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Business models: An empirical approach
to firm structures and organisational change

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of the requirements for the degree of Doctor of Philosophy
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i. ABSTRACT

Popular though poorly-defined, the business model construct has generated a fragmented and non-accrative research literature. Despite prominence in the practice community for scholarly research has yet to converge on construct boundaries or establish a research framework in organizational theory. This study develops an integrative approach to business models and identifies business model formation and change processes.

Prior studies address business models within the strategy discourse of competitive positioning. The failure to disentangle business models and strategy has limited theoretical and practical research. A quasi-systematic review of the academic literature combined with a discourse analysis of the business model in practice yields an empirical assessment of business model language. Managers use business models to address opportunities rather than position the firm for competitive advantage. This anchors an integrative definition for the business model as *the design of organizational structures to enact an opportunity*.

Building on this framework, an analysis of structured interviews with 556 large firm CEOs establishes the links between organizational structures and strategic flexibility. Working within a capabilities and structural framework, the study extends research on strategic flexibility firms engaged in business model innovation in a global, cross-industry context. Creative culture enables strategic flexibility while partner dependence inhibits it. In addition, firms that focus managerial attention without giving up non-core activities achieve flexible outcomes.

Finally, a case-based study of innovative entrepreneurial firms unpacks characteristics of business model formation and change processes. In contrast to theories of outward-facing strategic fit with environment, entrepreneurial firms undergo an internally-driven process towards business model coherence. The case studies reveal a self-evolving narrative process operating at multiple levels within the firm. The application of a narrative framework facilitates a novel sense-making approach to theories of change at entrepreneurial firms.
ii. DECLARATION

I declare that this thesis submitted for the degree of Doctor of Philosophy is my own composition and that, except as noted otherwise, the information presented herein is my own original work.
iii. DEDICATIONS

To my wife, Lynn Hyland, who made it possible for me to change my career. This dissertation, like most of my recent accomplishments, owes its existence to her love and support.

To my parents, Maris Bock and Harvey Bock, M.D., who predicted and encouraged this career path long, long ago.

To my children, Taran Lee and Kenna Rose, who put up with my travel schedule and still let me tickle them and read them bedtime stories when I got home.
iv. ACKNOWLEDGEMENTS

Specific contributions to this dissertation are noted at the start of the respective Sections in alphabetical order.

In addition, I gratefully acknowledge the support, guidance, criticism, and care shown by many people over the course of my studies and the development of this dissertation, only a few of whom I can mention here.

First, I thank the entire Innovation and Entrepreneurship Group at Imperial College Business School, and by extension, Imperial College London. I have been fortunate throughout my life to study at some of the greatest educational institutions in the world, culminating at Imperial.

Within the I&E Group, Erkko Autio and Bart Clarysse accepted my idiosyncratic geographic situation and sometimes unconventional approach to study with good graces, and provided constructive criticism when asked. My appreciation also goes to the various support staff of the I&E Group who, over time, acclimated to my unpredictable and difficult-to-accommodate scheduling and logistics requests. The tolerance and flexibility displayed by Julie Paranics and Catherine Appleton enabled my mostly virtual presence on campus, which allowed me to find a balance between intensive studies, a sometimes grueling data collection process, and precious hours with my wife and young children.

Despite my relative physical distance from the department, I benefited from regular and thought-provoking discussions with Gajendran Kandesami, whose insight was a constant challenge to improve the clarity and rigour of my own thinking. Thanks to Tore Opsahl for updating my out-of-date statistical knowledge, encouraging me to think broadly about both research and career, and for good humor when I needed it. Grazie to Massimo Warglien who inspired me to combine
the research fields that most fascinate me: entrepreneurship, storytelling, and simulation.

Grateful thanks go to the faculty at the Management and Human Resources Department of the University of Wisconsin-Madison School of Business. Alan Filley, now passed from this earth, and Bob Pricer were the sparks that lit my interest in entrepreneurship. My earliest appreciation for the academic role emerged from coursework with Anne Miner and Don Hausch. If there was anyone other than my parents who foresaw this path so early, it was Anne. I have boundless admiration for her intelligence, insight, and commitment.

Gracious appreciation goes to the many company managers who completed my surveys, and especially to the entrepreneurs who allowed me to wander the corridors of their organizations, interrupting meetings and interfering with the rightful work of their employees. My own entrepreneurial experience leads me to believe that entrepreneurial management is intense as well as intensely personal. Thank you for sharing your stories, good and bad, and for the opportunity to witness your tragedies and triumphs firsthand.

My thanks, of course, to my family and friends who accepted my career change with surprise, enthusiasm, and support.

Finally, no single paragraph could do justice to the role Gerry George played in this effort. Frankly, I’ve lost track of how much time and effort Gerry has dedicated to my development, so perhaps that’s for the best. Suffice to say I am privileged to count him as a mentor, colleague, and friend. Value reaped in this work was sowed by Gerry seven years ago; the remaining flaws are mine alone and are included only over Gerry’s amused objections.
v. A NOTE ON THE DOCUMENT AND FORMATTING

This document was originally prepared in Microsoft Word for OSX on the using EndNote X1 on an iMac G4. The final version was ported to Adobe PDF via the native PDF generator in OSX. The typeface used in this document is 12 point Arial font. The language of the document is English (United Kingdom) except where Americanisms escaped my best editing efforts. Any formatting, typographical, grammatical, factual, or other errors are the sole responsibility of the author.
1 INTRODUCTION

This section provides an overview to the study. It introduces the extant research on business models, the motivating research questions, and the empirical framework of the three investigations undertaken. A short note on contribution to organisational research is also provided.

1.1 Background

While the term “business model” has gained widespread use in the practice community, the academic literature on this topic is fragmented and hindered by inconsistent definitions and unclear construct boundaries. While some scholars and practitioners assert the importance of business models and business model analysis (e.g. Amit & Zott, 2001; Magretta, 2002), others are wary or sceptical (e.g. Porter, 2001). Combined with a disparity between use-in-theory and use-in-practice, the lack of construct clarity has inhibited accretive research results and limited the validity of translational research, though reporting on recent focused initiatives has worked to narrow the conversation (e.g. Baden-Fuller & Morgan, 2010).

Despite these limitations, the literature on business models has expanded rapidly, generating thousands of scholarly papers and dozens if not hundreds of practice-oriented books. Definitions for business models across publications vary widely, incorporating organisational ‘narrative’ (Magretta, 2002), ‘processes’ that convert innovation into value (Chesbrough & Rosenbloom, 2002), ‘recipes’ for firm activities that incorporate organisational design and strategy (Slywotzky & Wise, 2003), and ‘flows’ of information and resources (Timmers, 1998). In contrast to these perspectives is a transactional framework focused on the nature of boundary-spanning structures (Amit & Zott, 2001).
In addition, business models have not been clearly distinguished from corporate strategy (Mansfield & Fourie, 2004; Porter, 2001). Some studies argue that the business model is a component of strategy (Seddon et al., 2004; Teece, 2010) while others view it as a new mechanism of value creation that complements strategy (Amit & Zott, 2001). This distinction is important because it frames how scholars and practitioners should approach business model analysis. Are business models directly linked to firm performance (Zott & Amit, 2007) or do they function as a moderating variable between top management and firm outcomes (Patzelt et al., 2008)? If there is a finite set of business models based on combinations of underlying characteristics (Bienstock et al., 2002), could optimal business models be determined ex ante, or only as knowledge becomes available in the growth process (Heirman & Clarysse, 2004)? If adjustments to the business model are critical to the entrepreneurial firm’s survival (Andries & Debackere, 2007), are business model change processes path dependent (Willemstein et al., 2007)?

The lack of a consistent framework has resulted in widely-dispersed research questions and findings. Theory development should progress towards a necessarily artificial construct that best approximates “the hypothesized course of [observed] events” (Weber, 1949: 44) in the service of encouraging rigorous theory-building, well-characterized descriptive research, and high-impact normative predictions. Developing a convergent construct could significantly reduce confusion and help reconcile conflicting empirical results, since a viable platform for theory-building and hypothesis-testing is an essential element of research validity and utility (Bacharach, 1989). A key tension in this study is the need to distinguish between the business model and other received organisational constructs while recognizing that extensive use of the business model construct emerged in the popular press and practice.
community before rigorous research attempted to codify its construct parameters.

Of particular interest is the relevance of business models to entrepreneurial activity, both because use-in-practice evolved from the venture community (Osterwalder et al., 2005) and because many studies of business models focus on entrepreneurial activity, (e.g. Downing, 2005; Heirman & Clarysse, 2004). The formation and success of new organisational forms, based primarily on the information technology boom of the 1990s, is often credited to the development of novel business models (Venkatraman & Henderson, 1998). Research links firm growth potential to its business model (Franke et al., 2008). Business models may, in fact, represent a form of entrepreneurial opportunity creation (Downing, 2005; Franke et al., 2008) explicitly initiated by market imperfections (Cohen & Winn, 2007). Studies within an entrepreneurial framework have considered whether a business model should be focused and formalized (Tracey & Jarvis, 2007), adapted to environmental circumstances (Hurt & Hurt, 2005) or specific to entrepreneurial mode (Morris et al., 2005). Clearly, the business model has something to do with entrepreneurship, though the relationship remains uncertain.

Similarly, business model innovation has been poorly specified. Although some research specifies more restrictive utilisation (Wu et al., 2009), business model innovation is generally interpreted as a form of systematic organisational change tightly linked to the idiosyncratic nature of the firm (Bessant, 2005) and the mode of organisational value creation (Amit & Zott, 2001). The phenomena of business model innovation has been specifically linked to outperformance in practice at large companies (Giesen et al., 2007; Johnson et al., 2008), but at this time no research has been conducted to differentiate the organisational processes that distinguish business model innovation efforts from product and process innovation.
Both popular press and research examples of novel business models tend to focus on new-to-the-world business models rather than new-to-the-firm or new-to-the-industry business models, and the performative benefits of business model innovation have, to date, only been studied via cases and relatively high-level analyses (Johnson et al., 2008). Extensive research has demonstrated locus of strategic innovation efforts tightly linked to firm structures (Burgelman, 1983a), but to date no process models have been developed to similarly describe business model innovation. This should be addressed, because unlike either product or process innovation, business model innovation is touted as an idiosyncratic form of systematic organisational change in which nearly every assumption associated with value creation may be questioned (Slywotzky & Wise, 2003).

This study therefore approaches business models with a broad perspective on the organisational literature and relevance to the field of practice. In particular, it considers the critical role of structures in the context of firm-level characteristics and outcomes. As the epistomology of business models derives from the practice of venture creation, this study consistently returns to that empirical context for grounding and reference. The research questions specifically address empirical aspects of business model content and change, with a particular focus on the juncture of managerial cognition and organisational behavior.

1.2 Research questions

This study addresses gaps in business model research. It seeks to develop a definition for the business model construct that integrates practice with the established academic literature. The development of that construct enables more rigorous and accretive research on important questions of organisational change. To that end, the following questions are addressed:
- What are the characteristics or dimensions of the business model that integrate managerial practice with established scholarly research? In other words, how do practitioners understand business models, and how can that understanding be framed within the established discourse of scholarly research?

- What are the characteristic drivers, organisational change processes, and outcomes of business model innovation? How does unpacking the process mechanisms associated with business model innovation distinguish between fundamental types of organisational innovation?

- How is business model change at entrepreneurial firms understood within a cognitive framework? Can simulation methods of constraint satisfaction replicate or predict business model change processes, especially compared to theories of strategic complementarity?

1.3 Motivation for an empirically-oriented approach

Some cases of organisational research address emergent phenomena to quickly establish construct boundaries and launch systematic and relatively well-codified research conversations: such is the case with born global firms (e.g. Phillips McDougall et al., 1994). In other cases, such as the field of strategic management, consensus remains elusive despite decades of research (Nag et al., 2007). Because research on business models applies a variety of perspectives and theoretical frameworks, often without clear deductive or inductive definitions, the conversation has been fragmented and perhaps dysfunctional.

Rather than add another subjectively-derived theory-based definition to the literature, this study begins with an effort to integrate the academic organisational
literature on business models with use-in-practice. This empirically-oriented approach provides a defensible basis for clarifying business model elements as practitioners understand them. There are three immediate benefits to this effort. First, the analysis is inherently grounded in practitioner thinking and action. Second, by framing the analysis in the context of extant research, it offers a convergent filter that facilitates reinterpretation, rather than obsolescence, of prior research. Finally, it presents concrete opportunities for new accretive research and translational work that builds on established practice and theory.

The study then applies this perspective to empirical studies of business model innovation and change. The second investigation considers business model innovation at large organisations in a global context. Utilising a private database of CEO data, the study identifies drivers of business model innovation and links change processes with outcomes of strategic flexibility. In the third investigation, an empirically driven simulation addresses business model change process at an innovative entrepreneurial firm. This simulation of organisational configuration extends prior research on strategic complementarity. It applies the concept of coherence, or plausibility, to re-interpret the cognitive process of business model sense-making at entrepreneurial firms.

1.4 Methods and empirical setting

This study codifies the language of business models in practice and utilises that language as a basis for developing descriptive and normative theory about business model change processes. Details of the specific datasets and empirical settings are presented in the relevant sections, but a brief introduction is also provided here.

Pilot interviews with entrepreneurs and venture financiers were utilised at the
start of the research process to identify commonalities and characteristics of the business model in practice. The venture community was selected for the probative investigation. Extensive use of the business model construct developed within that community (Osterwalder et al., 2005) and ongoing business model research has often focused on entrepreneurial companies and dynamic industries (Amit & Zott, 2001; Downing, 2005). The data from the pilot interviews demonstrated that commonalities in understanding by practitioners was not mirrored in the scholarly literature. An inductive study of practitioner discourse was undertaken to address this disparity. The selection of Indian managers for the study was driven by both intention and convenience. The choice ensured that the primary discourse language would be English, for convenience. At the same time, focus firms were less likely to have participated in US-based venture funding activities associated with the rapid promulgation of the business model concept. Managers were self-selected via participation in executive education programmes.

Discourse analysis has become a more common tool in organisational studies but has more routinely been used to assess language and meaning associated with established constructs (Phillips & Hardy, 2002). Using discourse analysis to codify use-in-practice follows from discourse theory (Foucault, 1982) and recent meta-research within the field (Nag et al., 2007). In this case, the intermediary mechanism of quasi-systematic literature review provides the boundaries of the discourse analysis, with the caveats noted in Section 3. Manager responses to the statement “What is a business model?” were assessed within those boundaries, creating a lexicon of business model concepts in practice.

The codification of business model use-in-practice enables a more grounded assessment of research data. Access to a third party-dataset provided the
opportunity to investigate business model innovation. The 2006 IBM Global CEO Study provides one of the broadest surveys of large firm CEOs available. While the dataset has limitations, as described in Section 4, it provides a unique window into business model change processes at large firms in a global context across multiple industries. The study was conducted in 2006 and utilised a structured interview of the CEOs of 762 firms from every major geography. The study was originally designed by IBM to assess innovation activities at organisations (Giesen et al., 2007). The assessment of business model innovation applied in this investigation uncovers new relationships between change processes and strategic outcomes. The use of this dataset to assess links between business model innovation and strategic flexibility represents the largest, most comprehensive quantitative analysis of business model processes to date.

The final investigation assesses business model structural change at an entrepreneurial organisation. This neural network simulation applies data from quasi-structured interviews with executives, managers, and line staff at the organisation before, during, and after the change took place. The narrative information from the interviews was utilised to generate a set of business model elements and the interrelationships among those elements. The neural network, based on the Hopfield constraint satisfaction heuristic, then generates stable configurations of elements. This appears to represent the first application of neural network simulation to business model structures and change at an entrepreneurial firm.

1.5 Contribution

This research makes two contributions to the entrepreneurship and strategy literatures. First, the systematic literature review integrates diverse conversations in the business model literature and distills commonalities based primarily on
established strategic frameworks. The subsequent practice discourse analysis establishes an empirical basis for integrating those research streams and identifies the most relevant use-in-practice characteristics. The integrated business model definition establishes an inductively-derived foundation for interpreting prior research on business models and presents numerous opportunities for extending business model studies in a variety of contexts.

Second, the empirical studies of business model change and innovation provide a window into the structural and cognitive processes associated with opportunity enactment at both large and small firms. The quantitative study of business model innovation demonstrates that large firms enacting business model innovation must focus managerial attention while retaining control of non-core functions in order to maintain or improve strategic flexibility. In addition, this research demonstrates that collaboration inhibits strategic flexibility when firms focus on opportunity innovation rather than product or process innovation. In an increasingly globalized and economically turbulent context, this result has important implications for firms that must maintain or improve responsiveness to exogenous change.

The case study simulation of business model change uses a cognitive lens to show that macro-level structural effects may be derived from individual conceptual maps. The novel method and setting present a variety of paths for new and interesting entrepreneurship research directions. Although business models are an inherently entrepreneurial, opportunity-centric construct, the findings from this research demonstrate that business model change and innovation processes are relevant to the outcomes for any for-profit organisation seeking to exploit novel opportunities.
1.6 Thesis structure

Following this introduction, Section 2 provides a broad review of the business model literature, highlighting the breadth of debate and important findings, underlying assumptions, and relevant research gaps. The broad review concludes with a quasi-systematic, thematic categorisation. This establishes the linguistic framework for the discourse analysis of the business model in practice presented in Section 3. That study reconceptualizes the business model via a quantitative assessment of use-in-practice discourse obtained from a survey of managers of Indian firms.

Section 4 investigates the underlying change processes large organisations utilise during business model innovation efforts. A third-party database provides data from structured interviews of CEOs to consider how firms improve adaptability via structural changes. The study also addresses the unresolved question of whether partnership activities improve or inhibit adaptability by focusing specifically on the business model change context. Section 5 presents a novel simulation methodology to recapitulate the unusual structural change enacted at an innovative, entrepreneurial firm following the uptake of a critical technology innovation. This case-study based investigation presents coherence as a form of constraint satisfaction to extend existing theories of strategic complementarity. Section 6 concludes the study with broad implications of the presented research, including contributions and suggestions for research that would extend and elaborate on the current findings. Citations for the entire study are provided in Section 7.
2 ESTABLISHING CONTEXT IN THE BUSINESS MODEL LITERATURE

Acknowledgement: The thematic categorisation presented in Section 2.3 was developed with, and improved by, the critiques and suggestions of Gerry George.

A note on relevance

Sections 2.1 and 2.2 provide extensive background and rationale for the thematic categorisation in Section 2.3. The breadth of review in Sections 2.1 and 2.2 is not integral either to the development of that categorisation or to the investigations in Sections 3, 4, and 5. Readers primarily interested in the investigations in Sections 3, 4, and 5 may choose to focus on Sections 2.3 and 2.4 in this review for brevity or convenience without loss of context.

2.1 Introduction

This review surveys the literature of business models to establish a context for relevant organisational research. Publications on business models form a massive, fragmented, and non-accretive discourse spanning dozens of scholarly fields and topics. An effective review must establish clear limits or risk information overload, thin coverage, or irrelevance.

The broad review, and more specifically the thematic categorisation in Section 2.3, serves as backdrop for all three studies of business models presented in this dissertation. The nature of the literature requires a logical approach to provide perspective and make limitations explicit. For this reason, the review is divided into three parts to sequentially focus and ultimately establish thematic boundaries for the investigation. The first section of the review provides a limited historical perspective on business model research combined with a brief survey on non-organisational research to establish the breadth of the conversation on business models. This
reinforces the requirement for clarifying construct boundaries within the given field of organisation studies.

The business model literature associated with organisational studies still represents a significant body of research. Business models have become an established research topic in a variety of organisational frameworks spanning firm-level, economic, and innovation studies. The second part of the review demonstrates common uses and frameworks as well as the disparities in research assumptions and divergent outputs associated with the lack of convergent definitions. The discourse on business models developed out of the field of corporate strategy and continues to utilise that language today. The review identifies the conflation of business model ideas with extant theories of corporate strategy and critically assesses the rationale for distinguishing between the two. It also develops an alternative perspective that assess business models within an entrepreneurial context. Reframing the conversation on business models facilitates theory development and the interpretation of empirical research from the established knowledge base of corporate strategy. The tension between opportunity-centric and competitive-centric frameworks emerges as an important motif throughout this research and informs and motivates the research questions addressed in the study.

The final section of the review establishes a thematically-based categorisation of business model research. This quasi-systematic review of relevant research on business models provides the specific context for the discourse analysis of business models in practice in Section 3. That discourse analysis integrates the practice of business models with the scholarly literature and serves as backdrop for a quantitative analysis linking business model innovation to strategic flexibility in Section 4 and a simulation of business model coherence in Section 5. Separate,
focused literature reviews are presented for those analyses.

### 2.1.1 Scope of the conversation

Reviewing the literature on business models has itself become a significant task, if only for the sheer quantity of documents published. An EBCSO© database search for “business model” on Dec 1, 2008 generated 929 title hits, 10,715 abstract/keyword hits, and 89,923 all-text hits. At the same time, use of the business model construct is relatively recent—of the 929 title hits, only 107 were published before 2000, and only seven of those before 1990. The literature spans numerous fields and often focuses on information and communications technology, though many crossover articles present e-business models in an organisational theory context (e.g. Bienstock et al., 2002; Eden & Ackermann, 2000).

There can be little doubt that the business model is a familiar, if difficult to describe concept. Even apparently related research efforts rely on marginally distinct definitions and usages. As one example, the “name-your-own-price” model has been identified both as a distinct business model (Fay, 2004) as well as only one example of business models characterized as “novel” rather than efficient (Amit & Zott, 2001).

The extent of usage shows that business models receive active attention in the practice community, especially within the entrepreneurial and venture capital fields. References in high-impact peer-reviewed management journals have been slower to accumulate, as noted in more detail in Section 2.2. At the same time, it appears that knowledge and even some acceptance of the construct has permeated the top levels of the organisational management scholarly community. For example, a rare mention in The Academy of Management Journal occurs in a footnote:

*A reviewer pointed out that it is possible that it is possible [sic] that*
facilities that perform relatively poorly with respect to emissions might be devoting their energies to changing their business models more fundamentally, so as to leapfrog to more sustainable operations (Russo & Harrison, 2005: 586).

In other words, while the researchers chose to attribute poor emissions performance directly to observable operational characteristics, a reviewer suggested that business model change could be occurring at a more fundamental level, generating lagged observable outcomes.

This research study attempts to set boundaries for the conversation on business models within the organisational literature and to make these implicitly held understandings more explicit. Prior to describing how business models have been addressed in the organisational literature, it’s helpful to provide a limited chronological perspective. In addition, a very limited overview of usage outside the strict boundaries of the organisational literature provides contrast with the focused field considered in this investigation.

2.1.2 Some chronology and use in practice

“Models of business” date back to computational work by Simon and others (see Ijiri & Simon, 1964 for a "business model" of growth). The term is still commonly used to reference a computational simulation of firm systems in the ICT field and even in some managerial studies. Harkening back to Simon’s work, these are often algorithms and procedural steps validated via simulation to address operational efficiency (Koh & Saad, 2002). The business model has also been specified in purely operational terms, such as a tracking system for measuring success and for connecting “customers, employees and investors.” (Rucci et al., 1998)

By the mid 1990s, however, the term in practice had morphed primarily into a
high-level explanation of an organisation’s activity focus, as seen in one of the earliest peer-reviewed management journal uses:

[This particular program manager is very unclear as to the business model that the [new business group managers] are going to be driving and therefore that unclarity makes him less than dynamic with regard to this particular program. (Buchanan, 1993: 306)]

The management practice community demonstrated strong interest in business models, especially in relation to firm performance (Slywotzky, 1999). By 2000, business model terminology was ubiquitous enough to prompt the U.S. patent office to clarify that while a business method is patentable, a business model is not (Ovans, 2000). A common use in practice focused on the revenue-generating aspects of the business model (e.g. Lewin et al., 1999).

Figure 1: Harvard Business Review articles mentioning business models 1926-2008

Publications in the business practice field accelerated during the dot-com
bubble and have remained of interest since. Figure 1 shows the number of publications in Harvard Business Review from 1926 through 2008.

In contrast, scholarly publications focused on business models, almost non-existent prior to the mid-1990s, have grown most dramatically following the dot-com bubble. Figure 2 compares HBR publications to SSCI-listed “business model” topic publications since 1996.

![Figure 2: Business model articles by topic in HBR and SSCI-listed publications](image)

The lack of a clear construct definition, however, limited the comparison and applicability of research. Despite efforts by practitioners and researchers to integrate those streams in the past decade (e.g. Linder & Cantrell, 2000a; Morris et al., 2005; Osterwalder et al., 2005; Teece, 2010), research on business models has remained relatively unfocused.
2.1.3 Industries, geographies and technologies

Research on business models spans the spectrum of scholarly specializations, geographies, industries, and technologies. Even a brief survey demonstrates the extent of construct adoption and utilisation.

Business model research on the financial industry identifies business models used by money managers (Anson, 2006) and provides normative advice for characteristics of client management systems at banks (Fremlin et al., 2008). Research on software developers suggests that firm-level business model co-evolution with industry-level networks is an important determinant of total value creation potential and organisational outcomes (Feller et al., 2008). The business model perspective has been used to assess characteristics of new industries, such as mobile phone access to e-newspapers (Eriksson et al., 2008) and brokerage services (Looney et al., 2004). Scholars have proposed business model typologies for disparate, idiosyncratic industries such as biotechnology (Nosella et al., 2005) and food services (Hurt & Hurt, 2005).

Detailed technology studies use business models as shorthand for the systems of transactions that link operations to fee generation (Kasera et al., 2004). In complex information technology firms such as Internet multicast, this type of cognitive mapping facilitates the discussion of otherwise highly complicated operational systems. In particular, these maps help extrapolate business concepts from familiar contexts to unfamiliar market environments (Seelos & Mair, 2007), such as developing world technology adoption where buying criteria present special challenges to explaining and predicting outcomes (Chesbrough et al., 2006; Kshetri, 2007). The effects of these cognitive maps may be profound, as when accountants’
cognitive fluency with a business model affects otherwise objective benchmark data assessment in rendering professional opinions (Vera-Munoz et al., 2007).

Business models are commonly assessed in national contexts, on the assumption that certain characteristics of business models interact with national sociocultural or socioeconomic elements. Novel business models may be adopted more slowly in some countries because of sociocultural effects—as the case with technology firms in the Netherlands (van der Meer, 2007) and SMEs in Japan (Tamotsu, 2006). Alternately, socioeconomic conditions may effect business model change, as shown in the response to disruptive economic events by airlines in Canada (Flouris & Walker, 2007).

Research on business models spans industries, geographies, and technologies. This variety presents additional challenges for the student seeking a clear set of assumptions, theories, and empirical results to guide new directions in business model research.

2.1.4 Beyond organisational theory

Focusing the lens on business model research is even more important because the construct has been utilised for entirely different purposes outside organisational theory. Although research on business models was engendered in a strategic context, the construct became embedded in the discourse of new businesses associated internet-related technologies and products. Two explicit outcomes of this accident should be noted. First, a specific usage has developed for the business model in the e-business and ICT contexts. Second, the practice discourse of business models associated with the massive media exposure of dot-
com phenomena resulted in the business model construct being ported beyond the firm-level. Use in non-firm contexts bear little in common with the organisational research construct beyond a certain sense of system-based purpose or structure.

E-business and ICT

One of the most common applications of business model terminology references internet-based firms that began to appear in the late 1990s. Rindova and Kotha (2001) describe internet-based business models as structural elements based on dynamic capabilities. Others noted that novel organisational forms were occurring in a vacuum of normative or prescriptive theory:

“Business models are perhaps the most discussed and least understood terms and aspects in the areas of eBusiness, eCommerce and eMarkets. Much talk revolves around how traditional business models are being changed and the future of e-based business models. Despite an intuitive understanding that seems to be widespread, a more thorough analysis reveals a confusing and incomplete picture of the dimensions, perspectives, and core issues of these business models. A reading of scientific, as well as non-scientific publications, presents a broad variety of understandings…” (Alt & Zimmermann, 2001: 3)

Research on business models within the e-business sector resulted in a variety of taxonomies, typologies, frameworks, and classifications despite the lack of a consensus business model classification system for broader business. The unprecedented rapidity of technology diffusion associated with the Internet and e-business systems factored into these efforts, despite the lack of foundational theory:

“Classifying and analysing e-commerce business models is important because despite the recent instability in the e-commerce domain the Internet is too important a technology to ignore.” (Bienstock et al., 2002: 174)
Some of these e-business studies merit note, either because they became established within the field or because the methodology or results shed light on the nature of business models or the discrepancies in the research stream. One of the earliest and most influential assessments was Mahadevan’s (2000) recapitulation of the typologies and business model definitions applied to the e-business sector. He specifically noted the lack of theory underpinning these early analyses. His own descriptive analysis defined a business model as the combination of the three “streams” of value, revenue, and logistics. He also proposed a normative framework for the optimal business based on the market function fulfilled by the firm and the physical characteristics of the underlying product or service.

An alternate typology for e-businesses based on value creation and relational elements links business model types to the fundamental growth and value strategy (Lam & Harrison-Walker, 2003). Wirtz & Lihotzky (2003) suggested an e-business typology based on the dominant functional mode of the organisation as well as retention strategies that are contingent on that business model. Similarly, Rappa (2004) defines the business model as the combination of value creation, value chain positioning, and the nature of boundary-spanning transactions. His study is specific to e-business, however, and his proposed taxonomy based on both transactive and revenue generating structures is neither extensive nor exhaustive. Like many e-business practitioners, however, Rappa strongly suggests a contingency-based argument for limitations on the set of viable business models for a given industry.

Alt and Zimmerman (2001) provide an summary analysis of business model references across a set of websites, noting the perceived importance of the construct in the practice context and the plethora of extant definitions and applications. They develop a functional definition incorporating four elements— revenues, processes,
structure and mission-- set against the legal and technological framework in which the organisation functions.

Stewart and Qin (2000) investigate the underlying assumptions about business models. They systematically assess whether firms in the developing internet/e-business space were actually utilising truly novel business models rather than applying novel technologies and market mechanisms to extant business models. This research distinguishes between business model innovation and product/process innovation, suggesting that consumer economic outcomes and long-term sustainable business models are unlikely to be significantly changed by internet and e-business technologies. In other words, the internet did not inherently generate novel business models, only novel applications of technology to established business models or novel business models facilitated in part by novel technological systems.

An extension of a value-based e-business model definition (Timmers, 1998) suggests that e-businesses functioning within a virtual network must rely on automated information and data exchange systems because human processing and decision-making is too slow to support industry-level operations (Manthou et al., 2004). This is one of the most fascinating arguments within the e-business model field, because it suggests that business models may operate without social agency. A variety of important research questions are immediately apparent: can business model change or adapt in the absence of conscious agents? Would such effects be dependent on the sophistication of the automated data processing systems? In other words, is there a form of “intelligence” associated with the functioning of business models in virtual network environments? To date, these questions appear to have gone uninvestigated, but extend beyond the scope of this study.
The most comprehensive categorisation systems focus on transactive structures of the organisation. One of the most rigorous e-business taxonomies is based on number of buyers, number of sellers, type of seller, price mechanism, nature of product offering, and frequency of exchange (Bienstock et al., 2002). The study reviews 400 websites to develop six enumerated business model elements. The authors suggest that other published typologies could be subsumed into this more explicit taxonomy, and that e-business model frameworks could be extended to a broader business context, but no such efforts appear to have been undertaken.

The other thorough treatment proposes “atomic” business models (Weill & Vitale, 2001), also based on the nature of the boundary-spanning transactive structure. The authors use this framework to propose a normative theory of viable e-business systems. Setting aside the complex specifics of the typological elements, the broader framework clearly presents the business model as the transactive structure of the entity, focusing entirely on the nature of the organisation’s boundary-spanning transactions.

An extension of this type of research utilises a taxonomy of eight internet business models to assess strategic growth investment outcomes after the dot-com crash (Eisenmann, 2006). In both cases the focus on the transactive or revenue-generating nature of the business model could be partially extended into a broader organisational framework, though it does not appear that such efforts have been made.

In theory, e-business model typologies and frameworks should represent a subsystem of general business models and could be treated as a “special case” within the broader scope of business model definitions and analysis. Many of the published studies, however generate classifications based on characteristics unique
to the sector or specific to the investigative process (e.g. Bienstock et al., 2002).

Investigations have applied broader classification systems that include organisational structure, boundary-spanning relationships, relationship capital, and value creation (Dubosson-Torbay et al., 2001). A similar three-dimensional cluster analysis specific to business-to-business marketplaces examines content, structure and governance (Ordanini et al., 2004). This empirical analysis showed that large diversified exchanges outperform vertical niche operators, suggesting that economies of scale are more critical than resource-specific capabilities. The organisational structure types and the value creation mechanisms in both studies, however, are specific to e-business structures and cannot be easily extended to general organisational outcomes. Although the efforts to develop theory for e-business models should have represented a microcosm of broader business model research, these idiosyncracies limit the value of extending results to a general business model definition or typological framework of organisations.

While the development of a viable generalized business model construct should effectively subsume the classifications and typologies generated in the ICT industries as a “special case,” the proliferation of e-business typologies, taxonomies, and classification systems suggest that such integration will be difficult. The long-term relevance of e-business studies to the broader field of organisational studies is unlikely to be significant.

Beyond the firm

The prevalence of use in the practice field to describe firm-level phenomenon led to the extrapolation of the construct to non-firm-level applications. This section briefly identifies some of these perspectives, primarily to exclude them from consideration in the current study.
Business models are sometimes described as industry-level, rather than firm-level phenomena. An industry-level framing usually addresses the development of dominant business models, especially in industries with high capital intensity and high cost of technology adoption. In the airline industry, for example, rapid process changes are infrequent and difficult, and business model forms are dominated by economics of operational networks (Gillen, 2006). In some cases business model change is attributed to innovation (Calia et al., 2007) but in others it is embedded in industrial economic context. In this framing, the business model is an outcome of technological characteristics and regulations as well as scale effects and convergence of technology adoption mechanisms (Delaere & Ballon, 2007).

In many cases, this perspective links population ecology with contingency theory to suggest that a given industry can support a single business model selected by broad institutional forces. This type of preferred organisational form has been presented for industries as diverse as scholarly journals (Boissy, 2005), stock exchanges (Serifsoy, 2007), and e-government websites (Janssen et al., 2008).

One application of the terminology to the entire biotechnology sector provides a useful example of industry-level framing: “The biotech business model is a developed world system that depends on public and insurance funding to pay for the high prices of patented pharmaceuticals.” (Carbone, 2003: 210) In this case, the entire industry’s functional mode within a broader regulatory environment is assigned a business model, one in which the customers are governments and insurance companies rather than hospitals or patients.

Business model analysis and research has been applied outside the for-profit corporate sector to assess the business model of business schools (De Onzono & Carmona, 2007) and to the transnational crime syndicates implicated in sex
trafficking (Shelley, 2003). Bryson and Buttle (2005) argue that Community Development Loan Funds in the UK represent an alternate business model to that employed by traditional financial institutions in that the firm’s definition of value incorporates non-profit-maximization elements. A similar argument suggests that a “sustainable” business model within the Canadian forestry industry would have no negative impact on the regional ecology (Sharma & Henriques, 2005). In this case, the “stakeholders” of the firm includes the broader ecology or at least the regional forest environment.

But the business model construct has not been limited to the realm of organisations. Scholars have proposed that ownership rights to scientific information can be described with business model language (Kurek et al., 2006), extending business models to the resource-level. Moving beyond firms and even industries, researchers have argued for national-level business models, dominant logics for the characteristic functioning of for-profit entities within specific geographic or economic contexts (Moore et al., 2006). Prahalad and Lieberthal (1998) describe a business model for the “middle class,” extending the conceptual framework to a sociodemographic entity. Demonstrating the confusion associated with establishing an appropriate analytical level for business model research and publications, the authors also argue that multinationals “will have to rethink and reconfigure every element of their business models” to compete in new markets such as India and China. This socio-cultural framework for business models conflicts directly with the literature on e-business models, in which the characteristics of business models are specific to firm types and transactive elements, regardless of location or origin. At the other end of the spectrum, scholars have argued for business models that function at the level of the individual (Svejenova et al., 2010)—a sort of personal modus
operandus.

