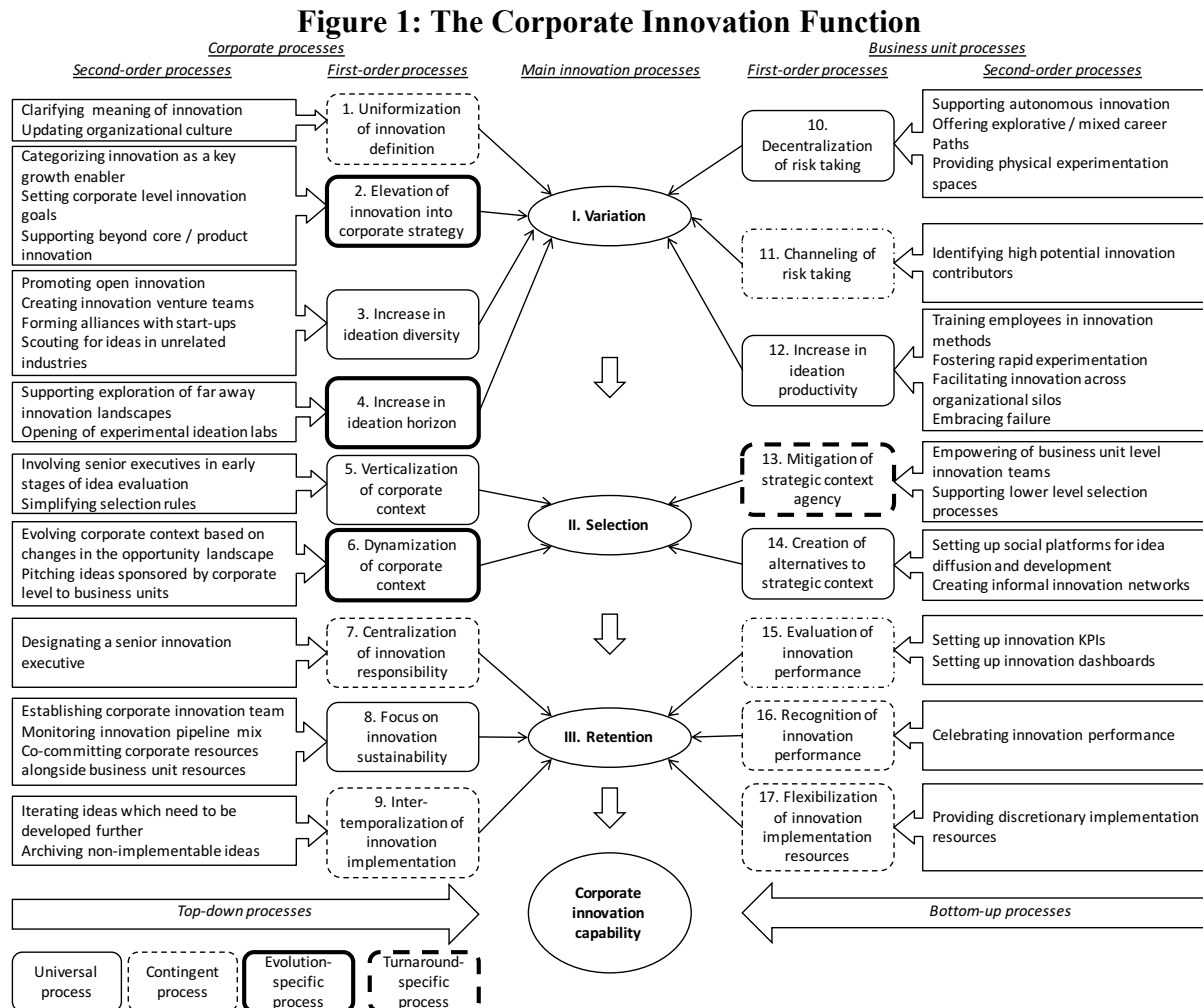
<sup>14</sup> In Table 3 we also include improvement cases. We focused our analysis on evolution and turnaround cases given that we identified only a lower number of improvement cases.

**Table 5: Case-ordered Matrix of Variation, Selection, and Retention of Corporate and Business Unit Level Processes**

Code name	I. Variation processes				II. Selection processes				III. Retention processes								
	Corporate processes		Business unit processes		Corporate processes		Business unit processes		Corporate processes		Business unit processes						
	Uniformization of innovation definition	Inclusion of innovation into corporate strategy	Increase in ideation diversity	Increase in ideation horizon	Decentralization of risk taking	Channeling of risk taking	Increase in ideation productivity	Verticalization of corporate context	Dynamization of corporate context	Mitigation of strategic context influence	Creation of strategic context alternatives	Centralization of innovation responsibility	Focus on innovation sustainability	Inter-temporalization of innovation implementation	Evaluation of innovation performance	Recognition of innovation performance	Flexibilization of innovation implementation resources
<b>Evolution</b>																	
Dione		*	*		*			*				*					
Eurybia	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Oceanus	*	*	*		*		*	*		*	*	*	*		*		
Phoebe	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*
Rhea	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Tethys	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Thea	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Themis	*	*			*	*	*	*	*	*	*	*	*		*	*	*
<b>Improvement</b>																	
Asteria	*	*	*	*			*	*		*	*	*	*		*	*	*
Crius	*	*	*		*		*	*	*	*	*	*	*		*	*	*
Metis	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*
Pallas	*	*	*		*	*	*	*		*	*	*	*	*	*	*	*
Perses	*	*	*		*		*	*	*	*	*	*	*	*	*	*	*
<b>Turnaround</b>																	
Atlas	*		*		*		*		*	*	*	*			*	*	*
Cronus			*		*	*	*	*	*	*	*	*	*	*	*	*	*
Eos			*		*	*	*	*	*	*	*	*	*	*	*	*	*
Hyperion			*		*	*	*	*	*	*	*	*	*	*	*	*	*
Lelantos	*				*	*	*	*	*	*	*	*	*	*	*	*	*
Ophion	*				*	*	*	*	*	*	*	*	*	*	*	*	*
Prometheus			*		*	*	*	*	*	*	*	*	*	*	*	*	*

#### 4.4 FINDINGS

The main goal of our analysis was to uncover processes employed by corporate managers to influence how innovation is done within multidivisional firms. Building on the evolutionary view of intra-organizational innovation processes (Burgelman 1983a), we first mapped processes we found on to the variation, selection, and retention (VSR) framework (see Figure 1). We paid particular attention to distributing processes across the three levels of analysis (i.e., corporate managers, middle managers, inventors) and process types (i.e., turnaround-specific, evolution-specific, common, contingent processes). Subsequently, we discussed interdependencies within and across the main processes of variation, selection, and retention.



## 4.4.1 VARIATION PROCESSES

### 4.4.1.1 Corporate-level Variation Processes

At the corporate level, we observed one common, one contingent, and two evolution-specific processes related to variation. The common variation process is the increase in variation diversity (3). Firms across the sample used open innovation (Chesbrough, 2006), consisting of sourcing ideas directly from external providers, such as universities, other firms, or individual inventors. Further firms invested into or partnered with start-ups with the objective to get access to latest technologies (Puranam, Singh, and Zollo, 2006). Firms also actively scouted for ideas in unrelated industries. Several firms established offices in Silicon Valley with the mandate to discover and assess the exploitability of the latest technological innovations. Firms routinely established a web interface through which outsiders could submit their innovation ideas. Firms also frequently organized ideation campaigns among outside stakeholders (e.g., customers). The senior director of consumer franchise innovation at Hyperion commented:

Open innovation is critical to fuel the short and long-term [innovation] pipeline. We use a defined system within Hyperion asking for submissions to fuel our innovation pipeline. We also actively work with other companies for product development, ingredient selection etc.

The contingent variation process is the uniformization of innovation definition (1). The decision by corporate managers to play a more active role in the management of innovation processes triggered a search for a firm-specific meaning of innovation. In several firms, this process took the form of a company-wide consultation across hierarchical levels. The head of central R&D services, innovation, and intellectual property at Pallas stated:

We asked lifecycle / worldwide committee in all the regions what is innovation for you. Name the products launched in the last 10 years you consider as innovative. [Based on this consultation] we derived innovation attributes: inspirational, game changing and money making. This definition of innovation has been communicated over and over throughout the company to make clear what innovation means. If employees have ideas fitting these criteria, they are encouraged to share them.

The uniformization of innovation definition also involves the promotion of aspects of the existing organizational culture compatible with the clarified meaning of innovation. Making significant changes to the organizational culture was considered counterproductive. In that sense, the uniformization of innovation definition follows the extant organizational culture and not vice-versa. The vice president of innovation at Asteria remarked:

Do not work against the company culture unless [your] company needs radical restructuring. Work with the culture and [its] good elements.

The first evolution-specific process is the elevation of innovation into corporate strategy (2). Across all evolution cases, innovation became a key element of corporate strategy. Corporate managers formulated mid- to long-term goals linked specifically to innovation activities, outlined strategy for achieving these goals, and defined metrics allowing them to track progress toward achieving innovation goals. The innovation goals were clearly separated from goals associated with existing businesses. The director of the Innovation Center of Excellence at Tethys commented:

We made innovation part of corporate strategy to drive industry-leading growth, along growth coming from expansion of our geographical footprint in focus areas and creation and expansion of a consumer-centric portfolio across key geographies to drive best-in-class shareholder return.

In contrast, executives in turnaround cases were mostly focused on getting extant innovation processes corrected and updated, as opposed to considering innovation as a significant growth engine at the same level of importance as growth from existing businesses. This dichotomy points to a differential in the level of innovation ambition between evolution and turnaround firms. Corporate managers in former firms established aggressive top-down innovation goals and were subsequently changing their innovation processes to achieve these goals. Corporate managers in the latter firms were concerned with ensuring that some level of innovation activity would occur

in their organizations, which focused corporate managers' attention to eliminating structural obstacles to innovation.

The second evolution-specific process we observed is the increase in variation horizon (4). It involves corporate support for the exploration of consumer trends and technologies whose potential financial contributions will not materialize in the near future. This process enables firms to reduce managerial myopia limiting opportunity searches to cognitively close landscapes (Gavetti & Levinthal, 2000) and to develop beyond-the-horizon (i.e., future-oriented) absorptive capacity (Cohen & Levinthal, 1990). The head of innovation at Phoebe commented:

We focus on trendsetting technology portfolios per business to achieve leading position. We aim to increase patents in trendsetting technologies through effective R&D spending. We do so by fully leveraging our capabilities and assets to tap further potential.

#### 4.4.1.2 Business unit-level Variation Processes

One common business unit-level variation process is the decentralization of risk-taking (10), aimed at pushing risk-taking behavior into areas outside of traditional loci of innovation activities, such as specialized R&D centers. Corporate managers encouraged autonomous bottom-up innovation, provided physical experimentation spaces, and made it possible for individual innovators to alternate between exploitative and explorative careers. In Eurybia's innovation documents, this process was described succinctly:

[The objective of the CIF is to] spread the culture of Innovation throughout all Eurybia Group disciplines.

The second common business unit-level process is the increase in variation productivity (12), focused on increasing the odds that variation activities result in higher-quality ideas. Second-order processes included training programs improving individual innovators' variation skills, rapid experimentation allowing efficient testing of early-stage ideas, facilitation of horizontal collaboration, and destigmatization of failure. Not all of these second-order processes were easy to implement, as noted by the executive responsible for driving innovation globally at Ophion:

Failure is an issue for everybody. If you fail, you may feel that you will get penalized. [Organizational] culture must change to turn failure into an opportunity to learn. It is tough to do in a regulated environment.

The contingent business unit-level variation process is related to the channeling of risk-taking (11). It consists of the identification of individual innovators deemed as possessing the ability to generate high quality ideas and of the solicitation of variation contributions from these individuals. The contingency nature of this process hinged on the ability of the organization to recognize high quality variation contributors. The vice president of global innovation at Cronus commented:

We ran innovation generation events and analyzed the database of 3000 ideas from 1000 employees on two dimensions including: contributions per person and quality of submitted ideas. We noticed that few people submitted a lot of low quality idea and a lot of people submitted few, but high quality ideas. We used social tools to get more ideas from these low frequency contributors.

#### 4.4.2 SELECTION PROCESSES

##### 4.4.2.1 Corporate-level Selection Processes

The only common corporate-level selection process is the verticalization of corporate context (5). This refers to corporate managers proactively influencing selection processes at lower hierarchical levels. The involvement of corporate managers started in the early stages of the development of novel ideas by individual inventors, as corporate managers directly participated in ideation events. Further, corporate managers got involved in the selection of bottom-up ideas. Corporate managers also simplified and added transparency to idea selection criteria and rules. For instance, Thea's innovation document describes a co-creation innovation methodology in which the idea discovery phase directly involved corporate managers, who also actively participated in the idea selection phase.

The evolution-specific corporate-level selection process is the dynamization of corporate context (6). It involves continuous updating of assumptions underpinning the corporate context, making it receptive to changes in the opportunity landscape. Another aspect of a more dynamic



corporate context is that corporate managers actively pitch novel ideas that they considered as promising to business units. The prominence of dynamization of the corporate context among evolution cases is a key distinction vis-à-vis the original Bower-Burgelman model (Bower, 1970; Burgelman 1983a, 1983b), in which the corporate context was assumed to be static in nature (Noda & Bower, 1996). The following quote by the vice president of global innovation at Oceanus illustrates the dynamic nature of corporate context among the evolution cases:

Tackling of new opportunities that include Big, Different and Breakthrough [projects], that wouldn't be achieved locally, requires knowing when it is time to change models again.

#### 4.4.2.2 Business unit-level Selection Processes

We identified one common and one turnaround-specific process at the business unit level. Both of these processes are aimed at lowering or eliminating the influence of the negative biases of middle managers towards novel ideas. The common process is the creation of alternatives to strategic context (14), which consisted of bypassing middle managers and connecting promising ideas directly with resources located at the corporate level. To create these channel alternatives to the strategic context, firms established social platforms for idea sharing and diffusion, and created informal innovation networks. The vice president of innovation at Asteria stated:

There used to be just one person selecting ideas and a lot of good ideas got lost. Now we use Ishare platform to connect idea generators with experts / other innovators. We also built internal "innovators network", as well as innovation networks for specific initiatives.

The turnaround-specific process, the mitigation of strategic context influence (13), aims at lowering middle managers' agency to dismiss novel ideas for reasons other than their potential to create value. Corporate managers empowered innovation teams in evaluating novel ideas and de-emphasized the role of formal hierarchy in the innovation activities. In doing so, corporate managers increased the selection influence of actual inventors and their collaborators with close knowledge of the novel idea, and decreased bureaucratic selection power arising from the hierarchical position of the evaluator. In addition, corporate managers supported the selection

processes at the inventor level, which lowered the hierarchical level at which the first selection of ideas took place. It also increased the resilience of pre-screened novel ideas when they faced scrutiny from middle managers (Knudsen & Levinthal, 2007). The vice president of global innovation at Cronus described their approach as follows:

We decentralized the innovation activity, [started to] use a light-touch management approach, integrated innovation activity into business units and leveraged pair-wise scoring consisting of comparing two randomly selected ideas.

The locus of this turnaround-specific selection process at the business unit level underlines the embedded difficulty in making business unit-level organizational structures penetrable for novel ideas. Resistance to innovation that turnaround firms had to overcome to ensure vertical flows of novel ideas stemmed from both employees directly opposed to innovation activities and employees suffering from innovation self-denial. The head of global innovation at Ophion noted:

[In the case of] aggressive resisters [to innovation], the challenge is how to manage them. People may [also] resist when they think they have been innovating for years.

#### 4.4.3 RETENTION PROCESSES

##### 4.4.3.1 Corporate-level Retention Processes

The common process at the corporate level, the focus on innovation sustainability (8), consists of sustaining the retention of selected ideas when their implementation runs into unexpected challenges. This top-down involvement was especially impactful when the utility of ideas transcended across multiple business units. The retention of such ideas might not have been optimal from the perspective of middle managers running the individual business units, as it drew on business unit-specific resources without offering short-term return potential at the business unit level. Yet, corporate managers might still pursue the implementation of hard-to-implement selected ideas, seeking long-term returns. To that effect, corporate managers established corporate innovation teams with the agency to intervene across business units and report to corporate

managers as opposed to middle managers. Further, corporate managers co-committed resources alongside business units' resources. Corporate managers also actively managed the innovation pipeline mix to continuously include easy-to-execute projects, as well as more complex innovation projects. Corporate managers' ultimate goal was to routinize the retention of selected bottom-up innovation activities originating at the business unit level so that implementation challenges would not stop the selected novel ideas from being retained. The focus on innovation sustainability (8) required an ongoing effort and attention from corporate managers. The director of strategic innovation at Themis commented:

We have a [innovation] strategy, how do we move from “us” making all innovation decisions to an organization that is managing and delivering innovation goals in a sustainable basis?

The first contingent corporate level retention process is the centralization of innovation responsibility (7), manifested by the designation of a senior-level executive with the responsibility for the retention of the innovation strategy. While the main responsibility of the innovation executive was to transform innovation goals into measurable results, concrete agendas varied depending on specific innovation objectives. A common denominator in the narratives was the initially undefined nature of this position. Instead, innovation executives were defining their exact roles and priorities through an iterative sense-making process that involved the perceptions of the different internal stakeholders. The managing director of strategic growth initiatives at Atlas described the evolving nature of his role as follows:

I was given the task to manage innovation top down, with no direction how to do it... I talked to business unit managers and asked “what do you think, are we innovative?” [It made managers'] head spinning, all heard of Google's 20% of time working on whatever they like... [But that would not work] not at Atlas. [I knew I] will not get it right the first time; it will be an iterative process; [moreover] the [corporate] innovation program will have to survive the strong culture.

The other contingent corporate retention process is the inter-temporalization of innovation implementation (9). This process involves providing longer-term support to the retention of those

ideas that needed to be developed further. Given that corporate managers can spread their bets on more innovation projects than business unit managers can, corporate managers are less constrained in how long they can support a high-potential idea whose retention progress is being slowed down by innovation process-related obstacles (e.g., Klein & Knight, 2005). Further, corporate managers can set up and maintain long-term organizational innovation memory by preserving blueprints for ideas that prove to be unsuitable for implementation in the current temporal period. The intertemporalization of innovation implementation is contingent on corporate managers' objectives being focused on long-term results, as opposed to seeking maximization of short-term profits. Another contingency is the provision of a discretionary innovation budget at the corporate level.

#### 4.4.3.2 Business unit-level Retention Processes

All retention processes at the business unit level were classified as contingent. The process of evaluation of innovation performance (15) results in the ability of the organization to measure both innovation activity and outcomes. It involves the establishment of key innovation performance indicators used to measure individual level innovation activity and the setting up of an innovation dashboard to follow innovation progress on a more aggregated level. The contingency nature of this process is linked to the difficulty in modifying existing metrics used to assess performance of both middle managers and individual innovators. The managing director of strategic growth initiatives at Atlas remarked:

[We] established financial target for each business unit linked to innovation, [managers] hated that, but it focused the business units on generating innovation, and measured progress against the innovation targets.