Business models have been proposed for other non-organisational elements. Markides (2007) refers to a business model for dissemination of content via intermediaries within various industries—suggesting that a business model can exist for a subset of individuals not bound within an organisational structure, and that the same business model can apply across industries. This is more accurately a community or occupational-level business model. Kodama (2004) presents a business model framework specific to technologies or product type. His empirical study of revenue growth and technology adoption suggests that newly-created business models are associated with new technologies. In another study virtual socioeconomic communities represent a type of business model based on the monetization potential of intra-group interactions (Lechner & Hummel, 2002). Both these studies link the creation of business models to industry-level innovation.

A semiotic or discourse approach would be well-suited to assess whether these non-firm-level analyses have any relevance to organisational studies, but such research goes far beyond the scope of this study. Resolving distinctions between generic business models and internet or e-commerce business models remains largely unresolved. This study focuses on business models in the context of organisational theory. To the extent that an e-business model is the business model of an e-business, e-business models represent a specialized subset of general business models. If e-business models represents a specific ICT architecture of firm or boundary-spanning functions, then this study does not address theoretical or empirical results of e-business model research.

2.2 The organisational literature of business models

The management and strategy literatures have been more reticent to address
theoretical and empirical aspects of business models, presumably due to the lack of
definitions and foundational theory. For example, only eight AMJ articles prior to
2009 use the phrase “business model:” two prior to 1971 and six after 2000 [source:
EBCSO© database search for “business model” on Dec 1, 2008].

Some publications in top management journals provide explicit definitions of
business model and empirical tests of theory, primarily by developing links between
business models and strategy as a predictor of firm-level performance (Amit & Zott,
2001; Zott & Amit, 2007; Zott & Amit, 2008). More varied research streams may be
found in other publications, where a nascent body of research is accumulating,
including California Management Review, Technovation, and Review of Network
Economics (see Bigliardi et al., 2005; Brousseau & Penard, 2007; Krishnan et al.,
2007; Mahadevan, 2000; Willemstein et al., 2007). Long Range Planning produced a
special issue on business models in 2010.

The following survey of the organisational literature on business models is not
intended to be comprehensive, as such an endeavor would be impractical if not
impossible in the context of a single study. It is, rather, representative, covering
broad areas of research and a variety of frameworks. The review begins with the
most common representations of business models, as revenue models,
determinants of firm outcomes, process systems, and adjuncts to corporate strategy.
A variety of other, less mainstream perspectives on business models are identified,
including process systems, narrative, institutional logic, adaptive response, and
structures. It concludes with epistemologically driven perspectives, including holistic,
reductionist, and entrepreneurial framing, as well as a quick note on meta-research
on business models.

By contrast, the quasi-systematic search presented in Section 2.3 provides a
highly-focused overview of the literature in the specific context of organisational strategy, based on specific search heuristics. It establishes a structured linguistic context for the assessment of business models in practice presented in Section 3.

2.2.1 Revenue models

Perhaps the most frequent application of the business model construct in the organisational literature defines it simply as the firm’s revenue model. Drucker has been cited describing a business model as “nothing else than a representation of how an organisation makes [or intends to make] money” (Johnson, 2010). Many researchers use the terms interchangably, as Rotheermal and Sugiyama (2001) do to reference the opportunities for firms to leverage the internet as a growth mechanism.

Some researchers make this more explicit, thought the distinctions between business models of revenue generation, value creation, and profit generation are not well distinguished. Brown and Gioia (2002) describe business models as “the generic formulas or strategies that a company follows to make money” [404] in presenting a case study of an online spin-off from a larger firm. Lewin, Long & Carroll (1999) equate the business model with the firm’s revenue architecture. In one variant of this perspective, Feng et al define the business model as the firm’s cost recovery mechanism—how the firm recoups the investment costs associated with getting to market (Feng et al., 2001). Le (2005) defines the business model as the firm’s value creation architecture to classify business-to-business marketplaces.

Some studies present a relatively broad conceptualization of the business model as the firm’s value creation mechanisms enabled by the firm’s strategic positioning and capabilities, but focus entirely on revenue generation. One such
investigation profiles an Australian wine producer and Encyclopedia Brittanica’s forays into e-business to demonstrate successful and failed business model reinvention (Voelpel et al., 2004). A similar investigation implicitly defines the business model as the means by which the firm generates revenues via a case study firm changing its business model from advertising-supported to fee-based (Pauwels & Weiss, 2008).

Ratliff (2002) examines NTT’s introduction of i-mode wireless technology. In this example, the structural process of forming a joint venture was a determinant of, rather than an outcome of the business model, in that the revenue-generating characteristics that dominate the business model structure were only enabled by the joint venture. This is an excellent example of the ambiguity inherent to the conversation on business models, because the business model is presumed to be a direct determinant of organisational outcome and yet simultaneously contingent on organisational structures necessitated by endogenous resource constraints. This tension between the business model as outcome of either exogenously determined factors and agent-driven strategic choice is widespread in the literature.

Levy (2008) suggests that the business model is the revenue-generating system that links the firm within the broader value chain and economic network of its industry. Similarly, Bond (2003) states that the success of a business model is equivalent to the firm’s ability to generate revenues in a given market with a given technology. Both of these assessments suggest that business models function within an institutional context strongly defined by the technological characteristics and industry dynamics.

While the business model as revenue- or profit-mechanism is advantageous in its simplicity, the broad use of the construct has extended the boundaries to
incorporate other processes, structures, and systems. The practice community incorporated more complex elements into the business model conceptualisation, and the academic community has, for the most part, accepted that expansion. Limiting the definition to revenue generation ignores practice community usages and is contextually relevant within the discourse of most academic research.

One element of Drucker’s attributed definition merits additional note—that business models are “representations.” In other words, describing a business model requires a cognitive process that results in something separate from the thing-in-itself at the firm that is being described—“The map is not the territory.” (Korzybski, 1933) This distinction informs the study of the business model in practice in Section 3 and the cognitive mapping simulation of business model change via constraint satisfaction networks in Section 5.

2.2.2 Organisational outcomes

Although the term “business model”\(^1\) has been used for decades in the business practice community to describe a variety of observed organisational patterns and outcomes, entrepreneurs and financiers have recently begun to use it to assess the survival potential of a firm. Boulton & Liebert (2000) suggest, in fact, that the business model is the primary predictor of the success or failure of the firm. Similarly, Berggren and Nacher (2001) state that a superior business model is just as important as a superior product and the firm’s “value delivery network.”

Common use in the practice community identifies the business model as a

\(^1\) A note on language: the expression “research on business model” seems awkward compared to, for example, “research on strategy” or “research on learning”. It is more common to see “research on business models” or “research on the business model construct,” as if the phrase must be specified. This report conforms to this language oddity.
critical component of a company’s success. Slywotzky (Slywotzky, 1999) in particular has focused on business models and business model innovation as direct predictors of firm survival and performance. The success of the biggest growth firms of the past 25 years are attributed to business model innovation (Johnson et al., 2008). Roberts and Senturia (1996) directly linked successful internationalization of U.S. software firms or desktop periperhapsl firms with the implementation of the domestic business model in foreign markets, although the focus of the research was the firm’s primary selling and distribution mode. Prahalad and Lieberthal (1998) argue the opposite: that cost-effectively serving the massive emerging middle class markets in countries like India and China would require the multinationals of the day to the completely overhaul their business models. Ghemawat argues that traditional international expansion operates on the theory of business model replication, but that better results may be obtained from exploiting differences in culture, business norms and economics (Ghemawat, 2003).

A significant number of authors and researchers focus on the causal link between the business model and the survival of the firm, based on the requirement for profitability (Stewart & Qin, 2000). This distinguishes the business model from the revenue model; a demarcation clearly suggested by Mahadevan (2000) who incorporates the revenue stream as one of three components of a business model. This suggests that the business model integrates operational and contextual firm characteristics to develop a rationale or logic for the existence of an organisation in addition to the issue of whether or not a set of customers exists that would, for a given price, purchase a product or service. Fiet (2008) use the Afuah (2003) value-based business model definition to argue that some business models can be “forgiving.” This characteristic can be found when firms find ways to offload risks to
partner and supplier firms without commensurate compensation for risk assumption. Betz (2002) notes the general perception that venture capital-funded firms did not, in fact, themselves, have sustainable business models. Stam and Elfring (2008) assessed whether open-source business models affected the importance of industry network ties in the relationship between entrepreneurial orientation and firm-level performance. In this case, only one aspect of the business model, a measure of the firm’s information interaction with the broader industry, was measured and modelled.

Various offshoots of the “business model as sustainability argument” occur throughout the literature. Agarwal specifically notes that companies must experiment with business models to survive in periods of market growth (Agarwal et al., 2002). A number of key assumptions are hidden in this perspective: firms can change business models, models must be tested in the market, and uncertainty limits ex ante identification of sustainable business models. Others have argued that business model sustainability is also affected by endogenous factors, such as growth and aspirations (Barkema et al., 2002), and that managers initiate business model change (Perlow et al., 2002).

A limited set of authors have developed and tested empirical models linking business models and firm-level performance. Albers and Clement (Albers & Clement, 2007) present the results of a quantitative analysis assessing the interactions of business model and marketing strategy on revenue and profits. The sample is limited to e-businesses and the operationalization focuses on transaction characteristics. The results suggest that business models that successfully differentiate products and transactions outperform, and that customer satisfaction, rather than efficiency, is the most critical link between marketing strategy and business model efficacy.
Patzelt et al (Patzelt et al., 2008) investigate whether the dominant business model of the firm moderates the effect of top management team experience on organisational performance in the biotechnology industry in Germany. They determine that industry-specific experience benefit product-centric business models more than service-centric business models, but that founder involvement in product firms may actually be detrimental to performance. Tracey and Jarvis (Tracey & Jarvis, 2007) suggest that a firm's business model must be proven before franchising can be successfully initiated, though their conclusion is based on the failure of Aspire’s franchising process.

The most important and rigorous research in this field has been conducted by Amit and Zott (Amit & Zott, 2001; Zott & Amit, 2007; Zott & Amit, 2008). Based on a review of value creation at e-businesses, they define the business model, as “the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.” (Amit & Zott, 2001). Their research suggests contingent links between business models and strategy and that certain business models present improved performative profiles. A more detailed analysis of these studies is provided in Section 2.2.9 and 2.3.6, including both strengths and weaknesses of the research.

2.2.3 Process systems

One of the most intuitively appealing constructions of the business model is a simplification of the firm’s system of processes or activities. This framework is the most direct descendent of the “model of a business” simulations to replicate and inform managerial models of managerial decision-making e.g. (Ijiri & Simon, 1964). In some cases this framework has been maintained in full, as in Sillince’s business
model for trigger-based acquisitions associated with organisational meta-goals (Sillince, 1996). Petrovic et al (Petrovic et al., 2001) apply systems theory to define the business model as the “business system” for creating value underlying the firm’s activities. Similarly Cho et al (Cho et al., 2005) describe a technique for converting a firm’s business model to a software-based system in which web applications can be quickly developed and tested. These types of ICT-related process models often focus entirely on the mechanisms associated with the porting of operational activities to a web-based service platform. In other words, the business model is the internet-based set of processes and systems that enables the firm to function in a virtual environment (Karunamurthy et al., 2007).

This ICT-centric application is too idiosyncratic to be relevant for most organisational research. Within organisational research, however, business models have been studied as broader interpretations or representations of the firm’s critical processes. Viscio and Pasternak (Viscio & Pasternak, 1996) identify the business model as the system of the firm’s global core, business units, services, governance, and linkages. They suggest that the base business model of the UK industrial revolution—command and control—is changing to something more fluid and complicated. Chesbrough & Rosenbloom (Chesbrough & Rosenbloom, 2002) framed business models as a process within an innovation context, defining a business model as “a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs. The business model is thus conceived as a focusing device that mediates between technology development and economic value creation” (Chesbrough & Rosenbloom, 2002, p. 532). This innovation-centric proccesual framing is, however, still too narrow to apply to most organisations.
Process-based framings have been developed for broader strategic contexts. Winter and Szulanski (2001) describe a business model as a “complex set of interdependent routines that is discovered, adjusted, and fine-tuned by doing” in the context of developing a model for replication of core operational routines. McEvily et al argue that a business model is a “set of business activities used to serve a market” (McEvily et al., 2000). Departing somewhat from their original framework of transactive structure, Amit and Zott (Zott & Amit, 2010) suggest that a business model may be perceived in practice as an activity set rather than a transactive structure. The practical advantage of this approach puts the power in managers’ hands to assess the viable and non-viable linkages within the activity system that best support the goals of the organisation.

A common thread in this framework is that viable business model elements must be discovered experientially rather than deduced from environmental and/or firm-specific characteristics. In addition, some business model activities may be learned and transferred within and across organisations, while tacit business model elements may be protected.

2.2.4 Conflation with strategy

Business model research often utilises the language of organisational strategy, including value creation, structures, and change. Many business model studies either conflate business models with strategy, attempt to distinguish between them, or describe how they interact. Examples of each are provided below, along with a critical assessment of the need to distinguish between the constructs for the purpose of improving the value of organisational research on business models.

Intermixing of business models and strategy is common. Shafer et al (Shafer
et al., 2005) suggest that the business model represents the implementation of strategic decisions, conflating business models with strategy process. Venkataraman and Henderson (Venkatraman & Henderson, 1998) similarly referenced a business model as a “coordinated plan to design strategy.” Wocke (Wocke et al., 2007) use a study of four MNEs to argue that the business model links the firm’s strategy to its geographical scope, and thus directly impacts human resource strategy and planning. Ghosh (Ghosh, 1998) suggested that firms could become “business model magnets” by leveraging novel capabilities derived via the internet. This utilisation parallels the resource-based view within the strategy literature. In this framing, a business model could be both a source of innovation comparable to product or process innovation, as well as an underlying source of competitive advantage; in other words, a business model would be a component of organisational strategy.

Casadesus (Casadesus-Masanell & Ricart) explicitly defines the business model as realised strategy. The authors provide business model maps analogous to the strategic complementarity maps in Porter (Porter, 1996) and Siggelkow (Siggelkow, 2002). Again, the simplicity of the solution appears to miss the practical use of business models by managers and, of course, eliminates the need for the construct in the first place.

Numerous scholars have proposed specific distinctions between corporate strategy and business models, though few do so via strict deductive or inductive logic. Ghoshal and Bartlett (Ghoshal & Bartlett, 1994) described a firm that formalized “management by anticipation” via “taking proactive measures to achieve budgeted profits was finally formalized in a revised strategy statement and a new business model [107].” The authors specifically refer to this as the development of a new “business logic,” clearly distinguishing between the firm’s survival mechanism or
raison d’etre and a strategic logic of competitive positioning. Similarly, Betz (Betz, 2002) distinguishes between strategy as “futuristic business thinking about present business challenges and future opportunities,” and the business model as “an abstraction of a business identifying how that business profitably makes money,” to generate a typology of “strategic business models,” based on combinations of core inputs and outputs. This open-systems modeling process focuses on the operational characteristics of the firm as well as available opportunities. An alternate perspective assesses the business model within the industrial organisation economics framework to suggest that business models are representations of the firm’s strategy separate from the competitive context (Seddon et al., 2004). Using the same industrial organisation economics framing, Hill and Rothaermel suggest that strategic types, such as low-cost and differentiated, are based on different business models, and conclude that multiple business models cannot be sustained within the same organisation (Hill & Rothaermel, 2003).

Amit and Zott (Amit & Zott, 2001) argue that business models represent a source of value creation unexplained by received strategic theory. They distinguish between product-market strategy and the transactive structure of a firm’s business model. Based on this distinction, the authors develop and test theory linking the interaction of business models and strategy to firm outcomes. Although their studies focus primarily on publicly-traded e-businesses, the implications are potentially relevant across sectors and firm size. The results of their analysis suggest potentially strong interactions between business models and strategy (Zott & Amit, 2008) as well as fundamental advantages to specific business model characteristics (Zott & Amit, 2007).

In a study of business models and strategy, Mansfield and Fourie state: “It is
unwise at this juncture to attempt absolute claims of definitive explanation or even to opt for one single definition.” (Mansfield & Fourie, 2004) The present study argues that while perfectly bounded definitions and constructs may not be convenient or simple, it is no longer appropriate within the context of rigorous organisational research to sidestep this problem. Section 3 directly addresses the distinctions between business models and strategy; section 4 considers the effects of business mode innovation on strategic outcomes, and section 5 addresses the business model as the coherent configuration of organisational elements distinct from the nature of organisational strategy as competitive advantage.

2.2.5 Organisational resources and dynamic capabilities

The resource-based view, or RBV, has become one of the most important frameworks for organisational strategy research. It is not surprising, then, that business models have been assessed and interpreted within the RBV framework. For example, Ghosh (Ghosh, 1998) identifies the business model as an organisational resource, suggesting that business models incorporate capabilities and thus become potential sources of competitive advantage. Scholars have linked business models and business model change to resource acquisition e.g (Garnsey et al., 2008; Hamel, 1999). Venkataraman and Henderson (Venkatraman & Henderson, 1998) defined virtual organisation as a novel business model facilitated by novel resources. Uhlenbruck (Uhlenbruck et al., 2006) report on a study of internet firm acquisitions and suggest that business models are comprised of elements and characteristics that may be imitated, increasing the cost of monetizing of intellectual property. The results show that acquiring firms obtain abnormal returns, possibly based on resource complementarities. Risto & Mika (Risto & Mika,
2007) apply a resource perspective to examine the asset and capability acquisition process associated with specific business model types in the Finnish software industry.

This framing potentially resolves the conflation of business model and organisational strategy by subsuming the former into the latter. This can be reconciled with activity-based perspectives e.g. (Winter & Szulanski, 2001) as well as narrative framings (Magretta, 2002) by placing these systemic characteristics or properties into a dynamic capabilities context (Eden & Ackermann, 2000). A business model as an organisational dynamic capability has intuitive appeal—it may present unique characteristics and therefore presents mechanisms for competitive advantage, and may be changed by organisational activity or made obsolete by exogenous change.

In this context, business models can be learned: Kim and Miner suggest that firms can learn from the failure of other firms with similar business models (Kim & Miner, 2007) which suggests that a business model serves as a common referent across firms and that learning about similar business models is easier than learning about distant business models.

There are at least two drawbacks to this contextualization within the RBV. First, although there could be overlap between the conceptualizations, especially at small firms, dynamic capabilities and business models appear to function at different operational levels. Dynamic capabilities are resident in individuals or groups of individuals (Eisenhardt & Martin, 2000), which could but does not have to include the entire organisation, whereas the business model, as broadly interpreted in this and other studies, operates as an organisation-level feature or function. Second, limiting the business model to the role of a resource, even a dynamic capability, subsumes
the business model to a component of corporate strategy associated with competitive positioning and limits its structural relevance in managerial action, as understood in many practice and scholarly analyses. The resource-based framing of the business model, however, remains an important and common approach.

2.2.6 Innovation

Because business models were derived and contextualized concomitant with the advent of the internet, innovation, especially technology innovation, has been commonly associated with understanding business models. An important distinction should be drawn between the interaction of innovation and business models and the separate phenomenon of business model innovation. Although many of the empirical examples and theoretical frameworks focus on technological innovation, a more coherent assessment is derived from a generalized perspective on innovation that incorporates technology, product, and process innovation.

Business models and innovation interact across a variety of dimensions. Innovation may drive business model characteristics and change. Pykalainen (Pykalainen, 2007) argues that the effectiveness of a business model is determined by the combination of ideology, technology, and complementary assets. Focusing on the role of open-source software firms in the context of business innovation Pykalainen argues that the firm’s technology effectively defines the available set of business models. Similarly Sainio (Sainio & Puumalainen, 2007) combine business models with a disruptive innovation framework to argue that the level of disruptiveness and the strategic importance of the disruptiveness should influence the impact on a focus firm’s business model. Their case study research of four ITC companies reveals that there are different types of disruptiveness, and that
practitioners may not perceive disruptive technologies as threats unless the business process elements are clearly at risk.

Business models can evolve in parallel with innovation, as suggested in Kodama (Kodama, 2004), where technology-driven product development co-evolves with product-specific business models. Botha (Botha, 2007) develops a business model innovation model that presents innovation as a function of design and knowledge management. Differentiating between sense-making and information-processing as well as tight versus loose control of knowledge management determines whether radical business model innovation is exploratory or exploitive, and controlled or uncontrolled. In a similar framing, Doz (Doz & Kosonen, 2010) considers business model renewal as a managerially-determined phenomenon dependent on strategic sensitivity, leadership and resource fungibility. These perspectives link business model innovation to managerial attention and responsivity. This link will be assessed in significant detail in the quantitative study presented in Section 4.

Finally, innovation in business models, commonly referred to as business model innovation, represents an entirely distinct and potentially important innovation modality from traditional fundamental types of organisational innovation (Johnson et al., 2008; Slywotzky, 1999). The rapid development of e-business structures and organisations that could not exist but for the Internet enabled close scrutiny of a subset of businesses with varying configurations attempting to leverage the same novel infrastructure at the same time. The rapidity of technology diffusion facilitated and demanded dramatic changes in how firms functioned which couldn’t be directly linked to underlying technology innovation. In other words, many organisations changed fundamental operations to take advantage of the new technology without
directly incorporating it into the product or service they provided to customers. Novel information access and processing systems revolutionized the critical activities, routines, and capabilities firms utilised to generate value. These were difficult to describe as product, service, or even process innovations. Business model change became a simple and communicable description of these dramatic transformations (Chesbrough). Based on case studies, Chesbrough (Chesbrough & Schwartz, 2007) develops a prescriptive process for technology-based business model innovation, in which firms assess co-development objectives and R&D capabilities and then match the venture’s business model to that of the partner. This framework suggests that business model development and change are punctuated phenomenon that follow disruptions or enact a new opportunity.

Malhotra argues that business model innovation may incorporate changes in information flows between organisations as well as significant change in unspecified internal operations and structure (Malhotra, 2001). A very different perspective is offered by Jawahar et al (Jawahar & McLaughlin, 2001) who suggest that extremely new or idiosyncratic business models may defy existing management theories. They note that prior research suggests that dominant business models are not self-evident within emerging industries. Business model innovation as experimental co-creation of novel business models has been described in the internet and other sectors (Wirtz et al., 2010; Yunus et al., 2010), usually in a structurally contingent framework in which organisations attempt to match business model to novel technology characteristics. Chesbrough (Chesbrough) assesses some of the barriers to business model innovation, based primarily on prior research on innovation at Xerox (Chesbrough & Rosenbloom, 2002). He concludes that business model innovation requires experimentation, effectuation, and strong leadership. This framework can be
extended to show that business model experimentation incorporates learning effects (Sosna et al., 2010). It is not clear, however, whether the learned knowledge and capabilities are intra-innovation, that is, specific to the new business model characteristics, or meta-innovation, that is, applicable to the business model innovation process itself.

Research on business model innovation is very recent and relatively unformed; a separate literature review is developed on this topic in Section 4 to inform a quantitative study on business model innovation and strategic flexibility.

2.2.7 Institutional context

As noted previously, business models have been studied within an institutional context, facilitated in part by the legitimization process for business models comparable to the concept of a dominant logic within an industry. For example, Bower (Bower, 2003) studied academic research projects argues that large firms legitimate business models which then become the accepted value-creation architecture for de novo start-ups. In a detailed study of the Brazilian telecom sector, Rodrigues and Child (Rodrigues & Child, 2003) reference the business model as the dominant value-creation mechanism in a given sector, co-evolved based on the interplay of strategic choice and institutional pressures such as government regulations and socioeconomic norms. They utilise institutional theory to show that co-evolution occurs within the regulated environment. Isomorphic effects converge firm characteristics while innovations at the firm level influence the institutional norms and rules, and thus the sector dominant business model. A new business model emerges as the result of this co-evolution, combining the entrepreneurial action of the firm with the change in institutional norms and legitimization process of the
model.

This framework is supported by the observation of isomorphism of MNC business models (Kostova et al., 2008) as well as the structuration effects between business models and technology platform standards (Hawkins & Ballon, 2007). Zimmerman and Zeitz (Zimmerman & Zeitz, 2002) develop theory linking legitimization to firm growth, including the business model as one key element for institutional pressures. In particular, they note that firms with novel business models may actually control the legitimization process if the model is innovative and the firm can generate the narrative sensemaking around the model, rather than allowing external interpretation.

Numerous studies have utilised this framework to develop theoretical models for firm behaviors and outcomes. Franke and Gruber (Franke et al., 2008) suggest that successful financing outcomes for early-stage firms includes the legitimization of the firm’s business model in the venture capital evaluation process. By defining the business model primarily as the firm’s revenue generating mechanism, Brown and Gioia (Brown & Gioia, 2002) tie legitimacy strictly to firm profitability and sense-making to internal managerial processes and decisions.

Scholars studying innovative, high-profile firms report on the development of business models that become dominant and eponymous. These iconic (Sabatier et al.) or legendary (Gambardella & McGahan, 2010) business models are generally credited with extremely novel market creation effects. A criticism of this perspective is that the success of these organisations, such as Apple and Genentech, has already been assessed and attributed to various strategic constructs. These authors do not draw clear distinctions, for example, between the transition from a product-centric firm to a platform-technology licensor as business model innovation rather
than strategically-based technology or process innovation.

2.2.9 Contingency

One of the most common themes in the business model literature is that successful business model achieve a fit with some aspect of the organisation or its environment. Allmendinger (Allmendinger & Lombreglia, 2005) states that four business model types are predetermined by the characteristics of the firm's products and solutions. Similarly, Athreye (Athreye, 2005) affirms that the firm’s business model may be designed to best leverage the firm’s resources, and that dominant business models emerge that determine which firms succeed within a given industrial economic context.

This framework effectively extends traditional structural contingency theory (Woodward, 1965) by treating the business model as an operational configuration determined, in part, by the nature of the firm’s underlying technologies. Zott and Amit (Zott & Amit, 2008) explicitly link firm success to the fit between business model and corporate strategy. Huang (Huang & Keskar, 2007) applies a similar framework to identify outcome-determining linkages between transactive structure characteristics in the form of supplier selection metrics to corporate strategy. Chesbrough et al (Chesbrough et al., 2006) argue that the causality of fit must be reversed for novel technology adoption in so-called “bottom of pyramid” markets. The business model must be determined before product characteristics should be frozen and operations implemented.

An alternate perspective, however, suggests that business models are discretionary, non-equifinal and non-path dependent. Brown and Gioia (2002), for example, suggest that e-businesses may in fact try out multiple business models at
the same time. In this framework, successful business models are determined both by the variation process as well environmental selection pressures.

2.2.9 Structures and design

In the management literature, structural perspectives on business models emerged directly from new internet-enabled organisational forms. Venkatraman and Henderson described a business model as an architecture of three vectors: customer interaction, knowledge leverage, and asset configuration (Venkatraman & Henderson, 1998). The authors focused specifically on how firms would compete effectively in internet-enabled commerce. The evolution to virtually-enabled and virtual organisations was a common theme in business model research, including studies that considered hybrid structures that incorporate physical and virtual transactions (Prasarnphanich & Gillenson, 2003).

Some assessments of structural business models focus entirely on operational elements. Chung et al use the background of an in-depth assessment of Hasbro’s global sourcing operations to suggest that a business model may be represented as the process of establishing a networked system of alliances and IT capabilities. (Chung et al., 2004) Although the authors explicitly rely on a definition of the business model as a variant of value chain structure, the case study focuses on the development of operational, rather than strategic networks, in which the novel business model is one in which a knowledge-sharing network is established to facilitate more rapid response in the supply chain.

Garnsey et al (2008) present a structural design-oriented business model definition: “design that specifies how a firm is connected to others in its ecosystem in order to create and capture value” (222). This design conceptualization is
contingently linked to technology and product/market configuration, though the authors suggest that, like organisational strategy, business model may be developed ex ante or emergent from operationalized routines. One structural definition describes “complex” business models in which managers must be prepared to accept inconsistent or even paradoxical intra-organisational elements, especially in entrepreneurial contexts, because structural contingent effects can’t be known ex ante (Smith et al., 2010).

Mahadevan’s (2000) business model “anatomy” explicitly states that firm-level business models are unique-to-the-firm combinations of characteristics. This design-centric conceptualization contrasts strongly with the institutional framing where isomorphism results from exogenous forces on the firm’s operational activities. Instead of a legitimization process, firms succeed via uniquely specialized business models enacted by management via variation rather than selection pressures. Extending this framework suggests that the unique, successful design must be replicated across firm structures as geographies, as consistent replication of structures is a critical source of advantage (Winter & Szulanski, 2001). Hurt and Hurt (2005) describe this process in the French food retail industry focusing on how the “firm’s authority structure, work routines, decision-making, reporting and control processes, knowledge transfer methods, and HRM approaches” [38] are transferred across national borders. These structures determine firm characteristics and thus outcomes, based in part on the interaction with the environment. Even if business models are broadened to more generic categories, the design decision can be linked to outcomes. In one example, business model type is shown to effect the impact of environmental munificence on alliance formation before and after the dot-com crash (Park & Mezias, 2005).
In cases where firms compete in entirely new or unfamiliar landscapes, design of business model structures may be both more complex and linked to outcomes. Chesbrough et al (2006) apply business model theory to bottom of pyramid opportunity development. They review three case studies to discuss key drivers of successful BoP opportunities. In particular, the authors argue that the development of a viable business model must precede viable product development. A business model establishes an architecture that coordinates the actors within the value network, and BoP opportunities often require the firm to establish the entire architecture, rather than leveraging existing institutions and systems. This is true both on the supply and demand side—successful firms may have to establish and train production as well as educate and train distribution channels and customers.

Despite the plethora of studies, few business models scholars develop inductively or deductively derived business model construct definitions. This is especially problematic in the context of business model as design or structure, because without theoretically rigorous construct boundaries, distinguishing business models from other organisational structures or systems becomes non-trivial. Amit and Zott develop the only rigorous, inductively developed business model definition in a study of 59 e-businesses in the U.S. and Europe (Amit & Zott, 2001). They conclude that the value creation demonstrated by these firms cannot be explicated by received theory associated with virtual markets, value chains, strategic network theory, the resource-based view of the firm, and transaction cost economics. The business model is proposed as a unifying mechanism describing the “content, structure, and governance of transactions” [511], incorporating value creation elements of each of the previously assessed received theories. This definition is inherently attractive: it rests on observed firm behavior, combines elements of
entrepreneurship with strategy, and presents opportunities for assessment and theory-building.

A brief critique of this work is appropriate, because it represents the most rigorous and accretive stream of business model research in the organisational literature. The data set utilised may present a “value creation” profile more consistent with an industry-specific market inefficiency rather than sustainable business practice. If this is the case, a significant amount of the “value creation” described in the inductive study may have been value associated not with the companies themselves, but with the market conditions surrounding the dot-com bubble. Second, the authors’ case for why e-business value creation cannot be explained by received theory is substantive but not certain. To use one example, that of Porter’s value chain, the authors do not explain how the value chain framework fails to identify the value drivers or value creation mechanisms associated with e-business. They cite prior research suggesting that value chain analysis is most appropriate for traditional production businesses, and then state: “Value creation opportunities in virtual markets may result from new combinations of information, physical products and services, innovative configurations of transactions, and the reconfiguration and integration of resources, capabilities, roles and relationships among suppliers,

2 Amit and Zott profile three companies in the article: Autobytel, Cyberian Outpost, and Ricardo.de. Autobytel completed an $103.5 million IPO in April 1999, resulting in a $714 million market capitalization at the end of the first day of trading. As of September 2008, the market capitalization of Autobytel is approximately $50 million, a result of an almost continuous decline since the IPO. Cyberian Outpost completed an IPO in 1998; at its peak in 2000, the company was valued over $1 billion. In 2001, however, Cyberian Outpost was acquired by Fry’s Electronics for approximately $25 million. Ricardo.de appears to have been a successful auction site, but the original 1 billion Euro acquisition by QXL was pared back to approximately 250 million Euro in 2000. Following the transaction, QXL stock fell by a factor of 100, from £8/share to 6.5p/share. Ultimately, the combined company was successful—though involved in a variety of legal disputes. QXL was renamed Tradus, and was acquired by Naspers in 2007 for approximately £950 million. The broader trends associated with the dot-com bust, as well as the fates of the specific companies profiled in the article, cast some doubt on whether the extraordinary market values reported in the study are reflective of business model value or sector- and economy-wide misvaluation.
partners and customers” [496]. In other words, they do not show that the value is unexplained; they suggest that prior theory has generally been applied to other types of industries. It is not proven that unique e-business value creation, if it exists, cannot be represented by the value chain (or the other received theory frameworks.

In subsequent work, Zott and Amit assess the performance implications of business model modes, specifically novelty-based and efficiency-based business models (Zott, 2007 #372). This empirical study of 190 publicly-traded entrepreneurial firms draws on design configuration theory to develop novel measures of a firm’s boundary-spanning transactional mode. Novelty-centered firms enjoy improved performance, regardless of environmental munificence. Firms with combined modes fare less well, reminiscent of Porter’s “stuck in the middle” strategy. An important contribution of this work is the determination that organisational design encompasses the firm’s boundary-spanning transaction set, as well as the internal functions of the firm. The same challenge to the validity of the data could be made, given that the performance measure was market capitalization, which may have been skewed for recent-IPO firms in that sector during the relevant time frame. A third study suggests contingent links between business model design and corporate strategy (Zott & Amit, 2008)

Extending the transactive structure argument, suggests that business models can in fact be sets of boundary-spanning transactions between organisations and thus associated with no single firm (Dahan et al.). Alliances associated with the NGO sector may be necessary components in the development of previously unservable markets associated with underdeveloped countries.

A recent (Baden-Fuller & Morgan, 2010) variant of the structural perspective describes business models as recipes or representations that systematize a set of
otherwise potentially independent elements to the service of a whole. The structure and design framework represents one of the most important, consistent, and thorough streams of research on business models. It is important to note that distinctions may be drawn between purely design-focused conceptualizations and transaction-focused design conceptualizations. This distinction is necessary and informative in the quasi-systematic review conducted in Section 2.4, because it facilitates clarity in the effort to integrate business models in practice with the scholarly literature. The theme of recipe or representation provides the background for the cognitive mapping of business models presented in Section 5.

### 2.2.10 Cognition

A cognitive approach to business model theory utilises narrative and sense-making perspectives. Primarily citing examples of relatively recent major success stories such as Wal-Mart and Dell, Magretta argues that the business model is the gestalt embodiment of what the firm accomplishes, integrating all elements of operations and structure into a simple story (Magretta, 2002). Business models are “stories that explain how enterprises work [97].”

Tikkanen et al (2005) reviewed the literature on business models and concluded that a synthesis definition requires a cognitive component. (Koza & Lewin, 1999) state that business models in stable industries are more easily understood, suggesting that business models serve as a type of cognitive map that reflects the complexity of the landscape.

Francis and Bessant (2005) use an explicit narrative framing for the business model by defining it as the system of cognitive elements that managers utilise to understand, manage, and change the firm. This suggests a fascinating divergence
from traditional understanding of organisational outcomes, in that the key determinant of success is coherence, subjective sense to managers, rather than whether it has some operationally identifiable characteristics associated with success in a competitive context.

Cognitive frameworks can be problematic precisely because objective referents may be difficult to establish. If business models are both narrative and calculative devices, they may exist in a multiplicity of forms, rather than as a singular construct or mechanism (Doganova & Eyquem-Renault, 2009). This approach presents an effective descriptive construct that bridges intra-firm cognition with firm-level outcomes. The business model is constantly changing with the needs of the organisation, making comparisons within and across organisations quite challenging.

It is clear, however, that business models are fully embedded in practice and the managerial process of understanding organisations. Following work by on the halo effect of assessing causal business models (O'Donnell & Schultz, 2005), Vera-Munoz et al (2007) report on an artificial experiment in which accountants were provided with causal business models as well as benchmark data on competitor-level spending and asked to recommend budgetary outlays. The application of a causal mechanism apparently improved analytical processes and judgment, even when the causal model did not match the benchmark data. In other words, the effort of thinking about business models improved analytical capacity. This fits well with the conception of a business model as a sense-making construct or analytical tool. In support of this conceptualization, Sanders and Boivie (2004) show that understanding a firm’s business model, especially when the business model is unfamiliar or unproven, is a critical component in the third-party capital raising process. The authors do not distinguish between the actual operational business
model and the cognitively processed understanding of the business model developed by potential investors, but there is clearly a sense-making process at work exogenous to the operational or process-driven system within the organisation.

Downing (2005) extends this framework to the cognitive development of an entrepreneurial business model. In this context, the business model functions at the gap between opportunity identification and organisational design. Based on dominant logic theory, Downing defines the business model as “a set of expectations about how the business will be successful in its environment” [186]. Business models then evolve via internally-driven structuration, influenced by the narrative and dramatic dynamics that drive the development of the firm’s social order and rules, directly effecting organisational structure, hierarchy, and meaning-making. The evolution of a cognitively derived business model will be explored more fully in Section 5.

2.2.11 Change and adaptation

As noted in Section 2.2.6, business model change and innovation has received extensive attention, but much remains unknown about the drivers, processes, and outcomes of business model adaptation.

research-based start-up business models. They determine that some firms are started as “prospectors” without a clear business model, and that many RBSUs change business model relatively early on, based on improved access to knowledge and capital resources. Similarly, Barkema et al state that business model sustainability or required change is affected by endogenous factors such as growth and aspirations (Barkema et al., 2002). Calia et al (2007) develop a case study on a Brazilian metallurgy company to show the impact of the firm’s innovation network on change in the company’s business model, in which access to capital and information resources enabled the firm to incorporate international activities in its business model.

In addition to suggesting that distinct business models can be associated with autonomous organisational structures, Gilbert suggests that some business models develop or evolve at the firm level based on the interaction with the environment, rather than the agency of managers, and that experimentation can generate entirely novel business models (Gilbert, 2005). A detailed case study of the Arsenal Football Club proposes the business model as an analytical tool for addressing organisational change (Demil & Lecocq, 2010). This framework can be criticized in that the proposed characteristic changes in cost and revenue profiles associated with business model evolution in the case study can’t be uniquely differentiated from outcomes of process or product innovation.

A more common perspective on business model change identifies the driver of adaptation as managerial agency. In this framework, top management and key personnel usually serve as the catalyst for change, though emergent business models may be quite different than anticipated (Cule & Robey, 2004; Kuratko & Mathews, 2004; Perlow et al., 2002). Slywotzky argues that most successful firms
change business models regularly, in advance of industry turbulence (Slywotzky, 1999).

In a contrasting perspective, business model change and adaptation are results of exogenous forces or somewhat random variation via exploration. Hamel (2003) describes successful turnarounds as delayed business model evolution events. Venkatraman states that variation drives business model evolution, with primarily new firms driving new business model experimentation. (Venkatraman, 2000). Cohen & Winn (2007) suggest an economic approach in which market imperfections lead to novel business models through the mediating activities of entrepreneurs and managers.

Distinguishing between vertically integrated and disintegrated business models suggests that the dominance of a given business model is contingent the nature of market demand (Christensen et al., 2002). As markets become sophisticated, the dominant operational model shifts towards integration, but may shift back as specialized firms present value propositions based on less overhead than integrated firms. Here the optimal selection of firm architecture cannot be determined solely by the nature of the firm’s products and systems, but must take into account the industry integration cycle. Alternately, while new business models can destroy the competencies of established firms, incumbents can shape the evolutionary process to neutralize or absorb the impact of the new business model and remain successful (D’Aveni, 2002).

Process models of business model change and adaptation are few and relatively unspecified. One adaptation model for business models for new technology ventures incorporates resources as the inputs and constraining factors on the exploration and exploitation of options (Andries & Debackere, 2006).
all potential business models cannot be known in advance, and new technology
business ventures find their place in the environment by a process of adaptation. A
related study links business model adaptation to firm life cycle evolution (Andries &
Debackere, 2007). Business model change at 60 new ventures between shows that
adaptation is a necessary process: firms that changed business model at least once
had a higher survival rate than those that did not. Adaptation appears to be most
important in immature, capital-intensive, and high-velocity sectors such as
biotechnology.

If business models change, they may resist change. Firms can suffer from
business model inertia (Hamel, 2000). New business models or business model
elements cannot emerge because of reliance on prior successful business model
characteristics. Hamel specifically attributes this to cognitive effect, in particular the
individuals responsible for designing or implementing the dominant business model
(Hamel, 1999). In fact, Firms with a successful business model tend to reinvest in the
same model, leading to competency traps (Hoffmann, 2007). Although it is
individuals that may resist business model change, some scholars suggest that the
entire organisation may need to be reprogrammed to change business models
(Govindarajan & Trimble, 2005). This may present special challenges if the
institutional memory of the organisation is partially embedded in the business plan,
as the firm must be prepared to unlearn its own history to make the change.

Although the design framework for business models suggests that
entrepreneurs and managers may design any business model structure, and much
of the research on business model change and innovation presumes an agent-drive
change process in which variation is the evolutionary driver, a number of research
studies have considered whether business model change is in fact path dependent.
A survey and case analysis of Dutch biotechnology firms suggests trends in business model changes based on a value-evolution model in which firms generally move from service-focused to product-focused businesses (Willemstein et al., 2007). Similarly, Lovins et al (1999) state that most successful businesses migrate from product-oriented to solutions-oriented business models. This framework focuses primarily on the transactive element of the business model, and in particular adjusting the selling model to enable customers to move fixed to variable costs.

A variety of outcomes are attributed to business model change and adaptation. Business model disruption may lead firms to change markets (Day, 1999). Proactive business model adaptation has recently been linked to the success of the world’s fastest-growing large firms (Johnson et al., 2008). To date, however, no large scale studies have addressed performative outcomes of business model change, adaptation, and innovation. Much research remains to fully explicate business model change adaptation. Section 4 of this study identifies some of the drivers, processes, and outcomes specific to business model innovation in a structural context.

2.2.12 Entrepreneurship

Although business models are generally assumed to be relevant for all firms, the link between business models and entrepreneurship has been of particular interest in organisational studies. At least three key issues link business models to entrepreneurial action: how business models function in the new venture creation process, how business models are linked to opportunities and opportunity enactment, and whether business models can be tied to new venture outcomes.

The development of a business model is commonly associated with new
venture development. A review of four start-up case studies to emphasize the importance of the business model in the venture creation process (Gondal, 2004). The business model is an important tool used by the entrepreneur as the value creation mechanism co-evolves with the early growth of the firm. Similar research on academic spin-offs demonstrates the importance of the business model to the earliest stages of venture establishment (Heirman & Clarysse, 2004).

Business models may be fundamentally linked to underlying opportunities, including both identification and exploitation, rather than specific entrepreneurial ventures (Ericksen & Dyer, 2004). In this framing, entrepreneurial orientation and entrepreneurial capital drive the development of innovative business models (Schindehutte et al., 2008). The link between the firm’s business model and its intended or extant strategic positioning affects market entry options and outcomes (Ojala & Tyrväinen, 2006). At the same time, a firm’s business model, though equivalent to or closely akin to its strategy, exists independent of the means and ends associated with a given opportunity (Plummer et al., 2007). In other words, novel business models are not isomorphic with novel opportunities, and multiple business models may be associated with the same opportunity.

The links between successful entrepreneurial enactment and business models have not been fully explored. As described in Section 2.2.8 and 2.2.9, the link between the survival of the entrepreneurial venture and the presented business model is often associated with legitimization or structural contingencies, comparable to theories of dominant logic. For example, a study of Finnish software companies establishes a contingent link between resource-specificity and business models at successful entrepreneurial ventures (Risto & Mika, 2007). Interestingly, the fundamental question of why certain business models are successful has been
studied with a practice perspective primarily from the perspective of large. Given the emergence of the business model construct from the venture creation field, a better understanding of the relationship between business models, opportunity enactment, entrepreneurial action and outcomes would be valuable.

Business models have become part of the epistemological and ontological conversation about entrepreneurship. The study in Section 3 explores this relationship in more depth, as the results of the discourse analysis of business models in practice point towards the relevance and usefulness of an opportunity-centric framework for understanding business models.

2.2.13 Holistic interpretations

As noted, one of the challenges to the student of business models is the overabundance of construct definitions. Efforts to integrate or systematise broad the broad spectrum of definitions often yield holistic, all-encompassing constructs. The primary criticism of these outcomes is that they do not conform to standards for development of social science theory that describes data with the simplest available methods (Weber, 1949). Four such efforts are noted here, both for completeness as well as to provide a contrast for the discourse-based study in Section 3.

Morris et al (2005) provide a meta-discussion of business models. The authors review 30 business model definitions and develop a framework that integrates most of the construct elements from those definitions. The described hierarchy of economic to strategic elements effectively incorporates prior literature, but also expands the boundaries of the business model construct to encompass, rather than distinguish, established administrative and management constructs, including strategy. This is a common problem with many of these efforts, because
the fragmented nature of the literature makes integrative definitions quite broad unless significant filtering and excision is exercised. Hedman (2003) adopts a similar tack, with similarly problematic results. The resulting utilisation of the business model concept to operationalize every aspect of business functions effectively subsumes corporate strategy. In addition, the business model effectively becomes a description of every organisational characteristic, in which case the level of descriptive detail becomes idiosyncratic to each organisation, and theory-development irrelevant.

Chesbrough & Rosenbloom initially define the business model as “a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs” (Chesbrough & Rosenbloom, 2002). They elaborate on this definition, however, such that the business model fulfils 6 functions: articulating the value proposition, identifying target market segments, defining the structure of the value chain in which the firm participates and the firm’s position in that value chain, estimating cost and profit structures, and, finally, identifying the firm’s competitive strategy. Although less extensive than the Hedman analysis, this construct explicitly incorporates numerous aspects of organisational strategy as well as operational and boundary-spanning functions.

No review of business models would be complete without mentioning the work of Osterwalder, though reference is limited to his dissertation (Osterwalder, 2004a) and publications in the ICT field (Osterwalder, 2004b; Osterwalder et al., 2005). The fundamental challenge to utilising Osterwalder’s integrative business model formulation is that, like the works noted in this section, it subsumes all aspects of organisational function as well as corporate strategy. Osterwalder’s practice-based pilot assessment of business models is noted in Section 3.
As theory-development is best informed by the simplest constructs that explain observations (Weber, 1949), these holistic interpretations of business models are ultimately not conducive to theory-building.

2.2.14 Empirical typologies

Section 2.1.4 identified some of the extant e-business and ICT-focused typologies described in the literature. This section briefly identifies some of the business model typologies associated with broader organisational study to demonstrate the variety and disparity of proposed business model characteristics in the literature.

Linder and Cantrell posit characteristic differences between business model components, business models, and business model change (Linder & Cantrell, 2000a). They develop a detailed typology of business models and business model change processes based on qualitative observations of 70 multinationals. The business model typology, however, is qualitatively descriptive rather than based on combinations of underlying characteristics. In related work, the authors develop a classification of business model change types, as well as report on the most commonly applied types at a sample of multinational firms (Linder & Cantrell, 2000b).

Mustar et al (2006) review the literature on research-based spin-offs to develop a taxonomy of firms based in part on business model type. Business model characteristics of these entrepreneurial firms are divided into activities, knowledge transformation, and growth orientation. An empirical study of the French biotech SME sector generates a two-cluster solution for business model types within the French biotech SME sector (Mangematin et al., 2003). Niche business models use
smaller R&D projects to target specialized markets, require fewer resources, hire junior managers, and ally with local partners. Radical business models require significant capital resources, hire senior managers and famous scientists, and ally with international partners. A factor analysis of Italian biotechnology sector develops intuitively consistent clusters of business models based on empirically evident variables such as firm age, firm size, R&D intensity, and service offerings (Bigliardi et al., 2005).

Although the theoretical implications of this type of research has limitations (Sutton & Staw, 1995), it is possible to derive conclusions when characteristics are carefully defined. For example, a quantitatively derived typology of 453 website suggests that firms with broader networks and multiple revenue streams are more likely to survive (Chen, 2003).

One goal of the current investigation is to set aside subjective typologies in favor of an improved, generalized understanding of business models that links organisational theory and practice context. It may be ultimately possible to reinterpret the results of prior typological studies within a more integrated and substantive construct definition.

2.2.15 Conclusions

The organisational literature on business models, a subset of the broader literature on business models, extends through a variety of theoretical frameworks and empirical studies. The lack of convergence in definitions, construct boundaries, and research direction has led to a large, fragmented body of research not easily integrated. It is possible that a more rigorous taxonomical approach to business models could improve the relevance and cross-interpretation of future studies (Sahu
& Marko, 2007), but it is unclear whether this approach would enable integration of prior research or ensure more rigorous theory-building towards practicable results.

This study begins with a different approach to understanding business models. Section 2.3 creates the context for understanding the business model in practice by developing a thematic categorisation of languages in the scholarly literature.

### 2.3 Creating context via a quasi-systematic search method

As noted, the scope of the business model literature makes any integrative effort extremely challenging. As the intent of this study is to understand business models in practice and integrate that use with scholarly research, significant filtering of the literature is required to establish a common language for assessment. To enable this process, a quasi-systematic review focused coverage on relevant research on business models within a narrow field. To maximise relevance and development of organisation-specific theory, the search excludes purely computing and modeling research as well as non-management fields such as political economy.

A search was conducted in December 2008 for “business model” using the “all text” feature via EBSCO® Business Source Premiere in the management and business studies, generating a total of 288 citations. A second search was conducted for “business model” using the “topic” feature via the ISI Web of Science® search engine, generating 194 citations. Combining the search results yielded a total of 474 unique citations in the base review set; only eight citations occurred in both search outputs confirming the fragmented nature of the field. A broader search yielded a variety of books, websites, and unpublished manuscripts. Publications were eliminated under the following conditions: no use of the phrase \[n=102\], irrelevant mention based on grammatical coincidence \[n = 9\], single use without
explanation or relevance to organisations \( n = 106 \), multiple mention without significant concept elaboration or development \( n = 78 \), and multiple mention unrelated to organisational theory \( n = 17 \). The remaining research studies \( n = 108 \) were reviewed for theory and empirical contributions. The set of 108 papers as generated at the time of search is shown in Appendix A. Updated citation information on these an all other references publications is provided in References.

![Figure 3: Output of quasi-systematic search [31-Dec-2008]](image)

Accessible sources were reviewed and segregated as shown in Figure 3. Much of this more restricted dataset has already been covered in Section 2.2. Sections 2.3.1 through 2.3.6 present the dominant conceptual themes as a linguistic framework for the discourse analysis in Section 3. For each theme, representative studies are noted to illustrate the common framing in the scholarly literature. The discourse analysis in Section 3 references these themes to anchor business model discourse in practice. A summary of the six major themes is provided in Table 1 at the end of Section 2.3.
2.3.1 Business model as organisational design

The first major theory-based contextual theme is associated with organisational design, specifically agent-driven design. The role of managerial agency in determining organisational structures resonates with the configuration of firm products, activities, and markets (Hunt, 1970). Managers and entrepreneurs rationally assess existing and potential business models to establish new organisations and ensure firm survival (Perlow et al., 2002). Slywotzky’s (1999) practitioner-focused work interlinks business models and strategy and suggests that business model innovation is the cornerstone of long-term performance. Alternate analyses suggest that firm performance is linked to business model fit with strategy (Zott & Amit, 2008) or business model consistency across international subsidiaries or partners (Roberts & Senturia, 1996). The business model as design requires that managers implement a single business model to avoid operational inefficiencies (Markides & Charitou, 2004). Tracey and Jarvis (2007) extend this to normative theory of successful franchising.

On the other hand, the co-evolution of strategy and business models may occur as a cumulative, emergent process directed by purposive, coordinated learning (Ghoshal & Bartlett, 1994). Even if business model change is initiated and executed top-down, emergent business models may deviate from agent-driven design (Cule & Robey, 2004). In addition, questions of business model path dependence remain unresolved. Studies have found path dependent transitions between business models in manufacturing (Lovins et al., 1999) and biotechnology (Willemstein et al., 2007), but other research suggests that business model evolution is inherently uncertain (Heirman & Clarysse, 2004). General mechanisms for the evolution of successful or dominant business models remain unexplored. A theory of
business models in which organisational outcomes are primarily influenced by managerial knowledge, expertise, choice, and execution has practical appeal but does not clearly explain business model innovation, the contingency effects of resource acquisition and deployment, or opportunity creation.

Parallel research in multiple contexts has emphasized the business model as a component of organisational design without converging on its components. Regardless, the discourse of design, especially agent-driven design, is pervasive in the scholarly research on business models, and presents discourse elements familiar to scholars and practitioners.

2.3.2 Business model and the resource-based view

The resource-based view (RBV) commonly links business models to resource acquisition and allocation (Garnsey et al., 2008). Hamel (1999) suggests that firms must acquire resources concomitantly to the implementation of new business models. Mangematin et al. (2003) present a business model typology within the French biotech sector based on the financial, human, and social capital resources that drive organisational forms. The inclusion of knowledge and dynamic capabilities into the RBV paved the way for more linkages between the business model and RBV. Venkatraman and Henderson (1998) suggest that leveraging traditional and knowledge assets enables virtual organising as a new business model. “New economy” firms have been credited with leveraging intangible assets to generate extraordinary value (Venkatraman, 2000). Eden and Ackerman (2000) define the business model as the dynamic capability that links the firm’s distinctive competencies to organisational aspirations and outcomes. An alternate perspective links the business model to social networks and knowledge sharing (Chung et al.,
Some studies frame the business model as an evolving bundle of activities, a "complex set of interdependent routines that is discovered, adjusted, and fine-tuned by ‘doing’" (Winter & Szulanski, 2001). In this context, the business model serves as a type of dynamic capability, and is subject to competency traps, as when firms with a successful business model reinvest in that business model rather than explore others (Hoffmann, 2007). Some variants connect the transactive element of market need to the key business activities (McEvily et al., 2000). In this evolutionary framework, business model elements are discovered experientially and evolve without managerial agency.

The RBV has permeated much of the research on business models, influencing theory-building and empirical analysis. No consensus has emerged, however, on how business models interact with appropriability regimes, and much of the research on business models framed within RBV does not clarify how business models differ from product-market positioning strategy. The prevalence of resource-based research publications, both in scholarly and practice journals, presents an established, well-accepted framework for discussing business model characteristics and elements.

2.3.3 Business model as organisational narrative

The business model construct lends itself to an institutional framework that incorporates organisational narrative. Citing Priceline and Wal-Mart as examples, Magretta (2002) defines the business model as the gestalt embodiment of firm execution, integrating all elements of operations and structure into narrative as “stories that explain how enterprises work.” The storytelling framework has proven a
powerful tool for understanding and interpreting organisational behavior (Gabriel, 2000) but the necessarily subjective nature of story formulation presents challenges for objectively assessing organisational behaviors and outcomes. If the economic landscape is objectively specified, business model narrative may be limited to the business logic of the firm operating in a constrained environment, usually abstracted to the firm’s revenue mechanism (e.g. Lewin et al., 1999).

A related perspective focuses on sense making and enactment (Daft & Weick, 1984) where institutional pressures on the business model shape firm growth processes. Firms may control the legitimization process if the model is innovative and the firm drives narrative sense-making at organisational and community levels (Zimmerman & Zeitz, 2002). Narrative sense-making would be relevant in emerging markets where investors are unable to evaluate unproven business models without clarification (Sander
ts & Boivie, 2004). Business models may be an important component in the co-evolution of stories that determine legitimacy as a necessary component of firm survival (Lounsbury & Glynn, 2001). If business models play a key role in legitimization, we would expect to see isomorphism based on the adoption of common business models (Kostova et al., 2008).

The narrative sense making of business models could occur within the firm as well. Business models would evolve via internally-driven structuration, influenced by the narrative dynamics that drive the development of the firm’s social order, rules, organisational structure, hierarchy, and meaning-making (Downing, 2005). The narrative perspective allows for fuzziness in business model development and deployment. Firms may trial multiple business models at the same time (Brown & Gioia, 2002). At the same time, the business model as narrative mechanism limits the scope of research to story-formation and cataloging of narrative commonalities;
we currently have no processes that mediate narrative models and firm behavior or outcomes.

The narrative framework for business model research incorporates elements of institutional, cognitive, and process-based frameworks. It is intuitively appealing and practically potent, because it matches a long history of story-telling in organisational contexts (Gabriel, 2000). At the same time, the inherently subjective nature of the narrative framework, reliant on idiosyncratic sense-making, presents challenges for objective, ad hoc and pre hoc description. Regardless, the discourse of narrative business models resonates in both scholarly and practice use.

2.3.4 Business model as innovation form

Many studies assess the relationship between technology innovation and business models or business model change. This perspective frames business models within an innovation context, defining it as “a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs. The business model is conceived as a focusing device that mediates between technology development and economic value creation” (Chesbrough & Rosenbloom, 2002: 532). A business model is then a component of innovation commercialization separate from product and process innovation. Business model development and change are punctuated phenomena that follow disruptions or enactment of new opportunities. An adaptive framework for innovation suggests that business models adjust in parallel to the firm’s life cycle evolution (Andries & Debackere, 2007). Business model change at the firm level would then be especially prevalent among immature firms in capital-intensive and high-velocity sectors. The business model may be an important link between
innovation and organisational structure. It remains unclear, however, whether business model change results in reconfiguration of the firm’s organisational structure (Francis & Bessant, 2005) or whether organisational design and knowledge management determine business model structure.

As noted in the more extensive assessment in Section 2.2.6, innovation and business models are intertwined in both research and practice. More research is needed to clarify the links between business models and organisational innovation as well as the mechanisms and processes of business model innovation and change. The languages of innovation and business models have become closely related, and are used commonly in scholarly and practice studies.

2.3.5 Business model as opportunity facilitator

Despite business model origins being closely bound to venture creation, the business model as a facilitative intermediary in the opportunity creation process is a less-well developed framework,. The business model has been described as the link between innovation and value creation (Chesbrough & Rosenbloom, 2002) as well as the cognitive link between entrepreneurial appraisal of the opportunity and its exploitation (Fiet & Patel, 2008). Others focus on the transactive element and view the business model as the mechanism for opportunity exploitation (Amit & Zott, 2001). If the opportunity is uncertain, the optimal business model cannot be rationally determined (Heirman & Clarysse, 2004). The business model is sometimes equated to the underlying “business idea” or the firm’s value creation mechanism (Afuah, 2003; Markides, 2008), but separating the entrepreneurial opportunity from the established firm’s profit-managing process has not been addressed. Research on venture capitalists’ use of business model frameworks links business model
development with perceived commercial potential (Franke et al., 2008; George & Nathusius, 2007), but the mechanisms by which the underlying opportunity and the business model are interconnected have not been explored.

Section 2.2.12 develops a more extensive assessment of business models and opportunity enactment, which reflects the fundamental commonalities across the discourse of the constructs. The results of the inductive study described in Section 3 present promising directions for reconceptualizing the business model along these lines.

2.3.6 Business model as transactive structure

The most rigorous and engaging construct definitions in the literature center on transactive structures such as the streams of logistics and revenue (Mahadevan, 2000). Amit and Zott's deductive construct (2001) seeks to explain extraordinary value creation mechanisms in e-businesses. The business model is proposed as a unifying mechanism describing the “content, structure, and governance of transactions” (Amit & Zott, 2001: 511). Firm performance is a function of specific business model characteristics (Zott & Amit, 2007) and the fit between business models and strategy (Zott & Amit, 2008). This framework has been most commonly applied to e-business sectors, usually in the development of cluster solutions and typologies that deconstruct exchange characteristics (Bienstock et al., 2002).

The transactive-based definition is inherently attractive: it rests on observed firm behavior, combines elements of entrepreneurship with strategy, and presents a spectrum of opportunities for empirical assessment and theory building. Fiet and Patel (2008) argue that some business models are “forgiving” by shifting transaction risk to outside resources without commensurate remuneration. Research has
extended Amit and Zott’s transactive model to assess strategic growth investment outcomes after the dot.com crash (Eisenmann, 2006) and value creation associated with internet firm acquisitions (Uhlenbruck et al., 2006).

The transactive theme has been a productive framework in the business model literature, though it has focused almost exclusively on the e-business sector. The language of transactions appears consistent with the general themes and concepts of business models, and presents a potentially important framework for understanding business models in practice.

2.4 Summary

Despite the fragmented, non-accrative literature, the business model remains one of the most commonly-used and published topics in organisational research. The sheer scale of publications requires careful consideration in addressing questions of organisational theory and practice. This study sets aside the vast majority of the literature that is not directed at or descriptive of for-profit organisations, and specifically focuses only on business model research in the context of organisational and management theory.

The quasi-systematic review of scholarly research yields thematic conversations that illuminate business model discourse in the academic setting. A summary table of these themes identifying representative publications and definitions is provided in Table 1. For the most part organisational research addresses business models in a strategic context, associated with the nature, process, and outcomes of positioning the organisation against competitors. The thematic analysis of dominant use in the scholarly literature provides the backdrop for understanding how business models are understood in practice.

*Table 1: Thematic summary of business model literature*
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sample publications</th>
<th>Summary</th>
<th>Representative definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Timmers, 1998; Slywotzky 1999, 2001</td>
<td>Agent-driven or emergent configuration of firm characteristics</td>
<td>“A business model is an architecture for product, service and information flows, including a description of the various business actors and their roles.” (Timmers, 1998)</td>
</tr>
<tr>
<td>RBV</td>
<td>Winter &amp; Szulanski 2001; Mangematin et al, 2003</td>
<td>Organisational structure co-determinant and co-evolving with firm’s asset stock or core activity set.</td>
<td>“Each business model has its own development logic which is coherent with the needed resources—customer and supplier relations, a set of competencies within the firm, a mode of financing its business, and a certain structure of shareholding.” (Mangematin et al., 2003)</td>
</tr>
<tr>
<td>Narrative</td>
<td>Magretta 2002</td>
<td>Subjective, descriptive, emergent story or logic of key drivers of organisational outcomes.</td>
<td>“[Business models] are, at heart, stories - stories that explain how enterprises work.” (Magretta, 2002)</td>
</tr>
<tr>
<td>Innovation</td>
<td>Chesbrough &amp; Rosenbloom 2002</td>
<td>Processual configuration linked to evolution or application of firm technology</td>
<td>“The business model provides a coherent framework that takes technological characteristics and potentials as inputs and converts them through customers and markets into economic outputs.” (Chesbrough &amp; Rosenbloom, 2002)</td>
</tr>
<tr>
<td>Transactive</td>
<td>Amit &amp; Zott, 2001; Zott &amp; Amit 2007, 2008</td>
<td>Configuration of boundary-spanning transactions</td>
<td>“A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.” (Amit &amp; Zott, 2001)</td>
</tr>
<tr>
<td>Opportunity</td>
<td>Afuah, 2000; Markides, 2008; Downing, 2005</td>
<td>Enactment and implementation tied to an opportunity landscape</td>
<td>“[The business model] is a set of expectations about how the business will be successful in its environment.” (Downing, 2005)</td>
</tr>
</tbody>
</table>
3 THE BUSINESS MODEL IN PRACTICE

Acknowledgement: Data interpretation, clarification of business model dimensions, and statistical analysis presented here benefited from brainstorming and advice from Gerry George, Rekha Rao, Celina Smith, and the critiques of Johan Bruneel, Markkus Perlman, and anonymous reviewers.

3.1 Introduction

What are business models and how do practitioners use them? These broad questions combine organisational design and strategy perspectives (Chandler, 1962; Zott & Amit, 2007) with a view towards implications for entrepreneurship studies. The formation, growth potential and success of new organisational forms is often credited to the development of novel business models, especially in turbulent industries (Venkatraman & Henderson, 1998). Researchers have suggested that business models are critical constructs for understanding value creation (Amit & Zott, 2001; Chesbrough & Rosenbloom, 2002; Mahadevan, 2000), while others note the lack of construct clarity and comingling with business strategy (Porter, 2001). This study presents findings from an inductive study of practitioner perspectives to reconstruct the business model within the scholarly discourse and identify its underlying structures using an entrepreneurship lens. The results help integrate the scholarly dialog on business models to emphasize the link between business models and opportunity enactment.

Definitions for business models vary widely, incorporating organisational narrative (Magretta, 2002), processes that convert innovation into value (Chesbrough & Rosenbloom, 2002), recipes for firm activities that incorporate organisational design and strategy (Slywotzky & Wise, 2003), ‘flows’ of information and resources (Timmers, 1998), and designed structures such as the firm’s set of boundary-spanning transactions (Amit & Zott, 2001). Most studies, however, fail to
clearly distinguish the business model from received organisational constructs such as strategy, in part because the construct emerged as a term of convenience in the popular press and practice community (Osterwalder et al., 2005). The lack of a convergent, well-defined theoretical construct has led to inconsistent empirical findings *vis a vis* firm performance and organisational change. Disparate definitions suggest that business models for growing firms could be inherently uncertain (Andries & Debackere, 2007; Heirman & Clarysse, 2004) or, alternately, path dependent and predictable (Willemstein et al., 2007). The study of business models is especially pertinent to entrepreneurship research as empirical business model studies tend to examine new ventures or innovation-driven industries. Business models may represent a form of entrepreneurial opportunity creation (Downing, 2005; Franke et al., 2008; Markides, 2008) explicitly initiated by market imperfections (Cohen & Winn, 2007). But the lack of a consistent framework has resulted in fragmented research questions and findings. Studies ask whether a business model should be focused and formalized (Tracey & Jarvis, 2007), adapted to environmental circumstances (Hurt & Hurt, 2005) or specific to the entrepreneurial mode (Morris et al., 2005). Developing a convergent construct could significantly reduce confusion and help reconcile conflicting empirical results. Theory development should progress towards a necessarily artificial construct that best approximates “the hypothesized course of [observed] events” (Weber, 1949) in the service of encouraging rigorous theory-building, well-characterized descriptive research, and high-impact normative predictions. The goal of this work is to provide a bridge from the scholarly literature to observed phenomenon in managerial practice.

A critical challenge to business model studies is the lack of coherence in the
research. Efforts to review the literature and develop consensus tend to yield all-encompassing definitions that subsume established organisational constructs such as value creation and strategy (Morris et al., 2005; Osterwalder et al., 2005). While perfect coherence or agreement across the research spectrum may not be strictly necessary, future research may be hampered by non-convergent definitions. Given the lack of a consistent framework and the non-accretive characteristic of empirical studies, this study undertakes an alternate approach to compare practitioner perspectives to the language of construct definitions in the literature.

3.2 Business models in practice

Timmers (1998) crystallized the practice-based perspective on business models as the architecture of systems, revenue-generating mechanisms, and value-creation potential. Careful reading of Timmers’ report, however, clearly shows he referenced an industry-level rather than firm-level framework: “A business model in itself does not yet provide understanding of how it will contribute to realise the business mission of any of the companies who is an actor within the model.” (3) Despite this, Timmers’ contribution serves as the one of the seminal studies on business models in the ICT sector and is routinely referenced with regard to the architecture of firm-level resources and activities.

Building on this perspective, the practice-centric literature focuses on identifying the specific characteristics or components of the business model. For example, Kim and Mauborgne (2000) characterized business model assessment as a combination of price, cost, and partnering. Boulton and Liebert (2000) described it as the combination of assets unique to the firm’s configuration of needs and goals. Feng et al (2001) defined the business model as the firm’s cost recovery mechanism and argued that the dot-com boom, rather than presenting new business models,
represented a breakdown in the cumulative market’s traditional requirement for cost recovery via profitability, allowing firms to seek cost recovery via capital markets instead.

Another simple codification of the business model in practice is described as managing the business operation (Chan & Chung, 2002). In this instance, focus is divided between the underlying revenue model and the selling model, which for internet companies used to be typed as “business to consumer” and “business to business.” An extension of this construction describes strategic business models as both how the firm operates now and must change in the future (Betz, 2002). In this framework, firms may establish multiple business models out of which only one may emerge successfully over time (Brown & Gioia, 2002). Alternately, some studies focus on just one characteristic of the firm as representative of the business model. Christensen et al (Christensen et al.) limit consideration to the level of vertical or horizontal integration to develop an evolutionary model of industry aggregation.

A popular practice-centric perspective on business models develops typologies and anatomies of business models and business model elements. Bienstock et al (2002) propose a combinatorial taxonomy based on number of buyers, number of sellers, type of seller, price mechanism, nature of product offering, and frequency of exchange. They review 400 websites to develop an extensive typology of e-businesses, which the authors propose may be relevant for all firms. Weill and Vitale compartmentalize “atomic” e-business model components common to any internet commerce-based business (Weill & Vitale, 2001). A contrasting perspective argues that business models may be unique to specific firms, as demonstrated in a case study that focuses on the focus firm’s information-processing role linking multiple industries (Liao et al., 2004). This aptly illustrates the tension
between entirely idiosyncratic and unique business models and categorisation schemes and taxonomies for commonalities across business models.

The pervasiveness of the construct in practice can be observed in the United States Patent and Trademark Office’s determination that business models may not, in fact, be patented (Ovans, 2000). Limited research, however, has been conducted to appreciate business models from the practitioner cognitive perspective. The only explicit analysis appears in Osterwalder’s doctoral dissertation in the form of a limited categorical survey of practitioner beliefs. The results are recapitulated in Table 2. The data limitations are significant, as the data was intended as a pilot test only. In particular, responses were categorised to a dichotomy separating value-centric responses and activity-centric responses. The limited sample size does suggest that technology-oriented firms see business models from a process perspective while “business-oriented” companies see business models within a value-creation framework. Osterwalder’s study provides a starting point for a more comprehensive and analytical assessment of practitioner knowledge.

Table 2: Business model in practice survey data [adapted from Osterwalder 2005]

<table>
<thead>
<tr>
<th></th>
<th>Business-oriented responses</th>
<th>Technology-oriented responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value/customer-oriented</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>business model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity/role-oriented</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>business model</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 A discourse analysis of the business model in practice

The breadth and fragmentation of the scholarly literature lends itself to the application of a novel analytical approach to identify integrative elements. Because the business model construct, as currently understood in both practice and research,
emerged from the practice field, especially the venture and growth organisation sectors, a study of the use of the business model in practice may illuminate commonalities or overlap between scholarly and practice use. Rather than devolve to semantic distinctions based on the language of other theoretical frameworks, this study proposes that establishing the practice cognitive perspective in the broader context of scholarly discourse presents a useful framework for understanding and describing business model phenomenon, creating a common language for future research.

3.3.1 Pilot Interviews

This inductive investigation into business models began with pilot interviews of managers at venturing groups and early-stage technology firms identified in Table 3, because early use of the construct developed in the context of rapid adoption of internet technology fueled by venture funding (Osterwalder et al., 2005). Interviewees responded to a semi-structured interview template utilising open-ended questions that narrowed to firm-specific characteristics of business models. Participants were prompted to describe business model elements and the mechanisms of business model change.

Three conclusions from these pilot interviews emerged. First, every interviewee recognized the construct. Second, many interviewees expressed uncertainty about defining the general construct or identifying components of the business model—no consistent frameworks or definitions were evident. Finally, the definitions and examples offered by interviewees centered on three key characteristics: survival, organisational structure, and opportunity exploitation. Based on the fragmented literature and lack of precision in practice, this study initiates a
broader research design to assess practitioner perceptions of business models.

Table 3: Summary information on US/UK interview sample

<table>
<thead>
<tr>
<th>Firm</th>
<th>Summary Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>European venture capital firm specializing in green ventures</td>
</tr>
<tr>
<td>2</td>
<td>Start-up UK firm developing medical edutainment software</td>
</tr>
<tr>
<td>3</td>
<td>Small US firm commercializing software and web tools for non-label musicians</td>
</tr>
<tr>
<td>4</td>
<td>Start-up US biotechnology firm</td>
</tr>
<tr>
<td>5</td>
<td>Growth-stage US biotechnology firm developing high efficiency drug assay tools</td>
</tr>
<tr>
<td>6</td>
<td>Very small US design engineering consultancy</td>
</tr>
<tr>
<td>7</td>
<td>Small US firm commercializing specialized drug assay equipment</td>
</tr>
<tr>
<td>8</td>
<td>Corporate venture capital group with large US-based financial firm</td>
</tr>
<tr>
<td>9</td>
<td>US-based corporate venture capital group within large global manufacturing firm</td>
</tr>
<tr>
<td>10</td>
<td>Start-up US biofuels technology enabling firm</td>
</tr>
<tr>
<td>11</td>
<td>Growth-stage US biotechnology firm developing unique drug assay tools</td>
</tr>
<tr>
<td>12</td>
<td>US-based ventures and M&amp;A group within large global industrial manufacturing and services firm</td>
</tr>
</tbody>
</table>

3.3.2 Survey administration

To follow up on the pilot interviews with a more structured and quantitative process, the study utilised a survey instrument with open-ended questions prompting text responses as well as quantitative assessments of numerous firm characteristics in a standardized format. The survey asked two open-ended questions: “What is a business model” and “What is your company’s business model.” The questions were purposefully kept simple and placed at the start of the survey in order to obtain a tabula rasa response. Survey responses were affected by the available writing space and the written direction to “explain in 1 or 2 sentences.”
The survey was ultimately administered to 182 senior managers of Indian firms who attended executive education programmes between Fall 2008 and Spring 2009. Firms ranged in size from 2 employees to more than 20,000 employees and in age from start-ups to more than 100 years old. The median annual growth rate was 23%, consistent with the rapid growth of the Indian economy in 2008. The sample covered a range of industry sectors with strong representation in ICT, manufacturing, high-technology sectors, and services firms. An additional test sample was obtained by administering the survey to 13 managers of United Kingdom firms who attended an unrelated executive education programme in Fall 2008.