Recognition of innovation performance (16) institutes mechanisms for celebrating innovation achievements, such as public commendations, opportunity to work on projects of intrinsic interest to employees, or personal recognition and advice from senior executives. However, this process is more complex than it might appear, since celebration of both innovation

successes and failures is required. Rewarding failure was non-trivial, particularly in firms operating in highly regulated environments (e.g., finance, aviation). In these type of environments, which require high levels of operating reliability, failure was viewed as undesirable. One contingency in this process was the willingness by senior managers to back their non-tangible recognition of individual-level innovation efforts with tangible rewards. Previous literature uncovered that non-tangible rewards and intrinsic motivation were the main motivating factors for employees' decision to engage in creative variation (Zhang & Bartol, 2010). Yet, we found that maintaining employee motivation beyond the initial variation phase required increasing use of extrinsic motivators. The managing director of strategic growth initiatives at Atlas stated:

[We] increased cash awards to implement innovation, [in addition] to rewarding innovation at town hall [meetings]. [When an employee got commended for a novel idea], all the other employees [claimed to have] had the same idea. [Only] once money gets involved, people execute.

The process of flexibilization of innovation implementation resources (17) consists of making retention resources available on a discretionary basis (Noda & Bower, 1996). This is important since the implementation of innovation initiatives often runs into unexpected obstacles (Klein & Sorra, 1996). Flexibilization of innovation implementation resources was contingent on the amount of resource slack within the organization (Penrose, 1959), lowering the negative effect on short-term performance of allocating resources to bottom-up innovation. Flexibilized resources took both tangible and intangible form, as reflected by a comment from the senior vice president at Crius:

What we [the CIF] offer: time, funding, feedback and idea refinement, a firm wide hub for innovative ideas, people and projects.

#### 4.4.4 INTERDEPENDENCIES WITHIN VARIATION, SELECTION, AND RETENTION PROCESSES

Above, we outlined the strongest links between first-order processes and variation, selection, and retention processes (i.e., main processes). Below, we discuss secondary links

comprising both vertical and horizontal interdependencies within and across the main processes.

#### 4.4.4.1 Vertical and Horizontal Interdependencies in Variation.

We observed several vertical and horizontal interdependencies in the corporate involvement in the variation process. One salient vertical interdependency involved the search for the meaning of innovation. Corporate managers involved in the uniformization of innovation definition (1) sought opinions across the hierarchical levels. In the case of Lelantos, consultations about the meaning of innovation took place at regional, divisional, and team levels. Increases in variation diversity (3) required regular interactions between corporate managers and middle managers. For instance, at Atlas, investment professionals responsible for making venture capital investments held consultations with business unit heads to get their inputs. Yet, it was an indirect bottom-up influence since specific resource allocations remained firmly a corporate-run process. In contrast, in the case of Perses, corporate managers formed direct intra-organizational partnerships to drive variation diversity. In addition, we observed that the explicit inclusion of innovation into corporate strategy triggered the need for business managers to incorporate in their market strategies plans to generate growth from innovation, as the overall growth targets were unachievable from exploiting existing activities only.

Horizontally, on the corporate level, the uniformization of innovation definition (1) facilitated the inclusion of innovation into corporate strategy, as the organizational meaning of innovation was clarified which facilitated its codification (Zollo, 1998). In addition, the increase in ideation diversity (3) supported the increase in variation horizon (4), as corporate managers gained awareness and knowledge about more distant trends and technologies. On the inventor level, we observed that channeling of risk-taking reinforced the positive effect of the decentralization of risk-taking on the increase in variation productivity. Without directing the variation incentives to employees with high potential to innovate, the variation process tended to

produce low-value ideas only.

#### 4.4.4.2 Vertical and Horizontal Interdependencies in Selection

The main vertical interaction we observed within the selection process was between corporate managers and individual innovators, more so than between corporate and middle managers. Corporate managers assumed that increasing middle managers' openness to autonomous innovation is possible, but it will be a lengthy and complex process, as it involves modification of elements of organizational culture. Instead, corporate managers focused their efforts on directly empowering individual innovators. For instance, in the case of Eos, corporate managers reduced the chances of negative consequences for individual innovators. Further, they increased the cost in terms of performance evaluation for middle managers to block autonomous innovation initiatives.

Horizontally, on the corporate selection level, the verticalization of the corporate context (5) and resulting greater direct knowledge of bottom-up innovation initiatives allowed corporate managers to enhance their capabilities to modify assumptions guiding their interventions into innovation processes. At the business unit selection level, the mitigation of strategic context agency (13) made it easier for individual inventors to bypass middle managers in their search for resources and corporate-level endorsement of their innovation activities.

#### 4.4.4.3 Vertical and Horizontal Interdependencies in Retention.

The first vertical interdependency in retention is between the *centralization of innovation responsibility* (7) and the evaluation of innovation performance (15). Corporate managers, often with the help of outside consultants, inserted measurable metrics used to evaluate the innovation performance of middle managers. Innovation performance metrics were often contested by middle managers, as innovation metrics conflicted with middle managers' main focus of delivering

exploitative results. The second vertical interdependency is between the focus on innovation sustainability (8) and the flexibilization of innovation implementation resources (17). The discretionary innovation budget controlled by corporate managers was not only used to support corporate-level innovation processes, but was also deployed to provide ad hoc resources for retention of selected innovation initiatives at the business unit level.

Horizontally, on the corporate retention level, centralization of the innovation responsibility supported several of the second-order processes aimed at making innovation sustainable. This was particularly the case for the establishment and resourcing of corporate innovation teams and the acquisition of discretionary innovation budgets. On the business unit level, the ability to evaluate innovation performance allowed for its recognition. The evaluation of innovation performance also facilitated more efficient flexibilization of innovation implementation resources.

#### 4.4.5 INTERDEPENDENCIES ACROSS MAIN PROCESSES

Interdependencies across main processes were associated with the informational outputs generated by first- and second-order sub-processes. In the case of variation (I) and retention (III) processes, focus on innovation sustainability (8) influenced corporate efforts toward increasing variation diversity (3), as corporate managers monitored the numbers and types of projects in the innovation pipeline (i.e., innovation pipeline's characteristics). Corporate managers proactively addressed discrepancies between innovation pipeline characteristics and the corporate innovation strategy (2) by influencing the variation diversity (3). Further, we observed that the ability of corporate managers to evaluate (15) and recognize (16) innovation performance hinged on the level of concreteness of the innovation definition (1). The innovation definitional fuzziness decreased the ability of corporate managers to drive innovation retention.

In the case of the main selection (II) and main retention (III) processes, inter-



temporalization of innovation implementation (9), together with flexibilization of innovation implementation resources (17), allowed for the iterative selection of ideas. The benefit of this was that, instead of terminating ideas whose implementation ran into issues in the retention phase, ideas were submitted for re-selection to assess their potential for further resource commitment.

#### **4.5 TYPOLOGY OF CORPORATE INVOLVEMENT IN INNOVATION MANAGEMENT**

Prior to discussing theoretical implications of our findings, we synthesize the level and nature of involvement of corporate managers in innovation management (i.e., the CIF configuration) by defining the collaborative, parallel-capability, and sponsorship CIF models. These three CIF models were the dominant types emerging from observations across our cases. For each CIF model, we explain the respective variation, selection, and retention mechanisms. We conclude our typology discussion by positioning each CIF model on the innovation efficiency frontier, defined as the efficient trade-off between type I and II innovation errors.

##### **4.5.1 THE COLLABORATIVE CIF MODEL**

In the collaborative CIF model, corporate managers proactively influence existing innovation processes across the organization without developing a standalone corporate-level innovation capability independent from innovation processes occurring within the business units. Corporate managers act as facilitators focused on removing hindrances to innovation and improving existing processes.

In the Collaborative CIF model, corporate managers seek to enrich the variation process by matching previously underutilized external and internal variation with opportunities in the same or other business units. To introduce external ideas, corporate managers create an organizational climate conducive to what Chesbrough (2006) described as an open innovation environment. Main mechanisms involve investments in external ventures (Dushnitsky & Lenox, 2005), the formation

of alliances with start-ups (Rothaermel, 2001), and scouting for ideas in unrelated industries (Hansen & Birkinshaw, 2007). Internally, corporate managers focus on empowering high-potential innovators who might be reluctant to engage in the innovation process without receiving corporate support. Main mechanisms involve encouragement of autonomous innovation through internal venturing (Burgelman, 1983a), provision of safe experimental spaces (Dombrowski et al., 2007), and removing hindrances to switching between exploitative and explorative career paths (Cohen, McClure, and Yu, 2007). Further, corporate managers strive for variation efficiency through training in ideation at the individual employee level (Roffe, 1999), support for rapid experimentation (Thomke, 2003), and the creation of an organizational climate tolerant to failures stemming from innovation pursuits (McKee, 1992).

In the collaborative CIF model, corporate managers lessen the influence of middle managers in the selection process in three ways. First, corporate managers get directly involved in early stages of the novel-ideas evaluation process before novel ideas face the scrutiny of middle managers. This verticalization of corporate context enables corporate managers to detect novel ideas that fit the corporate context and eliminate low-value ideas early on. The pre-selected ideas are given resources for their development into more defensible innovation initiatives (Knudsen & Levinthal, 2007). Second, corporate managers sponsor the development of social innovation platforms and the formation of informal networks composed of middle managers and subject matter experts supporting individual innovators (Tsai & Ghoshal, 1998). These two networking mechanisms provide ways for individual innovators to present their novel ideas, get early feedback on the merit of their novel ideas, and access resources for their further development. Third, corporate managers seek to introduce selection mechanisms operating below the middle manager level (e.g., pairwise scoring - comparison of relative merit of two randomly selected ideas).

In the collaborative CIF model, the retention of selected novel ideas remains at the level of

business units, with corporate managers providing additional implementation resources in cases when unforeseen implementation hurdles arise. Further, corporate managers fulfill two longer-term retention roles. First, corporate managers focus on innovation sustainability by proactively monitoring the innovation pipeline in terms of the numbers, stages, and types of innovation initiatives. Corporate managers proactively address deviances between the current state of the innovation pipeline and the intent of the corporate context. Second, corporate managers act as a memory for selected innovation initiatives that turn out to be non-implementable in the near future by safeguarding their codified blueprints (Zollo, 1998) for potential future reactivation.

#### 4.5.2 THE PARALLEL-CAPABILITY CIF MODEL

In the parallel-capability CIF model, corporate managers develop a completely separate innovation capability from the innovation capability residing at the business unit level. As the business unit level innovation capability follows the Bower-Burgelman model described above, in the following sections we focus our discussion on variation, selection and retention processes occurring at the corporate level.

Variation process at the corporate level is focused at the development of forward-looking innovation sensory capability, orienting the firm's absorptive capacity toward future opportunities (Cohen & Levinthal, 1990). This forward-looking sensory capability is gained through the establishment of innovation teams responsible for identifying, understanding, and codifying (Zollo, 1998) technologies developed within innovation clusters. A number of the sampled firms established a presence in Silicon Valley, even though their core business was unrelated to Silicon Valley's technological landscape. Another mechanism for exploring distant opportunity landscapes was the establishment of ideation labs, which allowed for experimentation with radically new ideas through, for instance, creation of concept products potentially relevant to customers only in a distant future.

Marginson and McAulay (2008) argued that corporate managers are more inclined to short-termism (i.e., preference for projects with more certain outcomes) than middle managers due to capital market pressures. Yet they failed to find empirical support for their prediction suggesting the need for further research on the relationship between risk-taking behavior and hierarchy. In our observations related to the corporate selection process in the parallel-capability CIF model, corporate managers pro-actively sought to allow high-value/high-risk innovation projects to get selected. A key mechanism at the corporate level allowing for the selection of high-value/high-risk innovation projects was the dynamization of corporate context. Corporate managers pro-actively sought to understand distant opportunity landscapes, which allowed them to better assess the risks associated with identified innovation opportunities and make an informed selection decision. Thus, in contrast to the prediction made by Marginson and McAulay (2008), in the parallel-capability CIF model corporate managers seek to select radical, as opposed to incremental, innovation initiatives for retention.

Retention in the parallel-capability CIF model occurs at the corporate level until the desired outcome is reached. Discretionary corporate innovation resources facilitate the overcoming of unexpected retention hurdles. Once the desired outcome is obtained, corporate managers make a top-down decision about which business units are given the responsibility for exploiting the retained innovation initiative.

#### 4.5.3 THE SPONSORSHIP CIF MODEL

In the sponsorship CIF model, corporate managers develop an incomplete innovation capability for driving their own innovation agenda through variation and selection, yet remain dependent on business units for the retention of innovation initiatives generated at the corporate level. Parallel variation and selection capabilities coexist at both corporate and business unit levels, while the retention capability exists uniquely within the business unit realm. Thus, corporate

managers need to pitch their selected initiatives to business units for sponsorship and retention through implementation.

#### 4.5.4 THE INNOVATION EFFICIENCY FRONTIER

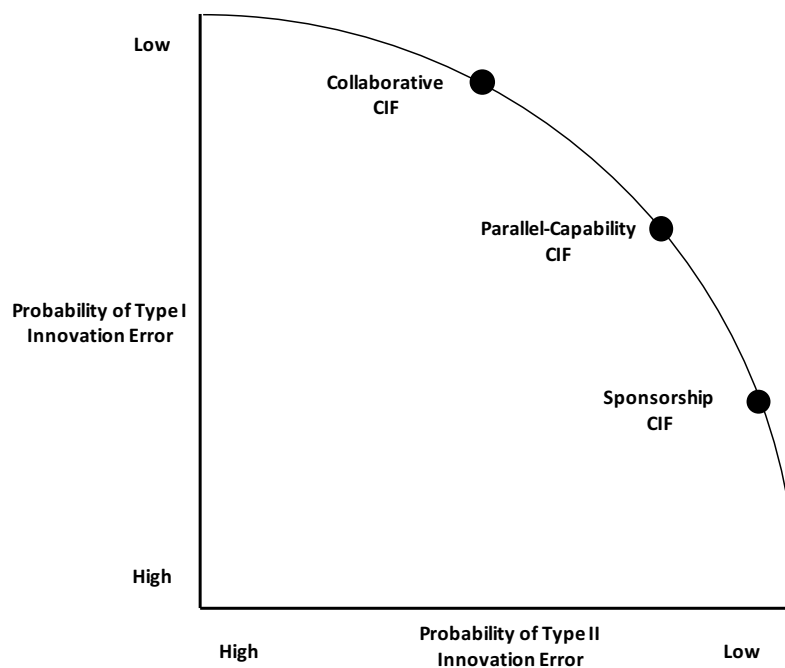
A critical question that remains is whether a firm, at the same time, can minimize both type I and II innovation errors. Figure 2 synthesizes our arguments of how different configurations of the CIF affect firm-level innovation performance, expressed as the incidence of type I and II innovation errors. The collaborative CIF model is effective in aligning business unit innovation effort with the corporate context, thus reducing type I innovation errors. In the collaborative CIF model, the cognitive effort by corporate managers is directed at aligning business unit-level innovation activities with the imperatives of the corporate context, which is backward-looking and constrained by the limits of managerial cognition (Cyert & March, 1963). Thus, paradoxically, the incidence of type II innovation errors is high given that autonomous innovation initiatives deviating from the corporate context have fewer opportunities to develop into defensible projects (Knudsen & Levinthal, 2007).

In contrast, in the parallel-capability CIF model, corporate managers proactively encourage innovations deviant from the imperatives of current corporate context, which reduces the incidence of type II innovation errors. In effect, corporate managers act as a buffer between high-potential and high-risk innovation initiatives and the business unit-level selection pressures. Yet, as corporate managers devote less attention to innovation initiatives at the business unit level, the incidence of type I innovation error increases, as the selection decisions by middle managers face less scrutiny from corporate managers.

In the sponsorship CIF, the incidence of type I innovation errors is even higher than in the parallel-capability CIF model, as corporate managers are dependent on middle managers' acceptance of top-down innovation initiatives. We expect this dependency to create leniency by

corporate managers toward low-risk and low-return innovation selection choices made by middle managers. On the contrary, we expect the incidence of type II innovation errors to be the lowest among the three CIF models, as corporate managers do not lose connection to the autonomous bottom-up high-risk/high-value innovation initiatives as is the case in the parallel-capability CIF model. This cross-fertilization of top-down and bottom-up high-risk/high-return innovation initiatives drives down the likelihood of type II innovation errors.

**Figure 2: The Innovation Efficiency Frontier**



#### 4.6 DISCUSSION AND CONCLUSIONS

Our investigation into corporate engagement in intra-organizational innovation processes enabled us to construct a detailed account of how corporate managers develop and deploy the capability to influence how innovation occurs in their firms. By disentangling corporate engagement in the variation, selection, and retention of novel ideas at the corporate, middle manager, and individual innovator levels of analysis, our findings shed light on mechanisms and associated resources employed by corporate managers to build, sustain, and improve business unit

innovation capabilities in multidivisional firms. In the following section, we outline the theoretical and managerial implications of our findings.

#### 4.6.1 EXTENDING THE COMPLEMENTARITY VIEW OF TOP-DOWN INNOVATION MANAGEMENT

Relatively little is known about the interaction among innovation processes operating at different levels of analysis involving actors having varying degrees of agency in innovation management (Garud et al., 2013), as “Both the generation of ideas purely at the level of the SMT [senior management team] and the receipt and treatment of ideas by SMTs proposed upwards to them have received scant attention in the innovation literatures to date despite the crucial position held by senior managers to facilitate or stifle innovation” (Anderson et al., 2014, p. 1321). This dominance in the extant innovation literatures of studies examining innovation processes operating at lower organizational levels could be attributed to tacitness of the phenomenon of corporate involvement in innovation, related to the general lack of understanding of what corporate managers actually do (Collis, Young, and Goold, 2007). In our study, we address this gap in the literature and build on emerging research that suggests that top-down and bottom-up innovation processes are complimentary (Birkinshaw et al., 2011). In our study, we unpack the relationship between the top-down and bottom-up innovation processes and mechanisms used by corporate managers to influence how variation, selection, and retention of novel ideas occurs at the individual innovator, middle manager, and corporate levels of analysis.

During our investigation, we found that corporate managers were cognizant of the need not to actively influence bottom-up innovation management, sometimes even by heavy-handed top-down micromanagement of business unit processes. Corporate managers sought to build on extant innovation processes and design new ways for driving innovation capabilities, capacity, and outcomes.

In cases where organizational culture at the business unit level was hostile to innovative

behavior, corporate managers preferred workarounds to increase the overall firm innovation performance, as changing organizational culture at the business unit level was considered ineffective. Further, the nature of corporate engagement in innovation management was in most cases ad-hoc and tactical, as opposed to planned and strategic. Corporate managers, assigned responsibility to drive innovation, were typically given few pointers about how to build and then deploy corporate innovation capabilities. Consequently, we did not observe that top-down corporate involvement would substitute for bottom-up innovation processes. Instead, we generally observed rather cautious top-down approaches aimed at augmenting the best elements of existing bottom-up innovation processes and complementing them with top-down innovation processes.

The boundary condition for the complementarity relationship between the top-down and bottom-up innovation processes manifested by our observation of the parallel-capability CIF model. When corporate managers recognized that bottom-up innovation processes are unlikely to result in higher-risk/higher-potential innovation initiatives, they built a separate corporate-level innovation capability sheltered from business unit-level selection pressures.