3.3.3 Discourse analysis background

Discourse analysis, also referred to as “content analysis” or “textual analysis,” is an analytical tool originally attributed to Foucault (Foucault, 1982) that distills information from text using quantitative techniques (Fairclough, 2003). From an epistemological perspective, discourse analysis seeks to understand the cognitive production of reality via use and evolution of language “as constitutive of the social world— not a route to it…the world cannot be known separately from discourse” (Phillips & Hardy, 2002). Although the tools were primarily developed in fields such as political science and sociology (Weber, 1990), discourse analysis has been used in organisational research to assess mechanisms of organisational change (O’Connor, 1995), develop a meta-analysis of organisational science in the broader context of humanities studies (Zald, 1996), and even contextualize the field of strategic management research (Nag et al., 2007).

Discourse analysis requires three technical decisions (Stemler, 2001): first, the discourse content must be identified; second, the unit of analysis is chosen;
finally, text is analyzed via an emergent or an a priori set of categories. In this study, the discourse content was the set of responses to the written survey question: “What is a business model.” Data were analyzed at both the word and response unit to enable multiple modes of comparison and improve objectivity of the analytical process via cross-referencing of results.

The lack of comparable analyses, however, required the development of either an emergent or novel a priori categorisation scheme. Established word categorisation sets were unsuitable because of the specialized nature of this analysis.

The initial test of preliminary survey data against the pilot study utilised an emergent categorisation set for convenience. Although an emergent categorisation may be appropriate given the lack of previously-established categorisation sets, the thematic categorisation developed in Section 2 provides a valuable and useful basis for assessing survey content with the benefit of direct comparison between practitioner perceptions and received theory-building. In order to maximize the validity of the categorisation and to enable juxtaposition between practice and theory, an a priori set was developed based on the thematic analysis of the literature. These are discussed in the sections below

3.3.4 The preliminary dataset and emergent discourse categories

The first India dataset included 99 survey responses, of which 92 were completed and usable. The initial test sample included the 13 surveys completed by the entrepreneurial UK firms as well as the transcribed data from the interviews of the US firms that participated in the pilot study. At this stage of the analysis, multiple responses from firms were eliminated to improve the independent nature of the data,
resulting in 72 survey responses from Indian firms and 11 UK responses.

Table 4: Emergent business model concepts from the preliminary dataset

<table>
<thead>
<tr>
<th>1st Order Concepts</th>
<th>2nd Order Categories</th>
<th>3rd Order Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>How / Cause</td>
<td>Design</td>
</tr>
<tr>
<td></td>
<td>Defines</td>
<td>Organisation</td>
</tr>
<tr>
<td></td>
<td>Align</td>
<td>Resources</td>
</tr>
<tr>
<td></td>
<td>Element</td>
<td>Resource Structure</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Make / do</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strategy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Order Categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Order Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Order Concepts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Order Categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Order Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Order Concepts</td>
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<td></td>
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<tr>
<td>2nd Order Categories</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Order Dimensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A rudimentary discourse analysis was completed to develop inductive ideas about business models in practice and test whether the survey data resembled the interview data prior to thorough analysis. The author conducted this analysis and developed the emergent category set shown in Table 4. First order concepts were derived *ad hoc* by reviewing the textual responses and noting recurring concepts. A secondary filtering process reduced the 38 word concept groupings into 15
significant categories based on commonalities associated with standard business concepts; additional convergence was determined to be detrimental to retaining data quality. Table 4 depicts the 38 first order word concepts combined into the 15 second-order semantic categories and the three aggregate business model dimensions discussed below.

Table 5: Emergent general business model semantic concept count

<table>
<thead>
<tr>
<th></th>
<th>Base</th>
<th>Test</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>India</td>
<td>US/UK</td>
<td></td>
</tr>
<tr>
<td>Resource Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>44</td>
<td>19</td>
<td>63</td>
</tr>
<tr>
<td>Organisation</td>
<td>48</td>
<td>18</td>
<td>66</td>
</tr>
<tr>
<td>Resources</td>
<td>12</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Activities</td>
<td>22</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td>Strategy</td>
<td>12</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Mode</td>
<td>11</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Subtotal</td>
<td>149</td>
<td>52</td>
<td>201</td>
</tr>
<tr>
<td>Transactive Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transactions</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Products &amp; Services</td>
<td>14</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Transaction Characteristics</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Value Chain</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Downstream</td>
<td>26</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Subtotal</td>
<td>52</td>
<td>25</td>
<td>77</td>
</tr>
<tr>
<td>Value Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td>36</td>
<td>15</td>
<td>51</td>
</tr>
<tr>
<td>Purpose</td>
<td>17</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Goals</td>
<td>14</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Subtotal</td>
<td>67</td>
<td>17</td>
<td>84</td>
</tr>
<tr>
<td>Other</td>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>275</td>
<td>94</td>
<td>369</td>
</tr>
</tbody>
</table>

N = 99 firms for Total sample; n = 76 for Survey [India]; n = 23 for US/UK Test Sample

The quantitative results of the emergent categorisation process are shown in Table 5. As the categories are not mutually exclusive within the semantic context of each response, a response could be tallied for multiple categories. Again, the unit of analysis is the presence of semantic concepts at the response-level rather than the
word-level.

The most common semantic groupings deal with organisations, design, transactions with downstream entities, value, and activities. The intuitively appealing groupings and the similarities between the India and test samples suggested that discourse analysis would yield interesting descriptive results. The similarities between the India survey data and the test data may be seen visually in Figure 4, which shows spider graphs of the semantic counts for the two datasets.

Based on the success of this preliminary analysis, a similar semantic counting analysis was conducted on survey Q2: “What is your firm’s business model?” Although the initial intent had been to utilise the same semantic categories for textual analysis, a review of the responses suggested different patterns from the abstracted elements of the more general question. Compare the responses to the two questions from the same respondent:

Q1 [55]: “A business model explains the main functioning process and operations of an organisation to reach its overall goal.”

Q2 [55]: “K----- provides high quality crystalline waterproofing solutions to building around the world. We follow the "always being by your side" concept.”

Responses to the firm-specific question generated firm-specific information focusing on concrete elements of organisational form: manufacturing vs. distribution, and product types: physical vs. financial. The specialized vocabulary associated with firm-specific characteristics argued against the application of the semantic categories from the first question.
Figure 4: Semantic category counts for general business models
A set of categories was seeded by prior research on business model typologies (Bienstock et al., 2002; Malone et al., 2006) and additional semantic categories were added inductively. In this case, the divergence of vocabulary led to 54 concept categories, though some of these were pre-designed for convergence; for example, “manufacturing,” “distribution,” and “service” were utilised as part of the 1st order category “organisational form” based on Malone et al (2006).

Table 6: Firm-specific “business model” semantic concept count

<table>
<thead>
<tr>
<th>Resource Structure</th>
<th>Base</th>
<th>Test</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>India</td>
<td>US/UK</td>
<td></td>
</tr>
<tr>
<td>Organisational Form</td>
<td>69</td>
<td>25</td>
<td>94</td>
</tr>
<tr>
<td>Organisation</td>
<td>10</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Resources</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Innovation</td>
<td>23</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>113</strong></td>
<td><strong>44</strong></td>
<td><strong>157</strong></td>
</tr>
<tr>
<td>Transaction Type</td>
<td>53</td>
<td>31</td>
<td>84</td>
</tr>
<tr>
<td>Transaction</td>
<td>21</td>
<td>13</td>
<td>34</td>
</tr>
<tr>
<td>Downstream</td>
<td>54</td>
<td>26</td>
<td>80</td>
</tr>
<tr>
<td><strong>Transaction Characteristics</strong></td>
<td>34</td>
<td>9</td>
<td>43</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>162</strong></td>
<td><strong>79</strong></td>
<td><strong>241</strong></td>
</tr>
<tr>
<td>Value Structure</td>
<td>32</td>
<td>11</td>
<td>43</td>
</tr>
<tr>
<td>Social Good</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>37</strong></td>
<td><strong>14</strong></td>
<td><strong>51</strong></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>9</strong></td>
<td><strong>0</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>321</strong></td>
<td><strong>137</strong></td>
<td><strong>458</strong></td>
</tr>
</tbody>
</table>

N = 99 firms for Total sample; n = 76 for Survey [India]; n = 23 for US/UK Test Sample

Follow-up review integrated the concept categories into twelve 2nd order categories. The results of this analysis were more ambiguous, as shown in Table 6. The emergent categorisation set bears some relation to the one developed for the data obtained from Q1, but mostly in the very broadest categories, which are shown.
Many words and phrases were difficult to assess because they were entirely firm-specific and either difficult to categorise without an inordinate number of categories. The spider charts in Figure 5, however, demonstrate the strong similarities between the conceptual patterns between the survey data and the test data.

3.3.5 Inherent limitations of the preliminary analysis

Inherent limitations in the preliminary analysis reduce the interpretive power of the results. First, the dataset would benefit from a larger sample size. Of more importance, however, are the analytical processes in the discourse analysis. Three key drawbacks merit attention. The first is the use of an emergent categorisation set. In this case, some element of emergence is unavoidable, as no prior categorisation set exists for this type of analysis. At the same time, an emergent set is less likely to be applied consistently across the entire dataset, as categorisations or subcategorisations may be partly dependent on analysis order. For example, if the full categorisation set is not fully determined until halfway through the review process, then it is possible if the data had been reviewed in a different order that the sorting would have generated different results or even a different categorisation scheme.

Second, a single reviewer performed the analysis, suggesting the potential for assessment error and/or bias. Third, the full power of discourse analysis resides in the application of multi-level analysis, especially word-level analysis. To address these issues, additional surveys were administered, a second data coder was identified, and both word and response-level analyses were conducted.
Figure 5: Semantic category counts for firm-specific business models
3.3.6 The full base dataset

The base data are the 182 surveys from managers of Indian firms. The target content includes hand-written responses to open-ended survey questions. A sample response to the question [Q1] “What is a business model?” is shown:

[76] The way by which organisation's resources are deployed to create value to customers in the form of product and services leading to growth and higher profits for the organisation

Complete transcription of the responses was performed independently by a third-party. Of the 182 surveys completed, 18 were eliminated from the sample because of incomplete responses or difficulties in handwriting transcription; when more than 25% of the response could not be transcribed the response was excluded. When less than 25% of the response could not be transcribed, the unidentifiable words were dropped, resulting in approximately 2% of the data discarded. Thirteen additional responses were excluded from the discourse analysis because the response appeared to be firm specific, such as, “[23] Design and manufacture of stainless steel process equipment for any process.”

The remaining 151 surveys represented 130 unique organisations. The data were cleaned as follows: obvious typographical errors were corrected, acronyms and shortenings were expanded to full words, and symbols and numerals were replaced with the appropriate words. Punctuation and other non-word symbols were discarded. A cursory review revealed that the words “business” and “model” would be over-sampled in the analysis because numerous responses included the phrase “business model;” 44 instances of the phrase “business model” were eliminated from the sample as
tautological. Figure 3 shows the histogram of word frequency occurrence. The resulting
data set thus included 151 responses, 2417 total words and 650 unique words. Roughly
60% [n=389] of the words occurred only once in the sample, 95% [n=615] occur ten
times or less.

3.3.7 An a priori categorisation set

An a priori categorisation set was developed by combining the inductive
knowledge gained from the preliminary discourse analysis with the results of the
thematic review of the scholarly literature. The resulting categorisation set, including the
major thematic categories and subcategories are shown in Table 7.

Table 7: Discourse categories and subcategories

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Meaining</td>
<td>Non-meaning, business / company, other</td>
</tr>
<tr>
<td>Design</td>
<td>Design, structure, choice, configuration, emergence, plan / map, time, other</td>
</tr>
<tr>
<td>Resources</td>
<td>Assets, knowledge, learning, capabilities, uniqueness, networks, protection, competence, activities / processes, culture, other</td>
</tr>
<tr>
<td>Narrative</td>
<td>Story, legitimization, sense-making, newness, beliefs, expectations, meaning, norms, other</td>
</tr>
<tr>
<td>Innovation</td>
<td>Innovation, discontinuity, technology, evolution, novelty, advance / progress, other</td>
</tr>
<tr>
<td>Transactions</td>
<td>Transaction / exchange, boundaries / boundary-spanning, partners, customers, markets, products / services, value chain, transaction characteristics, other</td>
</tr>
<tr>
<td>Opportunity</td>
<td>Exploration, exploitation / execution, needs / wants, problem, goal, idea, vision / mission, opportunity, other</td>
</tr>
<tr>
<td>Value</td>
<td>Value, revenues, profits, money / cash, value creation, value capture, growth, other</td>
</tr>
</tbody>
</table>
3.3.8 Coding at the conceptual level

Two reviewers coded each response using a binary scheme to reflect the presence or absence of category/subcategory relevant content. Response unit level discourse analysis presents the conceptual “sense” of the aggregate data more formally than high-level summaries. Each response could be coded to multiple categories, but only one primary subcategory within a category was assigned to ensure that category counts were not duplicated. For example, response [76] shown above describes a deployment “way,” the company’s resources and product/service mix as well as firm-level outcomes of value and profit. This response is therefore coded to the categories of Design, Resource, Transactions, and Value. It is specifically coded to the subcategories of “plan/map,” “resources-other,” products/services,” and “value-other” respectively. Although two types of “value” were clearly identified in the response, only one subcategory is selected. This measures the prevalence of categories across responses rather than frequency within responses. A total of 315 response-level category/subcategory codings were recorded. Response-level category totals and percentages are shown in Table 8. The results are presented against word-level coding output for convenience, as discussed in Section 3.3.9.

3.3.9 Coding at the word level

Discourse analysis benefits from multi-level assessments and interpretation (Fairclough, 2003). Sentence and response-level coding suffers from filtering and subjectivity associated with the complex process of extracting “meaning” from multi-word sets. Because the survey responses ranged from less than 10 words to more than
40 words, contextualizing and coding responses required simplification and interpretation across substantively varying scales. A word frequency assessment is a standard tool of discourse analysis (Fairclough, 2003; Stemler, 2001). The potential benefits of word frequency analysis are numerous: systematic categorisation at a defined content level, increased objectivity of coding, and larger data sets for quantitative assessment. The primary disadvantages are associated with coding effort and rigor and the presence of non-meaning or uncodable words.

Table 8: Absolute and normalized frequency of business model concepts

<table>
<thead>
<tr>
<th>Category</th>
<th>Response Unit</th>
<th>Coder 1</th>
<th>Coder 2</th>
<th>Consensus</th>
<th>Coder 1</th>
<th>Coder 2</th>
<th>Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>82</td>
<td>183</td>
<td>136</td>
<td>146</td>
<td>367</td>
<td>316</td>
<td>317</td>
</tr>
<tr>
<td>Resources</td>
<td>38</td>
<td>79</td>
<td>83</td>
<td>78</td>
<td>133</td>
<td>140</td>
<td>136</td>
</tr>
<tr>
<td>Narrative</td>
<td>14</td>
<td>26</td>
<td>47</td>
<td>48</td>
<td>32</td>
<td>54</td>
<td>62</td>
</tr>
<tr>
<td>Innovation</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>19</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Transactions</td>
<td>57</td>
<td>84</td>
<td>80</td>
<td>100</td>
<td>179</td>
<td>180</td>
<td>209</td>
</tr>
<tr>
<td>Opportunity</td>
<td>59</td>
<td>66</td>
<td>105</td>
<td>107</td>
<td>130</td>
<td>237</td>
<td>264</td>
</tr>
<tr>
<td>Value</td>
<td>64</td>
<td>59</td>
<td>67</td>
<td>52</td>
<td>148</td>
<td>170</td>
<td>153</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>315</strong></td>
<td><strong>500</strong></td>
<td><strong>519</strong></td>
<td><strong>532</strong></td>
<td><strong>1008</strong></td>
<td><strong>1098</strong></td>
<td><strong>1142</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Category</th>
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<th>Coder 1</th>
<th>Coder 2</th>
<th>Consensus</th>
<th>Coder 1</th>
<th>Coder 2</th>
<th>Consensus</th>
</tr>
</thead>
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<tr>
<td>Design</td>
<td>26.0%</td>
<td>36.6%</td>
<td>26.2%</td>
<td>27.4%</td>
<td>36.4%</td>
<td>28.8%</td>
<td>27.8%</td>
</tr>
<tr>
<td>Resources</td>
<td>12.1%</td>
<td>15.8%</td>
<td>16.0%</td>
<td>14.7%</td>
<td>13.2%</td>
<td>12.8%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Narrative</td>
<td>4.4%</td>
<td>5.2%</td>
<td>9.1%</td>
<td>9.0%</td>
<td>3.2%</td>
<td>4.9%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Innovation</td>
<td>0.3%</td>
<td>0.6%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>1.9%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Transactions</td>
<td>18.1%</td>
<td>16.8%</td>
<td>15.4%</td>
<td>18.8%</td>
<td>17.8%</td>
<td>16.4%</td>
<td>18.3%</td>
</tr>
<tr>
<td>Opportunity</td>
<td>18.7%</td>
<td>13.2%</td>
<td>20.2%</td>
<td>20.1%</td>
<td>12.9%</td>
<td>21.6%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Value</td>
<td>20.3%</td>
<td>11.8%</td>
<td>12.9%</td>
<td>9.8%</td>
<td>14.7%</td>
<td>15.5%</td>
<td>13.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

[Number of surveys: 151; Number of words: 2417]

Two reviewers alternated independent coding with discussion to code the content in stages (Stemler, 2001). One coder was one of the authors with a high degree of familiarity with the context, terminology, and literature. The other coder was a post-
graduate Finance student with no direct experience or familiarity with the context, terminology, or literature. After each independent coding stage, the reviewers compared coding and discussed differences. Minor subcategorisation changes were made during the coding process. Ultimately, 118 unique words representing 1275 occurrences, roughly 53%, were placed in the “non-meaning” category, while 532 “meaning” words representing 1142 occurrences were categorised thematically. The 50 highest frequency words are shown in Figure 3. Roughly 60% \([n=389]\) of the words occurred only once in the sample, 95% \([n=615]\) occur ten times or less. Only eight words occur with frequency greater than 50 in the sample.

### 3.3.10 Comparison to the English language corpus

Based on a word frequency analysis, the sample appears to be a satisfactory representation of written English when compared to the standard corpus of English. Table 9 shows the occurrence of the 50 most frequent words. The five most frequently occurring words in the sample ["is," “and”, “the,” “of,” and “to"] match the corpus (Leech et al., 2001). In addition, the most frequent words conveying context-specific meaning in the sample ["value” and “process"] in the sample occur in the lexicon after approximately 40% of total word frequency, also closely matching the corpus (Leech et al., 2001). Two significant distinctions from the corpus highlight the special-purpose nature of the data sample: the five highest-frequency words represent 23% of the sample but only 17% of the corpus, and the lowest-frequency words make up approximately 21% of the total sample while comparable low-frequency words represent 47% of the corpus (Leech et al., 2001). In other words, the lexicography of the sample is
less rich or varied than the written English corpus, corresponding to the focused subject
matter and purposed nature of the responses. The high-level similarities between the
data sample and the corpus, however, suggest that the data sample is not anomalous
as a sample of written English.

Table 9: Fifty most frequent words in the dataset

<table>
<thead>
<tr>
<th>Word</th>
<th>Frequency</th>
<th>Word</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>the</td>
<td>151</td>
<td>you</td>
<td>15</td>
</tr>
<tr>
<td>a</td>
<td>117</td>
<td>market</td>
<td>14</td>
</tr>
<tr>
<td>and</td>
<td>105</td>
<td>revenue</td>
<td>14</td>
</tr>
<tr>
<td>of</td>
<td>100</td>
<td>services</td>
<td>14</td>
</tr>
<tr>
<td>to</td>
<td>98</td>
<td>with</td>
<td>14</td>
</tr>
<tr>
<td>business</td>
<td>67</td>
<td>customer</td>
<td>12</td>
</tr>
<tr>
<td>is</td>
<td>56</td>
<td>growth</td>
<td>12</td>
</tr>
<tr>
<td>or</td>
<td>54</td>
<td>model</td>
<td>12</td>
</tr>
<tr>
<td>in</td>
<td>45</td>
<td>product</td>
<td>12</td>
</tr>
<tr>
<td>which</td>
<td>41</td>
<td>your</td>
<td>12</td>
</tr>
<tr>
<td>it</td>
<td>31</td>
<td>be</td>
<td>10</td>
</tr>
<tr>
<td>value</td>
<td>28</td>
<td>customers</td>
<td>10</td>
</tr>
<tr>
<td>company</td>
<td>27</td>
<td>framework</td>
<td>10</td>
</tr>
<tr>
<td>how</td>
<td>21</td>
<td>strategy</td>
<td>10</td>
</tr>
<tr>
<td>its</td>
<td>19</td>
<td>we</td>
<td>10</td>
</tr>
<tr>
<td>process</td>
<td>19</td>
<td>can</td>
<td>9</td>
</tr>
<tr>
<td>way</td>
<td>19</td>
<td>one</td>
<td>9</td>
</tr>
<tr>
<td>for</td>
<td>18</td>
<td>are</td>
<td>8</td>
</tr>
<tr>
<td>organisation</td>
<td>18</td>
<td>do</td>
<td>8</td>
</tr>
<tr>
<td>by</td>
<td>17</td>
<td>make</td>
<td>8</td>
</tr>
<tr>
<td>on</td>
<td>17</td>
<td>products</td>
<td>8</td>
</tr>
<tr>
<td>that</td>
<td>16</td>
<td>service</td>
<td>8</td>
</tr>
<tr>
<td>achieve</td>
<td>15</td>
<td>set</td>
<td>8</td>
</tr>
<tr>
<td>an</td>
<td>15</td>
<td>structure</td>
<td>8</td>
</tr>
<tr>
<td>plan</td>
<td>15</td>
<td>vision</td>
<td>8</td>
</tr>
</tbody>
</table>

3.3.11 Frequency analysis

Table 8, shown previously, compares the counts of the response-level analysis to
the counts of the unique word-level and frequency of occurrence analyses, both in
absolute numbers and normalized. The frequency of occurrence analysis takes into
account how often specific words occurred in the sample. The higher counts for unique
words and frequency in the consensus column are due to the re-coding of non-meaning words into the thematic categories during the consensus review process. Words associated with organisational design were most common both in number of words and total frequency. Words associated with opportunity and transactions were common. Less common were words associated with resources and value. Words associated with narrative were rare and words associated with innovation were almost non-existent. These trends were consistent over the response and word levels of analysis.

The 25 common sub-categories, representing approximately 80% of usage across all analyses, are shown in Table 10. The subcategorisation results reveal a more nuanced understanding of practitioner perceptions about business models. First, although ideation and purpose/mission related words occurred regularly, the most frequently occurring element within the “opportunity category” was exploitation/execution. Business models are tightly characterized by actualizing functions and activities. On the other hand, the most common elements within organisational design deal with structure and configuration. Business models are not isomorphic with strategic planning or content: business models are representations of organisational configuration or coordination. While value creation is a critical element of business models, no single subcategory dominates; business models may have idiosyncratic characteristics of value development, whether via revenue generation, profit making, or other less common preferred outcomes.

Comparing the response-level coding with the word-unit coding reveals useful lessons about the practice of business models. Figure 6 presents a radar diagram of the 20 subcategories with the highest coding counts, grouped into thematic units.
Similarities between the response-level coding and the word unit-level coding are evident, though some distinctions should be identified. The more abstract analysis at the response-level, which would be the processing level utilised for most qualitative and case study research, shows a higher prevalence of the traditional aspects of strategic choice: planning, goals, and products and service. At the word-unit level, however, stronger representations of exploitation emerge, along with transactions, activities and assets, as well as miscellaneous elements of design and the nature of time.

Figure 6: Most common business model subcategory themes

Whereas the semantic, higher-level perspective suggests a business model
language of design and value, the underlying word usage in practice demonstrates the
importance of resource and transactive elements at the organisational level. The
predominance of design and execution, in combination with traditional product/market
positioning evident in the study output have been the focus of most of the research on
business models to date; the discourse analysis reveals that in practice the underlying
components of business models incorporate both resource and transactive structures.

3.3.12 Testing differences between Indian and UK Data

The generalizability of the Indian data set was more carefully tested against the
UK sample, excluding the U.S. sample to avoid method bias associated with the
difference in data collection. The data had been collected from U.K. companies
participating in a seminar at Imperial College. Because the seminar had targeted
organisations with a design focus, and was offered free on a first-come first-served
basis, the demographics of the participants differed significantly from the base data set.
The 13 UK firms are primarily early stage entities engaged in design or design service
fields. Of these, 11 are headquartered in London and ten are less than two years old
generating less than $150,000 in revenues per year, clearly qualifying as very early
stage firms. Average self-reported growth rate was 30% and average self-reported net
margin was 23%. The two samples presented similar growth and profit characteristics.
The data for the UK sample were treated as described for the India sample. A total of
190 words, including 91 unique words, were assessed in a word frequency analysis in
which 66 of the words were matched exactly against words in the base lexicon and
were categorised directly. The remaining 25 new-to-the-analysis, unique words were
Table 10 compares the top 25 subcategories based on word frequency for the base data set [India] and the test data set [UK]. Table 11 compares the normalized category counts by word frequency for the base data set and the test data set. The normalized counts differ statistically for ten of the 25 top subcategories, but there is also a surprising amount of similarity. Exploitation/execution is the dominant subcategory for both samples, and many of the top count subcategories match across samples. More
than 80% of the total subcategorisation counts occur in these 25 subcategories. The
category data shows some differences between samples, but the z-test for codings for
four of the six “meaning” categories cannot be shown to be different at the 90%
confidence interval. In addition, the differences are matters of degree. Rank ordering the
categories results in only one mismatch: “design” is second in the base sample and
third in the test sample, while “opportunity” is second in the test sample and third in the
base sample. It should be noted that while the word frequency data is relatively normally
distributed, the categorical data is not, so these tests provide only a first order
approximation for the comparison between the test sample data and the base data.
Nevertheless, the similarities between the test sample and the base sample suggest
that the broad concepts embodied in the business model in practice demonstrate
general consistency despite significant differences in firm characteristics.

Table 11: Z-tests of normalized category counts for samples based on word frequency

| Category      | Base Sample [India] | Test Sample [UK] | |z|
|---------------|---------------------|------------------|--|
| Non-Meaning   | 52.75%              | 62.43%           | 2.57*** |
| Design        | 13.12%              | 7.41%            | 2.27**  |
| Resources     | 5.63%               | 2.12%            | 2.06**  |
| Narrative     | 2.57%               | 1.59%            | 0.83    |
| Innovation    | 0.04%               | 0.00%            | 0.28    |
| Transactions  | 8.65%               | 7.41%            | 0.59    |
| Opportunity   | 10.92%              | 12.70%           | 0.75    |
| Value         | 6.33%               | 6.35%            | 0.01    |

*Significant at 90% confidence
**Significant at 95% confidence
***Significant at 99% confidence

[Number of surveys: Base 151, Test 12; Number of words: Base 2417, Test 190]

3.3.13 Data limitations

The data set and analytical processes present certain data limitations. Survey
participants were self-selected into executive education programmes and may
demonstrate a common perspective on learning, knowledge, and resource investments. Because survey responses were limited to a few sentences, it is not certain whether respondents would have preferred to write more, though many wrote less—the shortest responses were less than 10 words. The fact that discourse analysis showed strong similarities between the India and UK data samples suggests that ethnicity was not a distinguishing factor in practice perceptions about business models, but alternate hypotheses, such as the influence of primarily English-based practice publications, cannot be entirely ruled out. In addition, India and the UK share many cultural similarities that might not be carried over into other countries.

Table 12: Cohen’s Kappa for inter-rater reliability for coding of first 10% of sample

<table>
<thead>
<tr>
<th>Category</th>
<th>Observed Proportion of Agreement</th>
<th>Expected Proportion of Agreement</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Meaning</td>
<td>.88</td>
<td>.50</td>
<td>.76</td>
</tr>
<tr>
<td>Design</td>
<td>.90</td>
<td>.76</td>
<td>.57</td>
</tr>
<tr>
<td>Resources</td>
<td>.99</td>
<td>.93</td>
<td>.79</td>
</tr>
<tr>
<td>Narrative</td>
<td>1.00</td>
<td>1.00</td>
<td>N/A</td>
</tr>
<tr>
<td>Innovation</td>
<td>.97</td>
<td>.97</td>
<td>0.00</td>
</tr>
<tr>
<td>Transactions</td>
<td>.99</td>
<td>.80</td>
<td>.92</td>
</tr>
<tr>
<td>Opportunity</td>
<td>.91</td>
<td>.83</td>
<td>.46</td>
</tr>
<tr>
<td>Value</td>
<td>.99</td>
<td>.90</td>
<td>.85</td>
</tr>
</tbody>
</table>

Although the analytical process utilised two coders and followed standard practices for discourse analysis, the process remains subjective. Cohen’s Kappa was calculated following independent coding of the first 10% of the sample to test for inter-rater reliability—the results are shown in Table 12. The low frequency of “innovation” and “narrative” words, both in this sub-sample and the entire sample reduce the validity of the test for those categories, but inter-rater reliability was moderate or substantial for five of the other six categories (Landis & Koch, 1977).
Additional biases may have been introduced via the inter-coder discussion process. One of the coders was more familiar with the literature and terminology of business models, and may have been a source of influence on the other coder. Comparing coding results shows that the consensus coding was closer to the second coder's preliminary codings in five of the 7 categories. Inter-rater reliability for post-discussion coding is shown in Table 13. Cohen's Kappa values show reliability to be substantial, with the exception of the “Innovation” category, caused again by the extremely low occurrence of Innovation words in the sample.

Table 13: Cohen’s Kappa for inter-rater reliability for coding of entire sample

<table>
<thead>
<tr>
<th>Category</th>
<th>Observed Proportion of Agreement</th>
<th>Expected Proportion of Agreement</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Meaning</td>
<td>.95</td>
<td>.69</td>
<td>.85</td>
</tr>
<tr>
<td>Design</td>
<td>.94</td>
<td>.65</td>
<td>.82</td>
</tr>
<tr>
<td>Resources</td>
<td>.98</td>
<td>.89</td>
<td>.89</td>
</tr>
<tr>
<td>Narrative</td>
<td>.98</td>
<td>.89</td>
<td>.77</td>
</tr>
<tr>
<td>Innovation</td>
<td>1.00</td>
<td>.99</td>
<td>.50</td>
</tr>
<tr>
<td>Transactions</td>
<td>.96</td>
<td>.72</td>
<td>.86</td>
</tr>
<tr>
<td>Opportunity</td>
<td>.96</td>
<td>.74</td>
<td>.86</td>
</tr>
<tr>
<td>Value</td>
<td>.97</td>
<td>.85</td>
<td>.82</td>
</tr>
</tbody>
</table>

[Number of words = 650]

3.4 Reconceptualizing business model theory

Analysis of managerial discourse demonstrates that the business model is a relevant construct despite the concern expressed by managers that they’d “never tried to define it before,” or “could not explain it clearly.” More than 90% of the survey participants attempted to answer the question “What is a business model” and also provided a response to the question “What is your firm’s business model?” Practitioners believe that the business model represents a relevant concept linked to firm performance and survival, and especially relevant to the underlying opportunity that the
firm exploits. Practitioner discourse reveals that a business model is an organisation-level phenomenon, an architecture or design that incorporates sub-systems and processes to accomplish a specific purpose. It is not equivalent to that purpose, nor is it the reason that the organisation exists. It is not a process. The business model is not fully explained by a firm's revenue model, though aspects overlap. Practitioners apply both resource-based and transactive elements to the business model. Finally, the business model does not subsume nor is it subsumed by corporate strategy.

3.4.1 Re-assessing the Literature

The lack of coherence or convergence in the business model literature lends additional importance to construct assessment and the identification of future research directions. The analysis of the language of business models in practice presents specific clues for understanding business models in the broader context of organisational theory. First, the language of innovation is almost entirely absent from practitioner perceptions about business models. This is not to say that business models cannot be innovative, nor that innovation plays no role in business model formation or change, but that innovation is not, per se, a fundamental element of a business model. Similarly, although the literatures on narrative present compelling arguments for the importance of sense making and legitimization in the context of business model formation and change, the language of narrative and legitimization does not form a critical component of the business model construct in practice. Narrative may present a potentially useful abridgement of the complexity of organisational history in appreciating or contextualizing a firm’s rationalized strengths, but understanding business models as
a form of subjective and often retroactively adjudicated narration does not match practitioner language. For now, legitimization appears to be relatively distinct from the underlying business model components.

Alternately, the discourse analysis supports research streams linking business models to resources and transactive structures. The deductively derived transactive construct (Amit & Zott, 2001) matches the language and utilisation of practitioners, describing a structure encompassing the nature and content of boundary-spanning transactions with organisational partners. The positioning of the firm’s interactions and the configuration of the firm’s transactional content features prominently in practitioner discourse; the nature of transactional characteristics similar to the transactional types described by Amit and Zott also recur in practitioner language. At the same, time, practitioners describe elements of the firm’s resource structure, especially core activities and capabilities, as commonalities in the overall business model. This resonates with extant research on activities, capabilities, and closely matches research on business models conducted in the life science fields, which emphasize scale economies and knowledge coordination structures.

The discourse analysis, both at the conceptual level but especially at the deeper layer of word frequency, emphasizes the relevance of opportunity in the business model construct. In particular, practitioner language focuses on three aspects of opportunity enactment: execution, goals, and ideas. A business model narrows entrepreneurial ideation to a definable opportunity, establishes the relevant goal set that drives entrepreneurial action and organisational investiture, and bounds the implementation of organisational activities that enact the opportunity. The business model develops in
parallel with the entrepreneur’s knowledge and resource base as the organisational structures are developed that will ultimately create value by exploiting the underlying opportunity. In this framing, the business model is both an enabling and limiting structure for the firm’s accumulation and deployment of resources (Amit & Zott, 2001; Garnsey et al., 2008; Mahadevan, 2000; Morris et al., 2005; Tracey & Jarvis, 2007). The assumptions driving development of a business model and its implementation activities ultimately provides specificity to the opportunity itself.

3.4.2 Business model as opportunity-centric design

Few of the business model definitions in the literature are based on rigorous inductive or deductive logic. This discourse analysis presents an integrative framework for understanding business models in the practitioner context, and reconciles some of the disparities between the rigorous work on transactive structures, organisational theory in relatively mature sectors, and the assessment of business models in entrepreneurial contexts. Emphasizing the entrepreneurial aspect of business model development and change productively focuses attention on the opportunity-centric nature of business models. Business models are not the activities, but the structures that bound and connect the firm’s core activity set in service to a specific set of goals (Winter & Szulanski, 2001). For small and medium-sized firms, the resource structure and transactive structure interact to create and capture value directly associated with the firm’s primary opportunity. Focusing on the for-profit sector, specifically for small and medium enterprises that function as a single business unit, the business model may be reconceptualized as the design of organisational structures to enact a commercial
This definition presents four distinct advantages over other definitions in the literature. First, it more accurately reflects use in practice. Second, it distinguishes the business model from the definition of strategic management (Nag et al., 2007). Third, it aligns the business model with opportunity discovery, ideation, and enactment, linking the currently fragmented streams of research. Finally, the reconceptualization establishes clear directions for future research on business models, particularly within the entrepreneurial framework.