#### 4.6.2 THE EFFECT OF CIF ON THE INCIDENCE OF TYPE I AND TYPE II ERRORS

One of the reoccurring themes among the observed processes was the proactive effort by corporate managers to influence how individual innovators, middle managers, and corporate managers themselves engage in risk-taking behavior associated with innovation activities. Further, corporate managers were influencing how these three levels of employees interacted with relation to innovation-related activities. In the following paragraphs, we discuss how the observed processes map into corporate managers' efforts to promote risk-taking behavior across hierarchical levels, filter risk-taking behavior, and ultimately transform risk-taking behavior into the firm's overall innovation performance (Figure 3).



**Figure 3: Effects of the Corporate Innovation Function on the Incidence of Type I and II Innovation Errors**

	Promotion of risk taking behavior	Filtering of risk taking behavior	Transformation of risk taking behavior
Incidence of type I innovation error	+	-	-
Incidence of type II innovation error	-	-	-

#### 4.6.2.1 Promotion of Internal Risk-Taking Behavior

The wiliness of individual employees to engage in innovation activities declines with their increasing embeddedness in formal organizational roles (Van de Ven, 1986). Current literature emphasizes the importance of open innovation (Boudreau & Lakhani, 2009; Chesbrough, 2006) in enabling firms to remain innovative by leveraging external high-potential novel ideas. Our study extends and enriches the open innovation literature by uncovering processes aimed at discovering underutilized internal innovation talent and using it as a supplementary source of high-potential novel ideas. We observed two approaches undertaken by corporate managers for achieving this goal.

First, corporate managers focused on creating an intra-organizational environment tolerant of the risks associated with innovation related behavior. The uniformization of innovation definition (1), involving the interaction of corporate managers with employees across hierarchical levels, enabled corporate managers to define what types of innovations and associated risks are desirable. Elevation of innovation into corporate strategy (2) established innovation as an equal source of growth alongside expansion of the core business, pursuit of M&A, or establishment of alliances (Capron & Mitchell, 2013). All of these processes increased legitimization of employees' risk-taking behaviors linked to the pursuit of innovation. Further, this legitimization effect was

strengthened when corporate managers codified (Zollo, 1998) the elevation of innovation into the corporate strategy by formulating a corporate innovation strategy setting out overall firm performance targets related to innovation.

Second, corporate managers enacted processes aimed at discovering and utilizing innovation slack already existing within the organization, complementing the open innovation process. Decentralization of risk-taking (10) increased options for individual employees to engage in innovation activities, lowering the threshold for justifying innovation activities, as well as risks for individual careers in the case of failure. Corporate managers were cognizant that not every employee in their organization has the option or capability to productively engage in innovation activities. To address this limitation to the decentralization of risk-taking, corporate managers engaged in channeling of risk-taking (11) to increase chances that employees with high potential to innovate engage in autonomous innovation.

Promotion of internal risk-taking behavior increases the incidence of type I innovation error, while it reduces the incidence of type II innovation error. Type I innovation error is increased as legitimization of innovation-related risk-taking increases the generation of low-value innovation proposals, reflecting consistent comments by our narrators that not every employee has the aptitude to contribute to the innovation process. Further, several narrators reported that their firms were trapped in the “innovation maximization fallacy” (Anderson et al., 2014, p. 1320) whereby the top-down promotion of the risk-taking behavior resulted in abundant low- to negative-value creativity. The incidence of type II innovation error is reduced as top-down guidance on desirable innovation areas encourages innovation mental effort of talented employees who would otherwise remain in their exploitative roles.

#### 4.6.2.2 Filtering of Risk-taking Behavior

Within the VSR framework, processes regarding selection of novel ideas are the least

understood (Reitzig & Sorenson, 2013). Previous research focused on factors inhibiting selection of the highest-value ideas by middle managers, such as personal agendas (Bower, 1970), strategic context (Burgelman, 1983a), and psychological biases (Reitzig & Maciejovsky, 2015). Our observations resonate with the view that middle managers are not the ideal evaluators, from the overall firm's perspective, of high-value/high-risk novel ideas. Narrators consistently considered that middle managers can block innovation just by doing their job, which provided them with the formal authority to say no to high-value/high-risk novel ideas.

Our observations expand the discussion on the selection of novel ideas within a multidivisional firm by uncovering top-down mechanisms lessening the negative effects of corporate managers' risk aversion for autonomous innovation. Verticalization of corporate context (5) increased corporate managers' involvement in early selection decisions concerning merits of novel ideas that increased monitoring of middle managers' selection decision-making. Mitigation of strategic context agency (11) introduced selection mechanisms operating below middle managers' hierarchical levels, decreasing the number of low-value novel ideas and increasing the viability of high-value novel ideas through early detection, endorsement, and development from the embryotic stage into defensible innovation initiatives (Knudsen & Levinthal, 2007). The rules-based nature of these sub-middle manager selection processes increases their robustness vis-à-vis behavioral and personal biases (Reitzig & Maciejovsky, 2015). Creation of alternatives to strategic context (14) decreased opportunities for middle managers to dismiss these pre-selected high-value ideas, as individual inventors had other means to access resources needed for further development of their ideas. In particular, informal innovation networks set up by corporate managers served as conduits for autonomous innovation, counterbalancing the skepticism toward high-value/high-risk novel ideas within formal selection networks (Gulati & Puranam, 2009). By playing an active role in the redesign of the overall process of novel idea evaluation, corporate managers got a deeper

knowledge of the characteristics of the internal innovation pool, allowing them to continuously update their mental models about the innovation opportunity landscape. This dynamization of corporate context (6) process lessens corporate managers' dependency on middle managers for inputs needed for the reformulation of corporate strategy (Burgelman, 1994) and allows corporate managers to maintain awareness of shifts in the opportunity landscape (Gavetti & Levinthal, 2000).

Filtering of risk-taking behavior reduces the incidence of both type I and II innovation errors. Top-down involvement in the selection process, as well as the introduction of rules-based sub-middle manager selection, eliminates low-value projects from the onset. Further individual innovators are less likely to continue in innovation activities when their proposals are consistently dismissed. Thus, the incidence of type I innovation error is reduced. Our narrators commented that the vast majority of employees produce mediocre novel ideas, while a few employees generate consistently high-value novel ideas. Filtering of risk-taking enables corporate managers to identify these innovation high performers and support their innovation efforts, thus reducing type II innovation error.

#### 4.6.2.3 Transformation of Risk-taking Behavior

Implementation of selected novel ideas is a complex process with many hurdles that selected novel ideas must overcome (Klein & Sorra, 1996). Resonating with the work by Noda and Bower (1996), our observations highlighted the importance of staggered resource allocation in the process of transforming selected novel ideas into valuable outcomes for the firm. In several of the sample firms, corporate managers established discretionary innovation resources under their control (i.e., corporate innovation resources). The allocation of these corporate innovation resources was flexible (17), as corporate managers were allocating them based on each project's unforeseen needs, and not based solely on a pre-determined plan. Top-down flexibilization of innovation implementation resources (17) reflected the inherent uncertainty accompanying the

transformation of highly risky innovation initiatives into desired outcomes.

Several structural changes initiated by corporate managers increased the likelihood that selected novel ideas will be of value to the firm. Corporate managers redesigned evaluation structures for middle managers to include innovation performance measures (15) linked to accomplishing innovation targets. The establishment of a permanent corporate-level innovation team (7) increased the likelihood that the corporate innovation strategy would be achieved. Further, it also increased the chances that knowledge blueprints for selected novel ideas, which in the end cannot be implemented, are archived for later reactivation and knowledge recombination (9).

The process of transformation of risk-taking behavior significantly reduces type I innovation error, as the merits of each novel idea are further scrutinized during the flexible resource allocation process. There is no significant effect on the incidence of type II innovation error, as no new novel ideas are selected at this stage. However, there is an inter-temporal (9) reduction in type II innovation error, as archived ideas may lead to breakthroughs over the long-term.

#### 4.6.3 LIMITATIONS AND OPPORTUNITIES FOR FUTURE RESEARCH

The importance of linking corporate actions to type I and II innovation errors stems from the trade-off organizations face between aligning innovations with the current corporate strategy and supporting innovations disrupting it (Garud et al., 2013). This research focused on the question of how corporate managers exert influence on innovation processes occurring at lower hierarchical levels in multidivisional firms. Based on an inductive multiple-case research design, we developed a framework for a CIF, thus far unexplored in the literature. We explained the process of CIF conceptualization, creation, and deployment, as well as its effects. By exploring the processes through which the CIF is established, we were able to derive a theory of the effect of the CIF on the innovation output.

The inductive nature of our study, as well as our data, limits the generalization of the CIF theory in several ways. First, we did not identify the actual triggers for the establishment of the CIF. In our data, we identified mainly economic and founder influences on corporate realization of the need to become more actively involved in the management of innovation. Future research should investigate the origin of the corporate decision to innovate, as well as the determinants of corporate innovation ambition. Second, we focused on structural elements of the CIF. More work is needed to understand the behavioral underpinning of corporate involvement in innovation, especially as corporate involvement in business-unit processes can potentially encounter strong opposition grounded in emotional, rather than cognitive, responses. It could be that group-based emotions may be significant determinants of corporate managers' involvement in innovation processes. Another limitation is a lack of observation in our data of CIF performance implications. Our informants and archival data converge on implicating that innovation occurring at the corporate level focuses on more radical and forward-looking innovation opportunities, while innovation capability at the business unit level aims to develop innovations closer to the current core products and services.

An additional limitation is that our sample is skewed toward firms that *have* established the CIF, leaving out firms that may have considered establishing the CIF, but have instead decided against it. Similarly, our data did not allow us to assess the degree of adoption of the CIF in the organizational population. Future studies employing large sample approaches should investigate whether the CIF constitutes a sustained competitive advantage.

Further, the establishment, deployment, and maintenance of the CIF requires allocation of corporate-level resources needed for supporting the agenda of a corporate level innovation executive, the staffing of a corporate innovation team, and the financing of a discretionary corporate innovation fund. The allocation of some corporate level resources specifically to

innovation may trigger tensions within the C-level team, given that these resources are likely to be taken from other C-level functions. Thus future studies should explore the resource allocation process at the corporate level to increase our understanding of decision making concerning governance of corporate headquarters.

#### 4.6.4 MANAGERIAL RELEVANCE

As a process study, this research generated new insights into how corporate managers influence innovation processes at the business unit level. Yet, as the establishment and deployment of the CIF involves changes and significant commitment across all organizational levels and is highly context-dependent, we remain cautious in providing normative prescriptions. Further, several lessons to be drawn from our study are as follows. First, in most of our sampled firms, corporate involvement in innovation represented a significant departure from established practices. As such, corporate involvement in innovation was often met with initial resistance, which suggests that a gradual and consultative approach across all three main innovation processes is going to increase the chances that corporate innovation objectives are attained. Second, the formal introduction of the CIF requires adjustments to existing organizational culture. We suggest that, rather than trying to significantly modify organizational culture, it will be beneficial to identify which cultural characteristics are supportive of corporate involvement in innovation and then fully leverage them. Finally, not all employees showed an equal motivation and ability to innovate. Identifying those employees willing to support and contribute to corporate involvement in business unit innovation and then deploying these individuals as boundary-spanning change agents is likely to be more effective than enforcing a top-down hierarchical approach.

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## 5.1 INTRODUCTION

How do the actions of corporate managers in large multidivisional firms lead to the establishment of innovation routines conducive to continuous discovery, evaluation, and monetization of distant innovations (i.e., dynamic corporate innovation capability)? Distant innovations encompass destructive (Schumpeter, 1940/1954), radical (Dewar and Dutton, 1986), and architectural (Henderson and Clark, 1990) innovations which are novel to the firm and markets in which the firm operates (Katz and Allen, 1982). Some large multidivisional firms develop dynamic corporate innovation capability (Lawson and Samson, 2001), while many once dominant multidivisional firms fail to adapt to rivals taking advantage of technological innovations (Christensen, 1997), business model innovations (Markides, 2006), or shifts in consumer preferences (Henderson, 2006). To continuously adapt to disturbances to market equilibrium—caused by either established rivals or new entrants (D’Aveni, 1999)—multidivisional firms need to develop innovation routines conducive to the generation of distant innovations (Martins and Terblanche, 2003).

Studying how managerial actions lead to the development of dynamic corporate innovation capability is important as it allows firms to counterbalance biases towards exploitation that permeate large organizations (March, 1991) and pursue both exploitation and exploration concurrently (Greve, 2007). Through the continuous generation of distant innovations, firms gain the agency to shape the industries in which they operate (Teece, 2007), endogenously impacting their own profitability (McGahan and Porter, 1999). The recent rapid decline of wireless email pioneer BlackBerry provides an illustration of just how suddenly a former innovation champion can fail when an innovative rival transforms an entire industry. Would BlackBerry’s failure to effectively respond to the emergence of Apple’s iPhone have been reversed if BlackBerry’s

corporate managers had been more proactive in developing dynamic corporate innovation capability? Similarly, have traditional automakers such as Chrysler, Ford, and General Motors established a dynamic corporate innovation capability allowing them to keep pace with automotive industry disruptors Google, Tesla, and Uber? And most recently, have traditional food retailers established the capability to quickly level the innovation playing field with Amazon after its sudden and disruptive entry into their arena?

The above examples highlight that a firm's innovation capability is principally an adaptation process (Gupta, Tesluk, and Taylor, 2007) through which a firm attempts to maintain its environmental fitness (Helfat et al., 2007). A firm maintains its environmental fitness by continuously identifying and taking advantage of new opportunities (Teece, 2007) and preempting disruptive moves by competitors (D'Aveni, 1999). Ultimately, a firm's innovation capability allows for sequential and/or parallel pursuit of incremental, radical, and architectural innovation types (Tushman, 1997; Shilling, 2008) alongside the exploitation of extant core businesses (March, 1991).

Previous research has paid little attention to the role of corporate managers in the development of innovation capability, in contrast to the rich body of scholarship exploring bottom-up innovation processes (see Anderson, Potocnik, and Zhou, 2014 and Garud, Tuertscher, and Van de Ven, 2013 for recent reviews). Corporate managers were assumed to be passive influencers of innovation capability through the definition of missions and goals guiding bottom-up innovation activities (Amabile, 1988; Damanpour, 1991). Relatedly, corporate managers were thought to be mainly engaged in resource allocation decision making detached from product-/market-facing activities (Bower, 1970; Burgelman, 1983). Overall, the idea that corporate managers can play a more active role in building a firm's innovation capability got lost in innovation scholarship

predominantly focused on bottom-up innovation processes (Birkinshaw, Bouquet, and Barsoux, 2011).

I address this bias in the extant literature towards bottom-up explanations of how innovation occurs in large multidivisional firms by leveraging a hand-collected dataset to study how the work of senior innovation managers results in a multidivisional firm's dynamic corporate innovation capability. I find that senior innovation managers support local innovation by connecting past innovation successes with present innovation opportunities related to core businesses. To encourage generation of distant innovation, senior innovation managers champion processes facilitating localization and absorption of knowledge unrelated to a firm's core businesses. Senior innovation managers' actions mitigating innovation risk at the individual inventor, middle manager, and organizational levels augment a firm's capacity to continuously generate distant innovations and regulate the resource allocation between local and distant innovation projects.

By proposing the concept of dynamic corporate innovation capability, I make three theoretical contributions. First, in contrast with the notion of a rational senior executive leading in a top-down directive manner (Porter, 1980), I find that the role of a senior innovation manager is subjected to political headwinds undermining its legitimacy at both the corporate and business unit levels (Eisenhardt and Bourgeois, 1988). Further, I uncover that most senior innovation managers lack a clear blueprint for accomplishing their main mission of generating more growth from innovation and their actions, resulting in reliance on trial-and-error approaches.

Second, the results of my study contribute to the scholarly discussion on the sourcing of novel knowledge by large multidivisional firms. My findings confirm that the use of external knowledge (Chesbrough, 2003; Chesbrough and Crowther 2006) is an important element of multidivisional firms' approach for generating distant innovations. Yet, I also find that the use of

open innovation is hindered by its costs and long investment-benefit conversion cycles. As a result, senior innovation managers initially rely on leveraging internal bottom-up sources of knowledge, using open innovation as a weak complement, rather than a strong substitute, to sourcing novel knowledge internally. Over time, as actions of senior innovation managers increase the internal capability to absorb external knowledge, the use of open innovation increases, often pushed through a top-down impetus to overcome sources of internal resistance to external knowledge.

Third, I show how senior innovation managers' top-down interventions weaken intra-organizational hindrances to self-organized, bottom-up, grassroots innovation initiatives with the potential to generate distant innovations. This result complements innovation scholarship studying the effects of innovation centralization (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014) as this study shows that the decoupling of innovation activities from the needs of core businesses can be induced at the business unit level, reducing the need for innovation centralization in order to generate distant innovations.

## **5.2 INNOVATION MANAGEMENT IN MULTIDIVISIONAL FIRMS**

### **5.2.1 CONDITIONS FOR INNOVATION IN MULTIDIVISIONAL FIRMS**

Large multidivisional firms are directed by corporate managers who possess agency over several business units operating in distinct markets (Rumelt, 1974). In each business unit, day-to-day activities are carried out by product-/market-facing employees (Burgelman, 1983), who are overseen by middle managers (Huy, 2001). Several characteristics of the multidivisional organizational form have caused scholars to argue that large multidivisional firms would excel at innovation. These attributes include rich resource bases (Schumpeter, 1940/1954), organizational slack (Penrose, 1959/1995), protections against the full effects of market selection forces (Levinthal, 1992), and implementation capability (Shilling, 2008).

However, despite the possession of these attributes, the survival odds of large multidivisional firms have been steadily deteriorating (Credit Swiss, 2017). Scholars have argued that one of the main reasons for this decay is a multidivisional firm's tendency to channel resources towards the exploitation of core businesses (Henderson and Clark, 1990; Nelson and Winter, 1982; Tushman and Anderson, 1986) at the expense of exploration (March, 1991). Internal biases towards exploitation stem from managerial "short-termism" (Lavery, 1996; Marginson and McAulay, 2008), managerial cognitive myopia (Tripsas and Gavetti, 2000), application of an exploitation mindset to exploration (Gilbert, 2006), structural suffocation of exploration (Puranam, Singh, and Zollo, 2006), insufficient incubation periods for novel ideas (Knudsen and Levinthal, 2007), and collective fear (Vuori and Huy, 2016). These internal biases towards exploitation are exacerbated by external pressures related to corporate raiders threatening inefficient management teams (Walsh and Kosnik, 1993), core business lock-in due to the demands of existing customers (Christensen, 1997), and the investor community's dictates for consistency in financial results (DesJardine and Bansal, 2014).

### 5.2.2 INNOVATION AS A DYNAMIC CAPABILITY

Firms can counterbalance exploitative biases by developing dynamic capabilities (Teece, Pisano, and Shuen, 1997). Dynamic capabilities are "specific strategic and organizational processes like product development, alliancing, and strategic decision making that create value for firms within dynamic markets by manipulating resources into new value-creating strategies" (Eisenhardt and Martin, 2000: 1106). The dynamic capabilities construct builds upon the resource-based argument that "firms need to find those resources which can sustain a resource position barrier, but in which no one currently has one, and where they have a good chance of being among the few who succeed in building one" (Wernerfelt, 1984: 175). Acquisition of such resources, which have concurrently valuable, rare, imperfectly imitable, and non-substitutable characteristics



(i.e., VRIN resources), enables the development of a firm's value, creating sustained competitive advantage which present and future competitors cannot replicate (Barney, 1991).

A sustained competitive advantage requires not only the accumulation of VRIN resources, but also their management through recombination (Henderson and Clark, 1990) and redeployment (Teece et al., 1997). Further, the maintenance of a sustained competitive advantage is contingent on a firm's ability to identify and exploit new profitable ventures ahead of competitors (Teece, 2007). This forward-looking innovation-sensing capability necessitates that corporate managers develop an internal capability to tap into external sources of knowledge (Chesborough, 2003) and combine them with internal sources of knowledge at the level of business units (Bowman and Ambrosini, 2003). Thus, a multidivisional firm's ability to continuously scout for both internal and external knowledge and transform it into valuable outcomes leveraging, reconfiguring, and maintaining VRIN resources constitutes the essence of dynamic corporate innovation capability.

### 5.2.3 DYNAMIC CORPORATE INNOVATION CAPABILITY: THE ROLE OF A SENIOR MANAGER

The dual imperative for the firm to reach out into the unknown and continuously convert identified opportunities into value for the firm indicates the need for the appointment of corporate executives having the qualities of strategic leaders who “utilize and interchange tacit and explicit knowledge on both the individual and organizational levels, and [who] use both linear and nonlinear thinking patterns.” (Rowe, 2001: 87). Increasingly, some of the most prominent Fortune 500 firms have been creating a strategic leadership role in innovation at the corporate level (Forbes, 2017).

For instance, in 2017, the Coca-Cola Company announced that it was “appointing a Chief Innovation Officer to elevate Global Research & Development into a standalone innovation function reporting directly to the CEO. This represents the increased importance of innovation to

the company's growth plans."<sup>15</sup> Despite this rise in the appointments of senior innovation managers, extant scholarship offers limited insight into their role (Collis, Young, and Goold, 2007). Intriguingly, McGahan and Silverman refute the stylized fact of a negative relationship between a firm's maturity and its declining innovation activity and call for "theory characterizing how transitions out of maturity occur." (2001: 1143). Understanding what the goals of senior innovation managers are and how they achieve them may contribute to the elaboration of such theory.

As Coca-Cola's announcement suggests, the main mission of a senior innovation manager is to generate additional growth beyond what is possible with and/or at the expense of growth through organic, M&A, and alliance options (Capron and Mitchell, 2012). Firm-level resource constraints (Penrose, 1959/1995) give rise to a resource allocation trade-off between non-innovation- and innovation-based growth (Hitt, Hoskisson, and Ireland, 1990). This trade-off is exacerbated by a firm's tendency to "diversify into a business as its technical strength applicable to that business increases" (Silverman, 1999: 1115). Given these resource allocation tensions, a senior innovation manager is likely to engage in multilevel resource allocation negotiations (Arrlet et al., 2015). In addition, to decrease their dependency on the outcome of these negotiations, senior innovation managers are likely to exert effort to identify and utilize existing organizational slack for innovation (Adner and Helfat, 2003; Bowman and Ambrosini, 2003; Penrose, 1959/1995).

Another cue from the Coca-Cola announcement is the centralization of innovation-related decision making at the corporate level, which resonates with the portrayal of innovation as disrupting extant businesses (Schumpeter, 1940/1954). As business unit managers are unlikely to disrupt their core competencies, top-down involvement may be necessary to support the identification, development, and implementation of Schumpeterian disruptive innovations. Recent

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<sup>15</sup> <http://www.coca-colacompany.com/press-center/press-releases/the-coca-cola-company-announces-senior-leadership-appointments>, accessed June 18, 2017

empirical findings support this view that centralization of innovation results in innovation outcomes that are more distant from a firm's core businesses, in contrast to innovations supported at the business unit level (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014). Similarly, Chesbrough and Crowther (2006) argue that top-down involvement in innovation is necessary for sourcing high-potential novel ideas from outside of organizational boundaries.

### **5.3 METHODS**

This study draws on an in-depth exploration of the role of a senior innovation manager working in the context of a multidivisional firm. Over a period of four years, I embedded myself as an observer in the milieu of conferences serving as a platform for senior innovation managers to present and discuss their work.

#### **5.3.1 RESEARCH SETTING**

Large multidivisional firms provide a suitable research context for studying how dynamic corporate innovation capability is developed through managerial actions, given the inherent complexity of managing various innovation maturity models across multiple markets embedded in different environments (McGahan and Silverman, 2001; Utterback, 1971). This innovation complexity increases the need for corporate managers to devise innovation routines (Nelson and Winter, 1982), which guide innovation activities at lower hierarchical levels but can also be adapted to changing environmental conditions (Feldman and Pentland, 2003).

#### **5.3.2 THEORETICAL SAMPLE**

To reconcile these contrasting views of the role of corporate managers in innovation management, I sought narratives containing rich descriptions of the work of senior innovation managers in large multidivisional firms over a period of several years. In total, I developed 14 narratives. The search for additional narratives was stopped after additional narratives did not yield

significant new insights (Yin, 2014). To triangulate findings from the narrative dataset, I gained interview access to three large multidivisional firms and conducted semi-structured interviews with employees involved in innovation management across hierarchical levels.

While it was not possible to name the industries and countries of domiciliation, in order to keep firms anonymous (Strike and Rerup, 2016), findings were largely replicated across the narrative sample and were strongly supported by the interview data. Firms were anonymized using the names of U.S. national parks for the narrative dataset and Canadian national parks for the interview dataset. Table 6 provides a descriptive overview of both the narrative and interview datasets.

**Table 6: Dynamic Corporate Innovation Capability: Overview of Case Studies**

Code name	Data	Firm type	Firm age (years)	Employees	# of Divisions	Employee level
Acadia	Narrative	Public	50-100	50,000-100,000	5-10	Corporate manager
Arches	Narrative	Private	50-100	10,000-50,000	<5	Corporate manager
Biscayne	Narrative	Public	100-150	50,000-100,000	5-10	Corporate manager
Canyonlands	Narrative	Private	<50	10,000-50,000	<5	Corporate manager
Denali	Narrative	Public	50-100	50,000-100,000	10-15	Corporate manager
Everglades	Narrative	Public	100-150	50,000-100,000	10-15	Corporate manager
Glacier	Narrative	Public	50-100	10,000-50,000	10-15	Corporate manager
Haleakalā	Narrative	Public	100-150	10,000-50,000	5-10	Corporate manager
Katmai	Narrative	Public	100-150	10,000-50,000	<5	Corporate manager
Olympic	Narrative	Public	<50	1,000-10,000	<5	Corporate manager
Redwood	Narrative	Public	>150	50,000-100,000	5-10	Corporate manager
Sequoia	Narrative	Public	100-150	10,000-50,000	<5	Corporate manager
Voyageurs	Narrative	Public	<50	>100,000	<5	Corporate manager
Yellowstone	Narrative	Public	50-100	>100,000	<5	Corporate manager
Yosemite	Narrative	Public	50-100	10,000-50,000	5-10	Corporate manager
Zion	Narrative	Public	>150	50,000-100,000	5-10	Corporate manager
Banff	Interview	Public	50-100	>100,000	<5	Middle manager
Jasper	Interview	Public	100-150	50,000-100,000	5-10	Corporate manager
Jasper	Interview	Public	100-150	50,000-100,000	5-10	Senior innovator
Jasper	Interview	Public	100-150	50,000-100,000	5-10	Senior innovator
Jasper	Interview	Public	100-150	50,000-100,000	5-10	Junior innovator
Yoho	Interview	Public	>150	>100,000	5-10	Corporate manager
Yoho	Interview	Public	>150	>100,000	5-10	Middle manager
Yoho	Interview	Public	>150	>100,000	5-10	Middle manager

### 5.3.3 DATA COLLECTION

I obtained the granular data required for this study by attending electronically 17 chief innovation officer summits from 2013 until 2017. The summits were organized by Innovation Enterprise, a firm which organizes summits on topics relevant to senior managers. At each summit, between 15 and 25 senior innovation professionals working for private firms, public organizations, and consulting firms gave oral presentations about their work. Often, these presentations ended with a Q&A session and were supported by PowerPoint documents offering an additional level of detail.

In total, I collected over 200 hours of recorded narratives and produced over 600 pages of high-fidelity transcripts. From this initial dataset, I constructed my theoretical sample discussed above. For a narrative to be included in the dataset used for this study, it had to fulfil the following requirements: (1) the narrator was a senior innovation manager; (2) the narrator worked in a for-profit multidivisional firm; (3) the narrator provided an overview of his or her work over the period of several years; and (4) the narrative did not suffer from any of the biases discussed in Table 7.

**Table 7: Narrative Data Biases and Mitigating Measures**

<b>Potential Data Biases/Issues</b>	<b>Mitigating Measures</b>
Narrator exaggerated the impact of corporate involvement in innovation.	The focus of the study was on the process; reported quantified results were not coded and were not part of the analysis.
Narrator was biased towards description of actions applying to the corporate level only.	Only narratives providing a multilevel overview of the involvement of corporate managers in innovation management were included in the dataset.
Narrator was aware of the purpose of the study and engaged in self-censoring, resulting in the loss of comprehensiveness of the account.	While all narrators agreed to their presentations and supplemental materials being used for general research purposes, they were unaware of this specific study.
Narrator was influenced by researcher’s leading questions.	No contact was made with any of the narrators.
Narrator’s firm used a consulting firm to guide the corporate involvement in innovation.	Narratives which contained signs of being influenced by a consulting firm were not included in the dataset.
Narrator withheld key information due to confidentiality/competitive reasons and/or provided false information.	Narrative data was triangulated through alternative sources. Given that these narratives are available on a fee basis, it is unlikely that provided information was untrue given potential legal ramifications.

To ensure proper data triangulation, the interview data was collected only after the collection and initial analysis of the narrative data. In addition, firms included in the interview data sample did not form part of the narrative data sample. In total, 10 interviews were conducted from October 2017 to January 2018.

#### 5.3.4 ANALYTICAL APPROACH

I combined inductive data analysis (Gioia, Corley, and Hamilton, 2013) with analytical methods used to study narratives (Pentland, 1999). The inductive data analysis was used to derive initial codes, second-order concepts, and ultimately, aggregate themes. The narrative analytical methodology served to get beyond the surface and code aspects of narratives relevant to the development of dynamic corporate innovation capability.

To ensure analytical rigour, I conducted the narrative analysis in stages. First, I captured each story in a write-up (including the transcript of the oral presentation, the information contained in the accompanying PowerPoint document, the narrator's work history details) and triangulated this data using information from the company's website as well as the firm's public disclosures (Yin, 2014). Second, I constructed a detailed history of the role of each individual senior innovation manager, paying close attention to actants interacting in the story (Latour, 2005), sequences of events, plots, and relationships (Pentland, 1999). Third, I generated a prototypical role of a senior innovation manager by capturing underlying first-order codes, formulating emerging second-order concepts, and conceptualizing aggregate constructs (Strauss and Corbin, 1998). Fourth, based on my understanding of the role of corporate innovation managers uncovered in the second and third stages, I constructed a full emergent process model of dynamic corporate innovation capability.

Interview data used for triangulation was initially analyzed using an approach similar to the first analytical stage described above. After this first stage was completed, I systematically compared and contrasted narrative and interview data segments (Strauss and Corbin, 1998). While no major differences were identified, this iterative process enabled me to uncover nuances in the narrative data and ultimately elaborate the nature and effects of senior innovation managers' actions.

#### **5.4 AN ACCOUNT OF THE ROLE OF A SENIOR INNOVATION MANAGER**

To help the reader become acquainted with the data in a way that is as easy and authentic as possible, below I present an excerpt from the account of the work of a senior innovation manager

working in a large multidivisional firm. This account combines information from this narrator's biography, her oral presentation, the Q&A session, and the supporting PowerPoint document.

#### 5.4.1 ONE STORY

I have been working at my company for close to two decades in several different roles. In my current role as a senior manager for innovation and quality, I am responsible for providing customers with innovative solutions for meeting their needs and ensuring that our company is always in the leading position in the technological developments concerning our products. I enjoy the complex relationship between process and culture which enables innovation to take place in large organizations. I am an engineer by profession and prior to my employment with this firm, I worked as a scientist in various new product development roles.

My dual role as an innovation and quality executive may be seen as a dichotomy at first, but it gives me the opportunity to drive both perfection and motivation for improvements. Some people are better at each of the ends of the spectrum. My job is to ensure the right balance. My company has done this for over 100 years. [...] Our job is to make the innovation function feed better products to the marketplace, yet most of our resources are focused on operations. Most of our employees work within very short timeframes; thus, the concept of innovation and the type of required timeframes are very difficult for them to understand.

We have other issues. Our firm is a little like civil service—an old and rigid organization. Our structure is that of a big complex organization. Yet, innovation does not like organizational silos. These silos are great for generating new ideas, but you need to mix them with ideas coming from other silos. My job is mainly about breaking down these barriers and implementing processes enabling cross-fertilization of ideas across silos to create better products.

Different types of innovations coexist in my firm: incremental, step-change, process, and business model innovations. Our innovation strategy is to put together and manage a portfolio of



projects that are operating across these spectrums. We have to make sure we have a constant flow of innovations in the organization. We have a 10% success rate of innovations: from 50 ideas, we get 10 projects, and 2 successful products. Yet, [the company's leaders] say, "We want only successful innovation and more innovation." They do not realize it does not work like that. You need to work through the ideas, kill the low-prospect ideas, and focus on a selected high-potential idea group. [...]

I started by establishing the agreement on what type of innovation is required (incremental versus step change versus process versus business model), what it looks like, and how it is going to be achieved. Innovation leaders need to get this right first before going into businesses. [...] Design cross-functional innovation training; a lot of people associate innovation with ideation, but no, you need to understand all of the innovation process! Employees from different functional areas attended this course. They did not participate as a business unit, but as a collective cutting across businesses. We clarified what their role was to enable a bit of risk taking; their typical mindset is that their role is about mitigating risk, not embracing it. [...]

You need to set long-term goals and design platforms to provide structure, information flow, and the possibility of measuring success. We conduct formal reviews of the innovation processes. Senior visibility is also critical. [...]

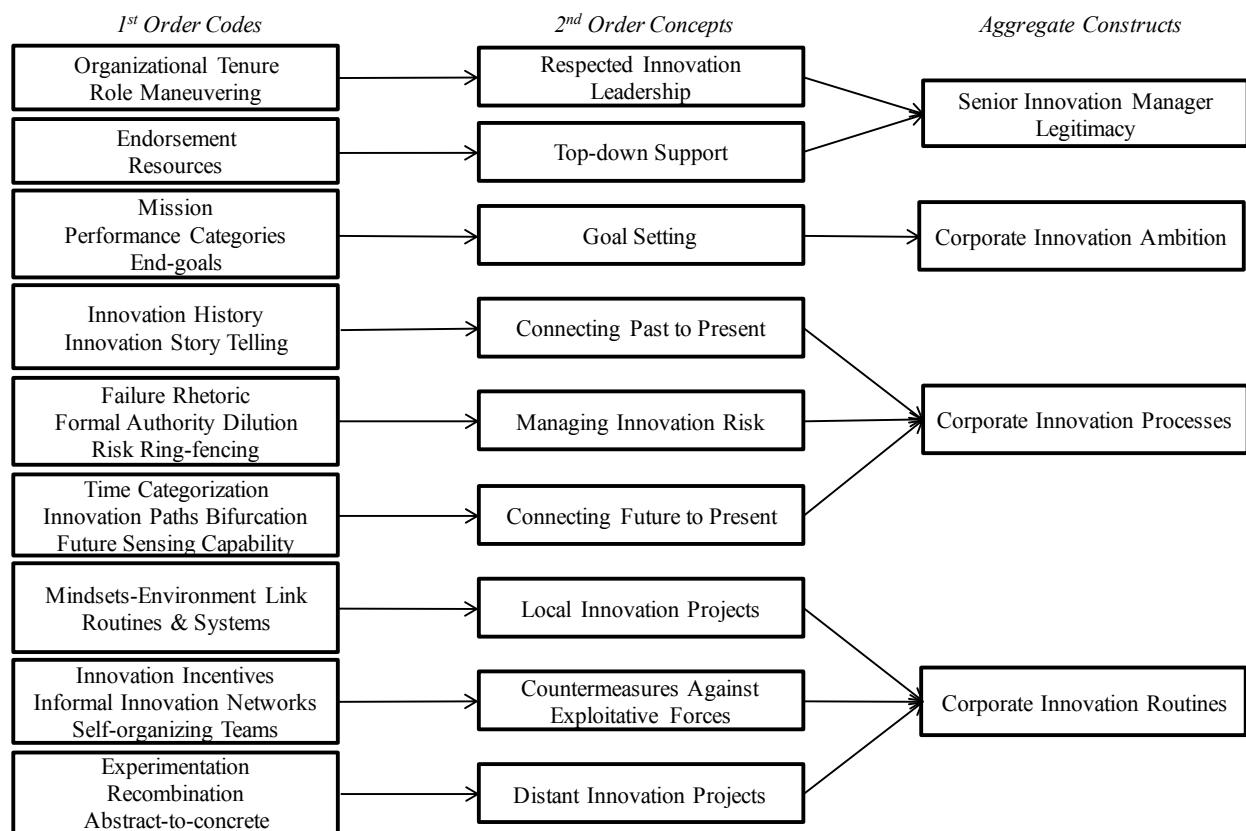
Most of our innovations come through partnerships, but more radical innovations are sourced internally. In today's world, it is not about product innovation, process innovation, or system innovation, it is about all of them put together. We operate in a more disruptive space than previously. It is both the best and worst time to be an innovation officer. It is difficult to be a senior innovation manager as there is no book to read, no process to follow for large organizations to innovate fast enough in the world we live in today. The real question is how do we get all parts of the organization to innovate at the same speed? And how do we instil innovation culture

throughout the organization? It is a [challenge] to get innovation perpetuated in the organization, and it is even more difficult to do this during an economic downturn.

## 5.5 THE PROTOTYPICAL ROLE OF A SENIOR INNOVATION MANAGER

I used individual narratives to construct a more generic description of a prototypical role of a senior innovation manager. As depicted in Figure 4, the main elements of the role of a senior innovation manager which emerged from this analysis were the establishment of senior innovation manager legitimacy, the generation of corporate innovation ambition, the design of corporate innovation processes, and the development of corporate innovation routines supporting both local and distant innovation activities.