3.5 Implications for theory

The opportunity-centric reconceptualization of the business model presents a useful framework to develop and test organisational theory. First, the business model may be distinguished from corporate strategy; research on business models is, in effect, necessarily research on entrepreneurial action. In addition, a significant element of business model configuration lies in the relative dominance of business model structural elements, whether purposeful or emergent, with implications for organisational effectiveness, strategic fit, and structuration within the environmental context. Dimensional dominance occurs when one business model dimension obtains relatively more resources or importance within the firm’s configuration of activities and efforts. Dimensional parity occurs when a firm develops opportunity exploitation with equal focus on two or all three dimensions. These implications are discussed below.

3.5.1 Business models, strategy and entrepreneurship

Establishing construct boundaries is a necessary precursor to directing future
research. The data links the business model and strategy at both the response and word unit levels of discourse. At the same time, managers perceive important distinctions between the constructs. Explicit references to strategy occurred in only 10% of the responses and less than 5% of the word units. Disentangling the business model from strategy requires explicit construct boundaries, enabled by comparing the inductively developed business model definition against a socially constructed definition for strategic management: “the major intended and emergent initiatives taken by general managers on behalf of owners, involving utilisation of resources, to enhance the performance of firms in their external environments.” (Nag et al., 2007) 944 Careful consideration reveals straightforward distinctions between the two constructs.

First, strategy is a dynamic set of initiatives, activities, and processes; the business model is a static configuration of organisational elements and activity characteristics. A strategy may be reflexive, initiating change within the organisation that impacts the emergent strategy; a business model is inherently non-reflexive. Implementing a business model may generate organisational change, but the business model itself is not a description of or recipe for change. Business models are opportunity-centric, while strategy is competitor or environment-centric.

A business model is the organisation’s configurational enactment of a specific opportunity; strategy is the process of optimizing the effectiveness of that configuration against the external environment, including the potential to change the configuration, alter the underlying opportunity, or seek out new opportunities. The cognitive processes associated with opportunity identification and enactment focus may or may not incorporate firm-level strategic thinking, but the firm formation decision is based on the
enactment of an opportunity through an explicit or implicit business model. Firm formation establishes a resource structure, no matter how rudimentary; enactment of any opportunity establishes a transactive structure linking the firm and at least one external entity; firm viability requires a value structure that creates and captures some minimal value to replenish or augment the firm’s resource base. The business model is therefore a core building block of the entrepreneurial enactment process.

3.5.2 Business model dimensions

The discourse analysis and the opportunity-centric framing of the business model yields three dimensions to the organisational structures noted in this definition: resource structure, transactive structure, and value structure. Resource structure refers to the static architecture of the firm’s organisation, production technology, and core resources leveraged to serve customers. Transactive structure is the organisational configuration that determines key transactions with partners and stakeholders. Finally, value structure is the system of rules, expectations, and mechanisms that determine the firm’s value creation and capture activities. The characteristics of business model dimensions are discussed below.

Many business model analyses focus on the firm’s product or production technology, which fits a contingency argument, i.e. firms with similar products and production technologies to present business models with similar characteristics. A significant majority of the survey participants mentioned product, production technology, or resource type in either the definition of a generic business model or a firm’s specific business model. For example:
The process of employing capital and resources, people, process and technology, to produce goods and services which will satisfy the needs of communities of customers thereby creating economic value for all the stakeholders involved.

The business model “resource structure,” however, should be distinguished from the value-differentiating resource characteristics of the firm. The resource structure of a business model is the organisational configuration of resources, capabilities, and activities independent of any subjectively or objectively derived value for those resources. This is an improvement on routine, activity or flow-based business model frameworks. First, a business model as an “interdependent bundle of routines” (Winter & Szulanski, 2001) presents a low-level map of the firm’s activities, which does not fit with the higher-level perspective of the business model in practice. Second, although core value-creating activities may be closely tied to organisational structures at extremely small firms, the growth of administrative structures even in medium-sized firms serves to coordinate those activities, distancing the business model characteristics from specific activity characteristics. Activity-level analysis risks obscuring similarities between firm business models behind idiosyncrasies associated with non-relevant distinctions, such as local organisational regulations and cultural exigencies. Finally, the general framework for routines and activity-based analysis is grounded in large, mature organisations (Nelson & Winter, 1982), whereas the opportunity-centric nature of the business model construct is most clearly understood in SMEs.

The underlying elements of resource structure are, therefore, the general form of organisational structure, the nature of the firm’s primary production systems, the structures that support the development and accumulation of critical value-bearing
resources, as well as the implicit aspects of organisational structure, like culture, that coordinate activities. Each of these elements may be dissected into a variety of underlying organisational components, but some of the most interesting characteristics of resource structure function in a holistic manner in service to the underlying opportunity.

The decision to open an organics-focused co-op rather than a traditional convenience store is primarily a business model, rather than a resource-based decision. A low-density architecture that engenders casual hierarchy, cooperative culture, and limited investment in infrastructure is a key component of the resource structure that co-evolves with the organisation’s resource and activity bundles. All of these may then feed into a strategic positioning of the business within the community market for groceries, perhaps as a high-price niche provider to a health-focused market segment. The resource structure provides the architecture in which the firm’s potentially strategic resources are embedded without necessarily determining or deriving from a strategic plan or decision. It seems obvious that resource structure and resource strategy would co-evolve; so research on business model and strategy co-evolution holds much potential. Similarly, the resource structure of early stage biotech and pharmaceutical companies may not be obviously linked with the firm’s dynamic positioning within the industry and are more reflective of founder/entity opportunity enactment. In this case, resource structure and strategy intersect at the development of unique intellectual property that will determine whether a viable opportunity is successfully enacted, but some resource structures are more likely than others to enable the development process, regardless of the underlying value of the resources at stake or the specific
strategic activities of the firm, such as network and partnership development.

The discourse analysis reinforces the importance of transactive structure. This is well-aligned with rigorous studies on business models (Amit & Zott, 2001), but suggests the inclusion of the interactions between the firm and its key stakeholders—namely employees and shareholders. The transactive element of business models presents a macro-level architecture that can be directly linked to the firm’s value creation outputs. This is particularly relevant for differentiating the variety of business models of firms utilising novel information and communication technologies. The literature provides a set of characteristics for transactive structures based on transaction cost economics (Williamson, 1979) and business model-specific research (Amit & Zott, 2001); the challenge lies in characterizing the structures, rather than the content of the transactions. Two of the firms from the pilot interviews develop and sell drug assay tools to organisations that perform high-throughput screening of drug targets. The underlying technologies are dramatically different, and the diseases for which the technologies are targeted are completely distinct, but the characteristics of the underlying transactions, and the organisational structures that configure those transactions demonstrate significant similarities.

Differences in cost structures and sourcing linked to product-specificity, differentiate the resource structures for these firms, but many components of the transactive structures for these companies may be nearly isomorphic. Much of the transactive structure research has focused on transactive structure dominant businesses, such as e-businesses, generating yielding useful descriptive components of transactive structure such as efficiency and lock-in (Amit & Zott, 2001). But significant
research remains to unpack the nature of intrafirm-level transactive structures in the broader context of organisational behavior outside the e-business sector. The transactive structure holds great promise towards explaining business model development and performance, but more research on processes and outcomes is needed to fully understand the rich repertoire of transactive structure characteristics.

A common element across practitioner perspectives and the literature on business models is value, but business model value incorporates structuration of value creation and capture in the context of opportunity enactment. Value structure is the organisational system that defines, supports, and controls the processes of value creation and capture. Value structure serves as the facilitator between the nature of the underlying opportunity and the enactment of that opportunity via resource and transactive elements. It is the differentiating point of entrepreneurial co-creation that establishes the boundaries and enabling mechanisms for entrepreneurial action, mediating between the fundamental opportunity and the entrepreneur’s perceptions of the opportunity landscape. As the firm acts to exploit the opportunity, the elements of value creation and capture likely adjust with the development of resources and boundary-spanning transactions. The value structure, however, may remain relatively constant, providing the high-level guidelines that link the entrepreneur’s perception of available value to strategic decisions to maximize value creation and capture.

**3.5.3 Resource structure dominance**

Technology, product, and process innovation and optimization co-determine industry evolution (Utterback & Abernathy, 1975) and firm behavior (Wernerfelt, 1984).
Resource structure dominated firms are likely to see firm evolution as a function of product development, where improved technology and products drive market reach and product adoption. Firm viability depends on accessing and leveraging resources with inherent, marketable value. In this framework, firm performance is a direct outcome of effective resource procurement, transformation, and delivery. Venture capital firms commonly refer to early stage firms operating under strict resource dimensional dominance as “technologies in search of a market.”

It is not surprising that many firms focus on resource structure in their business model. Although the resource theme was not the most commonly mentioned element in responding to the general question [Q1], “What is a business model,” responses to the question [Q2]: “What is your firm’s business model” consistently incorporated aspects of organisational structure, production technology, and key resources. Two examples include:

[21, Q2]: A consulting model where a team of consultants execute projects and bring in improvements required/designed by the customer.

[96, Q2]: We design and manufacture products, systems and services for electricity utilising revenue management. Understand the customer needs, develop a product which is flexible, sell concept to customer, improvise and capture the niche market. As the product gets older competition steps in, increase value addition in terms of features and compete in market. Keep innovating ahead of competitors. Most of the sale is through tenders.

Resource structure dominant firms accommodate change by altering resource allocations, acquiring and deploying novel resources, and reassessing business model viability based on fitting the firm’s available and potential resources against the perceived opportunity. Such organisations may be actively assessing strategic options
associated with other business model elements, such as markets, boundary-spanning transactions, and even the nature of value, but the dominance of the resource structure, either in the minds of managers or diffused in various organisational routines or systems, drives behavior towards resource-based adaptations. Resource structure dominant business models are likely most efficient in less rugged opportunity landscapes where variations based on small modifications of definable resources can be effectively assessed without requiring distant search processes. These business models may be vulnerable in shifting landscapes where distant search is costly and resource scale economies are highly localized.

The biotech company developing novel drug development assays in the pilot study is heavily resource structure dominant. The firm was organised more than 15 years ago to prepare a long-term commercialization of leading edge and unique intellectual property developed at a major research university. Founders, investors, and managers believed that the revolutionary technology would ultimately generate extraordinary value despite the lack of well-defined market applications. The firm has consistently grown its patent portfolio, hired experienced management willing to make long-term commitments, trained scientists in-house, and focused on identifying, discovering, and controlling techniques and skills internally. Changes in the patent landscape, the downstream industry and markets, and even the financing environment have led to modifications of organisational structure and technology development efforts without any significant changes in the firm’s boundary-spanning transactions, including its financing plans, or intended value creation/capture mechanisms.
3.5.4 Transactive structure dominance

Transactive elements of business models focus on the nature of boundary-spanning transactions (Amit & Zott, 2001; Mahadevan, 2000). The results of this study draw attention to the organisational structure that governs boundary-spanning transactions and intra-organisational transactions rather than the transaction as the unit of analysis. Transactive structure is the configuration and set of characteristics of the organisational structure that determines and defines key transactions with partners and stakeholders. The discourse analysis revealed the importance of transactive structure to practitioners in business model configuration. The following response to “What is your firm’s business model” underscores this emphasis:

[19, Q2]: Catering to a niche market, we sell our products directly to customers [on order] through interior decorators and fashion houses.

[85, Q2]: We are basically an advanced ceramic manufacturing company which also provides service through installation technology and total refractory management (TRM) for our customer to provide more value in what we and our customer are engaged with.

Transactive structure dominant business models focus attention on the structures and systems that determine and execute boundary-spanning and intra-firm transactions. These models benefit from resilience to changes in resource costs and function effectively when scale economies in transactions demonstrate significant learning and tacit knowledge effects. A disruptive innovation (Christensen et al., 2002), competence destroying or not, will only significantly impact transactive structure-focused firms if complementary asset availability significantly changes resource procurement dynamics, or if changes in value structure alter the nature of customer business models as well.
The weakness in transactive structure dominance lies in the potential for discontinuous changes in the nature of boundary-spanning transactions, which appear to be more rare and unpredictable than technology disruptions. For example, retail music stores survived a variety of changes in media formats and studio distributors but were effectively wiped out by iTunes and Digital Rights Management, which completely altered the music purchasing experience. The web services and software firm focused on the music industry in the pilot study transitioned from resource structure dominance to transactive structure dominance during the same period of turbulence in the music industry. The firm was founded to provide services to musicians primarily through the accumulation of a catalog of independent music that would generate bargaining power with music distribution channels. Industry and economic turbulence handicapped this resource structure dominant model, and the company completely changed to a transactive structure dominant business model focused on the nature of transactions with musicians and music producers—in effect the firm helped create a viable supply chain for independent and hobby musicians. Although the firm has begun to develop the catalog, the effort is secondary to the firm’s focus on the workings of the supply chain.

3.5.5 Value structure dominance

Value structure is the least understood dimension, despite the fact that performance is a cornerstone of strategic management (Nag et al., 2007). Because value is an inherent output of surviving firms, strategic performance research focuses on the relative effectiveness of value creation and capture in the context of competitor performance, rather than an absolute measure of value creation and
capture. The system of rules, expectations, and mechanisms that determine the firm’s value creation and capture activities must be considered holistically, rather than as independent mechanisms such as mission, governance, and incentive. This is particularly true for variations on value capture. The survival bias of most organisational research excludes consideration of non-obvious structures; recent activities in not-for-profit and double/triple-bottom line organisations suggests that the rarity of certain value structures was due in part to variants of institutional pressures and preferences rather than non-viability.

Firms exemplifying value structure dominance are rare, as commercial organisations likely take value structure for granted as a system that utilises boundary-spanning transactions to generate profits that are recycled into organic growth or distributed to owners. True value structure dominance would require that the firm’s focus primarily on the underlying mechanisms of value creation and capture. A monetization value structure dominance would yield an investment model indifferent to sunk costs and non-value driving expertise, devoid of personal or organisational priorities or preferences. A few of the survey responses show a focus on aspects of value structure interlinked with resources and transactions:

[76, Q2]: Create high value product and service relevant to customer perception with changing difficult times and enhance all stakeholder values continuously.

An organisation’s value structure may center on one or more aspects of opportunity enactment, rather than on the monetization process. None of the organisations in the pilot interviews could be considered value-structure dominant. The continuing success of Craigslist.com, an internet classifieds business may be an
example of non-traditional value structure dominance, based on the apparent contradiction between the traditional transactive structure requirements of venture and corporate investors and the founder’s long-term values embedded in the organisation, such as accessibility over commercial success (Richtel, 2007). Value structure dominance may be instigated by technology affinity when scientific entrepreneurs value market adoption over financial returns (George & Bock, 2008).

### 3.6 Directions for future research

This study opens pathways for future research on business models and entrepreneurship. Four broad areas for future research on entrepreneurship are identified below.

#### 3.6.1 Discourse analysis of entrepreneurial activity

Discourse analysis has been used extensively in other areas of social science research (Weber, 1990) but has not been systematically applied to the entrepreneurial process. Entrepreneurial enactment takes place in a variety of environments that present challenges to observation and measurement. Early stage entrepreneurial activity often comprises a limited number of participants and observers, limiting data collection mechanisms and objectivity. Discourse analysis may help identify broad patterns in entrepreneurial psychology and decision-making processes and isolate particular characteristics and actions unique to entrepreneurial circumstances. Discourse analysis may be flexibly applied to a variety of text-based inputs, including interviews, corporate documents, or even meeting notes and recordings. Of particular benefit would be longitudinal analyses of business model structures at firms to
determine how structures change as firms transition from opportunity enactment to opportunity management. Productive research could compare business model discourse between types of entrepreneurial founders, such as technical vs. non-technical, serial vs. new, or visionary vs. reluctant entrepreneurs. Alternatively, one can assess entrepreneur and firm outcomes by comparing business model characteristics identified by the entrepreneur vs. characteristics presented by the organisation, either through observation or text from business plans and press releases.

3.6.2 Interactions of business model dimensions

Resource, transactive, and value structures do not operate in isolation; organisations are complex systems of infrastructure, resources, and human interactions (Bower & Doz, 1979). The static framing of the business model construct does not require that the underlying structures, or the summative business model itself, be unchanging phenomena. In addition, the underlying elements of the dimensions are influenced by each other, whether directly through individual agency or via organisational routines. The underlying dimensions of the business model in practice could be studied for interaction effects. The business model is not a process, but it is shaped by individual, group, organisation, and environmental-level processes and events.

Research on dimensional interaction could assess whether static “fit” between characteristics of dimensions determines the probability and form of dimensional dominance. Additional research could develop scales for dimensional dominance or parity across two or all three dimensions. Understanding the nature of dimensional
interaction represents a potentially informative area of study, and process studies of business model change could describe how dimensional dynamics interact with underlying changes in the opportunity landscape. This could be an important stepping-stone to a rich explanation of entrepreneurial cognition within an organisational context. The literature on business models has focused on business models as configurations of product and market combination that evolve in response to exogenous shocks; improved understanding of the interaction of business model dimensions could present a picture of subtle linkages between entrepreneurial cognition and organisational change.

3.6.3 Business models in opportunity creation

Research on the relationship between the business model and opportunity creation may help identify layers of entrepreneurial activities between opportunity identification and organisational formation. A first step could be a cognitive model linking opportunity landscape assessment to business model design. Business model structures are a milestone, enabling comparison of important characteristics across organisations: development speed, resource acquisition, resource acquisition, and path dependence. A better understanding of business model structures could help answer a variety of questions about entrepreneurial activity. Are unique business model characteristics correlated with improved survival or performance? What are the key factors in the legitimization process associated with the implementation of innovative business models? Are some sectors or customer types more accessible to novel business models?
An interesting opportunity for research could bridge business models with the development of routines. Business model structures establish the context and boundaries for activities and processes associated with resource and capability development and boundary-spanning transaction formation. Empirical studies could identify business model characteristics that impel or hinder routinization or routine evolution.

3.6.4 Business models and entrepreneurial outcomes

The business model is commonly linked to firm survival and long-term performance, but research on this relationship needs to expand beyond product and transaction characteristics. It is likely that novel data sets will be necessary to assess aspects of business model structures as the characteristics of these structures may require more sophisticated measurement. This research offers the potential to bridge studies of entrepreneurial cognition and affect with research on organisational growth by developing models for the impact of business model structures on economies of scale and scope and legitimization effects. Such research could result in normative models for multiple outcome types, including resource acquisition, development of boundary-spanning transactions and networks, survival and performance, and possibly even industry-level outcomes such as novel product standards and adoption characteristics.

3.7 Conclusions

Despite more than fifteen years of interest and enthusiasm for developing, understanding and applying business model frameworks, rigorous research on business models remains in a nascent stage. The fragmentation of definitions and constructs has
precluded integrated and accretive research on business models, especially beyond the e-business sector. This investigation used discourse analysis of practitioner perception to inductively derive a reconceptualization of the business model. Framing the business model in practice within the scholarly discourse on results in an opportunity-centric perspective of the business model based on underlying dimensions of resource, transactive, and value structures. The interaction of business model dimensions potentially explains a variety of patterns in business model practice as well as the disparity in research to date. The findings of this study have potentially significant implications for entrepreneurship research. Entrepreneurs, either in venture creation or venture change stages, may assess opportunities based on the perceived importance of business model dimensions; the same opportunity may look different through a specific dominance lens. An integrated approach to research on business models presents an opportunity to unlock entrepreneurial processes, evaluate firm configuration effects, and explain and predict entrepreneurial outcomes.
4 BUSINESS MODEL INNOVATION AND STRATEGIC FLEXIBILITY

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4.1 Introduction

The distinctions drawn between strategy and business models in Section 3 may be extended by examining processes of organisational change. Business model innovation, a recently identified type of organisational change, presents a relatively untested context for understanding strategic outcomes. Understanding the connections between business model innovation and strategy is especially interesting because of the potentially mediating role of organisational structure. Business models are the opportunity-centric designs of structures, while the links between strategy and structure have been studied extensively at least since Chandler (1962). This investigation focuses on the characteristic structural change processes associated with business model innovation and the specific outcome of strategic flexibility. A novel, third-party dataset of interviews with the CEOs of more than 700 large firms provides an opportunity to test hypotheses about these change processes.

In contrast to the expansive research on business models, the study of strategic flexibility has generated focused theory development and empirical results. Organisations aspire to achieve strategic flexibility, commonly defined in the literature as adaptive responsiveness or more broadly as an organisation’s capability to identify major changes in the external environment, quickly commit resources to new courses of action, and swiftly halt or reverse erroneous resource commitments (Sanchez, 1995;
Shimizu & Hitt, 2004; Sull, 2009; Uhlenbruck, 2003; Worren et al., 2002). The capabilities-based framework emphasizes the normative value of responsiveness in complex and dynamic environments (Filatotchev, 2003; Hayes & Pisano, 1994; Matusik & Hill, 1998), but industry-specific studies have yielded conflicting results regarding the resource-based mechanisms that improve flexibility and performance (Bierly & Chakrabarti, 1996; Dewald & Bowen; Greenley & Oktemgil, 1998; Kotabe et al., 2007; Lakshman, 2007; Worren et al., 2002). Parallel research on organisational design proposes that adaptive capacity derives, in part, from structural attributes that facilitate or augment managerial focus and control (Ethiraj et al., 2008; Lee & Makhija, 2009; Puranam et al., 2006; Sanchez & Mahoney, 1996).

Early studies of strategic flexibility specifically addressed how firms adapt to new industries and technological opportunities (Harrigan, 1980). The factors that influence how firms develop these adaptive capabilities, however, have not been systematically explored. As exploration is inherently more uncertain than exploitation (Levinthal, 1997; March, 1991), strategic flexibility may be most valuable in unfamiliar and dynamic contexts associated with non-local search and discontinuous adaptation (De Toni & Tonchia, 2005; Goodstein et al., 1996). Despite calls to study this important topic (Shimizu & Hitt, 2004), no large scale studies have addressed structural change processes to identify and untangle key drivers of strategic flexibility in the context of opportunity exploration and organisational renewal.

These gaps are especially relevant vis a vis business models for two reasons. First, business models and business model innovation are the architectures of organisational structures and fundamental structural change, as shown in Sections 2
and 3. It is likely that the structural effects implicated in strategic flexibility outcomes will be linked to business models. Second, business models in practice are associated with opportunity enactment and are therefore implicated in the development of strategic flexibility as the ability to respond to changing opportunity landscapes.

This study investigates the links between organisational structures and strategic flexibility in the context of business model innovation. A business model is the design of organisational structures to enact a commercial opportunity. The practice literature has embraced business model innovation as a means of renewal linked to extraordinary results (Johnson et al., 2008) despite vague construct boundaries within the field of strategic management (Markides, 2008; Osterwalder et al., 2005). Unlike technology or process innovation, business model innovation is opportunity-centric and involves fundamental organisational change (Amit & Zott, 2001; Teece, 2010). Since organisational design mirrors the complexity of the firm’s competitive environment in the context of attendant threats and opportunities (Ethiraj & Levinthal, 2004; Gilbert, 2006), firms implementing business model innovation should adjust structures to improve adaptive response in competitive environments where traditional geographic and industry-specific barriers have become more permeable (Wu et al., 2010).

This study extends and clarifies research on the effects of informal and formal organisation on strategic flexibility (Gulati & Puranam, 2009) by focusing on firms enacting business model innovation. First, a core informal organisation attribute that influences innovation is its culture (Teece, 1996). A resilient organisational culture that embraces innovation responds more flexibly by redirecting resources to solve unfamiliar problems (Amabile & Conti, 1999; Amabile & Khaire, 2008; Fiol, 1991; Weick, 1993).
Second, firms simplify formal organisation design to enhance competitive focus, reduce coordination costs, and accelerate responsiveness. Formal organisation changes are often implemented via modifications to existing structures, including spin-outs, partnerships, and outsourcing (Prahalad & Hamel, 1990; Siggelkow & Levinthal, 2003; Tiwana, 2008). Despite the lack of systematic large-scale studies, business model innovation is gaining prominence as an important link between strategy and firm performance (Johnson et al., 2008; Teece, 2010; Zott & Amit, 2008). By studying the drivers of business model innovation and its implications for strategic flexibility, this study contributes to a broader understanding of the role of formal and informal design in how organisations pursue new opportunities.

The rest of this investigation is organised into four sections. First, a brief literature review provides background for developing theory on the structural changes that link of strategic flexibility and business model innovation. Specific hypotheses on formal and information organisation as well as inter-organisational dependence are presented. The dataset and statistical methods are presented, followed by the presentation of the results of the analysis. Finally, these results are discussed in the context of the original hypotheses, along with implications for practice and future research.

4.2 Theory

4.2.1 Strategic flexibility

Early studies of strategic flexibility relied on observations of implemented organisational change. Firms with strategic flexibility demonstrated the ability to transition from one industry to another in the context of exogenous pressures and
constraints (Harrigan, 1980). A variation on this theme defines strategic flexibility as the breadth of strategic options available to the firm (Anderson, 2000). Although the focus on observed or potential organisational adaptation in the context of external change remains prevalent in the literature (Hitt, 1998; Sanchez & Mahoney, 1996; Shimizu & Hitt, 2004; Verdu-Jover et al., 2006), broader interpretations of strategic flexibility have incorporated responsiveness to boundary-spanning and internal pressures (Bierly & Chakrabarti, 1996; Young-Ybarra & Wiersema, 1999) and proactive change rather than purely reactive change (Lawson, 2001). In this context, firms make *ex ante* decisions with regard to investments or activities that partially determine the firm’s future flexibility. Heterogeneous risk/reward preferences and knowledge sets may yield distinct flexibility profiles among otherwise similar firms (Chang, 1998; Evans, 1991).

More recently, an important conceptual shift reframed strategic flexibility as a dynamic capability embodied in organisational knowledge and routines (Hayes & Pisano, 1994). In this framework, strategic flexibility co-evolves with a complex set of endogenous and exogenous factors (Ilinitch et al., 1996), increasing its value in turbulent and highly competitive environments. The fundamental characteristic of strategic flexibility in this treatment is response rapidity, a particularly valuable faculty in dynamic multi-national, developing or transitional markets (Lee & Park, 2008; Uhlenbruck, 2003; Yiu, 2005). Empirical studies have found that strategic flexibility improves firm response to intense rivalry (Grewal & Tansuhaj, 2001) and adaptation in high velocity industries (Nadkarni & Narayanani, 2007). This is a powerful and constructive perspective in which strategic flexibility is an embedded characteristic of the firm associated with organisational adaptive capacity (Eisenhardt & Martin, 2000).
distinct from but potentially co-evolving with exogenous context.

Early empirical studies of strategic flexibility often have common limitations. Some investigate strategic flexibility as the combinatorial function of the flexibility of activities such as manufacturing and finance (Bierly & Chakrabarti, 1996). While this reductionist perspective benefits from straightforward operationalization of variables, it tends to measure available options such as access to new customers rather than tacit capabilities (Lee & Makhija, 2009). On the other hand, the studies on strategic flexibility as a dynamic capability have been limited to relatively small survey samples within national and industry boundaries and similarly limited case studies of specific business types, such as U.K. appliances, Brazilian automakers, and the U.S. cotton industry.

In contrast to the capability-based perspective, some structurally-focused research suggests that flexibility derives directly from organisational design and structural form. Perhaps the most important area of research in this vein focuses on modular design. Studies have demonstrated the value of both functional and firm-level modularity on strategic flexibility outcomes. Loose coupling of routines and functions associated with modular manufacturing design limits the cost of change (Sanchez & Mahoney, 1996) and improves responsiveness to environmental shifts (Kotabe et al., 2007; Worren et al., 2002). Similarly, modular organisational forms improve performance outcomes in simulations (Siggelkow & Levinthal, 2003) and empirical assessments (Schilling & Steensma, 2001) via the combination of improved local search coverage and efficient reconfiguration processes. These findings are limited, however, because the achieved value of modularity depends, in part, on the measure of performance (Worren et al., 2002).
Structural research on strategic flexibility, however, especially measuring the impact of structure on flexibility and performance outcomes, have also generally been limited to industry-specific studies (Filatotchev, 2003; Lakshman, 2007; Lavie, 2006; Lee & Makhija, 2009; Zahra et al., 2008). Furthermore, attributes of organisational culture may be linked to flexibility processes and outcomes. Studies have demonstrated the importance of the socio-political environment as environmental turbulence increases (Goodstein et al., 1996), and in some cases culture drives performance outcomes without the mediating effect of flexibility (Roca-Puig et al., 2005).

These mixed results cast doubt on purely capabilities-based or structure-based models of strategic flexibility. While firms may increase strategic flexibility via contingent work in non-core activities, tacit and idiosyncratic knowledge associated with core value-producing activities limit strategic flexibility even in turbulent or competitive environments (Matusik & Hill, 1998). The tension between capability-based expertise and firm structures is important to organisational adaptation because resource acquisition and structural change may not be isolated processes. This study addresses the gap in the literature on the role of structure and structural change on the development of strategic flexibility.

4.2.2 Business model innovation

The role of strategic flexibility is of particular interest in the context of organisational innovation to pursue new opportunities. Business model innovation is a recently identified type of organisational innovation in which firms identify and address novel opportunity portfolios rather than technology, product, or process innovations
Unlike well-studied product or process innovation processes that may function synergistically with firm strategy (Burgelman, 1983b), business model innovation is an opportunity-centric process in which organisations fundamentally reconfigure organisational design to pursue an entrepreneurial opportunity, as shown in Section 3.

Markides (Markides, 2006) defines business model innovation as redefining a product or service or how it is provided to customers, a primarily transactive specification. He goes on to argue that business model innovation only occurs when the innovation increases the total market available. Differentiating between business model innovation and product or technology innovation, he suggests that most business model innovation only captures small percentages of extant markets, allowing established players more options for response. In this context, strategic flexibility could be a valuable input to opportunity exploration, especially in technologically sophisticated companies and industries (Zhou & Wu, 2010). In other words, strategically flexible firms might benefit from a virtuous cycle of efficient exploration and adaptation through business model innovation, as suggested in the practice literature (Johnson et al., 2008).

An extensive literature documents the challenges to experiential learning and capability development, especially in high-velocity and high-technology industries (Lavie, 2006), including effective resource management (Sirmon et al., 2008), and locus of knowledge sourcing (Capron & Mitchell, 2009). Very limited research, however, has considered structural mechanisms that facilitate management’s ability to enact opportunity-centric innovation. Firms engaged in business model innovation presumably
utilise structural change to improve strategic flexibility. Recent research has shown that managers exhibit more ambidextrous behavior when formal authority is well-structured, while task formalization has no effect on ambidextrous management (Mom et al., 2009). In other words, structural formalization could be more important than task formalization in enabling exploration.

This suggests a complex relationship between control and attention in encouraging explorative and adaptive behavior. In the context of adaptive response, managers are limited by the scope of their functional control and access to resources, both of which are directly linked to attention-based cognition (Ocasio, 1997). In practice, reconfiguring formal organisation is an established mode of firm adaptation and strategic intent (Hall & Saïas, 1980); managers address novel opportunities via adjustments to formal organisation (Gulati & Puranam, 2009). This study therefore aims to examine the changes that are brought about by business model innovation efforts and their impact on the likelihood of achieving strategic flexibility. Specifically, strategic flexibility outcomes are hypothesized to be associated with [1] informal culture that serves as a lubricant for formal structural change and [2] reduction in the complexity of formal structure. In particular, two complexity-related characteristics are examined: focusing managerial attention via absolute reductions in functional activity and inter-organisational dependence on partners.

4.2.3 Informal organisation: culture

Before discussing the impact of formal organisation changes on strategic flexibility, it is important to consider the role of informal organisation. Work climate and
organisational culture jointly influence innovation outcomes (Abbey & Dickson, 1983; Teece, 1996; Tellis et al., 2009), while creativity, leadership, and an organisational climate for innovation facilitate novel solutions to competitive threats (Amabile & Khaire, 2008). But relatively few studies have considered how intangible resources, such as cognitive maps, leadership and culture help firms achieve flexibility (Fiol, 1991; Nadkarni & Narayanani, 2007; Plambeck & Weber, 2009).

Gulati and Puranam (Gulati & Puranam, 2009) argued that a strong informal organisation stabilizes or complements formal organisation during re-organisation. Culture as the “essence of informal organisation” (Teece, 1996) holds particular relevance during frame-breaking or radical organisational change evident in business model innovation. Culture includes the value systems that embrace or resist changes to organisational identity (Dutton et al., 1994). Entrenched routines and embedded views of strategic orientation increase resistance to radical change and inhibit change efforts (Fosfuri & Ronde, 2009; Fox-Wolfgramm et al., 1998). Since business model innovation challenges the organisation to reconfigure and renew activities, people and processes tuned to innovation should serve as a valuable lubricant. Firms with a culture that encourages creativity are more likely to embrace change in desired outcomes, intermediary processes, and resource configurations. An innovation-oriented, creative culture should improve strategic flexibility during business model innovation by ensuring that feedback from structural change outcomes is not suppressed by procedures, identity resistance or political coalitions.

*Hypothesis 1: When firms engage in business model innovation, an innovation-oriented culture will be positively related to whether a firm achieves strategic flexibility.*
4.2.4 Formal organisation-- structure

The formulation and implementation of strategy depends on formal organisation (Chandler, 1962). During business model innovation, firms engage in two main sets of structural design changes. First, firms reconfigure activities to focus on core products or managerial capabilities (Prahalad & Hamel, 1990). Second, firms improve organisational design to enhance efficiency of internal processes and innovation (Puranam et al., 2006; Rothaermel et al., 2006), creating slack that may be directed to novel exploration and adaptation (Lawson, 2001). Although changes that increase focus or improve efficiency may overlap, it is valuable to unpack the underlying drivers to more carefully distinguish between the two sets of internal structural changes.

Dismantling internal organisational structures and barriers can reduce structural complexity and its attendant internal coordination costs. Puranam, Singh and Chaudhuri (Puranam et al.) found that structural integration is necessary when large firms acquire smaller firms and there is a high degree of mutual dependence. Such integration reduces coordination costs, freeing attention and implementation resources. Consequently, structural design changes that reduce coordination costs and enhance cooperation among organisational units increase the firm’s ability to respond to changing market needs. Despite prior research suggesting that reductions in design associated with spin-offs are detrimental to parent firms, recent evidence suggests that the impact on the parent firm may depend, in part, on the appropriability regime and even the success of the spin-off (McKendrick et al., 2009). Further, outsourcing non-core transactive functions can focus managerial attention on solving problems and identifying opportunities arising from changing environments (Ocasio, 1997; Rothaermel,
et al., 2006). Therefore, formal organisation changes that reduce internal design complexity should enhance managerial attention to exogenous change and augment strategic flexibility.

*Hypothesis 2a: When firms engage in business model innovation, structural changes that reduce structural design complexity will be positively related to whether a firm achieves strategic flexibility.*

Reducing structural complexity, however, could drive renewed focus on increasing organisational efficiency rather than exogenous adaptivity. When the firm seeks to develop novel portfolios of opportunities, the benefits of ambidextrous management could be lost via internally-focused reconfiguration of activities. Business process reengineering, for example, was promoted as a mechanism to improve organisational performance via dramatic gains in efficiency subsequent to reconfiguration and simplification of extant resources and routines. This represents a type of renewed competitive focus, in which the organisation seeks to improve its competitive position within the extant opportunity set. Whereas competitive focus could improve operational performance at the division, unit, or firm-level (Huckman & Zinner, 2008), it is unlikely to yield flexibility in changing tasks, products, or markets (Kekre & Srinivasan, 1990). If strategic flexibility is the ability to respond to changing environments, then increasing competitive focus through reconfiguration of existing activities is unlikely to improve managerial agility. In a study of 225 firms from 14 industries, Nadkarni and Narayanan (Nadkarni & Narayanani, 2007) found that managerial cognitive maps that emphasized competitive-centric focus had lower strategic flexibility in high-clockspeed industries. While strategic focus was linked to strategic persistence, its effects were beneficial only in less dynamic industries.
Consequently, firms enacting business model innovation are likely responding to radical threats or opportunities symptomatic of dynamic and turbulent industries, where strategic focus would only hinder strategic flexibility.