**Figure 4: Dynamic Corporate Innovation Capability Data Structure**



### 5.5.1 SENIOR INNOVATION MANAGER LEGITIMACY

#### 5.5.1.1 Respected Innovation Leadership

Most of the senior innovation managers had an insider background, having worked for their organizations for years prior to assuming an innovation leadership role. The career of the senior innovation manager of Biscayne, who had held increasingly senior marketing positions across several divisions and countries, was representative of the career journeys of other senior innovation managers in the sample. Long organizational tenure provided them with intimate knowledge of both formal and informal organizational structures. Broad access across organizational layers and structures enabled senior innovation managers to transcend intra-organizational boundaries in their quest to instil dynamic corporate innovation capability within their organizations.

Long intra-organizational tenure accorded some level of authority to the senior innovation manager herself, but the senior innovation manager role was initially in a weak position vis-à-vis other formal organizational roles. First, senior innovation managers had to position themselves in relation to their peers, who would often consider innovation as being within their sphere of influence. Second, senior innovation managers were dependent on powerful heads of business units for innovation resources and execution. These middle managers would often consider innovation as their responsibility, yet they were primarily focused on the exploitation of core businesses. Given the political power held by these counterparts embedded in the formal organizational structure, senior innovation managers had to engage in role maneuvering, as opposed to claiming innovation leadership by solely relying on their title. The senior innovation manager at Acadia explained:

I needed to establish objectives for the innovation function to define how it will operate among well running divisions [...]. The way to position the innovation function was to tell divisional unit heads that while they are busy running their businesses and fulfilling annual plans, somebody needs to have time to think [about] and conceptualize that next big opportunity on the horizon as divisional heads cannot compete in terms of innovation with challengers coming from outside of the core business.

#### 5.5.1.2 Top-Down Support

The need for continuous top-down endorsement of the role of senior innovation managers was universal across the sample. Top-down support for the role was necessary given that senior innovation managers acted as change agents by disrupting established routines and behaviours, putting these managers in conflict situations with intra-organizational actors who preferred the status quo. Yet, continuous top-down support for innovation was not automatic and had to be enacted by senior innovation managers. A common mechanism employed by senior innovation managers for eliciting support was the identification and communication to the most senior leaders within the organization of environmental shifts with potential to render extant core businesses obsolete. The senior innovation manager of Denali commented:

We need to look ahead. 10 years ahead. It energizes the organization and shows you care about the future. I showed 10-20 megatrends to the board of directors. The storyline needs to keep the board of directors awake at night in a positive way, but it also needs to feel like if you do not act today, it will hurt. You need to follow up as it is difficult to persuade the board of directors about innovation that will not bear immediate fruit.

Resourcing of the senior innovation manager role occurred in a staggered manner. Most senior innovation managers reported initial resource scarcity to support their role, which required their resource acquisition creativity. They were asked to generate growth from innovation without diverting resources from other sources of growth. Thus, senior innovation managers initially used small supporting teams which could be scaled as needed. As high-impact innovation projects were identified, senior innovation managers borrowed resources from business units to work full time on specific innovation projects, yet with the understanding that once the project was completed, resources would be returned to business units.

Another common approach was to create and leverage networks of resources by locating and connecting innovation assets scattered across the organization. The creation of focused innovation resources was a reaction to the discovery of the ineffectiveness of large-scale top-down innovation events, which generated mostly low-potential ideas, wasting organizational resources. By first identifying innovation projects that mattered to the organization, resources could be

deployed more efficiently compared to the “boiling the ocean” approach of unfocused, large-scale innovation events. While focused innovation resources led to the identification and conceptualization of high-potential innovation projects within the senior innovation manager realm, the implementation was often delegated back to business units. The senior innovation manager of Biscayne elaborated:

We created the “Innovation Centre” which allowed us to consolidate all innovation resources under a common team. [...] Focused resources can move projects faster. We reduced the previous time from concept to launch from 10-15 years to less. We generated more breakthrough innovations. People were using the same language; no more misunderstandings that the true focus is consumer innovation and nothing else. [...] You need to put together the right skills mix for the specific problem to move the innovation project further. Brands are separate from the innovation teams; they act as sponsors.

## 5.5.2 CORPORATE INNOVATION AMBITION

### 5.5.2.1 Goal Setting

Innovation was not new to the sampled firms. All of the firms had well-resourced R&D programs that represented a significant percentage of annual revenues. Thus, the goals of the senior innovation manager role had to be clarified vis-à-vis these traditional R&D programs by following annual planning cycles and focusing on the needs of core businesses. Without such goal determination, organizational actors supporting the allocation of more funds to the traditional R&D effort could undermine the need for the senior innovation manager role. The PowerPoint document accompanying the narrative of Zion’s senior innovation manager contained the following description:

The corporate innovation unit addresses the challenges and opportunities for innovation at our firm. Our mission in the corporate innovation unit is to transform existing sectors or even build new sectors, unlock a culture of innovation within our firm, and build global reputation for our innovation. Our sectors annually drive several billions worth of routine innovation through efficient, risk-controlled R&D; the corporate innovation unit focuses on disruptive, radical, and architectural innovation. It builds on the overall expertise at our firm to drive cross-sectoral and beyond-sector innovation.

In most sampled firms, quantitative high-level performance targets were set at the inception of the senior innovation manager role. These were meant to be stretch goals that could not be achieved by simply increasing innovation activity around core businesses. Quantitative performance goals were set as well, and were related to the generation of incremental revenue at a minimum profitability within a set period. Performance goals were largely agnostic to whether innovations should be the product or the process type; yet, they were largely skewed towards disruptive, radical, and architectural types of innovation. In contrast, the end goals of the senior innovation manager role were mostly abstract and related to the routinization of the innovation processes associated with the senior innovation manager role in terms of their replicability, reliability, and sustainability over time. The PowerPoint document accompanying the narrative of Arches' senior innovation manager stated,

Our current innovation issues are inconsistency, repeatability, and lack of sustained success. The end goal is to create a repeatable capability across the organization, producing consistent winners and high-level performance.

### 5.5.3 CORPORATE INNOVATION PROCESSES

#### 5.5.3.1 Connecting Past to Present

One asset that all sampled firms possessed was a history of prior innovations which led to the success of current core businesses. In some cases, firms' founders were prominent innovators. Accounts of the innovation history existed in the form of stories, archival documents, preserved blueprints, and employees' memories. Senior innovation managers used innovation history to get clues about what made their firm innovative in the past in order to inform current and future innovation efforts. The senior innovation manager of Everglades reflected:

It is so easy to constrain yourself to your core business. We are looking around to learn from other industries and bringing [that learning] to our own business. We are also looking backwards to build on experiences and lessons learned in the past, especially in older businesses; the way they did stuff in the old days without all the fancy tools, how somebody 50 years ago managed innovation. To do so, we consult a large archive of past ideas located in

the city where the business started. In fact, innovation is largely about timing. Customers are often not ready. When that happens, we archive the idea so that it can be potentially revisited in the future.

Senior innovation managers codified innovation history by transforming it into stories of past innovation achievements. Innovation storytelling provided a connection between past innovation success and present innovation opportunities, and served as a strong motivational tool. It also legitimized innovation in that if it was permissible to innovate in the past, this signalled innovation's permissibility in the present. Storytelling was also used to maintain momentum in innovation projects in which partial achievements were made, but the overall success was still distant. The senior innovation manager of Olympic remarked, "To overcome resistance in the organization, you must tell stories. Whenever you have successes, these need to be shared to create the myth of success, which often comes ahead of the actual success."

#### 5.5.3.2 Managing Innovation Risk

The issue of failure management was a sensitive topic across all cases and hierarchical levels. It was understood that the pursuit of innovation, especially high-value innovation, leads to a high degree of failed outcomes. Yet, organizational DNA in most sampled firms was not set up to absorb a continuous stream of failures. Consequently, senior innovation managers had to introduce mechanisms to manage failure at the individual inventor, middle manager, and corporate manager levels. On the individual inventor level, senior innovation managers engaged in changing the narrative surrounding failure through failure rhetoric. Failure outcomes were narrated as "learning opportunities," which could be celebrated and valued to the same degree as innovation successes.

The objective of failure rhetoric was to entice employees to overcome their fear of failure and formulate and put forward their ideas. To achieve actual mitigation of failure consequences on an individual level, senior innovation managers "borrowed" employees from business unit

heads to work on specific innovation projects. This mechanism dissociated the consequences of failure from employees' formal roles, distributed failure consequences among several employees pulled to together to work on a specific innovation project, and redirected the potential failure blame towards senior innovation manager. The senior innovation manager of Everglades commented, "I explain the importance of risk taking (i.e., trying out a lot of new ideas) and that the consequences of failure are not that bad. Failure is called a 'non-expected outcome.'"

Prior to the establishment of the senior innovation manager role, most heads of business units were focused on exploitation and incremental innovation around the core business (Argyres and Silverman, 2004). Dedicating their attention and business unit's resources to breakthrough innovation (the results of which may not be directly attributable back to their business units) went against middle managers' own interests. Yet, as innovation gained legitimacy through the actions of senior innovation managers, it became harder and politically costly for middle managers to oppose innovation activities using their formal authority. The innovation empowerment of product-/market-facing employees, the emergence of self-organizing innovation communities, the deployment of social platforms bypassing middle managers, and a top-down push for more open innovation were common factors that reduced middle managers' formal authority to say no to innovation without objective justification. The senior innovation manager of Canyonlands offered the following account:

Overcoming risk aversion is a journey, but it is difficult as you have established people saying "I have been here for 20 years and I just do not believe in the idea." Sometimes, people reject "outside" ideas which are at the same time in their responsibility domain, as it creates a tension for them. Should they take the idea into their own department using their own budget, or should they allow somebody else outside their control and influence [to develop the idea]? We have a standardized process to evaluate the merit of ideas consulting experts and the patent department. If it is a good idea, the corporate innovation department helps innovators to get some budget and buy-in. Despite my approach being a largely bottom-up one, here I would use a top-down approach to force businesses to take in ideas from the outside to change the way established people think, in order to generate some percentage of open innovation.



With their large multidivisional firms possessing established brands and reputations for the reliability of their products, senior managers at sampled firms were concerned about innovation failures negatively impacting core businesses. Senior innovation managers established two structural mechanisms to manage innovation risk at the organizational level. The fail-fast approach enabled by rapid prototyping (Von Hippel, 1994) and early rule-based selection increased the number of ideas that could be considered and decreased the likelihood of resources being used inefficiently on low-value ideas and/or premature ideas. Selected high-risk/high-value innovation projects were then often pursued within a separate innovation department to contain spillover effects in the case of failure.

#### 5.5.3.3 Connecting Future to Present

The timeframes for local and distant innovation projects differed considerably. Local innovation projects, which were centred around core businesses, took months to a few years to become cash flow positive. The invention-to-cash flow duration of incremental projects was shortened by the pre-existence of the underlying knowledge which enabled invention. This knowledge often already existed within the firm. The relatively small time span differential between local innovation projects and exploitation projects led to frequent embedment of local innovation projects within business units. Distant innovation projects required significantly longer time spans for the innovation investments to start generating positive cash flows. The long duration of distant innovation projects stemmed from the need to first undertake fundamental research to generate knowledge, which could eventually be turned into invention. Interestingly, the use of open innovation did not guarantee considerable shortening of the timeframe needed for distant innovation projects, as is reflected in the comment made by the senior innovation manager of Haleakalā:

Developing disruptive innovation requires an innovation horizon that is at least 10 years long. [...] We separated the corporate innovation centre from business groups. In the innovation centre the time horizon is five years longer than that of the heads of business units. [...] We need open innovation to tap into the global knowhow and acquire complementary capabilities. When using open innovation, it took us 10 years from investment to being cash flow positive. We also encountered another killer of open innovation: we are open, but in reality, doors are closed.

Recognizing the need to allow both top-down and bottom-up innovation projects to happen concurrently within the firm, senior innovation managers created different innovation paths customized to the origin of the innovation projects. Top-down innovation projects were marked by problem-driven initiation, centralization of decision making, positioning within formal organizational structures, and attempts at replicability. In contrast, the environment for grassroots innovation projects was solution driven, energized by the intrinsic interests of individual employees, and largely self-governed, with only limited rules provided by senior innovation managers. The senior innovation manager of Katmai described the bifurcation of top-down and bottom-up innovation paths as follows:

The best ideas do not come from corner offices, but from people who touch the customer, deliver the product. [...] Product-/market-facing employees may not be the best ones to identify the problem, but they are the best at identifying solutions. [...] In our experience, only one out of every four good ideas come from planned processes. Innovation is unstructured and spread throughout the organization. [...] We provided a social innovation platform; employees had to decide how they would use the platform. There was no top-down direction on how they should use the platform. Within about two years after launch, 600 communities were formed across the organization. Employees create their own work groups and can selectively bring in third-party people without giving them access to internal intellectual property. [...] In contrast, our open innovation platform was business/unit organizationally driven, [and] adopted a centralized approach to technology and processes with decentralized delivery and execution, to establish a fast and replicable model across global enterprise. [...] We view top-down and bottom-up approaches to innovation as complementary and necessary.

“Future” was defined broadly by senior innovation managers as either yet-to-be-fully-understood environmental shifts with the potential to transform many industries at once, and/or already existing environmental conditions that shaped unrelated industries and that could disrupt industries in which their firm operated.

In terms of the environment, senior innovation managers were mostly concerned with disruptions due to technological progress and changes in customer needs and/or preferences. A key challenge for senior innovation managers was the sourcing of knowledge, allowing their firms to start understanding how environmental changes could be converted into innovations for their firms' adaptation. Open innovation was recognized as an important source of such knowledge, but it came at a price and was often seen as too slow as product introduction cycles shortened.

Thus, most of the sampled senior innovation managers gradually developed several internal capabilities for environmental knowledge acquisition used in conjunction with and/or complementing the use of open innovation: corporate venturing combined with start-up alliance programs, frontier technology scouting combined with rapid prototyping (Von Hippel, 1994), alternative realities simulation, extant knowledge recombination, and high-potential grassroots innovation activities facilitation. In the case of Yellowstone, the start-up process was combined with open innovation:

We integrated start-up processes in our enterprise and decisions are done by experiment, not by bureaucracy, PowerPoint, persuasion, position, or power. We run these experiments quickly and fail fast and celebrate. We embraced the minimal viable product approach: we focus on features, no gold plating, no perfection. For partnerships and open innovation, we run experiments with existing operational partners to test new processes and new technologies. We also explore other industries, engage in virtual innovation, partner with universities and design schools, and seek inspiration by meeting with other successful innovators in their workplaces, labs, and studios in diverse creative fields and industries.

#### 5.5.4 CORPORATE INNOVATION ROUTINES

##### 5.5.4.1 Local Innovation Projects

Senior innovation managers recognized the importance of incremental innovation centred around the core business as a building block for potentially generating breakthrough innovations (Clark and Henderson, 1990). Surprisingly, narrators mentioned that what was often missing in their firms' innovation focus was the link between innovations around the core businesses and

customer needs. Frequently, innovation was done for the sake of innovation without broader relevance and applicability. Equally puzzling was the mental entrapment of employees in their technological comfort zones without considering the employment of knowledge readily available in closely related fields. Therefore, often, the first step taken by senior innovation managers was to make employees' minds more receptive to customer needs and innovation opportunities existing in the outside environment. The senior innovation manager of Voyageurs commented:

The challenge was accepting technologies from the outside, from other industries. The company's CEO decided to create my position as a new role reporting directly to him—it did not exist before. Prior to [creating the role], we had risk and technology functions, but this was not enough to instill a dynamic corporate innovation capability. My main mission was not to create technological innovation, but to create a culture/mindset of innovation throughout the company to make sure we are more open and agile to accept technologies coming from the outside. What was lacking previously was the understanding of the needs of customers to develop the best products for the market.

#### 5.5.4.2 Countermeasures against Exploitative Forces

Over time, strong tendencies towards exploitation fuelled by systemic risk aversion developed in most sampled firms. For instance, the senior innovation managers of both Canyonlands and Everglades reported that their firms started to operate like civil service entities. To counter exploitative tendencies, senior innovation managers' efforts led to the emergence of a comprehensive system of incentives utilizing both extrinsic and intrinsic motivators. Extrinsic motivators included the introduction of performance metrics related to innovation into middle managers' evaluation. Intrinsic motivators included linking initial innovation effort with the appreciation of senior managers, awarding innovation rewards for ideas which made it to the product stage, and celebrating innovation effort regardless of outcomes. The senior innovation manager of Voyageurs remarked that “the real reward for innovators is when their idea makes it into the final product.”

The emergence of informal innovation networks permanently lowered the ability of formal structures to prevent novel ideas from being expressed, receiving seed funding, being developed,

and being evaluated using an objective set of criteria. The behind-the-scenes functioning of these networks made it difficult for innovation opponents to disrupt them or shut them down entirely.

The senior innovation manager of Canyonlands commented:

We started a guerilla initiative: spreading innovation guerilla style through the network of innovation-minded employees who incentivize people to generate great new ideas that are hard for other people to immediately put down; this is a reaction to the finding that middle managers may not be that receptive to spreading innovation. Thus, we created this network of guerilla innovators to explain what type of innovation is sought and what kind of rewards are given. People became very receptive.

Reducing the formal authority and empowerment of product-/market-facing employees led to the emergence of self-organizing teams. These teams were created organically from the bottom up around an idea, and their membership was fluid as the idea developed and members left or joined. Social innovation platforms provided innovation tools, but also allowed these teams to transcend organizational silos and geographical distances. Informal networks connected these teams with objective/impartial sources of evaluation and seed resources. The PowerPoint document accompanying the narrative of Yosemite's senior innovation manager stated, "If we don't disrupt ourselves, somebody else will! We moved to lean governance and rapid product development. We empowered "self-organizing teams," removing the hierarchical decision-making process to allow decision making at the lowest possible level."

#### 5.5.4.3 Distant Innovation Projects

The idea of using Google's approach to allocate unstructured time to employees for exploration resonated among senior innovation managers. However, most of the sampled firms operated in regulated industries over many decades and developed strongly hierarchical approaches to both exploitation and exploration activities. Consequently, their employees were not accustomed to diverting their effort outside of their formal roles. Corporate innovation processes put in place by senior innovation managers encouraged and enabled autonomous experimentation

at lower hierarchical levels. Further, some employees were offered experimentation-focused career paths, especially when entrepreneurial ventures were acquired. The senior innovation manager of Canyonlands commented:

When we asked people to identify the biggest innovation successes over the past 10 years, the examples given often started as small grassroots projects with one to two people working on them, as opposed to coming from a big top-down initiative. Thus, we identified as the main hurdle to grassroots innovation people's fear or inability to dedicate a little bit of their time to experimentation to try out new ideas. [...] We just acquired a small company and its founder obviously has a lot of new ideas. It was a challenge for us to exploit these ideas as the founder was not used to working in an environment with a boss and in a structured organization. We needed to give him a role which was still innovative. We instituted a new scientific (expert) career path so that certain employees can climb the organizational hierarchy without having responsibility for 100-200 people. These employees have the freedom to pursue their ideas and seek external collaboration. [This arrangement] created a cultural clash as internal R&D people do not like to have people with such freedom around; it is a challenge.

## **5.6 NATURE AND EFFECTS OF ACTIONS BY SENIOR INNOVATION MANAGER**

I further analyzed actions by senior innovation managers in terms of their execution nature and effects on formal structures. I found that corporate innovation processes varied along two spectrums. The former spectrum was anchored by mechanistic and experimental extrema. The latter spectrum was anchored by augmenting and disrupting extrema. The mix of nature of execution and effects on formal structures varied across cases, reflecting the heterogeneity of sampled firms' external and internal situations, as well as differences in the maturity cycle of their innovation systems across markets in which the sampled firms operated.

### **5.6.1 NATURE OF CORPORATE INNOVATION PROCESSES**

#### **5.6.1.1 Mechanistic Corporate Innovation Processes**

Mechanistic corporate innovation processes were marked by their rule-based nature and wide acceptance of their utility, which facilitated their adoption and diffusion within the organization. These processes were necessary for generating innovation, yet insufficient in

themselves, bestowing on them a “hygienic” characteristic. Often, they were already introduced prior to the establishment of the senior innovation manager role, and the senior innovation manager’s influence was directed towards making them more efficient and more widely adopted throughout the organization. When mechanistic corporate innovation processes were seen as an end in themselves, they consumed considerable resources without generating corresponding value. For instance, several senior innovation managers reported that large-scale ideation jams (Bjelland and Wood, 2008) produced many low-value ideas, overwhelming the innovation system.

#### 5.6.1.2 Autocratic Corporate Innovation Processes

Autocratic corporate innovation processes were marked by their top-down non-consultative nature. For example, in some cases, the use of open innovation had to be mandated by senior innovation managers due to internal resistance to outside ideas (Katz and Allen, 1982). Another example was the establishment of a corporate innovation centre operating outside of the realm of business units, which was often also separated from formal R&D structures. Considering the scholarly debate about the benefits and costs of proximity in innovation (Boschma, 2005), another interesting example was the top-down decision to lower the geographical distance between centres of innovation and product-/market-level activities.

#### 5.6.1.3 Resource Scaling Corporate Innovation Processes

Resource scaling corporate innovation processes were characterized by resource bricolage (Baker and Nelson, 2005), as senior innovation managers often had to work with few available resources. Resource constraints kept corporate innovation teams small. Over time, senior innovation managers developed mechanisms for scaling their corporate innovation teams on a temporary basis. For instance, senior innovation executives borrowed employees for specific

innovation projects from business units and guaranteed their return into their formal roles within a pre-agreed timeframe.

Other mechanisms for scaling up innovation resources included non-equity partnerships with start-ups that involved trading a firm's marketing and distribution capabilities in exchange for a start-up's frontier knowledge. Such non-equity partnerships limited the monetary cost to the firm for acquiring external knowledge and, at the same time, did not result in a long-term commitment for the firm, increasing its future partnership options. The trading nature of non-equity partnerships, whereby *both* partners gained a valuable resource, increased the chances of the partnership being formed relative to corporate venturing (Dushnitsky and Shaver, 2009). Further, the fact that the non-equity partnership did not involve deep organizational integration reduced the risk of structural suffocation of exploration (Puranam, Singh, and Zollo, 2006).

#### 5.6.1.4 Experimental Corporate Innovation Processes

Experimental corporate innovation processes were marked by their trial-and-error nature, which enabled the search for the right approach when the path to follow was unknown. On the level of novel ideas, senior innovation managers encouraged as much product/market experimentation as possible to efficiently assess an idea's *potential* value. In terms of selecting novel ideas, senior innovation managers introduced pairwise scoring, which pitted two randomly selected ideas against each other to determine *relative* value. On the level of implementation, senior innovation managers preferred rapid prototyping (Von Hippel, 1994) over striving for perfection to assess a novel idea's *real* value. At the corporate level, several senior innovation managers engaged in trial-and-error approaches, in contrast to the notion of a rational senior executive leading in a top-down directive manner (Porter, 1980).

#### 5.6.2 EFFECTS ON FORMAL STRUCTURES



#### 5.6.2.1 Augmenting Corporate Innovation Processes

Augmenting corporate innovation processes drew upon formal structures embedded in the organizational culture. Very early in the process of establishing the senior innovation manager role, senior innovation managers recognized that they could not go head-on against elements of established organizational culture. Thus, these managers tried to identify and leverage elements of corporate culture conducive to their mission of fostering distant innovations.

Eventually, senior innovation managers were able to use elements of the organizational culture which underpinned its stability, such as “imagination, vicarious experiences, stories, [and] simulations” (Weick, 1987: 113), to induce higher organizational tolerance for uncertainty and change related to the pursuit of innovation activities. Another related effect was the decrease of ease with which the political power rooted in formal structures could be used by organizational insiders to undermine the legitimacy of the work done by senior innovation managers.

#### 5.6.2.2 Parallel Corporate Innovation Processes

Parallel corporate innovation processes bypassed formal structures. When senior innovation managers identified elements of corporate culture which were critical for senior innovation managers’ mission, but which could not be changed to be more receptive to innovation, they created parallel alternatives. One example was the introduction of selection mechanisms that could be self-administered by individual innovators, which kept them outside of the influence of middle managers (e.g., pairwise scoring, rapid prototyping). Another example was the creation of staggered innovation resource pools outside of the formal R&D budgeting process. These resource pools could be flexibly deployed to support ad hoc and accidental innovation initiatives (Austin, Devin, and Sullivan, 2012) without the need to engage in a formal process of resource solicitation.

#### 5.6.2.3 Disrupting Corporate Innovation Processes

One particularly interesting aspect of the corporate innovation managers' actions observed in the data was the use of informal organizational structures (Gulati and Puranam, 2009) to mitigate the influence of elements of organizational culture that were programmatically hostile to innovation. One such informal organizational structure established by senior innovation managers was the innovation network whose members often employed guerilla-type approaches to circumvent formal opposition to innovation. Over time, these informal innovation networks often established direct links to the highest managerial echelons, including the CEO and the board of directors. Senior innovation managers' support for self-organization at the lowest possible hierarchical level also challenged formal structures and authority flows.

### **5.7 AN EMERGENT PROCESS MODEL OF DYNAMIC CORPORATE INNOVATION CAPABILITY**

The findings reveal the difficulty for senior innovation managers to generate more growth from innovation without making changes to organizational structures and behaviours of employees operating at different hierarchical levels. At the same time, the senior innovation managers recognized that mandating these changes through top-down directive decision making would amplify resistance to innovation embedded within multidivisional firms programmed and pressured towards efficient exploitation of core businesses. As a result, senior innovation managers had to pace and sequence their interventions.

In this way, senior innovation managers were coordinating three interdependent and concurrent phases of the development of dynamic corporate innovation capability: (1) connecting past to present; (2) managing innovation risk; and (3) connecting future to present. Based on my findings, I elaborate a grounded process theory of the development of dynamic corporate innovation capability in large multidivisional firms. To capture interdependencies among phases,

I employed the system dynamics approach used to study complex organizational processes (e.g., Rudolph, Morrison, and Carroll, 2009; Strike and Rerup, 2016).

Figure 5 depicts the establishment of the senior innovation manager role. “Senior innovation manager legitimacy” is a stock variable which establishes the ability of the senior innovation manager to influence intra-organizational innovation processes. It positively influences another stock variable, “corporate innovation ambition.” “Innovation risk mitigators space” represents a reservoir of options for reducing risks associated with the pursuit of innovation. The valve depicted as “T” regulates the flow from the innovation risk mitigators space into “countermeasures against exploitative forces,” which is a stock variable. The flow is increased by “managing innovation risks at the individual inventor, middle manager, and corporate levels,” which is an ongoing process variable, in turn negatively impacted by the “time needed to manage innovation risks” variable, representing the complex nature of innovation risk management. An increase in the stock of countermeasures against exploitative forces increases the “senior innovation manager legitimacy” stock, creating a “reinforcing innovation acceptance loop (A),” as the respect and support for the senior innovation manager role increases.

**Figure 5: Innovation Acceptance Loop**

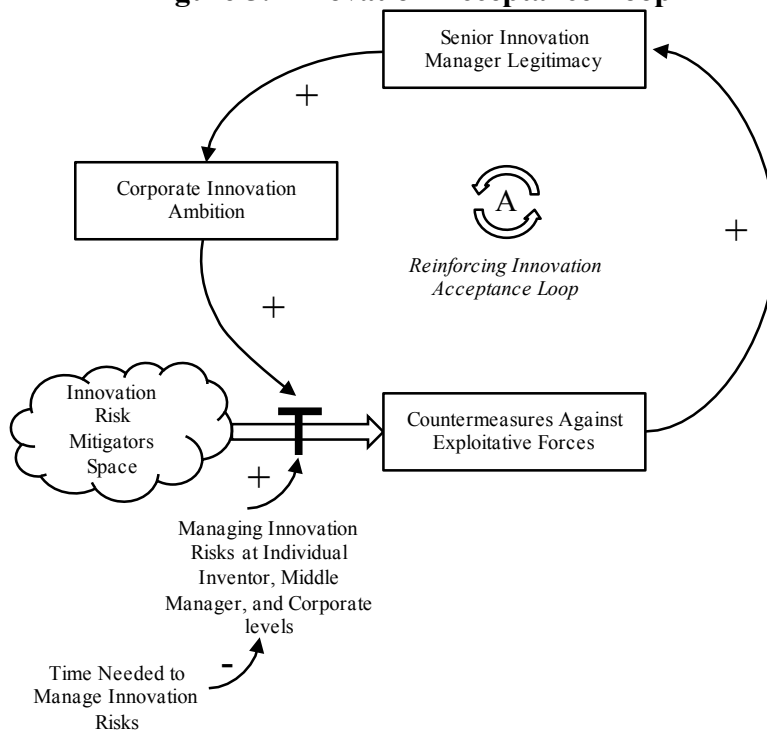


Figure 6 depicts the senior innovation manager role’s influence on both local and distant innovation. “Local innovation projects” as a stock variable. “Local” refers to the proximity of innovation projects to core businesses caused by a combination of external pressures on short-term results, cognitive limitations of middle managers, and incentive systems geared towards exploitation of core businesses. “Innovation space close to core businesses” is a stock variable representing innovation opportunities related to core businesses. The innovation space around core businesses is assumed to be objective in nature, reflecting the fact that most innovations are derived from extant knowledge. The valve depicted as “T” regulates the flow from the innovation space close to core businesses into the local innovation projects stock. “Connecting past to present” is an ongoing process variable through which senior innovation managers increase the flow by connecting past innovation achievements with present innovation opportunities. The rate of connecting past innovation achievements with present innovation opportunities decreases with the parameter “time needed to make the connection,” which captures the complexity of backward

innovation sensemaking. “Growth from local innovation” represents quantifiable contributions to revenue growth from commercialization of local innovation projects. The increase of revenue growth from commercialization of local innovation projects creates a “reinforcing local innovation loop (L),” which increases the flow of resources to local innovation projects as growth from local innovation increases.

“Distant innovation projects” is equally a stock variable. “Distant” refers to the structural, cognitive, and temporal separation between the knowledge stock of the focal firm and sources of knowledge required to pursue distant innovation. “Innovation space distant to core businesses” is a stock variable representing innovation opportunities distant to core businesses. Like the innovation space close to core businesses, innovation space distant to core businesses is assumed to be objective in nature.

The valve depicted as “T” regulates the flow from the innovation space distant to core business into the distant innovation projects stock. “Connecting future to present” is an ongoing process variable through which senior innovation managers increase the flow by lowering the distance between the firm and distant knowledge. The rate of connecting future to present decreases with the parameter “time needed to make the connection,” which captures the complexity of forward innovation sensemaking. “Growth from distant innovation” represents quantifiable contributions to revenue growth from commercialization of distant innovation projects. The increase of revenue growth from commercialization of distant innovation projects creates a “reinforcing distant innovation loop (D),” which increases the flow of resources to distant innovation projects as growth from distant innovation increases.

**Figure 6: Local and Distant Innovation Loop**

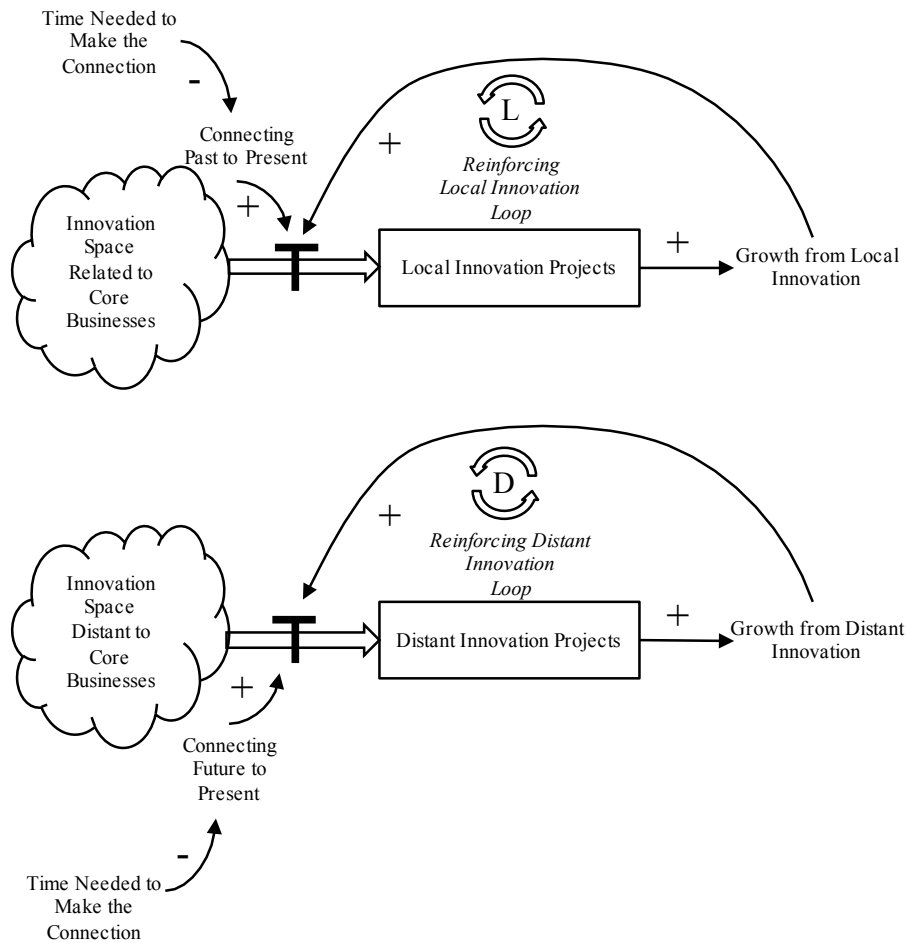
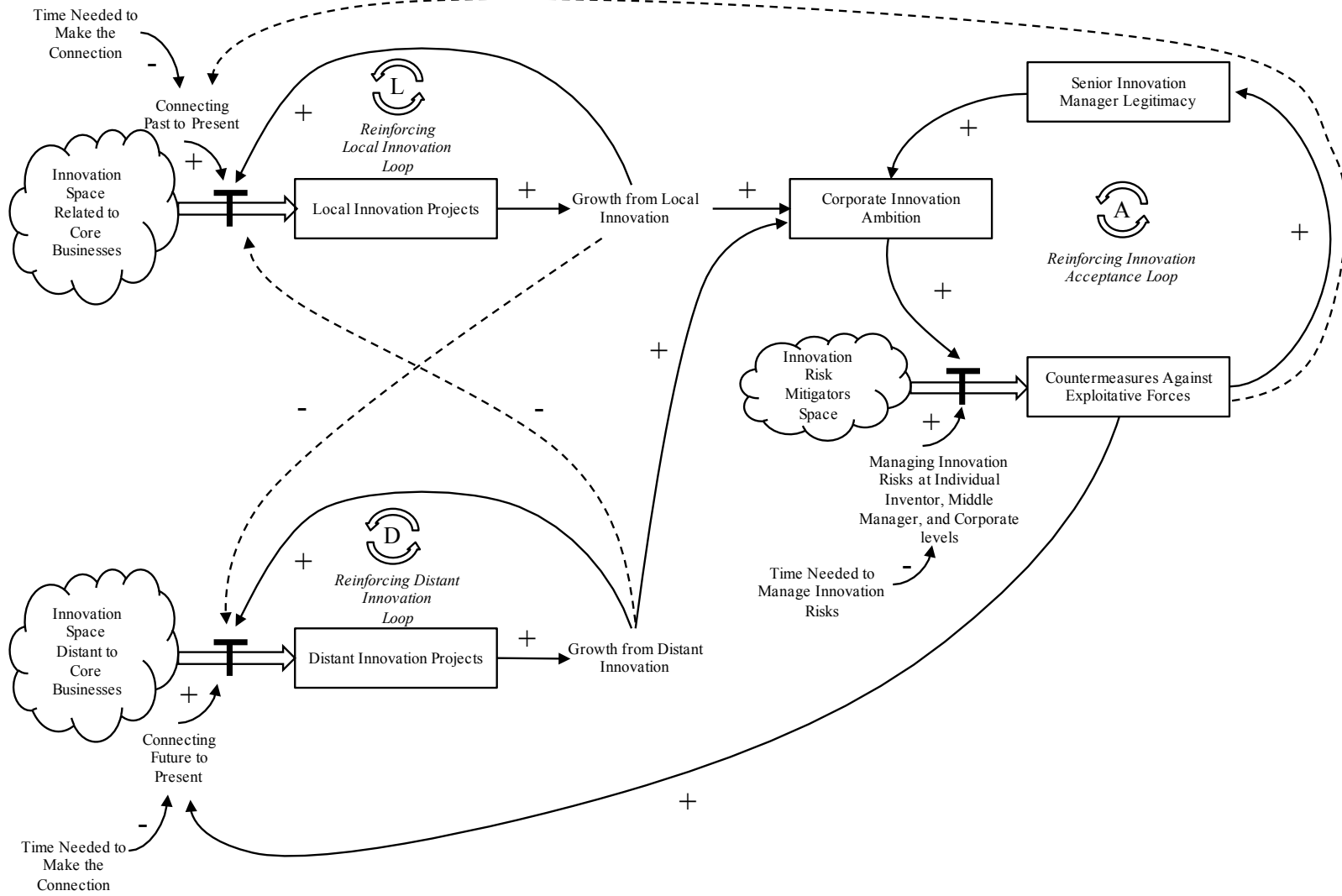


Figure 7 represents the full emergent process model of dynamic corporate innovation capability. As the countermeasures against exploitative forces stock grows, it increases the flow from the innovation space close to core businesses into the local innovation projects stock. The dotted line represents a weaker link, reflecting the finding that relatively little resistance existed to innovation projects close to core businesses, as all sampled firms had routinized R&D programs. Similarly, growth in countermeasures against exploitative forces increases the flow from the innovation space distant to core businesses into the distant innovation projects stock. Growth from both local and distant innovations increases the stock of corporate innovation ambition, which reinforces the innovation acceptance loop.

Under the assumption of resource constraints to exploration at the firm level, growth from distant innovation decreases the flow from the innovation space close to core businesses into the local innovation projects stock, and vice versa. Dotted lines represent the weak agency of senior innovation managers to obtain additional exploration resources during a given period, reducing this local-distant innovation substitution effect. On the other hand, a senior innovation manager also has the agency to both balance the local-distant innovation ratio and/or reduce the need for exploration resources by regulating the three valves depicted in the model.