*Hypothesis 2b: When firms engage in business model innovation, structural changes that emphasize activity reconfiguration will be negatively related to whether a firm achieves strategic flexibility.*

### 4.2.5 Inter-organisational dependence

A critical attribute of formal organisation is the firm’s connectedness to other organisations. Collaboration with external partners represents an important tool for exploration and accessing knowledge. Despite concerns about survival-biased learning sets (Denrell, 2003), embeddedness and partnerships generate a variety of potentially positive benefits (Combs, 1999; Uzzi, 1996). When firms operate in turbulent environments, access to knowledge potentially improves the accuracy of managers’ strategic decisions. In fact, exogenous uncertainty tends to increase collaborative activities with similar and familiar partners (Podolny, 1994) and network and collaboration effects generally improve innovation and performance (Gulati & Sytch, 2007; Stuart, 2000). This knowledge-based framework suggests that access to options via alliances improves strategic flexibility (Heimeriks, 2007; Lee & Park, 2008). From a network embeddedness framework, firms with high centrality and extant alliances should be the most effective implementers of novel opportunities, especially those associated with new partnerships (Al-Laham & Souitaris, 2008).

Nevertheless, structural design changes during business model innovation present a unique context for collaboration. Fundamental change in turbulent
environments involves unknown and unforeseeable elements. Under these conditions, the elements of cooperative partnering that create mutual value, such as trust, transparency, and governance mechanisms (Noo teboom, 1996) induce unpredictable or unknowable costs. This reduces the benefits of collaboration because partner-driven asset investment and the expectation of exploiting complementarities would be limited by uncertainty and lack of market knowledge specificity (De Luca & At uahene-Gima, 2007; Dyer & Singh, 1998). The complex and potentially costly alignment of managerial goals and capabilities associated with partner dependence may increase coordination problems that reduce flexibility (Harrigan & Newman, 1990). The specialized circumstances of business model innovation suggest that inter-organisational dependence actually hinders strategic flexibility outcomes:

*Hypothesis 3: When firms engage in business model innovation, inter-organisational dependence will be negatively related to whether a firm achieves strategic flexibility.*

### 4.3 Data and methods

Data from the IBM Global CEO Survey conducted in 2006 is utilised to test these hypotheses. This survey was administered through semi-structured interviews with 762 CEOs of primarily large, multinational organisations representing a wide array of industries and countries. Public sector organisations were excluded to ensure consistency in reporting organisational outcomes. In addition, data from 104 other organisations were excluded due to missing data. The final sample included 556 organisations from diverse sectors including communications, 15%; financial services, 23%; distribution or other services, 32%; and manufacturers, 29%. The sample set is global, covering every major geographic area: the Americas, 25%; Europe, 36%; Asia
and Australia, 39%. The dataset covers a range of firm sizes, but oversamples large and very large firms compared to the total population of for-profit firms worldwide. More than 50% of firms in the full dataset and business model innovator subset have more than 5,000 employees, and approximately 20% of firms in both the full dataset and business model innovator subset have more than 25,000 employees.

4.3.1 Survey design

The original purpose of the survey was to identify and report on managerial practice associated with organisational innovation types and aspects of business-technology integration (Giesen et al., 2007). The survey was designed in two parts. First, interviewees were asked questions related to innovation in general. Respondents assessed the relative importance of innovation efforts at their organisation by distributing 100 total points among three innovation types: product/market, business model, and process/operational. Participants were then directed to respond to additional questions specific to the identified highest-priority innovation type.

This investigation considers the effect of organisational changes brought about by business model innovation on the likelihood of achieving strategic flexibility. Because the dataset segregates respondents by primary innovation type, a two-stage Heckman probit model (Heckman, 1979; Shaver, 1998) may be applied. Although the second stage includes only the subset of 107 business model innovators, the 2-stage model specification accounts for selection bias by including data from all 556 observations in the first stage. This approach controls for potential endogeneity effects associated with linking outcomes to the firm’s choice of innovation efforts.
The data are cross-sectional, limiting causal inference. Moreover, common method variance is possible as data rely on information from a single source at each firm (Doty & Glick, 1998). Harman’s test, which utilises a factor analysis of all study variables, was used to test for common method bias (Podsakoff, 2003). If a single factor emerges, common method bias likely exists within the data. The Harman test was applied to each stage separately. In the first stage, 10 factors emerged from the 17 variables; in the second stage 5 factors emerged from the 9 variables. As the survey was designed to compare innovation types, participants were not prompted to discuss specific performance outcomes or how outcomes were influenced by formal or informal organisation. Combined with the results of Harman’s test, this suggests that common method variance does not represent a significant source of bias in the data.

Access to interviews with 556 CEOs of large firms is an exceptional resource. A number of factors support the objectivity of the data and results. Although the respondents were not randomly selected and sampled, the selection of firms was not effected by the authors of this investigation, nor are there self-selection effects linked to the study focus. Although the data set oversamples large firms and is likely non-randomly skewed towards information technology producers and consumers, the sample likely reflects a significant portion of large firms worldwide, as IBM provides products and services to a majority of Global Fortune 500 firms (Source: IBM website www.ibm.com accessed 1-May 2010).

The survey methodology incorporated two interviewers at each interview, enabling one to administer the survey while the other recorded responses. Interviewers received extensive guidelines and training as well as access to an online help system.
both before and after the interview process. Data was uploaded via the online data management system to a central location. Many of the questions, including the identification of organisational outcomes of innovation efforts, were open-ended. This allowed the interviewees to identify outcomes types without prompting, while the survey administrators could discriminate subtle differences between responses. Strategic flexibility, for example, was distinguished from focus/specialization, faster time to market, access to skills/product, access to markets/customers, and moving from fixed to variable costs. In sum, the survey provides rich data to test these hypotheses and appropriate variables to control for other forms of innovation, organisational attributes, and environmental characteristics.

4.3.2 Dependent variables

The first stage of the model is a selection model. This stage assesses the drivers that led respondents to select business model innovation as the firm’s main innovation type. Drivers included exogenous, macro-level forces relevant to firm-level innovation efforts, firm-level characteristics associated with change difficulty, leadership and prior innovation success. The dependent variable in the first stage model is a binary indicator of whether or not the respondent identified business model innovation as the firm’s primary type of innovation effort. Respondents that did so are referred to as business model innovators. The probit model in the first stage regresses this variable on firm characteristics, exogenous factors, and endogenous change process elements.

In the second stage, a binary variable captures whether or not the organisation achieved strategic flexibility through its business model innovation efforts. The strategic
flexibility variable was coded from an open-ended response by the CEO or organisation leader to identify benefits of innovation efforts. This variable was differentiated from related concepts of organisational focus, access to skills, products, markets or customers, risk reduction, or moving from fixed to variable costs. In particular, it measured adaptive responsiveness rather than simply faster time to market.

4.3.3 Independent variables

Creative culture. Prior studies have linked elements of informal organisational structure to strategic flexibility in which creativity serves as a complementary capability to strategic planning and selection (Tellis et al., 2009). A creative environment has been closely linked to innovation generation and adoption. Survey respondents were asked whether a climate for creativity existed within their organisations on a five-point Likert scale, ranging from “limited” to “very strong.”

Internal structural changes. Formal structural change is a direct mode of adaptation available to managers enacting business model innovation. The survey instrument contained a selection of internal structural change formats, including spin-offs, major project-based contracting, major strategic partnerships, offshore and onshore outsourcing, organisational structural changes, shared services, and use of third-party operating utilities. Binary indicators for each format were selected based on the respondent’s open-ended response to the identification of structural initiatives that were adopted as part of the business model innovation effort. A non-significant number of respondents identified alternative structural change modes not pre-specified in the survey tool; these were not included in the analysis as they represented less than 2% of
the total dataset, and no one alternative response represented more than .5% of the total dataset. To create a manageable set of organisational change modes for both modeling and interpretation, the dimensionality of the eight binary structural change indicators were explored using a principal component factor analysis.

Table 14: Factor analysis of internal structural change vehicles

<table>
<thead>
<tr>
<th>Variable</th>
<th>Internal structural changes</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delegation</td>
<td>Consolidation</td>
</tr>
<tr>
<td>Use of third-party operating utility</td>
<td>0.7339</td>
<td>0.0443</td>
</tr>
<tr>
<td>Onshore outsourcing</td>
<td>0.6990</td>
<td>-0.0845</td>
</tr>
<tr>
<td>Shared services</td>
<td>0.4795</td>
<td>0.0923</td>
</tr>
<tr>
<td>Major project-based contracting</td>
<td>0.4651</td>
<td>-0.0245</td>
</tr>
<tr>
<td>Offshore outsourcing</td>
<td>0.3078</td>
<td>0.5022</td>
</tr>
<tr>
<td>Spin-offs</td>
<td>0.0098</td>
<td>0.7399</td>
</tr>
<tr>
<td>Major strategic partnerships</td>
<td>0.1498</td>
<td>-0.6314</td>
</tr>
<tr>
<td>Organisational structural changes</td>
<td>0.0593</td>
<td>0.0689</td>
</tr>
</tbody>
</table>

The factor analysis revealed three factors shown in Table 14. These factors are identified as ‘delegation’, ‘consolidation’, and ‘reconfiguration’ of organisational activities. First, organisations can ‘delegate’ business functions by using third-party operating facilities, establishing shared services agreements, and contracting-out major projects in order to externalize peripheral functions while maintaining control and access to innovation. Although these organisations ensure that managerial attention focuses on core value creating activities and opportunities, delegation contracts the formal structure of the organisation by utilising boundary-spanning transactions as an alternate lever of
control. Moderate coordination costs and asset specificity require arms-length oversight rather than complete internalization of functions or separate organisational structures (Williamson, 1991).

Second, organisations may ‘consolidate’ activities by spinning-out or outsourcing activities as well as having an aversion to forming major strategic partnerships with others. This process eliminates non-core activities and focuses capability development on perceived areas of high value, commensurate with theories of core competency (Prahalad & Hamel, 1990). Third, ‘reconfiguration’ alters structures without divestitures, outsourcing, or uptake of novel capabilities, somewhat akin to shuffling and re-dealing a deck of cards without reducing the set. Reminiscent of business process reengineering (Hammer & Champy, 2001), reconfiguration relies on improved use of technologies or decision-making efficiencies to establish new sub-structures. Delegation, consolidation, and reconfiguration of activities correspond reasonably well to hypotheses 2a and 2b. While reconfiguration matches hypothesis 2b, both delegation and consolidation relate to hypothesis 2a as mechanisms that focus managerial attention by reducing structural design complexity. Consolidation accomplishes this by reducing the total activity set, while delegation reduces the amount of direct oversight and management of the activity set. Although a perfect match between the factor analysis and hypotheses might have been preferable from an ex ante theoretical perspective, the distinction between delegation and consolidation enables a more fine-grained assessment of the effects of reducing structural complexity than originally anticipated. This is covered in more detail in the Discussion section.

*Inter-organisational dependence.* Boundary-spanning or transactive structures
are an important component of business model analysis and have been linked to strategic fit and performance outcomes (Amit & Zott, 2001; Zott & Amit, 2007). Dependence upon partners for innovation resources and processes increases the coordination cost and time of innovation, representing a source of organisational inflexibility (Anthony, 2007; Hoetker & Mellewigt, 2009; Stuart, 2000). The survey instrument included a question on the importance on collaboration and partnering with a five-point Likert scale. The minimum value on the scale identified partnering as “of no importance” and the maximum value to “of critical importance”.

### 4.3.4 Control variables

*Discontinuous change.* While most firms enact continuous or incremental change (Brown & Eisenhardt, 1997), discontinuous change associated with business model innovation represents one possible endogenous response to exogenous disruptions (Romanelli & Tushman, 1994). The analysis controls for perceived need for discontinuous change with a five-point Likert response to a question on the level of change needed to implement key elements of innovation strategy, where 1 is “no change” and 5 is “extensive change.”

*Prior success with change effort.* A possible driver of organisational innovation is prior success of managing fundamental change. This type of learning effect is controlled via a question on the success of managing fundamental change in the past with a five-point Likert scale, where 1 is “unsuccessful” and 5 is “very successful.”

*CEO formally responsible for business model innovation.* Research has demonstrated the links between senior leadership involvement and innovation adoption
(Kimberly & Evanisko, 1981) and the role of managerial leadership in structural changes associated with strategic flexibility (Goodstein et al., 1996). To control for the direct oversight of the CEO, the study uses a binary indicator variable of whether or not the CEO was formally responsible for business model innovation efforts.

*Product / Market innovator:* The survey design assesses two other types of innovation activities: product innovation, and operational innovation. Although little research has considered resource and activity trade-offs associated with simultaneous innovation initiatives, it seems reasonable to assume that disparities between more traditional innovation modes could influence business model innovation efforts. To control for this effect, a variable was created to measure the firm’s proportion of non-business model innovation effort associated with product/market innovation. The measure varies from 0, representing no effort directed towards products, services, and market innovation, to 1 representing no effort directed towards operational innovation.

*Technological integration.* Given IBM’s embedded interest in information technology adoption and utilisation, the non-random sample may be predisposed to associate innovation with efforts to improve integration of technology with business processes. This effect is controlled with the response to a question on the importance of technology and business integration on a five-point Likert scale where 1 is “of no importance” and 5 is “of critical importance.”

*Sector.* The respondents were drawn from a variety of industrial sectors presenting potentially distinct exogenous drivers of change and varying industry life cycle issues associated with innovation efforts. Industry sector effects are controlled by including a set of binary variables.
**External forces.** The survey contained binary variables related to external forces likely to impact respondents' organisations in the next two years. Including these variables controls for specific exogenous drivers including market forces, globalization, macroeconomic forces, geopolitical issues, and environmental issues.

**Organisation size.** Organisation size may affect innovation efforts (Damanpour, 1992). In this study, organisation size is operationalized as the number of firm employees. Due to survey confidentiality requirements, the data on employee counts were aggregated into six categories of 5,000 employee increments: firms with fewer than 5,000 employees were assigned a value of 1, and those with greater than 25,000 were assigned a value of 6.

**Global firm.** Multinational firms span geographic and sector boundaries potentially accessing opportunities not available to organisations that operate solely within a national or regional market. A dummy variable on whether the firm has global operations controls for the effect of multinational reach on strategic flexibility.

**EU firm.** Organisations with headquarters within the European Union [EU] operate in a common market but with socio-culturally diverse facilities. The unusual institutional nature of nationally-disparate but economically-linked states creates the potential for unique structural and cultural features that could affect innovation and change. A dummy variable in included to control for these effects if the firm's headquarters is inside the EU.

**Survey source.** The survey was designed by IBM's Institute for Business Value and was administered by both IBM representatives as well as representatives of an independent research organisation, the Economist Intelligence Unit or EIU. To account
for any bias due to survey administrator affiliation, the analysis uses a dummy variable coded to “1” if the survey was administered to a given respondent by an EIU representative and “0” if the survey was administered by an IBM representative.

4.4 Analysis

As the survey design uses a self-selection mechanism to capture data specific to innovation processes and outcomes, a two-stage regression model (Heckman, 1979; Shaver, 1998) is appropriate to test hypotheses. Table 15 reports descriptive statistics for the dependent and independent variables for the first stage model and Table 16 reports descriptive statistics for the dependent and independent variables for the second stage model. The correlations report no particularly strong associations among the variables. Table 17 reports the results of the regression analysis. Column M1 shows the specific output of the first-stage selection model only using a probit analysis. Columns M2 and M3 report the results of the two-stage Heckman probit regressions. Column M2 presents the results for the two-stage analysis applying only the control variables in the second stage regression, and column M3 reports the full model that includes all theory variables to test the hypotheses.
Table 15: Descriptive statistics and pair-wise correlations for first stage model

| First stage variables | N   | Mean | SD  | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16    |
|-----------------------|-----|------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 Business Models innovator | 556 | 0.19 | 0.39 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 2 Survey source       | 556 | 0.24 | 0.43 | -0.13 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 3 Distribution sector | 556 | 0.32 | 0.47 | 0.01  | 0.02  |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4 Financial services sector | 556 | 0.23 | 0.42 | 0.01  | -0.10 | -0.38 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 5 Communications sector | 556 | 0.15 | 0.36 | -0.03 | 0.03  | -0.29 | -0.24 |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 6 Market forces       | 556 | 0.73 | 0.45 | 0.01  | 0.10  | 0.01  | -0.12 | 0.07  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 7 Globalization       | 556 | 0.34 | 0.47 | 0.06  | -0.05 | 0.05  | -0.09 | -0.22 | -0.24 |       |       |       |       |       |       |       |       |       |       |       |       |
| 8 Macroeconomic forces | 556 | 0.25 | 0.43 | 0.01  | -0.02 | 0.01  | 0.01  | -0.02 | -0.18 | -0.10 |       |       |       |       |       |       |       |       |       |       |       |
| 9 Geopolitical issues | 556 | 0.07 | 0.26 | 0.04  | 0.05  | 0.03  | -0.04 | -0.03 | -0.11 | -0.07 | 0.01  |       |       |       |       |       |       |       |       |       |       |
| 10 Environmental issues | 556 | 0.12 | 0.33 | 0.05  | 0.01  | -0.02 | -0.18 | 0.10  | -0.03 | -0.05 | 0.02  | 0.00  |       |       |       |       |       |       |       |       |       |
| 11 Organisation size [employees] | 556 | 2.71 | 1.68 | 0.02  | 0.05  | -0.03 | -0.03 | -0.06 | -0.03 | 0.03  | 0.07  | 0.06  | 0.03  |       |       |       |       |       |       |       |       |
| 12 Global firm        | 556 | 0.40 | 0.49 | -0.08 | 0.07  | -0.02 | -0.18 | -0.18 | -0.10 | 0.33  | -0.06 | 0.12  | 0.07  | 0.30  |       |       |       |       |       |       |       |
| 13 EU firm            | 556 | 0.34 | 0.47 | -0.12 | 0.01  | -0.05 | 0.01  | -0.03 | -0.04 | 0.06  | 0.08  | 0.00  | 0.04  | 0.14  | 0.22  |       |       |       |       |       |       |
| 14 Degree of change difficulty | 556 | 3.78 | 1.08 | 0.13  | -0.23 | 0.06  | -0.11 | -0.01 | 0.01  | 0.16  | -0.08 | -0.10 | 0.02  | 0.04  | 0.08  | -0.07 |       |       |       |       |       |
| 15 CEO responsible for innovation | 556 | 0.32 | 0.47 | 0.13  | -0.05 | 0.06  | 0.09  | -0.10 | -0.07 | 0.08  | -0.03 | 0.05  | -0.13 | -0.04 | 0.04  | 0.09  |       |       |       |       |       |
| 16 Prior success with change effort | 556 | 3.61 | 0.92 | -0.05 | -0.02 | -0.09 | 0.07  | 0.10  | -0.04 | -0.06 | 0.06  | 0.00  | 0.02  | -0.07 | -0.08 | 0.13  | -0.20 | 0.03  |       |       |
| 17 Product / Market innovator | 556 | 0.58 | 0.19 | -0.11 | 0.01  | 0.05  | -0.02 | -0.06 | 0.09  | 0.03  | -0.12 | -0.03 | -0.02 | -0.03 | 0.08  | 0.02  | 0.04  | -0.07 | -0.08 |       |
The first-stage selection model identifies drivers of business model innovation. As previously noted, the practice literature suggests that managers use business model innovation to address higher-level and longer-term challenges. This assumes that certain exogenous discontinuities may lead or outpace incremental process and product innovation to the detriment of overall performance (Johnson et al., 2008). This interpretation of the rationale for business model innovation is supported by the study data. The analysis shows that business model innovation is inversely related to product/market innovation activities and positively associated with the need for discontinuous change.

Table 16: Descriptive statistics and pair-wise correlations for second stage model

<table>
<thead>
<tr>
<th>Second stage variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Strategic flexibility</td>
<td>107</td>
<td>0.56</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Innovative culture</td>
<td>107</td>
<td>3.46</td>
<td>1.04</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Factor 1: Delegation</td>
<td>107</td>
<td>0.05</td>
<td>1.05</td>
<td>0.16</td>
<td>-0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Factor 2: Consolidation</td>
<td>107</td>
<td>0.03</td>
<td>0.98</td>
<td>0.07</td>
<td>0.02</td>
<td>-0.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Factor 3: Reconfiguration</td>
<td>107</td>
<td>0.07</td>
<td>0.99</td>
<td>-0.15</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Inter-organisational dependence</td>
<td>107</td>
<td>3.50</td>
<td>1.15</td>
<td>-0.04</td>
<td>0.20</td>
<td>0.12</td>
<td>-0.34</td>
<td>-0.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Technology integration needs</td>
<td>107</td>
<td>4.21</td>
<td>0.80</td>
<td>0.18</td>
<td>0.06</td>
<td>0.11</td>
<td>-0.06</td>
<td>-0.01</td>
<td>0.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 CEO responsible for innovation</td>
<td>107</td>
<td>0.45</td>
<td>0.50</td>
<td>-0.07</td>
<td>0.05</td>
<td>-0.28</td>
<td>0.00</td>
<td>-0.13</td>
<td>-0.02</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>9 Survey source</td>
<td>107</td>
<td>0.12</td>
<td>0.33</td>
<td>0.16</td>
<td>0.14</td>
<td>0.14</td>
<td>0.08</td>
<td>0.06</td>
<td>0.01</td>
<td>-0.20</td>
<td>-0.28</td>
</tr>
</tbody>
</table>

In addition, there is no significant relationship between prior change success and business model innovation efforts, suggesting that learning effects commonly associated with product and process innovation may not be as relevant to business model innovation efforts. This may support practice community claims that business model innovation is a novel transformation process distinct from other modes of organisational innovation. This would suggest that business model innovation is
fundamentally idiosyncratic and resistant to routinization, both characteristics of tacit dynamic capabilities. No causal attribution may be inferred, however—we cannot determine whether firms enact business model innovation because of the perceived need for discontinuous change or vice versa.

Executive leadership is associated with increased business model innovation, supporting the broader literature on the role of leadership in fundamental organisational innovation. Interestingly, global and EU firms are less likely to initiate business model innovation. This result may, in line with the findings of the Stage 2 analysis, reflect the inherent challenges associated with opportunity-centric innovation in a complex, dispersed organisational structure that exceeds the attentional resource of the management team. Alternate explanations are possible, however, including conflating elements of organisational cultural disparities or multi-market product innovation requirements.
Table 17: Heckman probit regression results

<table>
<thead>
<tr>
<th>Variables</th>
<th>M1: Selection model</th>
<th>M2: Two-stage model</th>
<th>M3: Full model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.94†</td>
<td>-1.00†</td>
<td>-0.95*</td>
</tr>
<tr>
<td></td>
<td>(0.50)</td>
<td>(0.58)</td>
<td>(0.47)</td>
</tr>
<tr>
<td>Survey source</td>
<td>-0.47**</td>
<td>-0.47**</td>
<td>-0.48**</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.18)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Distribution sector</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td>(0.17)</td>
<td>(0.16)</td>
</tr>
<tr>
<td>Financial services sector</td>
<td>0.01</td>
<td>0.00</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td>(0.19)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Communications sector</td>
<td>-0.15</td>
<td>-0.13</td>
<td>-0.12</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.25)</td>
<td>(0.21)</td>
</tr>
<tr>
<td><strong>External forces</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market forces</td>
<td>0.23</td>
<td>0.24</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.17)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Globalization</td>
<td>0.34*</td>
<td>0.36†</td>
<td>0.39**</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.21)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Macroeconomic forces</td>
<td>0.10</td>
<td>0.13</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.22)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Geopolitical issues</td>
<td>0.40†</td>
<td>0.43</td>
<td>0.50*</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.28)</td>
<td>(0.23)</td>
</tr>
<tr>
<td>Environmental issues</td>
<td>0.40*</td>
<td>0.41*</td>
<td>0.38*</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
<td>(0.19)</td>
<td>(0.19)</td>
</tr>
<tr>
<td><strong>Organisational attributes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation size [employees]</td>
<td>0.05</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>Global firm</td>
<td>-0.37*</td>
<td>-0.36*</td>
<td>-0.34*</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.18)</td>
<td>(0.16)</td>
</tr>
<tr>
<td>EU firm</td>
<td>-0.37**</td>
<td>-0.36*</td>
<td>-0.32*</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.16)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Degree of change difficulty</td>
<td>0.12†</td>
<td>0.12†</td>
<td>0.12†</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.07)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>CEO responsible for innovation</td>
<td>0.36**</td>
<td>0.37**</td>
<td>0.36**</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.14)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Prior success with change</td>
<td>-0.05</td>
<td>-0.05</td>
<td>-0.05</td>
</tr>
<tr>
<td>effort</td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Product / Market innovator</td>
<td>-0.90**</td>
<td>-0.90**</td>
<td>-0.94***</td>
</tr>
<tr>
<td></td>
<td>(0.31)</td>
<td>(0.31)</td>
<td>(0.30)</td>
</tr>
</tbody>
</table>

Robust standard errors are reported in brackets below the coefficients.
† p < .10, * p < .05, ** p < .01, *** p < .001
Table 17: Heckman probit regression results (continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M1: Selection model</th>
<th>M2: Two-stage model</th>
<th>M3: Full model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative culture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Internal structural changes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delegation</td>
<td>0.50***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consolidation</td>
<td>0.30*</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>0.12</td>
<td></td>
<td>(0.12)</td>
<td></td>
</tr>
<tr>
<td>Reconfiguration</td>
<td>-0.25*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.12</td>
<td></td>
<td>(0.12)</td>
<td></td>
</tr>
<tr>
<td>Inter-organisational dependence</td>
<td>-0.23*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.11</td>
<td></td>
<td>(0.11)</td>
<td></td>
</tr>
<tr>
<td>Technology integration needs</td>
<td>0.35†</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>0.18</td>
<td>(0.18)</td>
<td>(0.18)</td>
<td></td>
</tr>
<tr>
<td>CEO responsible for innovation</td>
<td>-0.10</td>
<td>-0.27</td>
<td></td>
</tr>
<tr>
<td>0.35</td>
<td>(0.23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey source</td>
<td>0.90†</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>0.48</td>
<td>(0.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.07</td>
<td>-0.92</td>
<td></td>
</tr>
<tr>
<td>1.83</td>
<td>(1.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>556</td>
<td>556</td>
<td>556</td>
</tr>
<tr>
<td>N - second stage</td>
<td>107</td>
<td>107</td>
<td>107</td>
</tr>
<tr>
<td>Chi-square</td>
<td>53.71***</td>
<td>7.93*</td>
<td>22.26**</td>
</tr>
</tbody>
</table>

Robust standard errors are reported in brackets below the coefficients.
† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Organisations with a creative climate for innovation are more likely to achieve strategic flexibility through business model innovation efforts [$b=.50, p<.001$, model M3]. In line with previous findings within industries and national boundaries, the analysis shows that informal organisation positively influences strategic. Hypothesis 1 is supported in a global, multi-sector.

Internal structural change to reduce structural design complexity is disaggregated to reflect two underlying factors: delegation and consolidation. The results of the regression distinguish between the two structural change processes. Delegation is positively associated with strategic flexibility [$b=.30, p<.05$, model M3]. Consolidation, however, does not have a statistically significant relationship with flexibility.

Finally, internal structural changes that emphasize reconfiguration of existing...
activities are negatively associated with the likelihood of achieving strategic flexibility [b= -.25, p<.05, model M3], consistent with the prediction that reconfiguration does not improve managerial focus. While hypothesis 2a only receives partial support, hypothesis 2b is supported.

Inter-organisational dependence is negatively related to strategic flexibility [b= -.23, p<.05, model M3]. Although collaboration and network effects are associated with improved performance, business model innovators with partner dependencies achieve lower strategic flexibility. Hypothesis 3 is supported.

4.5 Discussion

This investigation examines a narrow, well-defined relationship between business model innovation and a firm’s achievement of strategic flexibility. While the practice literature has encouraged managers to expect that organisational design changes enacted during business model innovation will yield improved performance, especially via enhanced adaptability, this investigation found a more subtle relationship between design transformation and strategic responsivity. The results show that reducing structural complexity is not sufficient to achieve flexibility; firms must also retain control over non-core functions. In addition, the study confirms that the informal organisation, specifically a climate for creativity and innovation, is associated with strategic flexibility, while dispelling the notion that flexibility can be attained through partner dependency. Taken together, this study makes four contributions to the theory and practice of business model innovation.

4.5.1 The effects of structures on strategic flexibility

Although organisational design and structure are critical features of business model innovation, it is important to understand how such structural changes
influence managerial attention and control. Theories of managerial attention and resource scarcity suggest that reducing design complexity should increase flexibility. This is partially supported by the study: delegation increases the probability of achieving strategic flexibility from 6.8% [at one standard deviation below the mean; -1sd] to 12.1% [+1sd]. During structural delegation, managers retain control of structural change while delegating responsibility and costs of coordination to third-party service providers via outsourcing and shared services. This has a dual effect of reducing structural design complexity and concomitantly increasing managerial attention to evolving opportunity environments. By delegating activities through use of third-party facilities and shared services, an organisation can maintain some degree of control over processes, information flow, and outputs. In turn, this allows an organisation to rely on the culled activities while focusing managerial attention on responding with agility to change.

On the other hand, when firms consolidate by completely relinquishing control of non-core activities, the benefits of strategic flexibility are not obtained. This results extends and moderates recent research on the potential benefits of spin-offs (McKendrick et al., 2009). When pursuing fundamental organisational innovation focused on new opportunities, firms are more likely to attain strategic flexibility via access to, if not control over, non-core activities. It may be speculated that important sources of market and opportunity information become inaccessible in the detachment process. Perhaps the firm’s absorptive capacity in an previously unimportant function falls below a critical level as new opportunities emerge in that space.

In contrast to delegation, reconfiguration of existing activities has a negative effect on achieving strategic flexibility. Here, managerial attention is still constrained
by non-core process activities retained during reconfiguration of activity sets. The probability of achieving strategic flexibility drops from 11.5% to 7.4% when reconfiguration increases [-1sd to +1sd]. This result is consistent with Nadkarni and Narayanan (2007) who found a negative effect between firms trying to create strategic focus and flexibility. These results add to this literature by suggesting that reconfiguration does not necessarily confer the benefits of focused managerial attention and, in fact, is associated with a lower probability of achieving strategic flexibility.

Taken together, the results of the analysis of formal structure show that formal structural change processes during business model innovation determine strategic flexibility outcomes based on differences in the degree of managerial control exercised and managerial attention or ‘bandwidth’ available. To achieve strategic flexibility, managers must blend issues of control and attention to ensure flexibility to competitive environmental changes.

Further, the culture of an organisation has a positive relationship with achieving strategic flexibility. A two standard deviation increase in the climate for creativity around the mean changes the probability of achieving strategic flexibility from 5.4% to 13.5%. While managers tend to focus on structural adaptation, a significant element of achieving flexibility stems from the innovative culture of the organisation’s employees. The magnitude of effect is substantial and comparable to other structural changes enacted during business model innovation. The results bolster claims for the strategic advantage of informal organisation characteristics such as innovative culture (Fiol, 1991; Gulati & Puranam, 2009; Teece, 1996; Tellis et al., 2009) and extend prior research to a global, multi-sector context. Having an innovative culture helps avoid employee resistance to organisational identity
changes that arise during transformation processes (Dutton et al., 1994) such as business model innovation.

Finally, the results show that greater inter-organisational dependence in business model innovation [-1sd to +1sd] decreases the probability that firms achieve strategic flexibility from 11.4% to 6.9%. This finding runs counter to prescriptive literature that advocates a greater reliance on partnerships to enact business model innovation (Chesbrough & Schwartz). While the data cannot confirm the underlying causal mechanisms for this effect, it is possible that reliance on partners for organisational change increases coordination costs and goal alignment problems which inhibit agility. Further research could more clearly delineate the underlying reasons for this negative relationship.

4.5.2 Limitations

This study is not without its limitations. The interviews were conducted by a for-profit company to evaluate forms of innovation. The participants do not represent a random sample but were targeted and self-selected from a list of firms including current or potential IBM customers and organisations of specific innovation interest to IBM. In order to preserve confidentiality, certain data including firm size, industry, and national origin were converted to categorical formats. Financial performance outcomes were not available to preserve confidentiality.

4.5.3 Future directions

Limitations aside, this is the first, systematic empirical study of CEOs that links business model innovation and strategic flexibility. Future research in this topic would benefit from linking structural change during business model innovation to
direct measures of firm performance. Reporting of such data has been primarily presented at low levels of granularity (Johnson et al., 2008) without explicitly accounting for other effect. In particular, longitudinal data that explicitly identify the structural change processes associated with business model innovation would build directly on the results of the study presented here.

This investigation presents numerous opportunities for future research to unpack structural effects. Two areas, in particular, appear to hold promise for both descriptive and normative theory building. First, the benefits of boundary-spanning collaboration are not as evident during business model innovation as with technology or process innovation. Although coordination costs amidst high uncertainty appear to be an obvious culprit, this study does not provide the level of detail to confirm the supposition. This question would be particularly interesting to address in the venture creation process, where business model change is likely and even necessary (Heirman & Clarysse), but collaboration is often tightly linked to venture success (Lacity et al.). Do collaboration effects outweigh coordination costs or vice-versa? An interesting question in this context would be: how does partner dependence effect venture survival when early-stage firms innovate business models?

A second area of potential value would be an investigation into the nature of control effects that drive strategic flexibility outcomes concomitant to structural simplification. What are the benefits of retaining control when reducing complexity is essential? Access to information sources appears to be a reasonable explanation, but runs counter to the results of the partner dependence analysis. If access to information does not drive benefits to collaboration, why would it do so in the context of control? Another possibility is that the idiosyncratic nature of business model innovation means that the coordination costs associated with changing familiar
functions are, on average inherently lower than the coordination costs associated with acquiring unfamiliar functions. One of the most interesting ways to address this question would be an in-depth, case-based study of business model innovation comparing the process outcomes between delegation and consolidation efforts.

A separate direction for research could extend simulation work previously addressing strategy and structure (Ethiraj & Levinthal, 2004) to look at population-level outcomes when firms use complexity-reducing structural changes to improve adaptivity in shifting opportunity landscapes. Are the effects dependent on landscape ruggedness, or relative ruggedness before and after shifts? Do the partner dependence effects persist regardless of landscape ruggedness or shift magnitude? If opportunity shifts are discontinuous enough, perhaps rapid access to novel information becomes less costly via collaboration despite coordination costs.

4.6 Conclusion

Based on an opportunity-centric framing of business models, a database of large firm structural change highlights the challenges of fundamental organisational innovation and helps distinguish between business models and corporate strategy. This investigation highlights the relevance of both informal and formal organisation during renewal and re-organisation as well as implications for organisational adaptation to environmental change. Results on the differences in control and managerial attention offered by changes in structures during business model innovation have implications for theories of organisational design and capabilities as well as the practice of business model innovation.

Managers of large firms, especially firms competing globally that are reliant on information technology, face extensive challenges in identifying and addressing novel opportunities. Studies of business model innovation have tended to focus on
the positive outcomes of organisational renewal associated with innovative thinking about business models and opportunities. This study provides confirmation of the potential power of business model innovation in organisational adaptivity as well as a cautionary perspective on the unique challenges of large-scale organisational innovation. Business model innovation is unlikely to be a sort of panacea, in which managers utilise existing tools, such as business process re-engineering, to exploit new opportunities.

Business model innovation appears to present idiosyncratic characteristics. If there are limited intra-firm and community level learning effects, then managers may be addressing novel both novel exploration and exploitation challenges. Models of attaining adaptivity via shrinking the organisation to core activities are apparently oversimplistic: managers apparently must find mechanisms to balance the tension between control and complexity.

This investigation demonstrates that business models are linked to strategic outcomes. Many of the process characteristics, as well as the resource and transaction cost effects of those links remain mostly unknown.
5 BUSINESS MODEL COHERENCE AT AN ENTREPRENEURIAL FIRM

Acknowledgement: This investigation benefited from prior work by Massimo Warglien on neural network simulations, including the general coding for a constraint satisfaction network. The broad framing of the investigation and the interpretation of case study data incorporates the ideas, critiques, and advice of Massimo Warglien and Gerry George.

5.1 Introduction

The final investigation in this study examines business models and business model change in the entrepreneurial context. Building on theories of strategic complementarity, it utilises a novel simulation approach to recapitulate observed structural change at one innovative entrepreneurial firm. In particular, the simulation model applies a heuristic of coherence, or plausibility, as a modified interpretation of strategic complementarity. Although observations from other study companies support the general framework, there are obvious limitations to theory developed abductively from an experimental methodology applied to a single example. The results of the investigation are therefore presented in this essay as a thought experiment looking towards new ways to understand business model and organisational change at entrepreneurial firms.