**Figure 7: Full Emergent Process Model of Dynamic Corporate Innovation Capability**





## 5.8 DISCUSSION

This study contributes to innovation management scholarship by elaborating on an empirical phenomenon, the dynamic corporate innovation capability, which has been underexplored in prior literature. The concept of dynamic corporate innovation capability explains how corporate managers support local innovation and use innovation risk management across hierarchical levels to induce distant innovation. Prior research has uncovered that “the process for moving from a firm’s reservoir of technical knowledge to the initiation of a project with potentially game-changing opportunity appears to be almost capricious” (O’Conner and Rice, 2001: 109). More recent studies have hinted at the possibility that corporate managers can reduce this ad hoc nature of distant innovation generation in large multidivisional firms by integrating bottom-up and top-down innovation processes (Birkinshaw, Bouquet, and Barsoux, 2011). Relatedly, other innovation management scholars have noted that “new structures must be created to support these breakthrough ideas. The issues surrounding such transformational processes deserve more inquiry” (Garud, Tuertscher, and Van de Ven, 2013: 802).

I argue that the senior innovation manager role is one such structure, and make a theoretical contribution by unpacking the senior innovation manager role and showing how various corporate innovation processes enacted by senior innovation managers influence continuous generation of distant innovations. I also explain that senior innovation managers are not a simple addition to the corporate team who can drive distant innovation by relying on their formal authority only. Instead, senior innovation managers engage in a highly political process, augmenting, bypassing, and disrupting elements of formal organizational structures using mechanistic, autocratic, resource scaling, and experimental approaches to managing innovation. Overall, this study shows that the influence of senior innovation managers unfolds over time as a multilevel process marked by

interdependencies and contingencies, as opposed to being a top-down, one-time structural adjustment to how innovation is managed within large multidivisional firms.

#### 5.8.1 THE ROLE OF A SENIOR INNOVATION MANAGER

This research project started with only a limited understanding of the role of a senior innovation manager. Findings in this study revealed that the senior innovation manager role is marked by several specific challenges, which, taken together, paint an image of a boundedly rational corporate executive (Cyert and March, 1963) operating through often unconventional methods, in contrast with the portrayal of a corporate manager acting based on analytical foresight (Porter, 1980).

First, generation of more growth from innovation required an increase in the exploration/exploitation ratio (March, 1991). Yet, the existence in large multidivisional firms of “the system of constraints [which] forces managers to choose policies within a narrow range of profit opportunities compatible with stockholders or creditor interests” (Herman, 1981: 20) required senior innovation managers to employ untraditional ways for increasing exploration, without significantly reducing ongoing exploitation and related profitability. To achieve this goal, senior innovation managers engaged in resource scaling and bricolage (Baker and Nelson, 2005), as well as in resource slack scouting (Penrose 1959/1995). Further, resource flexibility gained through these non-traditional means increased senior innovation managers’ flexibility in responding to unpredictable creativity (Austin, Devin, and Sullivan, 2012).

Second, responsibility to generate growth from innovation often already formed part of the job of other senior managers and/or was delegated to business unit managers. As such, senior innovation managers had to engage in political maneuvering to get accepted by their peers (Eisenhardt and Bourgeois, 1988). Moreover, often, business unit-level managers were

subordinated to senior innovation managers implicitly rather than explicitly, which required additional political maneuvering by senior innovation managers.

Third, concrete blueprints for senior innovation roles rarely existed, in contrast to established corporate functions related to finance, information technology, or M&A. This factor required senior innovation managers to engage in trial-and-error approaches and experiments, and to be highly entrepreneurial in general in their roles. Senior innovation managers also relied heavily on informal networks to counter the biases towards exploitation embedded in formal organizational structures.

#### 5.8.2 EXTERNAL VERSUS INTERNAL KNOWLEDGE SOURCING

The concept of open innovation of leveraging external knowledge to augment intra-firm innovation effort (Chesbrough, 2003) has gained significant scholarly and managerial interest over the last two decades. The argument that open innovation enables firms to pursue distant innovations is frequently made by scholars. Interestingly, the CEO of 3M, a consistently highly innovative firm, has remarked that 3M has always used relatively little open innovation, yet is now considering increasing its usage in the future (Berger et al., 2009). Similarly, this study uncovered that while open innovation was an important element of the sampled firms' overall innovation management systems, the costs and long investment-benefit conversion cycles associated with open innovation meant that senior innovation managers initially focused their effort on leveraging internal sources of knowledge, using open innovation as a weak complement to—rather than a strong substitute for—sourcing novel knowledge internally.

The leveraging of internal resources for generating distant innovation is directly related to the link between organizational slack and a firm's growth introduced by Penrose (1959/1995). Penrose conceptualizes the firm as a portfolio of resources functioning within an administrative framework, arguing that a firm's growth is related to managers' desire to “do something” using

human and other resources controlled by the firm. My study builds on this seminal insight in the context of innovation management: initially, senior innovation managers develop mechanisms facilitating the temporal, cross-silo, cross-business unit, cross-geography recombination of knowledge which is under administrative control of the firm, while encouraging the augmentation of the internal knowledge sourcing with open innovation. As the senior innovation manager role matures, sub-capabilities developed within the dynamic corporate innovation capability framework (e.g., extraction of knowledge from early stage start-ups, future sensing) decrease the cost and time intensity differentials between external and internal knowledge sourcing.

At the same time, maturation of the senior innovation manager role likely results in internal knowledge reservoir depletion, which may also lead to the increased use of external knowledge sourcing. In sum, firms must have a well-developed internal innovation management capability to leverage and fully exploit innovation opportunities sourced through open innovation.

### 5.8.3 INDUCED BOTTOM-UP DISTANT INNOVATION AS AN ALTERNATIVE TO CENTRALIZATION OF INNOVATION

The centralization of innovation activities within a multidivisional firm has also received significant scholarly attention. Sorenson and Stuart (2000) show the tendency of large firms to innovate using internal resources. Building on this research, Argyres and Silverman (2004) and Arora, Belenzon, and Rios (2014) demonstrate that centralization of innovation activities results in more distant innovations, in contrast to when innovation activities are contained at the business unit level. Consistent with these results, most senior innovation managers in the sampled firms created a dedicated corporate innovation unit to generate distant innovations.

Yet, findings in this study offer a more nuanced view of innovation centralization as they show how senior innovation managers use innovation resources located at *both* centralized and decentralized locations within the firm to generate distant innovations. Initially, senior innovation

managers borrow resources embedded in business units and insert them into a more centralized innovation domain on a temporary basis. Over time, these managers decrease firms' reliance on centralized innovation alone to generate distant innovations by introducing mechanisms allowing individual innovators operating within the realm of business units to self-organize on an ad hoc basis and access centralized innovation resources remotely on a demand basis.

Further, as stocks of senior innovation managers' legitimacy and countermeasures to exploitation grow, senior innovation managers' ability to use more directive top-down approaches to generate distant innovation within business units increases. In sum, this study's findings show that distant innovation gradually occurs through both top-down and bottom-up corporate innovation processes.

#### 5.8.4 BOUNDARY CONDITIONS

Large multidivisional firms are typically mature organizations focused on exploitation at the expense of exploration, and as such, they represent a subset of organizational structures. It is likely that firms with less mature innovation cycles experience less severe internal biases towards exploitation, and therefore have a lower need for developing dynamic corporate innovation capability. As I employed a cross-industry sample, the presented findings represent a coherent account of the role of senior innovation managers in innovation management in large multidivisional firms, as opposed to explaining inter-industry differences in the development of dynamic corporate innovation capability.

#### 5.8.5 FUTURE RESEARCH DIRECTIONS

##### 5.8.5.1 Effects of Dynamic Corporate Innovation Capability on Innovation Performance

This study focused on the process of developing dynamic corporate innovation capability, and not on the outcomes of this process. Further research should explore the impact that dynamic corporate innovation capability has on firm-level innovation output.

#### 5.8.5.2 Automation of Dynamic Corporate Innovation Capability

The study confirmed the importance of traditional approaches to innovation, such as the Stage Gate process. As the data collection progressed over the span of five years, the relevance of more advanced innovation-supporting systems that leverage machine learning and artificial intelligence increasingly entered the discourse at the chief innovation summits. Advances in these areas are likely to both accelerate the pace of technological change and offer new ways for firms to sense opportunities and take advantage of them.

#### 5.8.5.3 Early Selection versus Incubation

The introduction of selection mechanisms very early on in the innovation's incubation stage was problematic, as many high-potential innovations required significant time to crystalize into defensible projects. How to reconcile the need to deselect low-value projects early on with the need to let projects develop before being subjected to the selection environment remains an unsolved riddle.

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## **CHAPTER 6                    GENERAL CONCLUSIONS**

### **6.1 THE EXPLOITATION VERSUS EXPLORATION TENSION IN A MULTIDIVISIONAL FIRM**

I introduced my dissertation with a quote by March (1994: 47) about the existence of some possibilities available to managers to optimize the ratio between exploitation and exploration activities coexisting within a firm's boundaries. It is my hope that my research has contributed towards the knowledge about the nature of some of these possibilities.

In Chapter 2, I show that, contrary to the dominant view in the literature, top-down interventions in innovation management are not merely passive, but are often purposeful actions instigated by corporate managers to influence how innovation occurs at the corporate manager, middle managers, team, and individual inventor hierarchical levels across variation, selection, and retention of knowledge. In addition, I demonstrate that a specific action instigated by corporate managers often operates across levels of analysis and evolutionary phases of the innovation process. Specifically, I synthesize extant knowledge on top-down interventions in intra-organizational innovation processes (i.e., corporate innovation activism (CIA)) into structuring, nudging, and routinizing categories. By identifying important gaps and unresolved tensions in the extant knowledge on CIA, I set the stage for both theoretical and empirical exploration of CIA's rationale, genesis, and evolution.

In Chapter 3, I deductively establish the rationale for the existence of CIA within a multidivisional firm. I show that a careful reconsideration of foundational corporate strategy literature allows for the relaxation of the assumption of corporate managers' passivity in the management of innovation. Building on the knowledge base built in Chapter 2, together with the insights derived from the reconsideration of the foundational literature, I argue that CIA can manifest itself through efficiency gains in innovation processes and/or value added above and beyond what is achievable when the management of innovation is confined to business units alone. While corporate innovation synergy and corporate innovation value added are deductive

theoretical constructs, by elaborating on them, I establish the possibility that CIA is present across the universe of existing multidivisional firms.

In Chapter 4, I proceed to empirically examine the genesis of CIA. Using a proprietary dataset on corporate interventions in the management of innovation in large multidivisional firms, I confirm the existence of CIA by uncovering 17 CIA processes operating across hierarchical levels and evolutionary phases. To bring my findings closer to the realities of real-world multidivisional firms, I synthesize 17 CIA processes into three configurations, reflecting several options for the distribution of elements of CIA between the corporate centre and business units. Mapping these three configurations onto the innovation efficiency frontier allows me to link the CIA to the trade-off that corporate managers face as they attempt to optimize the ratio between low-risk/low-return innovation projects and high-risk/high-potential innovation options.

In Chapter 5, I make another empirical examination focused on linking CIA's managerial aspects to the transformation of discrete top-down interventions into an organizational capability to continuously discover, evaluate, and monetize distant innovations (i.e., dynamic corporate innovation capability (DCIC)). For this purpose, I assemble another proprietary dataset by longitudinally mapping the work of senior innovation managers in large multidivisional firms. I uncover a process giving rise to DCIC that is comprised of legitimacy building for the role of a senior innovation manager, the establishment of corporate innovation ambition, and the transformation of corporate innovation processes into corporate innovation routines. To generate understanding about how these sub-processes dynamically interact as corporate managers attempt to optimize the balance between exploitation and exploration, I use system dynamics modelling to create an emergent model of DCIC. In the model, I conceptualize innovation acceptance, local innovation, and distant innovation self-reinforcing loops, and propose several regulating mechanisms that corporate managers can use to manage the ongoing tension between exploitation and exploration on the organizational level.

## 6.2 THEORETICAL CONTRIBUTIONS

In addition to contributing to the scholarly discussion about the role of corporate managers in co-managing exploration and exploitation activities within a multidivisional firm, I make several other original theoretical contributions in my dissertation that are worth highlighting.

### 6.2.1 INNOVATION AS A CORPORATE FUNCTION

The dominant view in the literature has been that innovation in a multidivisional firm occurs through bottom-up processes which should be disrupted by top-down interventions (Amabile, 1983; Damanpour, 1991). Relatedly, Bower (1970) argues that corporate managers play a passive role in innovation management as providers of funds to innovation projects, rubber-stamping recommendations by trusted middle managers. Burgelman (1983a, 1983b) builds upon Bower's (1970) work and posits that corporate managers retroactively rationalize innovation successes as being the result of corporate actions, while in fact, they result from actions taken by middle managers. Hence, Burgelman (1983a, 1983b) retains the view of corporate managers as being inherently passive in innovation management.

Across the four papers in this dissertation, I consistently find that the passivity assumption surrounding the involvement of corporate managers in innovation management does not hold from multiple perspectives. My finding resonates with several recent calls in the literature to unpack the role of corporate managers in the management of innovation (e.g., Anderson, Potočnik, and Zhou, 2014). Through a literature review and deductive theorizing, I argue in Chapters 2 and 3 for the possibility of innovation being a core corporate function in a multidivisional firm. In both Chapters 4 and 5, I find strong empirical support for my assertion.

In this way, I demonstrate that the innovation literature's affinity towards the bottom-up view on how innovation occurs within a multidivisional firm is incomplete without considering how it is shaped by purposeful top-down managerial interventions. Unlike Birkinshaw, Bouquet, and Barsoux (2011), I find that the relationship between top-down and bottom-up innovation

processes is not solely complementary in nature, but orthogonal and parallel as well. My empirical findings in Chapters 4 and 5 show how managers deploy top-down interventions to augment, rectify, or circumvent bottom-up innovation processes to optimize innovation flows on the system level.

The important insight my findings generate is that the management of innovation in a large and complex multidivisional organization is not only about minimizing bureaucratic interference in bottom-up innovation processes (Amabile, 1983), but rather, about understanding the limitations of these processes and addressing these limitations through purposeful top-down managerial interventions. Through my empirical work, I disentangle these top-down managerial interventions along several dimensions. In Chapter 4, I outline possibilities available to corporate managers in terms of structuring their interventions to allow corporate managers agency to match organizational design factors to desired interactions between bottom-up and top-down innovation processes. In Chapter 5, I delve deeper into how managers adapt the nature of their interventions to pursued innovation goals. Overall, my findings open up a promising avenue for future research that focuses on increasing our understanding of how the modulation of top-down interventions in the management of innovation shape bottom-up innovation processes.

#### 6.2.2 MANAGEMENT OF UNCERTAINTY IN A MULTIDIVISIONAL FIRM

A key theme resonating across my four papers is the complex nature of the management of uncertainty generated by intra-organizational innovation activities. In the introduction to my dissertation, I highlight some of the revolutionary research that has been recently conducted in relation to this topic, including research on centralization of innovation activities (Argyres and Silverman, 2004; Arora, Belenzon, and Rios, 2014), the relationship between cost retrenchment and innovation capability (Lim, Celly, Morse, and Rowe, 2013), accidental innovation (Austin, Devin, and Sullivan, 2012), unofficial research (Criscuolo, Salter, and Ter Wal (2014), and vicarious learning from failures (Maslach, Branzei, Rerup, and Zbaracki, 2018). Building on

these pioneering research streams, as well as on the foundational literature, I make several original contributions to the knowledge on the management of uncertainty.

First, in Chapter 2, based on careful synthesis of extant knowledge, I argue that corporate managers' focus is not simply on mitigating uncertainty, but also on containing its negative aspects while harnessing its potential. In Chapter 3, I deductively argue that corporate managers can rearrange the loci of risk-taking behaviour to prevent innovation-associated risk from stopping and/or distorting innovation activities. In Chapter 4, I show how corporate managers modulate risk-taking behaviours to transform risk into valuable outcomes. Then, in Chapter 5, I develop a system-level model of top-down risk management at the organizational level.

Second, much research focuses on how managers promote failure in their organizations. While I touched on this theme in my literature review in Chapter 2, through my empirical work in Chapters 4 and 5, I find that failure is an outcome that individual employees strongly prefer not to experience. Thus, paradoxically, while experiencing occasional failure is wholly manageable and desirable at the organizational level, I find strong resistance to failure at the individual employee level. The question then becomes, how can an organization encourage individual-level behaviour with a high probability of failure to uncover truly high-potential innovations, while reassuring individual employees that innovation-related failure will not negatively impact their future prospects within the organization? Based on my findings in Chapters 4 and 5, I propose several possibilities for addressing this dilemma (e.g., failure rhetoric, celebration of failure, codified learning from failure, and flexible career switching). As recent publications on the topic of failure within large organizations demonstrate (e.g., Maslach, 2016; Maslach, Branzei, Rerup, and Zbaracki, 2018), this research stream offers many fruitful research opportunities.

Third, another strong theme resonating across and beyond my four papers is the effort of corporate managers to create an organizational climate conducive to experimentation (Thomke, 2001; Thomke 2003). This sub-stream of the literature has been gaining increasing scholarly



attention due to the idea that in order for a multidivisional firm to remain competitive across multiple industries, it needs to internally maintain areas with start-up-like organizational environments (Ries, 2011). My overall findings show that the coexistence of start-up-like and more mature organizational environments is not frictionless, and requires top-down interventions. In Chapter 4, I uncover several mechanisms deployed by corporate managers to enable experimentation to occur within the constraints of established formal organizational structures (i.e., top-down support for autonomous innovation, availability of explorative/mixed career paths, provision of physical experimentation spaces, and fostering rapid experimentation). In Chapter 5, I propose that the continuous management of risks at the individual inventor, middle manager, and corporate levels counterweights organizational gravitation towards exploitation and, as a result, supports the continuous pursuit of experimentation across organizational hierarchical levels. Overall, my findings point to the need for purposeful and continuous top-down support for experimentation in the organizational environment of a multidivisional firm marked by a persistent tendency to pursue short-term certainty.

## **6.3 PRACTITIONER CONTRIBUTIONS**

### **6.3.1 OVERVIEW OF EXTANT INNOVATION MECHANISMS**

One practitioner-related outcome of my dissertation is the overview of main innovation mechanisms available to managers organized along hierarchical levels and innovation projects' typical stages. Managers can use my overview as a reference guide to consider which top-down interventions in innovation management are likely to be relevant for their respective firms.

Further, my dissertation offers managers insights about differences, yet also about interrelatedness among various uncovered innovation mechanisms. For instance, unstructured innovation worktime, hackathons, and skunk works projects can be purposefully leveraged by managers both in sequence and in parallel to optimize the use of scarce innovation resources. Ideas

continuously generated through employees' unstructured innovation times can be developed further within the purposefully built innovation team environment of a hackathon, to then be passed on to a skunk works team working largely independently from the rest of the organization.

Ultimately, my synthesis of uncovered innovation mechanisms allows managers to consider nuances of innovation management related to the need for a senior innovation manager to combine top-down structuring of innovation processes, psychological interventions in innovation processes, and routinization of some aspects of top-down and bottom-up innovation processes.

### 6.3.2 THE ROLE OF A SENIOR INNOVATION MANAGER IN A MULTIDIVISIONAL FIRM

Most of my informants commented on the non-linearity of the path of a senior innovation manager, as the role eludes easy, "how-to" prescriptive recommendations. Yet, several common themes resonate across my dissertation findings. These themes may be relevant for newly appointed senior innovation managers as they decide how to proceed in their roles.

First, despite the oft-stated importance of innovation for an organization, the meaning of innovation for a specific organization is often poorly defined. Thus, I found across my cases that newly appointed senior innovation managers first engaged in a company-wide consultation to more clearly define the organization-specific meaning of innovation.

Second, the corporate innovation function is marked by its novelty vis-à-vis other more established corporate functions, even with respect to more recent areas of corporate attention (e.g., the transition into the digital world and taking advantage of big data analytics). Therefore, senior innovation managers had to work hard to justify their very existence at the corporate level and delineate their role against other corporate-level functions. This process was complicated by the fact that managers in charge of more established corporate areas, such as marketing and/or IT management, often considered the management of innovation to be within their respective realms. Another frequently complication was the business unit-level opposition to the cross-business unit authority of the corporate innovation function, as business unit managers often consider

innovation efforts to be within their domain. I found that senior innovation managers were addressing these political issues and maneuvering through careful diplomacy and a measured approach based on mutual respect, as opposed to imposing their will through heavy-handed tactics rooted in the formal authority stemming from their function.

Third, the corporate innovation function was often poorly resourced. Frequently, the directive from the CEO was to significantly increase the percentage of revenue directly linked to the corporate innovation effort, yet without committing to providing substantial resources from the onset of the creation of the corporate innovation function. Thus, most of the senior innovation managers included in my database had to improvise and find creative ways to resource their function along the way. Some mechanisms for this on-the-fly resourcing of the corporate innovation function uncovered through my research include assembling (initially very small) corporate innovation teams, temporarily borrowing resources from other organizational areas, and creating the perception with the CEO of a burning platform situation through skillful presentation of significant innovation trends and challenges which could be effectively addressed by increasing the funding for the corporate innovation function.

Fourth, tangible results of the corporate innovation function would often come only after many years from its establishment. I found that senior innovation managers addressed this issue in two ways. First, they created the perception of a more abstract time dimension related to their work in contrast to a more mechanical time dimension associated with other activities within their firms. This perception of a more abstract time dimension allowed senior innovation managers some flexibility in terms of negotiation of milestones and deliverables. Second, the sampled senior innovation managers identified more easily achievable tasks and focused on delivering those to create the perception of some level of outputs.

### 6.3.3 DESIGNING A CORPORATE INNOVATION PROGRAM

While the role of a senior innovation manager is marked by its non-linearity, the establishment of a comprehensive and sustainable corporate innovation program is an even more complex undertaking. In my dissertation, I open up the black box of several corporate innovation programs and deconstruct them into their underlying components. The uncovering of these components of a prototypical corporate innovation program allows CEOs and other senior executives who contemplate the introduction of such a program in their firms to gain awareness about the modularity of the process and make the right decisions suited for their specific organizational and environmental contexts.

#### 6.3.4 EMPLOYEE INNOVATION RISK MANAGEMENT

In most large and complex multidivisional firms, a number of employees are intrinsically motivated to work on innovation projects (Amabile, 1988). Yet, employees may be hesitant to pursue their intrinsic motivations due to the inherent riskiness of innovation projects. My research reveals several mechanisms that can mitigate innovation-generated risk at the employee level.

Organizations can offer guarantees to their employees that failure related to innovation pursuits will not negatively affect their careers. These guarantees can take form of an explicit contractual agreement between the firm and the concerned employee, stipulating that in case of a project's failure, the employee will be able to reassume his or her formal position without a loss of seniority.

In addition, organizations can structure innovation projects in a way that makes them transparent for employees in terms of the stage of a specific project, project's history, project's resourcing, project's expected duration, and/or project's expected outcomes. Such innovation project transparency can significantly decrease the information asymmetry between the organization and its employees, and increase employees' ability to evaluate the riskiness of an innovation project for their own careers.

Further, organizations can offer their employees innovation-specific career paths which reduce the managerial burden on the employee, yet still offer growth in seniority contingent on innovation-related performance. Such career options increase the chances of employees' success in innovation pursuits by allowing employees to fully focus on innovation-related activities.

### 6.3.5 DEBIASING INNOVATION DECISION MAKING

Pioneering work on decision making (Tversky and Kahneman, 1973; Kahneman, Lovallo, and Sibony, 2011) has uncovered several key biases distorting organizational decision making. Similarly, early scholars of intra-organizational innovation processes note the existence of several innovation-related decision-making biases (Bower, 1970; Burgelman, 1983a, 1983b). In my dissertation, I confirm the presence of biases, and uncover several mechanisms used by corporate managers to mitigate these biases. These mechanisms may be of importance to senior innovation managers who aim to debias their intra-organizational innovation processes.

I find that corporate managers are acutely aware of biases operating at the middle manager level. Consequently, they may design several bypassing mechanisms to lessen the influence of middle managers on the evaluation of novel ideas. Once such mechanism concerns the creation of alternative lines of communication between individual inventors and corporate managers in cases when novel ideas were rejected by their superiors. Another mechanism is the establishment of an informal network of innovation-friendly employees, who, at the same time, retain formal power though their rank in the organizational hierarchy. The existence of this informal innovation network makes it harder for middle managers to reject a novel idea based on their personal opinions and/or personal agenda. The inclusion of innovation metrics into middle managers' KPIs is another debiasing mechanism employed by corporate managers.

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# APPENDIX I ETHICS APPROVAL FORM

## Interviews

	<h1>Western Research</h1>	<b>Research Ethics</b>
<b>Western University Non-Medical Research Ethics Board NMREB Delegated Initial Approval Notice</b>		
<b>Principal Investigator:</b> Dr. Glenn Rowe <b>Department &amp; Institution:</b> Richard Ivey School of Business\Ivey School of Business, Western University		
<b>NMREB File Number:</b> 109327 <b>Study Title:</b> Active Involvement of Corporate Managers in Innovation Management in Multidivisional Firms - Interviews		
<b>NMREB Initial Approval Date:</b> June 05, 2017 <b>NMREB Expiry Date:</b> June 05, 2018		
<b>Documents Approved and/or Received for Information:</b>		
Document Name	Comments	Version Date
Western University Protocol	Received May 31, 2017.	
Recruitment Items	Employee Recruitment Script	2017/05/31
Recruitment Items	Executive Recruitment Script	2017/05/31
Instruments	Interview Protocol	2017/04/28
Letter of Information & Consent		2017/05/23
Recruitment Items	Email 2. Received May 23, 2017.	
Recruitment Items	Email 1. Received May 23, 2017.	

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

\_\_\_\_\_  
iley Hinson, NMREB Chair or delegated board member

✓ \_\_\_ Katelyn Harris \_\_\_ Nicola Morphet \_\_\_ Karen Gopaul \_\_\_ Patricia Sargeant \_\_\_



## APPENDIX II INTERVIEW QUESTIONNAIRE

Version Date: April 26, 2017



### **Corporate Involvement in | Innovation**

*Semi-Structured Interview Protocol*

**Duration: 45-90mins**

*Prepared by Zdenek Necas  
Ivey Business School*

<b>TOPIC I - PERSONAL ROLE IN INNOVATION</b>	
<b>1</b>	<b>Please comment on your personal role in innovation:</b>
1.1	What are the main innovation activities that are part of your formal role in the organization?
1.2	What are the main innovation activities that are not part of your formal role in the organization, yet in which you engaged due to your own personal interests?
1.3	In which innovation activities do you engage most?
1.4	When you have an innovation idea, what is the typical process you would follow to test its potential and obtain organizational support for its further development?
<b>2</b>	<b>Please discuss how your role in innovation supports organizational innovation goals:</b>
2.1	What is your understanding of your organization's innovation goals?
2.1.1	Does your organization have a clear definition of innovation?
2.1.2	Are innovation goals realistic and actionable?
2.2	How and by whom are these goals set and communicated?
2.3	In your view, how successful has your organization been in reaching these goals?
2.3.1	What are the most important innovation successes achieved by your organization?
2.3.2	Do you recall any significant innovation failures and/or postponed innovation projects?
2.4	Do you feel that your formal role allows you to meaningfully contribute to your organization's innovation goals?
2.5	How have your contributions to the fulfilment of innovation goals been appreciated by the organization?
<b>TOPIC II - TOP-DOWN SUPPORT IN INNOVATION</b>	
<b>1</b>	<b>Please comment on current top-down support in innovation:</b>
1.1	What are the main innovation processes initiated by corporate managers that support innovation?
1.1.1	Which of these processes have been most helpful in your own innovation activities?
1.1.2	Which of these processes have had no effect on your own innovation activities?
1.1.3	Which of these processes have been hindering your own innovation activities?
1.2	What is the role of middle managers (i.e., managers to whom you report at the business unit level) in innovation?
1.2.1	Do actions by middle managers facilitate or hinder innovation and in which way?
1.3	When you have an innovation idea the pursuit of which falls outside of your formal role in the organization, what would be the processes you would follow to develop your idea further?
<b>2</b>	<b>Please discuss how top-down support in innovation could be made more effective:</b>
2.1	What would be your main suggestions / recommendations to corporate managers to the engagement in innovation activities easier for you?
2.2	What would be your main suggestions / recommendations to middle managers to the engagement in innovation activities easier for you?



TOPIC III - OPEN-ENDED INNOVATION TOPICS	
<b>1</b>	<b>What are the main opportunities for improving innovation processes at your organization?</b>
1.1	How could the process of discovering novel ideas be improved?
1.2	How could the process of selecting novel ideas be improved?
1.3	How could the process of implementing novel ideas be improved?
<b>2</b>	<b>What should change in your role so that you can become more effective in innovation?</b>
2.1	What are the key success factors for reaching each of these goals?
2.2	Is your organization considering different ways for reaching these innovation goals?
TOPIC IV - CONCLUDING REMARKS	
<b>1</b>	<b>Omitted topics / Additional information</b>
1.1	Is there anything not covered in this interview that you think would be important to discuss in terms of how innovation occurs in your organization?
1.2	Do you recommend that we interview specific colleagues of yours and/or other company employees to gain further relevant insights into how innovation occurs in your organization?
1.3	Are there any documents you can share with us that would provide further detail on how innovation occurs in your organization?
<b>2</b>	<b>Follow-up</b>
2.1	Do you agree to be contacted in case further clarifications are needed?

## APPENDIX III CURRICULUM VITAE

### Zdenek Necas

Ph.D. Candidate in General Management - Strategy  
Ivey Business School  
Western University

### EDUCATION

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- Ph.D.** Western University (Ivey), General Management - Strategy (2018)  
University of Toronto (Rotman), Visiting Ph.D. Candidate in Strategy  
University of Pennsylvania (Wharton), Visiting Ph.D. Candidate in Strategy  
INSEAD Singapore, Ph.D. Candidate in Strategy
- M.Sc.** INSEAD Fontainebleau / Singapore, Management - Strategy (2013)
- M.B.A.** University of Navarra (IESE), General Management (2006)  
Columbia Business School, Entrepreneurship & Finance, Exchange program
- M.Sc.** HEC Paris, The Master in Management - Grande Ecole (2003)  
UCLA (Anderson), Finance & Marketing, Exchange program
- B.Sc.** University of Economics Prague, International Trade (2000)  
Copenhagen Business School, Marketing, Exchange program  
Uppsala University, International Trade, Exchange program

### ACADEMIC APPOINTMENTS

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**Schulich School of Business, York University, Toronto, Canada (F2018)**

Instructor,

Strategic Management, Senior undergraduate course (Honours iB.B.A. program), Four sections

**Brescia University College, Western University Affiliate, London, Canada (W2018 & W2019 - appointed)**

Instructor

Strategic Management, Senior undergraduate course

**Ivey Business School, Western University, London, Canada (W2017)**

Guest Lecturer / Teaching Assistant, Corporate Strategy, M.B.A. course

**INSEAD Singapore (2013 - 2015)**

Teaching Assistant, Mergers & Acquisitions, Alliances and Corporate Strategy, M.B.A. course, Multiple sections

Teaching Assistant, Power and Politics, M.B.A. course

## **ACADEMIC AWARDS & RESEARCH GRANTS**

---

- **Ivey Business School Plan for Excellence Doctoral Scholarship** (2015 - 2017)
- **Ivey Faculty Retreat Doctoral Research Poster Competition, 1<sup>st</sup> prize** (2016)
- **Strategy Research Foundation Dissertation Scholar Award** (2014 - 2016)
- **INSEAD Doctoral Fellowship** (2011 - 2015)
- **Wharton-INSEAD Alliance Research Grant**; Full funding to participate in the Wharton-INSEAD Doctoral Consortium in Philadelphia (2015)
- **Wharton-INSEAD Alliance Research Grant**; Full funding to participate in the INSEAD Corporate Strategy Camp (2015)
- **Wharton-INSEAD Alliance Research Grant**; Full funding for a campus exchange at Wharton (2014)
- **Wharton-INSEAD Alliance Research Grant**; Full funding to participate in the Wharton Mack Center for Technological Innovation Emerging Scholar Workshop (2013)
- **Wharton-INSEAD Alliance Research Grant**; Full funding to participate in the Wharton-INSEAD Doctoral Consortium in Philadelphia (2013)
- **IESE Alumni Association Merit Scholarship** (2004 - 2006)
- **HEC Paris French Government Merit Scholarship** (2000 - 2003)
- **HEC Paris Grant** for exchange at UCLA (2002)
- **University of Economics Prague Merit Scholarship** for exchange at the Uppsala University (1999)
- **University of Economics Prague Merit Scholarship** for academic excellence (1998)

## **DISSERTATION CHAPTERS**

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- **Necas, Z.** *Innovation Mechanisms in a Multidivisional Firm: Mapping, Synthesis, and Future Research Agenda*
- **Necas, Z.** *A Mid-range Theory of Corporate Innovation Activism*
- **Necas, Z., Schotter, A.** *The Development of Corporate Innovation Function in Multidivisional Firms*
- **Necas, Z.** *Dynamic Corporate Innovation Capability*

## **PUBLISHED CASES**

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- **Necas, Z., Huy, Q.** (2014). *INGLOT: Conquering the World*. INSEAD Case Publishing #05-2014/6028 (teaching case) / #04-2014/6028 (teaching note)

## **RESEARCH TALKS & PRESENTATIONS AT RESEARCH SEMINARS**

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- **York University**, *Dynamic Corporate Innovation Capability* (2018)
- **University of Toronto**, *Dynamic Corporate Innovation Capability* (2017)
- **3M Tech Forum**, *Dynamic Corporate Innovation Capability* (2017)
- **University of Toronto**, *Role of Organizational Hierarchy in Vertical Information Exchange* (2014)

- **INSEAD Singapore**, *Role of Cognitive Heterogeneity in Organizational Adaptation* (2013)
- **INSEAD Singapore**, *Sustaining Independence: Global Airline Alliances vs. Global Airline Challengers* (2013)

## **REFEREED CONFERENCE PRESENTATIONS**

---

- **Necas, Z.** *Dynamic Corporate Innovation Capability*, Strategic Management Society Special Conference, Banff, Canada (2017)
- **Necas, Z.** *The Effect of Hierarchy on Individual Ideation Performance*, Strategic Management Society Annual Conference, Berlin, Germany (2016)
- **Necas, Z.**, Schotter, A. *The Corporate Innovation Function*, Academy of Management Annual Conference, Anaheim, CA, USA (2016)
- **Necas, Z.** *Corporate Level Effects on Innovation*, Strategic Management Society Annual Conference, Denver, CO, USA (2015)
- **Necas, Z.** *Corporate Level Effects on Innovation*, Wharton-INSEAD Doctoral Consortium, Philadelphia, PA, USA (2015)
- **Necas, Z.** *Sustaining Independence: Global Airline Alliances vs. Global Airline Challengers*, Wharton-INSEAD Doctoral Consortium, Philadelphia, PA, USA (2013)
- **Necas, Z.** *Sustaining Independence: Global Airline Alliances vs. Global Airline Challengers*, Strategic Management Society Annual Conference, Atlanta, GA, USA (2013)
- **Necas, Z.** *From strategic to cognitive ambiguity: Role of managerial cognitive heterogeneity in multi-divisional firm's adaptation to environmental shocks*, European Group for Organizational Studies Annual Conference, Montreal, Canada (2013)
- **Necas, Z.** *Organizational Adaptation to Discontinuous Changes in Competitive Environment: MNCs vs. EMNCs*, Strategic Management Society Annual Conference, Prague, Czech Republic (2012)

## **INVITED DOCTORAL CONSORTIA**

---

- **Strategic Management Society Annual Conference in Berlin**, *Strategy Research Foundation Dissertation Poster Presentation* (2016)
- **Academy of Management Annual Conference in Anaheim**, *International Management Doctoral Consortium* (2016)
- **Academy of International Business Annual Conference in New Orleans**, *Doctoral Consortium* (2016)
- **Strategic Management Society Annual Conference in Denver**, *Strategy Research Foundation Dissertation Scholar Doctoral Consortium* (2015)
- **INSEAD Corporate Strategy Camp in Fontainebleau** organized by Phanish Puranam (2015)
- **Academy of Management Annual Conference in Vancouver**, *Technology & Innovation Management Doctoral Consortium* (2015)

- **Strategic Research Initiative Inaugural Ph.D. Boot Camp in New York** organized by Joanne Oxley (2014)
- **Strategic Management Society Special Conference in Mohali, *Doctoral Consortium*** (2013)
- **Wharton Mack Center for Technological Innovation Emerging Scholar Workshop on Evolutionary Perspectives in Management** organized by Dan Levinthal (2013)
- **Strategic Management Society Special Conference in Singapore, *Doctoral Consortium*** (2012)

## **ACADEMIC SERVICE**

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- Ad hoc reviewer for the **Canadian Journal of Administrative Sciences** (2017 - )
- Chair, “Structure, Coordination, and Innovation” session, **SMS Annual Conference in Berlin** (2016)
- Reviewer, **Academy of Management Annual Meeting in Anaheim** (2016)
- Reviewer, **Academy of International Business in New Orleans** (2016)
- Reviewer, **Academy of Management Annual Meeting in Vancouver** (2015)
- Reviewer, **Strategic Management Society Special Conference in Santiago de Chile** (2015)
- Draft manuscript reviewer, Puranam, P., & Vanneste, B. (2016). *Corporate strategy: Tools for analysis and decision-making*. Cambridge University Press: Cambridge, UK
- Analysis replicator, Chittoor, R., Kale, P., & Puranam, P. (2014). Business groups in developing capital markets: Towards a complementarity perspective. *Strategic Management Journal*, 36 (9): 1277-1296

## **INDUSTRY EXPERIENCE**

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**Delta Partners Group**, Director

**Accenture Strategy Practice**, Manager

**TACA International Airlines** (now Avianca), Senior Project Manager

**Merrill Lynch** (now Bank of America Merrill Lynch), Analyst