With this caveat, the investigation makes two contributions toward research on business models and entrepreneurship. First, the results improve understanding of business model change at entrepreneurial firms. Second, the coherence model simulates an observed structural change not obviously predicted by strategic complementarity. Models of firm-level behavior and outcomes in specific entrepreneurial contexts may be improved by incorporating sense-making behavior consistent with neural network heuristics.

Organisational change processes are complex, idiosyncratic, and seemingly
nonstochastic. Mathematical and econometric frameworks of organisational behavior have long been augmented by theories that incorporate models of cognition (Nelson & Winter, 1982) and social action (Bower & Doz, 1979). Theories that bridge the gap between cognition and organisational characteristics, such as structures, must utilise mechanisms that link high-granularity cognition and activities with low granularity results. One example of this type of bridging framework, utilised in theories of industrial organisation economics, predicts structural changes and outcomes via fitness (Drazin & Van de Ven, 1986). Fitness is commonly used to reference the interaction between the firm and the competitive environment (Levinthal, 1997). This study focuses on the alternate application of fitness in which intra-firm interactions as antecedents and determinants of organisational change.

Determinants of intra-firm fitness rely on resource or activity-based views of the firm. Resource synergy, originally codified by Wernerfelt (1984) continues to be studied as an important characteristic of effective organisations in the literature (Tanriverdi & Venkatraman, 2005). Similarly, strategic complementarity presents mutually reinforcing systems of heterogeneous elements within the firm as the indicator of organisational success (Milgrom & Roberts, 1990). In this framework, managers optimize interactions of intra-firm elements towards a goal of whole-firm effectiveness. This optimization process serves as the processural bridge between individual cognition and formation and change of organisational structures.

Theories of strategic complementarity have produced at least two important results about strategic advantage and organisational change. First, complementarity provides a mathematically grounded basis for interpreting "fitness" between organisational characteristics such as strategy and structure (Milgrom & Roberts, 1995). In effect, complementarity operationalizes resource and activity synergies.
Second, strategic complementarity provides a backdrop for identifying why and how firms improve effectiveness, and thus strategic outcomes, by evolving towards increased fitness (Siggelkow, 2002). This evolution generally incorporates incremental changes that reinforce mutually enhancing elements by changing, adding, or excising conflicting elements. It is, in effect, an adaptive process of eliminating observed local conflicts with a vision towards a unified whole— a sort of "think globally, act locally," perspective. In other words, the evolution of systems of strategic complementarity derives from the assumption that local modifications may accumulate towards a well-defined organisation-level design.

This essay extends the a narrow interpretation of strategic complementarity. The investigation has the following boundaries: first, it addresses systems of heterogeneous organisational elements in an entrepreneurial context. Second, it specifically considers a system of elements associated with the firms’ business model. Finally, it applies a heuristic of coherence, or plausibility, rather than mathematical supermodularity. Each of these parameters is discussed briefly here and in more detail in Section 5.2.

The case of entrepreneurial firms is interesting for three reasons. First, resource scarcity likely limits managerial attention and effort towards complementarity (Baker & Nelson, 2005). Second, fitness as a measure of or determinant of organisational effectiveness is less objectively certain at innovative entrepreneurial firms exploiting new opportunities or employing new resources or processes—successful business models can’t be predicted ex ante (Heirman & Clarysse, 2004). Finally, the narrative-building and legitimization associated with sense-making appear to play key roles in venture development and survival (Lounsbury & Glynn, 2001).
As shown in Sections 2 and 3, the business model is an important conceptual framework utilised by managers and entrepreneurs for sense-making. This investigation focuses on approximating the business model of a firm with a set of heterogeneous elements associated with the business model dimensions. This filters the resources and activities of the organisation into a cognitive map of the organisation understood by managers and entrepreneurs. In a cognition-centric framework, managerial action follows a process of enactment in which managers create cognitive maps of the world and envision possible outcomes (Child, 1997). The business model represents a high-level map in the enactment process bridging cognition and realised outcomes (Teece, 2010).

Finally, this investigation applies a novel computational method to simulate organisational configurations. In established theory of strategic complementarity managers create systems of complementary elements (Siggelkow, 2002). The heuristic of coherence applied in this investigation relaxes this assumption. Coherence may be broadly interpreted as assuming that entrepreneurial managers seek plausibility rather than perfect complementarity (Thagard & Verbeurgt, 1998). This is based on two presumptions: first that a given system may not present a configuration of perfect complementarity, and second that in entrepreneurial contexts, the evolution towards perfect complementarity may not be possible or even preferable, as discussed below.

This essay proceeds as follows. First, a brief review establishes the theoretical framework of strategic complementarity as well as the alternative theory of coherence. The review also presents the context for addressing business model change at entrepreneurial firms. Second, a case study of organisational change at an entrepreneurial biotechnology firm provides the backdrop for the modeling
exercise. A simulation of business model coherence utilising a Hopfield network replicates the organisational structure change observed in the case study. The results point towards opportunities to augment established theories of organisational change as well as broad avenues of new research.

5.2 Theoretical framework

This section establishes the theoretical framework for the case study, simulation and abductive theory developed in the remainder of the investigation.

5.2.1 Supermodularity and quasisupermodularity

Resource complementarity in a systems context may be derived from Penrose (Penrose, 1955) and Boulding (Boulding, 1956). Wernerfelt’s development of the resource-based view of the firm (Wernerfelt, 1984) developed a mathematical interpretation of resource exploitation and potential mutual enhancement in the context of market entry. Wernerfelt doesn’t explicitly derive synergistic effects but does hint at them:

*If you push the example from Figure 2 a little further, you could look at the fifth resource, 'domestic contacts', as supporting the buildup of the first, 'production skills' through joint cost effects. [178]*

The first explicit, published application of supermodularity to an organisational context was presented by Topkis (1987). This treatment focused primarily on activities and decision-making in multi-player games. Milgrom and Roberts (1990) applied supermodularity theory to explain industry-wide shifts to flexible manufacturing practices, as well as suggest specific interpretations of managerial action towards systems of complementary organisational elements:

*Each of these features can be seen as part of a coherent pattern in*
which the pieces fit together in a complementary fashion, making the other pieces more valuable. (Milgrom & Roberts, 1995: 202)

Supermodularity is the inherent property of an operating set of elements such that the outcome of change to any element complements similar change to other elements. Formally, function \( f \) is supermodular over elements \( x \) and \( y \)

\[
f(x) - f(x \wedge y) \leq f(x \vee y) - f(y).\]

if and only if:

(Milgrom & Roberts, 1995)

Systems are supermodular, then, if increasing one variable improves the payoff of increasing other variables. Submodular functions demonstrate the inverse: increasing one variable decreases the payoff of increasing other variables. Supermodular functions reflect complementarity; submodular functions reflect substitutability:

Supermodularity is a cardinal property of a function defined on a lattice. It roughly states that a function has “increasing differences.” For this reason, it is usually interpreted as modeling complementarities. For example, consider a consumer with a utility function over two goods. A natural notion of complementarity is that the two goods are complementary if the marginal utility of consuming one of the goods is increasing in the consumption of the other; for smooth functions, if the cross-partial derivatives are non-negative. This notion is equivalent to supermodularity of the utility function. (Chambers & Echenique, 2006: 2)

Supermodularity of activities or resources requires that changing a given organisational element increases the returns associated with analogous changes in
other organisational elements. In a business rather than mathematic context, such effects cannot be realistically interpreted at all possible states: steel and steelworkers may be generally complementary, but if steel inventory exceeds product output demand, having even more steel does not make steelworkers more valuable. This consideration is partially reflected in the mathematical treatment of quasisupermodularity:

*Quasisupermodularity expresses a weak kind of complementarity between the choice variables; if an increase in some subset of the choice variables is desirable at some level of the remaining choice variables, it will remain desirable as the remaining variables also increase* (Milgrom & Shannon, 1994: 162).

In other words, quasisupermodularity of elements ensures that so long as more steelworkers are valuable for a given level of steel utilisation, then they are more valuable when steel utilisation increases. This, perhaps, is the closest mathematical treatment analogous to strategic complementarity.

Important conclusions and predictions may be made with these econometric models (Milgrom & Roberts, 1995). It is important, however, to recognize the limitations of applying theories of supermodularity to actual business systems for one critical reason. The mathematical certainty afforded by supermodularity and quasisupermodularity is unlikely to exist, or at least unlikely to be objectively ascertainable, in the large and complex systems of heterogeneous elements of most organisations. These limitations are discussed in more detail in Section 5.2.3

5.2.2 Strategic complementarity and synergy

Strategic complementarity, as used in the management literature, refers to the competitive advantage resulting from mutually-enhancing configuration of
organisational elements (Porter, 1996). Large organisations achieve competitive advantage by developing systems of heterogeneous resources, activities, and boundary-spanning structures that facilitate efficient operations. This results in comparatively advantageous positioning in the environment vis a vis competitors. Southwest Airlines, for example, ensures that all aspects of its operations support a low-cost model that meets minimum passenger requirements for safety and service, while Neutragena chose a specialized set of research and service-based activities to support a niche, quality-oriented product and distribution position:

As in most companies with good strategies, Southwest's activities complement one another in ways that create real economic value. One activity's cost, for example, is lowered because of the way other activities are performed. Similarly, one activity's value to customers can be enhanced by a company's other activities. That is the way strategic fit creates competitive advantage and superior profitability. (Porter, 1996) 70

The argument presented is, in effect, that the competitive advantage of a firm may be attributed to the mutually-enhancing interaction of elements for a given set of factor demands and activity levels. It is important to note, however, that strategic complementarity does not reflect the inherent supermodularity of a system. This will be discussed in more detail below.

The strategic complementarity framework is appealing on many levels. It is inspired by strict mathematical models. It builds on established organisational research of strategic content and positioning, including, for example, resource-based treatments of core competence (Prahalad & Hamel, 1990). It also presents an intuitive simplicity that ties into expectations about pattern-seeking behavior and narrative sense-making (Gabriel, 2000).

The business practice commonly refers to the characteristic of mutual
enhancement as synergy. Some strategic management textbooks even incorporate the concept of synergy into the foundational definition of corporate strategy (Carpenter & Sanders, 2008). This framing of synergy appears to be less mathematically constraining than strategic complementarity, as it merely requires that two or more elements may be combined in such a way to enable output not otherwise attainable from separate use. This requires neither the set-spanning positive differentials of supermodularity, the local positive differentials of quasisupermodularity, or the systemic mutually enhancing effects of strategic complementarity that generate strategic advantage.

Strategic complementarity also serves as the foundation for a variety of resource- and activity-based frameworks of organisational change enhancement. These include cognitive-behavioral applications for organisational learning (Argyris, 1993; Senge, 1990) and theories of planned organisational change (Robertson et al., 1993). Extensions of this framework have been applied to a variety of industrial organisational context, forming an entire subspace of strategy theory. Siggelkow (2002) develops heterogenous maps of organisational elements to demonstrate evolution of complementarity by which firms achieves fitness and competitive advantage over time.

5.2.3 Potential limitations to applying strategic complementarity

The following discussion of limits to the applications of supermodularity and strategic complementarity in practice specifically focuses on Porter’s “What is Strategy” paper (Porter, 1996). The emphasis on that paper reflects two issues. First, as with Porter’s paper, this investigation has a specific focus on descriptive theory and implications for practice, rather than the development of econometric models.
Second, Porter’s paper provides one of the most recognized treatments of the strategic complementarity framework. The limitations identified here do not detract from the relevance, importance, or rigor of Porter’s publication. The goal is to identify potential extensions of theory that help explain observations in an entrepreneurial context and point towards normative theory.

To begin, the translation from the mathematical specificity of supermodular functions operating on a lattice to complementarity or synergy of organisational elements may be somewhat greater than characterized in the literature. It is important to distinguish between the two, both to characterize application to practice as well as present limitations to descriptive and predictive theory. Supermodularity is the characteristic of a function or system in which elements are mutually reinforcing at every quantity and change effect. Supermodularity is not necessarily a good mathematical interpretation of complementarity, because complementarities may incorporate complex functional features whereas supermodular functions may be represented with strictly monotonically increasing relationships (Chambers & Echenique, 2006). In other words, it isn’t necessarily appropriate to extend results of econometric and mathematical exercises based on supermodularity to the application of strategic complementarity or synergy in real world contexts without clearly specifying the relaxation of assumptions and resulting effects.

Even considering this restriction, a theory of strategic complementarity as driver of organisational performance has certain limitations. First, models of complementarity rely on objectively assessable characteristics of resources or activities and the mathematically specified potential benefits, or costs, associated with their interactions. In reality, of course, the interaction of resources, activities, and higher-level organisational functions are mediated via human agents, creating
two potential sources of uncertainty. Interaction between otherwise complementary elements may be imperfect because of human error; similarly the interpretation of outcome may be flawed either ex ante or ex post, inhibiting the effects or misinterpreting the source of complementarity. Milgrom and Roberts (1995) argue that centralization may mitigate the risk of failing to implement systematic changes required to achieve complementarity. Regardless, it is difficult to objectively determine whether unachieved benefits are due to incomplete complementarity or flawed implementation or interpretation.

Additionally, complementarity relies on the assumption of objectively identifiable measurements of “fitness:”

*While operational effectiveness is about achieving excellence in individual activities, or functions, strategy is about combining activities…. Fit locks out imitators by creating a chain that is as strong as its strongest link.* (Porter, 1996) 70

This is a form of structural contingency theory (Woodward, 1965) that presumes an “ideal” configuration must exist for a given set of internal elements for a given exogenous context. Even if real, such a configuration would be ephemeral and specific to constantly changing circumstances. The presumption that ideal configurations either do not change or change slowly and smoothly may be reasonable for some industries, but certainly not universally so. Recent research on Lincoln Electric, in fact, has suggested that the very activities and resources that serve as the basis of complementarity in one context may not function synergistically in another (Siegel & Larson, 2009).

Another limitation lies in the selection of set elements intended to demonstrate complementarity. On the one hand, limiting the set to homogeneous elements, such as similar resources or activities, but not both, improves the probability of effectively
assessing the complementarity of the output function. At the same time, such restrictions reduce the accuracy of measuring performative effects at the firm level, because few firms operate on homogenous resource sets. Kim and Finkelstein (2009) mitigate these limitations by assessing potential rather than actualized value associated with complementarities in acquisition processes, but this has the effect of transferring the uncertainty of assessment from the independent to the dependent variable. Related research ties achieving complementarity to the combination of resource fit and alliance status in an institutional framework (Lin et al., 2009). A study on knowledge complementarity suggests that benefits accrue only in the presence of relatedness across heterogeneous product, customer, and managerial knowledge types (Tanriverdi & Venkatraman, 2005).

In part, these limits stem from cognitive effects. In the case of objectively-identified, absolute, and uniform resources, as described for example, by Wernerfelt (Wernerfelt, 1984), the utility of complementarity may also be objectively specified. Few, however, if any organisations can realistically be reduced to bounded portfolios of such resources. The addition of intangible resources and dynamic capabilities seems to render an objective complementarity-derived utility function impossible. From an institutional perspective, a critical component in the operationalization of complementarity outcomes may be the norms and structures both within and without the organisation (Siegel & Larson, 2009). Both the application and perceived value of these resources and elements are mediated through cognitive processes. Agents within an organisation utilising cognitive models of observed information to enact decisions, events, and outcomes within that model as part of the decision and action process (Child, 1997; Daft & Weick, 1984). In addition, managerial action is heavily driven by attention (Ocasio, 1997) as managers only develop models via attention-
based observations. Cognition, then, is inextricably intertwined within the complementarity of the resource or activity-based system. Organisations are not simple machines; the processes of black-box cognition within organisations remains an important determinant of behavioral and organisational outcomes. In most, if not all organisations, then, cognition plays a role in the potential and obtained complementarity of elements, especially non-objectively defined elements such as vision and leadership or intangible talents and dynamic capabilities.

Another potential problem with strategic complementarity is the lack of testability. Organisational systems specified as supermodular or quasi-supermodular functions may have no testable implications (Chambers & Echenique, 2006). In other words, it may not be possible to prove or disprove whether systems of mutually-reinforcing elements result in competitive advantage. Although the mathematical derivation is specific to supermodular systems (Chambers & Echenique, 2009), it is uncertain whether the relaxation of assumptions associated with quasisupermodularity and strategic complementarity are sufficient to enable testing of inherent competitiveness.

Finally, the strategic complementarity treatment incorporates a potential tautology. First, strategic complementarity of elements leads to competitively advantage positions via optimal, hard-to-imitate fitness:

*Strategy is creating fit among a company’s activities. The success of a strategy depends on doing many things well- not just a few- and integrating among them. If there is no fit among activities, there is no distinctive strategy and little sustainability…* (Porter, 1996: 75)

While fitness is valuable because it improves configurations of uniquely complementary elements:

*Although some fit among activities is generic and applies to many*
companies, the most valuable fit is strategy-specific because it enhances a position’s uniqueness…(Porter, 1996: 71)

In other words, strategic advantage comes from unique sets of well-fitted activities, because unique sets of well-fitted activities generate strategically advantageous positions. Strategic complementarity qua supermodularity was presented as a mathematically sound interpretation of “fitness” (Milgrom & Roberts, 1995) that extended prior research on the relevance of fit to organisational behavior and outcomes (Drazin & Van de Ven, 1986). The strict mathematical treatment explains the virtuous cycle of economies of scale, for example, but the inherent competitive value of a unique and difficult-to-imitate set of activities has not been demonstrated. It seems unlikely that the fundamental, necessary and sufficient attributes of strategic success are strangeness and inimitability. The tremendous success of generic pharmaceutical firms like Teva would seem to present counterexamples.

5.2.4 Organisational coherence

Perhaps the most intuitively uncertain characteristic of systems of strategic complementarity is perfect reinforcement across the entire organisation:

*Overall advantage or disadvantage results from all a company’s activities, not only a few.* (Porter, 1996) 62

One mechanism for extending strategic complementarity to observable entrepreneurial contexts is, interestingly, presented by Porter in the same article:

*Trade-offs occur when activities are incompatible. Simply put, a trade-off means that more of one thing necessitates less of another.* (Porter, 1996) 68

A trade-off is, in effect, a conflicting interaction between two elements—
substitutability rather than complementarity.

The inherent limitations of information gathering, resources, cognition, decision-making, and purposeful implementation points towards a narrower interpretation of strategic complementarity in entrepreneurial contexts. The interactions between the elements of an entrepreneurial organisation can be seen as constraints, and not all systems may be reconciled to configurations of perfect reinforcement. In this context, the alternate heuristic of coherence, the "maximal satisfaction of multiple constraints" (Thagard & Verbeurgt, 1998) may lend itself to configurational analysis or entrepreneurial structures.

Just as in systems of strategic complementarity, the conceptual elements in entrepreneurial systems may represent functions, ideas, activities, resources or even outcomes. The interaction between elements represents the constraints on the overall system, to be assessed via simulation of a constraint satisfaction network. Elements function in a binary state, either accepted ["on"] or rejected ["off"] in the system context. Coherence is defined as the stable configuration of elements in accepted/rejected states in which the most constraints are satisfied (Thagard & Verbeurgt, 1998). The simulation incorporates repeated “runs” in which the network, starting from various, random initial conditions, updates asynchronously based on these constraints. The most common stable outcomes are thus the coherent configurations of element states.

This approach is consistent with theoretical perspectives about the challenges of establishing internally consistent complementary sets of activities:

As a result, trade-off decisions begin to emerge, and attempts to respond to multiple and conflicting contingencies are likely to create internal inconsistencies in the structural patterns of organisations. To address these problems, a pattern analysis is needed for the
interactions of multiple contingencies and structural patterns on organisational performance.” (Drazin & Van de Ven, 1986: 521)

It may be helpful to conceptualize coherence in the organisational context as shorthand for the narrative plausibility of organisational elements. In contrast to mathematical, logical and physical uses of coherence that focus on cardinal, quantifiable characteristics or perfectly logical consistency, this approach is more similar to utilisation in linguistics:

A text “makes sense” because there is a continuity of senses among the knowledge activated by the expressions of the text [cf. Hörmann 1976]. A “senseless” or “nonsensical” text is one in which text receivers can discover no such continuity, usually because there is a serious mismatch between the configuration of concepts and relations expressed and the receivers prior knowledge of the world. We would define this continuity of senses as the foundation of coherence, being the mutual access and relevance within a configuration of concepts and relations. (De Beaugrande & Dressler, 1996: 84)

In one sense, coherence may be viewed as a less rigorous constraint than supermodularity or strategic complementarity, in that perfect interconnectedness and synergistic outcomes are not necessary characteristics of the system nor deterministic predictors of performance. On the other hand, coherence operates at a different level than fitness and supermodularity, because coherence is entirely a cognitive outcome based on the meaning-making cognition of agents. The application of coherence as a decision heuristic is relatively novel in the organisational field. At the same time, it presents an intriguing framework for extending strategic complementarity to describe organisational characteristics and outcomes in entrepreneurial contexts. The potential advantages are discussed below.
First, careful skepticism should be applied to organisational analyses that claims perfect objective assessment, as even seemingly objective performative outcomes, including publicly-observed quantitative measures such as profits, are, ultimately determined via human cognition embedded at various levels of the calculative process. Defaulting to “market pricing,” while econometrically sound, reflects broad-based consensus rather than universally demonstrable certainty. As the analytical level descends from the market to the industry to firm, group, functional, and individual levels, such consensus becomes increasingly difficult to confirm. This is especially true in cases of “fitness” associated with resources and activities within organisations.

Second, even the most rigorous dissections of organisational elements utilise multi-level conceptualizations: Sigglekow’s (Siggelkow, 2002) system incorporates quantifiably operational elements [“small investment in information technology”], individual personality characteristics [“focus on long-term performance”], governance structure [“mutual structure”], and organisation-wide anthropomorphisms [“openness to the press”]. Multi-level element systems incorporate subjective cognition by fiat, as no reductionist mechanisms are specified to objectively measure fitness between such elements.

To date, only very limited research has been conducted on coherent organisational sets or element networks. Durfee et al (1987) proposed a cooperative model to obtain coherence among problem-solving elements in a distributed network. The operationalization of the task-driven system, in which the stated goal of global coherence required that “the activities of the nodes should make sense given

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3 Consider, for example, the regularity of profit restatements at publicly-listed corporations.
overall network goals,” ultimately benefits from decentralization of smaller numbers of sophisticated nodes rather than centralized control of more and simpler nodes. This conceptualization of organisational coherence has been proposed to describe the extent to which SBUs within a larger corporation are related to each other, leading to the argument that as firms diversify businesses, they do so into businesses that maintain roughly the same level of relatedness as observed in the broader industrial environment (Teece et al., 1994). Non-firm coherence research developed models for aggregation of political entities (Axelrod, 2007) and industry coalitions associated with standards formation (Axelrod et al., 1995). A more recent application to service outcomes in the airline industry specifies network coherence as a function of service consistency, linking performance outcomes to commonality of capabilities across alliance participants (Wang & Horsburgh, 2007).

The study of coherence becomes especially interesting in contexts of environmental and resource uncertainty because meaning-making is primarily a contextual exercise that becomes less reliable in unfamiliar and unexpected circumstances (Child, 1997). Recent research considers strategy-formation in uncertain contexts via pattern recognition modeled by agent-based neural networks (Gavetti & Warglien, 2010). This study attempts to address similar pattern formation at the organisational level.

5.2.5 Business models at entrepreneurial firms

The business model of an entrepreneurial firm provides an intriguing framework for modeling organisational coherence. Business models have been associated with the narrative of opportunity exploitation and organisational meaning-making (Magretta, 2002). In particular, high levels of exogenous uncertainty are
common to entrepreneurial firms exploring and exploiting innovative technologies targeted at novel opportunities, limiting the expected value of strategic planning (Levinthal, 1997). By extension, these contexts limit the objective measurement of resource and process value necessary to exploit complementarities. This may be a necessary aspect of understanding business models at entrepreneurial firms, where managers must accept inconsistent or even paradoxical intra-firm elements because business model efficacy in a given context can’t be determined \textit{ex ante} (Smith et al., 2010). Here cognition is the sense-making process that actually is part of how reality as we understand it is actually created.

Although business model research has been fragmented and non-accretive, a promising frameworks links organisational structures and opportunities in a modeling or representational context (Baden-Fuller & Morgan, 2010; Teece, 2010). This is, in fact, not too far from a description of the business model commonly ascribed to Drucker: “the representation of how an organisation makes money” (Johnson, 2010). A business model is a cognitive artifact, a simplification or depiction of a more complex set of interactions and value-conveying resources. A firm’s business model is the observed delineation and characterization of the key conceptual elements associated with how the firm operates (Baden-Fuller & Morgan, 2010). It is not, in fact, a “resource” of the firm nor an active process within the organisation. As such, a business model describes a set of relationships among elements of the firm \textit{vis a vis} organisational structures associated with the enactment of a commercial opportunity. Unlike corporate strategy, which is generally conceptualized as a dynamic, emergent configuration of firm characteristics associated with competitive positioning, a business model delineates the extant organisational structures,
including boundary-spanning structures that determine and control the value-creating processes at the firm.

Modeling business model coherence is, in effect, making sense of the important conceptual elements that form the narrative of the organisation. Coherent business models specify the functional structures that comprise the firm. This also presents a mechanism to examine and, potentially, predict changes in organisational structure based entirely on cognitive interpretations of important organisational elements. The case study that follows describes the circumstances presented at a highly-innovative, entrepreneurial firm operating at the leading edge of one of the most scientifically complex and potentially influential technology sectors. The micro-level data from the interviews establishes a cognitively-derived configuration of organisational elements incorporated into a neural network simulation that effectively recapitulates the macro-level structures at the organisation.

5.3 Case study: Cellular Dynamics

5.3.1 Background

The case study firm, Cellular Dynamics [CDI] was selected opportunistically. The investigators’ familiarity with the technology, founders, and executives dates prior to the formation of the entities. This provided an unusual opportunity to observe the early activities of the organisation, including the lead-up to the structural changes and outcomes.

Table 18: CDI case study interviews

<table>
<thead>
<tr>
<th>Title</th>
<th>Interviews</th>
</tr>
</thead>
</table>
Formal data was collected as part of a larger study of innovative entrepreneurial firms conducted from 2008-2010. Pilot interviews were conducted with select executives; intensive interviews were conducted with a cross-section of employees, including one executive who subsequently left the organisation following the structural change, as shown in Table 18. Some employee title ambiguity is unavoidable because of the structural change—employee titles are reported with reference to the merged entity. Approximately 30 hours of interviews were conducted prior to, during, and after the restructuring process. Interviews were conducted at CDI offices in a private setting. The interviews followed a structured interview script that ensured consistency between interviews but facilitated discussion of topics and issues specific and relevant to each interviewee. An audiorecording was obtained for each interview and the interviewer took handwritten notes.

In addition to primary data collection, publicly available secondary data sources were obtained, including news reports, press releases, and patent and license issuances. Greatest reliance was placed on primary information provided by the President, former Chief Business Officer, and the Chief Technology Officer.

<table>
<thead>
<tr>
<th>Position</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>COO</td>
<td>2/3/2009, 21/5/2010</td>
</tr>
<tr>
<td>CTO</td>
<td>2/3/2009, 16/10/2009</td>
</tr>
<tr>
<td>Scientist</td>
<td>2/3/2009, 21/5/2010</td>
</tr>
</tbody>
</table>
5.3.2 Entities founding

Cellular Dynamics International, Incorporated is a world leader in stem cell technology research and development. Currently based in the United States, the company has an extensive portfolio of patents and the related know-how to a variety of leading-edge stem cell technologies.

CDI was formed in 2004. The company was founded by a group of scientists, financiers, and professional managers. The founding group included Dr. James Thomson, the University of Wisconsin-Madison scientist credited with first isolating primate and human stem cells, and Dr. Thomas Palay and Mr. Robert Palay, the managers of Tactics II, LLP, a venture fund specifically formed to invest in the commercialization of stem-cell related technologies. CDI licensed relevant human embryonic stem cell technology developed in Dr. Thomson’s laboratory from the Wisconsin Alumni Research Foundation, the technology transfer entity associated with UW-Madison. Management anticipated that CDI would develop assays based on stem cell technology to support or accelerate development of pharmaceutical therapeutics.

The second entity, Stem Cell Products Incorporated [SCP] was created in 2005. License rights were carved out from the original WARF licenses to enable long-term research to develop novel therapeutic compounds with an initial focus on the development of a blood product such as red blood cells and platelets that could be produced in large volumes for transfusion and other blood therapeutic applications.

A third entity, iPS Cells, Incorporated [IPS] was created in 2006, originally to serve three purposes: to license a new potentially disruptive technology from the same university, assess out-licensing opportunities for that technology and other
technologies owned by CDI and SCP, and investigate in-licensing of other 
technologies related to scale up and commercialization.

Separate entities had been formed for a number of reasons. Founders 
perceived that the firms would utilise distinct revenue models associated with 
different product characteristics. According to Tom Palay, “At the time of founding, 
the founders perceived that the businesses had different business models. So there 
was a concern that the high-risk, high-reward company could damage the lower-risk 
company.” [paraphrased from interview with Tom Palay, 3/2/2009] In addition, each 
entity had a different founder set, creating non-obvious equity valuation issues. “It 
was mathematically easier to have separate entities, especially since we didn’t know 
what was going to happen to the separate businesses.” [paraphrased from interview 
with Tom Palay, 3/2/2009]

At the same time, Dr. Thomson and the Palays were central to all three 
organisations. The entities also shared certain executive managers as well as central 
administration and some physical facilities. As of 2007, the “initial configuration”, the 
combined entities had raised more than $15 million in venture finance, and had a 
combined headcount of approximately 20 full-time employees.

At the time of this initial configuration, the separation of the entities was 
acknowledged as “imperfect.” It was justified via positivist and negative narratives. 
The positivist narratives included the complexity of satisfying equity interests of 
distinct founder groupings and distinguishing between business models for potential 
funders. In contrast, the negativist narratives diminished the perceived problems by 
noting that shared management teams and facilities were cost effective and 
encouraged communication between groups. David Sneider, the Chief Business 
Officer, commented that “the only real cost is associated with accounting for
resource use, and we have computers to make those calculations for us.” [paraphrased from interview with David Sneider, 13/2/2009]

5.3.3 Disruptive technology acquisition

In 2006, Thomson’s research at the University of Wisconsin-Madison proved the potential for induced pluripotent stem cells [iPS cells]. In simple terms, iPS methods could generate stem cells from adult cells rather than embryonic cells. This technological advance could resolve a number of outstanding technical and operational issues associated with stem cell production and commercialization, potentially bypassing entirely the use of cells derived from embryonic sources, a continuing source of ideological controversy. The third entity, iPS Cells, Inc., was formed specifically to license this technology from WARF.

The addition of iPS technology impacted numerous functions at the companies and changed the conceptual and narrative frameworks utilised by executive management as part of operational and long-term planning. This fundamentally altered the underlying capabilities set at the organisation. In contrast to the initial configuration, which focused on the development of assays that would support drug discovery, Tom Palay noted in 2009, “Our expertise is in the automation and production of cells based on culturing stem cells and differentiating those cells.” [paraphrased from interview with Tom Palay, 2/6/2010]

The immediate effect was to completely change the organisations’ long-term manufacturing strategy and capability requirements. At the time iPS was licensed, the company had been attempting to resolve a variety of technical problems associated with large-scale, high-efficiency stem cell manufacturing. This was due, in part, to variations in cell culture stocks available from acceptable vendors, but also to
limitations on extant laboratory processes for cell culturing. iPS enabled the organisations to approach distinct cell-type manufacturing issues within a single framework. In addition, the iPS platform provided a common basis for stem cell competencies associated both with drug discovery tool products as well as long-term therapeutic product development. At a tangible resource level, the iPS platform simplified certain aspects of the organisations’ internal materials development and automation skills.

In Spring of 2008, executive management and the founders of the separate entities held a series of strategic-level meetings. The discussions concluded that iPS provided a common platform for longer-term technology development for both therapeutics and tools. According to senior managers, discussions about merging the organisations had previously focused on the challenges associated with ensuring “fairness” with regard to equity stakes. Stock transfer pricing had been seen as a potentially volatile topic that could be difficult to resolve to the satisfaction of all parties.

Two other factors associated with organisational finance appeared to influence the transition process. First, a federal grant that would have funded some of the long-term therapeutic research was unsuccessful. Second, executive management was unable to secure venture financing from a lead venture capital fund. Given the length of the normal venture funding process, closing a venture round could not be anticipated in less than three months from the initiation of intensive discussions with a given investor. In interviews, members of the executive team expressed surprise and resignation associated with these circumstances. Particularly with regard to venture financing, managers expressed the opinion that the complexity of the organisation’s structure and apparently conflicting business
models may have created challenges for outside financiers. By mid-2008, management had acknowledged that a significant, mid-term venture capital investment was unlikely.

In summer 2008, executive management recommended that the Board of Directors of the entities approve the merger of the entities into a single legal structure. The merger was announced in late 2008; implementation of the merger lasted into summer of 2009. A variety of structural and cultural changes merit notice. The research team from SCP was significantly redeployed to development work: of 20 researchers only 5 were retained to continue long-term research specifically on the therapeutic products. The general manager of iPS, Inc., who was also serving as CTO of CDI and SCP, retained oversight of only the five long-term researchers. His role had previously included technology acquisition; this became his primary responsibility following the merger. Significant long-term R&D direction and oversight was shifted to a research manager within the merged organisation.

The combined company focused on the development of a single assay cell type, cardiomyocytes, and subsequently developed a high-throughput process for the manufacturing of that cell type for drug discovery purposes. The product was launched at the end of 2009. The manager of corporate development, who previously had managed a staff of two, was given authority to ramp up sales and marketing activities. By early 2010 the external-facing function within the organisation had ten full time employees. Throughout the organisation, employees noted a shift, described alternately as “research” to “development,” or “development” to “manufacturing and sales.” The interviews conducted in early 2009 displayed predominantly relaxed, optimistic, and cheerful tones. The interviews conducted in late 2009 suggested higher stress levels and tensions, sometimes explicitly linked to
the restructuring, sometimes linked to the new focus on commercialization. Two of the interviewees' positions had explicitly changed, both in terms of title and responsibilities. These interviewees expressed the most dissatisfaction with the transition. In general, mid-level employees appeared to be the most affected by the transition, both in terms of changing responsibilities and change in attitude or outlook.

The new configuration of the organisation placed primary importance on manufacturing, sales, distribution, and support processes. At the same time, significant research activities continued, including project scoping and selection activities worth noting. For example, the firm used an internal “call for projects” activity in late 2009 to identify high-potential new product areas. Management winnowed ten proposed projects to three and tasked inter-functional groups with preliminary research to demonstrate feasibility. Final proposals were presented in February 2010 and a single project chosen for further funding.

5.3.4 Organisational outcomes

The company has reported a number of positive outcomes. In August 2009, the company added Leroy Hood and George Church to its Scientific Advisory Board. Dr. Hood and Dr. Church are two of the world’s most celebrated scientists in genomics and have been instrumental in the formation and success of more than 20 successful biotechnology companies, including Amgen, Applied Biosystems, Millipore, and others. In December 2009, CDI announced the launch of iCell™ cardiomyocytes for drug development testing. In April 2010 the firm closed on $40.6 million in venture financing, bringing total venture funding to date to more than $70 million.
5.4 The simulation

This section describes a novel approach to recapitulating the structural configuration of the entity based on modeling the firm’s business model as a constraint satisfaction network. The business model is represented by the interaction of important conceptual organisational elements. Based on prior research and the results of the investigation described in Section 3, the key business model components for this investigation are: 1) resource structure, 2) transactive structure, and 3) value structure, and 4) narrative sense-making. The simulation model is also used to recapitulate the subsequent structural reconfiguration incorporating the uptake of the novel technology platform.

5.4.1 A constraint satisfaction network

A constraint satisfaction network architecture based on the work of Hopfield is utilised to simulate the cognitive conceptualization of critical organisational elements. The “running” of the simulation can be understood in terms of maximal satisfaction of multiple constraints is summarized below. A more complete description may be found in Hertz et al (1991).

Each node represents a conceptual element important to the viability of the organisation, understood as concepts, propositions, resources goals, actions, and so on. Nodes may complement or conflict with each other. Complementary relations include explanation, enhancement, facilitation, association, and so on. Conflicting relations include inconsistency, substitutability, incompatibility, and negative association. If two nodes are complementary, there is a positive constraint between them. If two elements are conflicting, there is a negative constraint between them.

Nodes are either activated or not activated. In the mathematical model, node
activation is represented as one [1] and deactivation as minus one [-1]. A positive constraint between two nodes can be satisfied either by both nodes being activated or both nodes being deactivated. A negative constraint between two nodes can be satisfied only when one node is activated and the other is deactivated.

The coherence problem consists of dividing a set of elements into activated and deactivated sets in a way that satisfies the most constraints. The network of nodes is “tested” for coherence by establishing a random initial state of activated and deactivated nodes and then randomly updating node states based on that node’s connections with other nodes. A locally stable solution to the coherence problem results when multiple tests of the network tend to converge to a common or consistent configuration.

5.4.2 Creating the business model schema

Building on the business model as the design of structures developed previously, the architecture of a business model is interpreted as the cognitive “schema” of conceptual elements understood by practitioners, especially executives. In this simulation exercise, these elements are represented as binary nodes in the neural network. Elements may be considerably heterogeneous, related to resources, goals or transactions, but are connected by relations of complementarity or conflict.

A business model is therefore interpreted as the “locally coherent” solution to the problem of maximizing compatibility and minimizing conflict among elements. Locally coherent design implies that there may be more than one global solution and that such solutions may be imperfect. This is a crucial distinction between coherence and supermodularity or strict interpretations of strategic complementarity, in that coherent solutions do require all possible conflicts be avoided nor that all compatible
elements be linked together.

Connections may be interpreted as “soft constraints” that may be violated. The cost of violating soft constraints manifests as the reduced stability of the given configuration, whether due to separating complementary elements or linking conflicting elements. A business model, then, is interpreted as an emergent property of the system of nodes and constraints, resulting form a dynamic process driven by the sense-making search for viability (Smith et al., 2010). Search for coherence, in turn, is modeled as an incremental process of “tuning” in which elements of the business model are activated or deactivated, or the relationships between elements are emphasized or de-emphasized, in order to improve the degree of compatibility among elements. This, then, is the co-evolution of the structure with the interpretation or narrative associated with that structure. In this interpretation, the resulting business model is a local minimum in a “coherence” surface.

5.4.2 Specifying the model

The four levels of the business model schema are based on the results described in Section 3 and prior research on business models. The first level comprises the critical resources or competencies the firm anticipates leveraging to generate entrepreneurial returns (Garnsey et al., 2008). The second level comprises the activities and transactions most germane to the firm’s extant or expected value creation mechanisms (Zott & Amit, 2010). The third level establishes the opportunities or targets associated with the firm’s extant or expected value creation mechanisms (Teece, 2010). The final level is the overall design or narrative orientation that represents the firm’s gestalt understanding of its role or position in the broader industry or value network (Baden-Fuller & Morgan, 2010).
The schema was developed based on review of the interviews and discussion with other investigators. The conceptual elements included are shown in Table 19.

Table 19: Business model levels and elements

<table>
<thead>
<tr>
<th>Level</th>
<th>Conceptual elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource structure</td>
<td>Automation skills, stem cell culture skills, iPS know-how</td>
</tr>
<tr>
<td>Transactive structure</td>
<td>Blood research, materials development</td>
</tr>
<tr>
<td>Value structure</td>
<td>Development orientation, research orientation</td>
</tr>
<tr>
<td>Narrative</td>
<td>Tools company, therapeutics company</td>
</tr>
</tbody>
</table>

The model is specified as shown in Figure 7, including the disruptor node “iPS know how” added in the second stage.

Figure 7: Conceptual network representation of business model
The simulated search for coherence is derived from Hopfield's model as described in Hertz et al. (1991). The state of the \( i \)th network node, \( S_i \), may be determined:

\[
S_i = \text{sgn}(h_i) = \text{sgn}\left(\sum_j w_{ij}S_j\right)
\]

\[
\text{sgn}(x) = \begin{cases} 1 & \text{if } x \geq 0; \\ -1 & \text{if } x < 0; \end{cases}
\]

\[
w_{ij} = \frac{1}{N} \xi_i \xi_j
\]

Where \( S_i = 1 \) represents the node in an “activated” state and \( S_i = -1 \) represents the node in a “deactivated” state. As described by Hopfield (Hertz et al., 1991), the transformational matrix \( W_{ij} \) is specified by the pattern \( \xi \), which is the vector representing the interactions between node \( i \) and the other nodes in the network: where \( N \) is a proportionality constant equal to the number of nodes. Nodes that are not connected have a presumptive interaction of zero. This may be extended to the recapitulation of multiple patterns superimposed upon each other, but this goes beyond the needs of the limited modelling exercise under consideration.

A simplified explanation for the functioning of this network is as follows. The elements in the network function in a configuration in which not all elements are necessarily connected to all other elements. The connections that exist are specified to be complementary or conflicting based on the cognitive conceptualization of the observer, now embedded in the underlying character of the simulation model in the \( w_{ij} \) matrix. Each element may be activated or deactivated within the network. If
element 1 and element 2 may be generally understood to complement each other, then they function synergistically, such that they tend to update to the same state. This might represent the mutually reinforcing interaction between a philosophy of low cost operations and the technological systems that encourage customer self service.

The model is initiated with a random pattern of activated and deactivated elements, and then asynchronously updated via the “stored” pattern of the $wij$ transformational matrix. A stable configuration, or local minimum, occurs when updating no longer produces node state changes. A run consists of a reasonable number of updates to determine whether a stable, or coherent configuration emerges. The simulation is then repeated many times to develop the stochastic profile of most likely outcomes.

5.4.3 Initial stable configuration

The initial stable configuration of CDI presented two legal entities. SCP was a research-oriented organisation focused on therapeutics; the primary CDI entity was a development-oriented organisation focused on creating assays and tools.

Investigator review of the interviews, emphasizing the interviews with the President, CTO, and Chief Business Officer, in conjunction with discussions amongst the investigators, led to a preliminary interpretation of element interactions. The complementarity or substitutability of the elements was discussed amongst the investigators and ultimately agreed upon by consensus. The weightings were selected by one investigator and utilised in the model without review, on the presumption that detailed discussion and numerical specification was unlikely to improve accuracy, given the novelty of the procedure and the previously untested nature of data collection.
The most common stable configuration, or coherent business model, is shown in Figure 8. Blue connections are “complements”, red connections are “conflicts”. Connection width approximates connection strength used in simulations. This configuration shows two groupings of complementary and conflicting nodes. The set of red, deactivated nodes incorporates therapeutics, research orientation, blood research, automation skills and stem cell culture skills. The set of blue, activated nodes links tools, materials development and development orientation. This outcome does, in fact, closely match the structural configuration of the CDI and SCP legal entities in 2007. It is important to note this locally stable solution incorporates complementary and conflicting relationships between the activated node group and the deactivated node group. For example, the red node “automation skills” has a
complementary relationship with both blue and red nodes ["materials development” and “stem cell culture skills,” respectively] the G2 node “stem cell culture skills” but a conflicting relationship with G2 node “therapeutics.”

![Figure 9: Internodal connection strength for most frequent initial configuration](image)

Legend: 1. therapeutics, 2. tools, 3. research orientation, 4. development orientation, 5. blood research, 6. materials development, 7. automation skills, 8. Stem cell culture skills, 9. iPS skills

The internodal connection strengths for the most frequent initial configuration is shown in Figure 9 with the coloration of the connections reversed, such that blue represents conflicting interactions and red represents complementary interactions.

### 5.4.4 Evolving the model

The first simulation recapitulated the structural configuration of the entity. In the second step of the simulation, the iPS node was incorporated into the network and the transformation matrix expanded to incorporate the relationships between the iPS node and other nodes.
Although one methodological option was to initiate asynchronous updating based on the most prevalent solution of the initial configuration, reinitiating the simulation from random activation configurations is preferable. Recapitulating the observed structural outcome would be more robust from randomized initial conditions; alternatively, a result that paralleled observed outcomes would strongly suggest equifinality and path dependence. In other words, the choice was made in an effort to decrease the probability of generating a descriptively accurate outcome driven by the outcome of the first stage simulation.

The introduction of the iPS node resulted in a different structural outcome. The most common stable configuration is shown in Figure 10. Rather than two distinct organisational structures, a single primary structure emerges that excludes
the “stem cell culture skills” node. This result closely replicates the actual events at
the organisation, in which management chose to merge the distinct entities.

The internodal connection strengths for the most frequent phase 2 configuration is shown in Figure 11, again with the coloration of the connections reversed, such that blue represents conflicting interactions and red represents complementary interactions.

Note that the final configuration still incorporates conflicting interactions, including conflicting interactions within the primary structure of deactivated nodes.

![Internodal connection strength for most frequent initial configuration](image)

*Figure 11: Internodal connection strength for most frequent initial configuration*

Legend: 1. therapeutics, 2. tools, 3. research orientation, 4. development orientation, 5. blood research, 6. materials development, 7. automation skills, 8. Stem cell culture skills, 9. iPS skills

### 5.4.5 Additional comments

Given the novelty of the methodological approach and the somewhat unexpected success recapitulating actual change at the organisation, a number of comments are appropriate to put the experiment into perspective.

First, the results are surprising given that managers’ stated reasons for keeping the entities separate in the initial configuration, as well as some of the key drivers for merging the entities together, are entirely absent from the model:
shareholder interests, financial considerations, and the costs and benefits associated with shared resources. These concepts and issues are, arguably, partially or entirely subsumed into the transformation matrix in the form of internodal interactions of the extant elements, but the success of the model without reference to those factors helps support the idea that pattern-forming and sense-making functions at levels that allows for certain types and levels of conceptual aggregation that bode well for descriptive and predictive simulations of business models at entrepreneurial firms.

Another interpretation could suggest investigator influence over model specificity and outcome. Since nodes present binary states, a limited number of configurations are possible, many of which would present two distinct structures. Future investigation would do well to consider developing measures of statistical likelihood of given outcomes based on random transformation matrices and nodal interconnectivity configurations.

It’s important to note, however, that the investigation process was a single iteration. Once the model had been specified and the transformation matrix determined based on the perceived weightings of the node interactions, the model was run for both the initial and change configurations without adjustment. It is safe to state that the investigators had not anticipated that the model would recapitulate observed structural configurations of the actual firm with this level of success.

5.5 Discussion

This study develops a coherence-based perspective on how entrepreneurial managers develop and coordinate organisational elements and structures. The abductively derived conceptualization extends frameworks of strategic complementarity into an entrepreneurial context via a novel simulation method incorporating stable solutions to a constraint-satisfaction network. In effect, the study
argues that business models and structural changes at organisations may be understood and, possibly predicted using cognitively derived configurations of important firm elements.

The investigative study that developed the quantitative data for the simulation model also provides qualitative data relevant to the thought experiment. Some of these findings are discussed below. Following this, some implications of the research and directions for future study are discussed.

5.5.1 Implications for entrepreneurship: data from other case studies

The study that generated the data on Cellular Dynamics included ten other innovative, entrepreneurial organisations. Although the data from these other firms has not yet been coded for simulation, a few brief observations support a coherence, rather than complementarity based interpretation of entrepreneurial action.

ReturnPath, the global leader in email whitelist technology and services, has evolved through four business model iterations since 2000, including five technology or entity acquisitions and two divestitures. Despite having less than 250 employees, the company spans five offices globally, and has undergone numerous functional and structural reformations. Throughout this process, the CEO and the executive team have focused on a process that emphasizes a positive culture within the organisation while actively co-evolving the structure of the firm with various identified opportunities. Rather than attempt to mold a perfect, mutually-reinforcing system within the organisation. The executive team has created a more flexible entity that has successfully adapted with changes in opportunities, markets, and products. It is useful to note some of the conflicting elements, or “endearing flaws” at the organisation. Despite the critical focus on culture, ReturnPath’s Chief People Officer
works in a virtual office in another country. The CEO stated in an interview that if he could change one thing about the firm, he wouldn’t have separate corporate and executive offices: the corporate office in New York is sometimes at odds with the larger development and engineering facility in Colorado. Numerous technical staff noted that the engineering team would benefit from senior expertise instead of growing capabilities internally by hiring and training younger staff, but since the executive team has decided the culture-building process takes priority, the imperfections of training inexperienced software engineers is a necessary problem.

Similar conflicts can be seen at Recurve, a San Francisco-based residential energy efficiency auditing and remodeling firm. In an effort to benefit from scale economies otherwise impossible for a remodeling firm to achieve, the company has developed a proprietary software product to enable other remodelers to provide the same services in other markets. The firm made a conscious decision to retain the previously core auditing and construction business inside the new software business structure, so as to capture market and utilisation data, despite the tremendous cultural and operational conflicts between the functional groups.

These examples, along with the simulation output, provide a window into the cognitive processes employed by entrepreneurs to manage organisational functions, activities, and elements. Two phenomena, in particular, merit notice. First, entrepreneurs appear to co-evolve opportunities via a stepwise sense-making process rather than an instantaneous understanding of the opportunity characteristics. In fact, it may be the process of manipulating organisational structure associated with managing conflicts and complementarities that facilitates understanding. At Confederate Motorcycles, CEO Matt Chambers attributes success of the firm’s most recent motorcycles to an entirely design-centric organisation that
fits with the organisational story associated with the objective humanistic ideals embraced by the founder. The company is currently on its second venture-financed growth path. The first venture funding was used to scale manufacturing, which led almost directly to the firm’s bankruptcy in 2001 because quality problems detracted from the high-performance, high-price market position. In this second venture funding, Chambers has focused on streamlining the high-quality production processes to control costs at constant output rather than increase output to drive down per unit costs. This actually supports Confederate’s stated policies of producing limited run bikes, as well as reinforcing the narrative of individualization and design-led vision. It also means the firm can not be as large or as profitable as promised to investors a decade ago, but appears to represent increased plausibility to Chambers and other employees.

The second phenomena is one of bridge-building. In Wernerfelt’s (Wernerfelt, 1984) resource-based treatment, resource complementarity is the key driver of new market entry decisions. But this is a strategically-centered, rather than opportunity-centered perspective. For Recurve, software engineering skills are simply not complementary to residential energy auditing and remodeling. The intermediate organisational structure is a bridge, and arguably a temporary one at that. Rather than focus on strategic complementarity, the executive team has erected a structure to span opportunities, a much riskier but necessary proposition. Savage Games failed to build a bridge having planned it for a decade—when the market for outsourced production collapsed, there was no viable structure to utilise for the really valuable opportunity, intellectual property development. Voxel, a global cloud

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4 See Section 5.5.3 for a more detailed case summary.
computing services and content delivery network is attempting to build a bridge. The firm has functioned sub-scale to offer high quality engineering support to customers at lower costs than Amazon and Akamai, but probably cannot continue to do so as it grows offices around the world. The company has successfully spanned opportunities in the past: from brokering server capacity to content delivery and specialized website support, and finally to a cloud platform. At each stage, the firm identified the new opportunity and built internal capacity, developing novel skills and capabilities as needed. At the time of the interviews in 2009, Voxel was recognized as one of the top CDNs and cloud service providers by uptime and speed, despite having one of the smallest global footprints within the industry. But the story of the small, nimble, low-cost firm isn’t plausible in the global context where the scale economies offered by Amazon or Akamai take effect. Voxel is trying to build a bridge so that it doesn’t have to compete with Amazon and Akamai on their terms for the same opportunity. So far, the opportunity hasn’t been specified, and the bridge is incomplete.

Much more investigation of the sense-making and bridge-building processes at entrepreneurial firms are required, but the coherence framework appears to offer a useful tool to develop models for how these phenomenon affect behavior and outcomes.

5.5.2 Refining strategic complementarity

The simulation analysis suggests that modified interpretations of strategic complementarity may apply to management of entrepreneurial ventures. The simulation generated a stable solution with two groupings that matched the initial configuration of the firm, as well as a stable solution following uptake of an additional
node that closely matched the merged organisation. Of particular note, the simulated systems of a successful entrepreneurial venture included non-complementary interactions between organisational elements. In fact, the ultimate structural configuration that presented successful performative outcomes incorporated more conflicting relationships within the primary grouping than the original configuration. The complexity of successful entrepreneurial ventures that operate in highly uncertain, resource-scarce contexts may be describable without assessing an objective, unique, equifinal, optimized system of fully mutually-enhancing elements. The coherence framework appears to present a viable approach to the interpreting entrepreneurial management of business models and structures. Entrepreneurs have limited resources and attention, and must constantly make trade-offs within the organisation which may be more accurately reflected in coherent configurations that systems of strategic complementarity.

The processes of evolving towards fit, such as “patching,” (Siggelkow, 2002) are not costless. In entrepreneurial contexts, with high opportunity costs and discount rates associated with rapidly evolving technological capabilities and competitive profiles, the costs of resolving internal conflicts, especially conflicts that are not core to the immediate value-creating capabilities of the organisation, may outweigh the near-term benefits. The case of an organisation like Vanguard, as described by Siggelkow, shows a firm functioning in a relatively mature industry--mutual funds--with established competitors and competitive positions. Evolution of fit presumes that investments in optimizing operational efficiency via strategic complementarity generate long-term benefits because the fundamental nature of value creation and competitor behavior will not change in the interim.

This may not be the case for a firm like CDI, where there is greater potential
for unexpected technological or competitive developments. Prior research has shown that structural flexibility presents more rapid opportunity identification in environments of high uncertainty (Siggelkow & Levinthal, 2003); Section 4 showed that retaining control of non-core functions is preferential when changing business models for obtaining strategic flexibility. Coherent configurations allow stable subgroups within the organisation as well as partial overlook of unavoidable or non-critical conflicts. The theory of a stable solution of entirely mutually-reinforcing elements, as described in Porter (2001) and Siggelkow (2002), though attractive, is likely illusory for entrepreneurial organisations where high levels of uncertainty and limited resources, especially attention-based and cognitive resources, require entrepreneurs to make short-term optimal and even suboptimal choices simply to maintain organisational functionality. It is possible that the presence of conflicting elements and subsystems within entrepreneurial organisations, otherwise giving the appearance of inefficiency, actually represent “endearing flaws” that help the firm retain flexibility and narrative continuity. These may represent tools and capabilities that prevent the firm from developing groupthink or capability traps.

5.5.3 Potential application of the energy function

A final implication of coherence networks in entrepreneurial settings is the potential to apply objective, longitudinal measures to configurations. Although Siggelkow’s theory of evolution of fit (Siggelkow, 2002) establishes a framework for how configurations of organisational elements may be molded by managerial action, there are no obvious mechanisms to test for strategic complementarity. One of the challenges to supermodularity as a theoretical bases for theories of strategic complementarity is that it has not testable implications (Chambers & Echenique,
2006). In other words—while the evolutionary model of fitness may, in fact, describe the successful development of strategic complementarity, the strategic complementarity of the system cannot be tested at any individual point without relying on hindsight. By contrast, coherence is testable, both cross-sectionally and longitudinally at any given time. In fact, one of the most attractive aspects of theories of organisational coherence is the ability to measure coherence via an energy function (Hertz et al., 1991):

\[ H = -\frac{1}{2} \sum_{ij} w_{ij} S_i S_j \]

This energy function represents a measure of the stability of the solution—it is locally minimized in a stable solution, though not necessarily globally minimized. The energy function may be assessed longitudinally to assess the relative stability of configurations given system constraints. For example, in the case of Cellular Dynamics, the initial dual-structure configuration is locally stable, but the uptake of the iPS technology changes the energy surface and the old solution is no longer a local minimum. This characteristic of constraint satisfaction networks implies that coherent systems are not just measurable but potentially predictable.

Preliminary review of additional case studies suggest that this type of coherence modeling presents a potentially useful addition to theories of strategic complementarity. For example, the case of Savage Entertainment [“Savage”], an independent video game production company in Los Angeles, may demonstrate the problems associated with coherent systems in the context of landscape change. Data collection at Savage began in 2007 and continues to the present day, despite the fact that the company has laid off 95% of the workforce [55 FTE] and operates at
the minimum scale to support part-time founder roles. For 11 years Savage successfully providing “job shop” support to the major video game production firms and content houses, including Electronic Arts, Activision, and Universal Studios. One of Savage’s games is the second highest selling product on the Nintendo DS system, and another was the third highest selling product in its release year (source: Savage Games website, accessed 12/1/2009). In 2009, however, the business model that had previously fit within the environmental context became unsustainable. A brief explanation shows the potential descriptive and predictive power of coherence models and energy functions.

When Savage was initially spun out of Activision in 1999, Chacko Sonny and Tim Morton expected to provide outsource services to Activision while pursuing the development of proprietary content. At the time, the average video game cost $2-5 million to produce, and the founders anticipated that slack resources applied over a 12-24 months span would produce enough new intellectual property to warrant outside investment or a partnership with a development house. The failure to accomplish this milestone led the firm to intensify its focus on outsource work, narrowing the amount of available slack for IP development. The firm maintained an internal narrative that it would, eventually develop its own titles, but the business model converged, as Sonny described, to a “mechanic’s garage” that specialized in fast, economical output. Arguably, Savage may have been the premiere firm in this niche—Savage was the only independent video game development more than 10 years old in Southern California, the center of video game development in the United States, in 2009. In effect, Savage had found a local energy minimum with a coherent, if partially inconsistent business model.

The economic crisis of 2008 and 2009 led to significant reductions in
outsourced video game development contracts. The large development studios had, through 2008, been acquiring small studios and production capacity. Demand for video game content had grown more than 10% per annum for more than 10 years, but the cyclicality of product release timing required the studios to enforce tighter control over the development process. Although demand for video game content continued to rise during the economic crisis, the development studios scaled back new content projects to conserve cash. Companies like Universal and Activision had too much development capacity—outsourcing projects were subsequently reduced or eliminated.

The founders at Savage saw the problem before it manifested—the company was fulfilling three contracts in mid-2009: a major studio project of original content, a small “port” of existing content from one platform to another, and a small virtual reality project for the Department of Defense. The smaller projects were slated to complete by early Fall; the customer for the major project had been hinting it might move the project in-house rather than complete the work with Savage. For the prior six months, the founder had been trying to line up additional projects without success—even former satisfied clients simply had no work to offer as the pipeline of projects had narrowed across the industry.

The founders at Savage had one additional possible option—they looked at raising funds to transition the firm to developing novel intellectual property. The average cost of content development, however, had increased by an order of magnitude. New games regularly exceeded $25 million budgets, and Grand Theft Auto IV reputedly cost more than $100 million to produce. With no prior history of successful content development, the hurdle to raise funds had become dramatically higher.
It is important to note that this was not a problem of strategic competitive positioning. The company still occupied a coherent, local minimum within the competitive landscape. At the same time, the landscape around that minimum had change dramatically—although it was a local minimum, it was no longer a viable local minimum. In addition, the slope of the local landscape had increased by an order of magnitude, effectively increasing the cost of transitioning to another local minimum. An analogy may be found in chemistry or physics, where a reaction or effect requires an activation energy. In Savage’s case, the activation energy required to move to a new viable local minimum associated with a coherent model for novel intellectual property development had increased beyond the firm’s ability to apply or acquire slack resources. Although the firm’s previously coherent model had not changed, the measure of the relative energy of the minimum within the landscape had changed. The operationalization of this type of analysis remains to be attempted, but suggests interesting potential for helping entrepreneurs assess questions of business model change and inertia.

Finally, a coherence-based perspective for entrepreneurial firms emphasizes one of the most commonly utilised cognitive frameworks in practice: narrative and sense-making. Entrepreneurship, and organisational culture generally, is commonly described with stories (Downing, 2005; Gabriel, 2000; Magretta, 2002). Business model coherence is inherently a cognitive process associated with the interpretation of plausible organisational structures. It is likely, in fact, that the sense-making process ultimately influences not just the interpretation of elements, structures, and narratives, but decision-making and managerial functions. For example, at Broadjam, another of the case study companies, the firm utilised a cash-generating contract with a major music studio to develop nascent relational database skills. At
the same time, the firm had developing online voting systems to enable users to determine the most popular hosted musical content, which led to a contract to provide online voting services for the Country Music Awards. These systems, though linked by software engineering skills, represent distinct capabilities and customer/market applications. Roy Elkins, the founder and CEO, justified the portfolio of organisational elements as all being linked to providing online commercialization support for independent musicians and their fans. The capabilities were, ultimately, merged into the firm’s musician social networking system that incorporates both content metadata sorting and sifting along with content rating mechanisms to create communities of affinity groups. It is possible that an assessment of strategic complementarity would have either rejected one of the capabilities or separated them completely; the coherence process overlooked the partial conflict via narrative rationalization, which ultimately facilitated the development of an entirely new firm-level service.

5.6 Conclusion

While much remains to be investigated, a coherence-based framework for entrepreneurial action appears to hold promise. A case study of structural change at Cellular Dynamics suggests both descriptive and potentially predictive use, while selected data from other case studies demonstrate potential applications of the framework. This extends existing theories of strategic complementarity and supermodularity to behavior and change at entrepreneurial firms. This investigation examines business model coherence via a constraint satisfaction network of heterogeneous organisational elements. The network recapitulates the structure and structural change at an innovative entrepreneurial firm, and points towards other applications of simulation methodology.
6 CONCLUSIONS

This study integrates and advances theory on business models within an opportunity-centric perspective. It presents an integrative interpretation of the business model that frames its use in practice within the scholarly literature. In particular, the assessment of the business model in practice shows that business models are opportunity-centric designs of organisational structures. Based on this inductively derived perspective, two studies of business model change demonstrate the unique descriptive value of business model analysis. First, a quantitative investigation of organisational innovation at large companies provides insight into structural change processes during business model innovation that are linked to outcomes of strategic flexibility. Second, a constraint-satisfaction network simulates business model change at a technology-based entrepreneurial firm. The results of these investigations are briefly recapitulated to synthesize the contributions to research and suggest avenues of additional study.

The massive and fragmented research body on business models has resisted integration, resulting in disparate fields of interest, non-accretive theory-development, and conflicting empirical results. A review of the organisational research on business models contextualized the varied conversations and identified dominant thematic frameworks within the most relevant literature. This creates a background of language categories, primarily associated with the strategy literature. Rather than attempt to synthesize parallel but disparate research streams, the first investigation in this study analyzed the discourse of business models in practice to derive an inductive and objective language of business models within the linguistic framework from the literature review. Business models are opportunity-centric designs of organisational structure. Business models function in three dimensions:
resource structure, transactive structure, and value structure. Although innovation and narrative frameworks may be relevant for particular studies, they are not reflective of the discourse of business models in practice.

Framing the language of practice business models within the discourse of business model research resolves arguments about business model characteristics driven by semantic distinctions. Rather than requiring an all-encompassing definition or focusing on a very narrow interpretation with limited testing options, the synthesized discourse of business models based on practice language offers an effective and useful middle-ground for theory development and empirical testing. In particular, it is derived from observed, high-granularity data rather than deductively derived from strategic theory.

The proposed framework, derived primarily from Indian company managers, matches usage in the United States and United Kingdom. Business models are understood similarly by managers in multiple global contexts. This conclusion is supported by the extant research on business models in the literature that span geographies as well as the quantitative analysis of business model innovation in Section 4 that uses company data from every major geographic region.

The most important results of the discourse analysis distinguish business models from organisational strategy and place the study of business models in an entrepreneurial framework. Unlike strategy, which is competition-centric and focused on positioning within an environment, business models are opportunity-centric and associated with the content and alignment of structures to enact an opportunity for the benefit of the organisation. A few contrasts bear repeating: strategies are dynamic processes that may be reflexive or change-oriented; business models are static designs of structures, not the process of changing those structures. Strategies
are relevant in competitive landscape context; business models are a necessary and critical component of the opportunity enactment process, even if the business model emerges without conscious intent or cognition.  

Placing the business model within the realm of entrepreneurship, rather than strategic research clarifies much prior research and presents an improved perspective on future research. Business models exist at all firms, entrepreneurial or not, but business model creation and change are, fundamentally, entrepreneurial processes. The business model is a cognitive and coordinating tool in the opportunity identification and enactment process. This presents a new and potentially useful window into entrepreneurial functions at the boundary between discovery and exploitation. Important questions remain to be answered about the drivers and forces that shape the emergent business model, but the synthesized business model as design of structures resulting from this study provides a potentially helpful framework to begin investigating those problems.  

Viewing the business model as opportunity-centric design of structures illuminates certain novel organisational innovation efforts. Unlike product and process innovation, which focus on implementation of extant opportunities via new value offerings or improved operational efficiency, business model innovation translates or recasts the firm’s opportunity portfolio. This effort may result in a variety of outcomes, including strategic flexibility, the rapid response to exogenous change. Although business models germinated in the context of new ventures, large firm business models are of interest because business model change represents a potentially important mechanism of attaining or maintaining strategic advantage in turbulent environments.  

In Section 4, a database of predominantly large firms across geographies is
assessed to identify the structural changes that link business model innovation to outcomes of strategic flexibility. This novel, third-party data set includes data from the CEOs of more than 700 organisations worldwide. Despite certain limitations, the dataset is a unique collection of executive-level information on organisational innovation and change processes. It appears to represent the largest and more comprehensive assessment of business model change available, as no comparable datasets are reported in the literature.

The study identifies characteristic structural change processes associated with business model innovation including structural simplification of formal organisation and the role of creative information organisation. The regression analysis confirms prior research linking creating culture to strategic flexibility as well as the value of structural simplification. It suggests that that while contracting formal organisation enables responsivity by reducing the managerial attention burden, managers must retain control of functions to obtain the full benefits of simplification. Finally, while prior research suggests that reliance on partners creates access to knowledge and other resources during traditional innovation efforts, it hinders strategic flexibility outcomes during business model innovation.

These results augment theories of organisational innovation. First, business model innovation demonstrates different drivers than traditional innovation activities. Business model innovation drivers operate at a macro-level, perhaps representing changes in the broad opportunity landscape. Also unlike product and process innovation initiatives, business model innovation is not linked to prior change success, suggesting that learning effects are not as significant. This matches the opportunity-centric nature of business models, as novel opportunities are more likely to incorporate capability-destroying or entirely unfamiliar technologies and talents.
The study does not identify why control is a necessary condition during formal organisation simplification, nor whether strategic flexibility improves outcomes for business model innovators. These questions are left to future study. Regardless, the analysis does suggest that business model innovation represents a new form of fundamental organisational innovation distinct from product/process centric innovation. As business models are tightly linked to entrepreneurial action, firms engaged in business model formation, change and innovation may be as focused on opportunity identification and sense-making as competitive positioning.

The final investigation in this study combines a cognitive and structural interpretation of business models via a novel simulation methodology. The study abducts a framework of organisational coherence from observation of a single entrepreneurial firm. The firm undergoes a structural change that appears at odds with traditional theories of strategic complementarity and supermodularity. Despite significant conflicting elements, two organisations are merged together with positive performative outcomes.

A structural business model is derived for the organisation interpreted as a schema of important organisational elements, including resource, transaction, and value structures. This interprets the business model as a representation or design via a narrative if not necessarily conscious process. While organisational management requires operational cognizance, the sense-making process serves the purpose of “modeling” the business for this analysis.

The structures of the organisation are simulated used a constraint satisfaction network based on Hopfield network theory, in which stable outcomes are considered to be coherent. Coherent configurations may include mutually enhancing as well as conflicting elements. The stable configuration resulting from the random updating of
network nodes matches the structure of the organisation prior to the introduction of a novel technology platform. Following the technology adoption event, the dual organisations were merged together; the simulation also results in a stable configuration with only one primary structure. The application of this novel methodological process presents opportunities for both descriptive and normative theory development. Business model coherence may be simulated as a network of heterogeneous conceptual elements. In addition, change processes may be modeled based on updating the network nodes or the nodal interaction matrix. In other words, the simulation presents the potential to both describe and predict organisational structural changes at entrepreneurial firms based on managerially-derived cognitive representations of business models.

These three investigations contribute to organisational theory and the study of business models. Business models are a relevant and explanatory framework for understanding firm behavior and managerial cognition in a global context. A consistent definition for the business model, based on discourse in practice, provides a sufficient and organised background for understanding entrepreneurial phenomena. In particular, as resource acquisition, partnerships, and value legitimization are generally understood to be essential elements of entrepreneurial success, an opportunity-centric business model helps demonstrate how these functions are understood by managers and incorporated into the entrepreneurial implementation process. These mechanisms appear to operate across geographies, as demonstrated by the first two investigations in this study.

The studies of business model change and innovation improve descriptive and process theory on organisational change processes associated with opportunity exploitation. The macro-level drivers and structural change mechanisms of business
model innovation are identified for large firms in a global context, along with normative theory for firms attempting to improve strategic flexibility. The simulation of business model change at Cellular Dynamics, in conjunction with the other research case studies, suggests that cognitive sense-making is an important aspect of business model change at entrepreneurial firms. Organisational coherence extends existing theories of strategic complementarity normally associated with organisational effectiveness. The neural network simulation is a relatively novel methodology for the application of descriptive and normative theory to organisational change processes.

This study points towards a variety of future research directions. These have been primarily identified in Sections 3, 4, and 5, but a few are highlighted here. Despite the massive extant literature on business models, much less is known than unknown. Significant value could be reaped via reinterpretation of prior research based on opportunity-centric perspective rather than strategic framework. As one small example, Winter and Szulanski’s research on replication (2001) utilises a definition of the business model as an emergent bundle of core value creating activities. Reframed in an opportunity-centric perspective, their results can be integrated with studies that point towards maintenance or modification of business models across national borders (Hurt & Hurt). This framework refocuses the question not on whether the strategy of growth by replication is viable, but whether there are distinctions in the underlying opportunity or the necessary opportunity enactment process across geographies.

As significant as this reinterpretation process could be, the integration of research on ICT and e-business into the organisational literature of business models could be even more significant. The perceptions that e-businesses might be
idiosyncratic compared to traditional businesses (Amit & Zott) or that e-businesses could be explained entirely via transactive structures (Weill & Vitale) have hampered comparative studies and yielded somewhat distinct research conversations. As a subset of commercial organisations born entirely in the past 20 years, e-businesses offer unique learning opportunities to organisational scholars; the business model as opportunity-centric design provides a framework for comparative and contrasting analytical research on venture creation, organisational structures, sense-making, and change.

While the transactive structures of business models have received some attention in both e-business and general organisational research, resource and value structures have received much less. Improved analysis of the resource structural dimension of business models should augment resource-based strategy research. Similarly, the link between the value structure dimension of business models and value creation processes associated with competitive positioning is entirely unexplored. The contingent links between transactive structural characteristics and strategy (Zott & Amit) suggest analogous links between resource structures and systems of strategic complementarity or resource-based competitive advantage, as well as links between value structure characteristics and value chains and networks.

The studies on business model change and innovation presented here provide only small steps forward in developing comprehensive theories of fundamental organisational change. To date, no large-scale panel studies of business model innovation have been reported. As noted, an potential path for new findings includes re-examining the few extant process studies of business model change within the opportunity-centric framework. Regardless, additional studies are required to distinguish key drivers of business model change at entrepreneurial
versus large firms. Much remains to be understood about the processes of change specifically associated with positive performative outcomes.

Two additional directions merit note. First, this study presents one of the first simulations of business model change. Much could be learned from more sophisticated models that incorporate multiple cognitive frames, whether at different levels of analysis or multiple actors at the same level of analysis. These could be especially valuable in bridging managerial cognition with emergent structural change and firm-level behavior otherwise difficult to explain via traditional strategic choice models. In addition, although research has suggested that business models may be imitated, the processes of learning or absorbing business models has not received significant treatment. A first step might be research to identify the appropriate locus of absorption. Are business models learned at the executive level and dispersed downwards, or are business model structures imitated at functional levels and propagated upwards via narrative sense-making?

The business model presents a wealth of interesting and challenging research opportunities. This study has attempted to provide a basis for more rigorous, engaging, and productive organisational investigations, especially associated with entrepreneurial action, narration, and change.


Osterwalder, A. 2004a. The business model ontology: A proposition in a design science approach. Université de Lausanne, Lausanne, Switzerland.


## APPENDIX A: FILTERED QUASI-SYSTEMATIC SEARCH RESULTS

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