A Systems Perspective on Business Model Evolution:

The Case of an Agricultural Information Service Provider in India

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Abstract

This paper explores how the organizational capabilities of a firm enable business model evolution by examining the development of a new firm that provides mobile-phone-based information services for farmers in India. We argue that these organizational capabilities are part of the dynamic capabilities of the firm. We use a longitudinal and in-depth single case study to extend our understanding of the mechanism for business model evolution in new firms. The study shows three themes emerging from the data analysis of the case study by drawing on the literatures on systems thinking, dynamic capabilities and business model evolution. The three themes are balanced redundancy, requisite variety and cognitive discretion, which enable a firm to achieve congruence between the components of the business model in order to deliver the customer value proposition. We explain how these three themes form the micro-foundations of dynamic capabilities that enable a firm to evolve its business model. We contribute to the business model and dynamic capabilities literature by proposing a systems perspective on business models and their evolution.

Key words: Business Model Evolution, Systems Thinking and Dynamic Capabilities

1. Introduction

A business model summarizes the architecture and logic of a business, and defines the organization's value proposition and its approach to value creation and capture (Baden-Fuller and Morgan, 2010). Business models can facilitate the creation of new customer value propositions (Aversa, Furnari and Haefliger, 2015; Velu, 2016). It is well known that new firms often have to change their business models from their initial plan to develop a profitable and viable model that has a compelling customer value proposition (Lubik and Garnsey, 2015; Mullins and Komisar, 2009). Established firms such as Apple and Google have changed their business models radically from their initial ideas, enabling them to build successful businesses. However, the extant literature has not explored the organizational capabilities that enable new firms to evolve from one model to another in order to build a viable business model.

New business models enable the creation of new customer value or enhanced delivery of an existing customer value proposition (Fligstein, 1996; Humphreys, 2010; Geroski, 1998). The business model needs to be configured to enable the delivery of the customer value proposition. Business models often need to change and evolve in order to deliver a proposition that customers will be willing to buy – the process of business model evolution[1] (Demil and Lecocq, 2010). This process is especially important for new firms, as their very survival depends on the ability to evolve the business model from the initial plan, the so-called Plan A, to a subsequent viable one, Plan B (Mullins and Komisar, 2009).

The challenges of business model evolution are both cognitive and economic. They are cognitive because the business model is a cognitive conception (Doz and Kosonen, 2010;

[1] The concept of business model evolution emphasizes the transformational approach to address change and innovation in the business model (Demil and Lecocq, 2010). In doing so, business model evolution examines the dynamic created in interactions between the components of the business model as it evolves from its existing form to a new one.

McGrath, 2010; Teece, 2010), meaning that management has to understand the cause–effect relationship of changing components of the business model. However, they are also economic because the business model is an activity system consisting of interdependent organizational activities centred on the focal firm, its constituent partners and customers in order to create and capture value (Achtenhagen, Melin and Naldi, 2013; Casadesus-Masanell and Ricart, 2010; Zott and Amit, 2010). Management decisions based on the cognitive conceptualization of the business model will have economic implications for the firm. Therefore, understanding the content of the activities, how they relate to one another and who has responsibility for them is a key aspect of managing the evolution of the business model. Such articulation of the content of activities, and their relationship with one another, has similarities with the concept of systems. A system is composed of inter-related parts or elements. Every system has at least two elements, which are inter-related (Kast and Rosenzweig, 1972).[2]

A business model can be seen as a system that acts as a mechanism to enable the core value proposition to be transferred as benefits to the customer (Seelos and Mair, 2007). In this sense, general systems theory has several analogies with business models, as the theory can be applied to show how organizations continuously interact with their environment to obtain energy and transform it into output (Bertalanffy, 1950; Katz and Kahn, 1978). We posit that systems thinking is an appropriate method to understand how the mechanisms for value creation and capture function and evolve, as they display similar characteristics to business models.[3] In particular, systems thinking tends to highlight the difference between the components with reference to the whole and its constituent parts, the relationship between components and the

[2] A complex system comprises a large number of parts that interact in a non-simple way (Simon, 1962).
[3] Systems theories traverse a diverse set of fields, from the physical and life sciences to the social sciences. We use the term ‘systems thinking’ to encapsulate the universal principles of these theories.

possible viewpoints of the agents who are part of the system (Cabrera, Cabrera and Powers, 2015; Midgley, 2003). Therefore, entrepreneurs and managers could benefit from taking a systems perspective of business models when they shape and design both the organizational activities and the links that connect them. The challenge for management is to ensure *dynamic consistency* by maintaining congruence between the components of an existing business model as they evolve (Demil and Lecocq, 2010). Such a process of business model evolution requires the firm to possess dynamic capabilities which is a form of organizational capabilities in order to adapt an organization's resource base.[4] However, the articulation of the micro-foundations of such dynamic capabilities is at a nascent stage.

Dynamic capabilities are higher-level capabilities that enable firms to strategize and orchestrate the firm's resources to create superior performance (Teece, 2007; 2014). Dynamic capabilities consist of three clusters of processes, namely *sensing* opportunities, *seizing* the opportunities by mobilizing resources and *transforming* by continuously renewing the organization and its associated business model. Firms that operate in markets with changing environmental conditions such as new technologies face the challenge of developing an appropriate business model to connect the technology with the needs of the market (O'Reilly and Tushman, 2013; Velu and Stiles, 2013). Such intertemporal management of the evolution of the business model, to configure an appropriate means to create and capture value, requires firms to possess dynamic capabilities (Teece, 2007; 2014). However, the nature of the constituent elements of dynamic capabilities that enable business model evolution is not well understood. In

[4] The literature distinguishes between two types of capabilities, namely ordinary and dynamic capabilities. Ordinary capabilities enable the production and sale of a defined set of products and services and focusses on the efficiency of a set of activities. In contrast, dynamic capabilities encompasses the entrepreneurial activities, processes and leadership skills to recognize the need to change the business model and hence, how the necessary resources are accessed and orchestrated in order to pursue the new value creation and capture opportunities (Leih, Linden and Teece, 2015).

this study, we explore the following question: 'What are the organizational capabilities in new firms that enable business model evolution?'

We present a longitudinal and in-depth single case study (based on interviews with senior management) of I-AGRI, a unique, mobile-phone-based information service for farmers in India. I-AGRI was formed by the ALPHA Corporation, a major global blue-chip company (the names of the firms have been changed). In particular, the case study examines how I-AGRI evolved its initial business model from a mobile-phone-based information service for farmers to a transactions platform for agricultural crops between buyers and sellers, and subsequently incorporating an engagement-based solutions provider business model for banks and other agricultural-related businesses. The study shows three themes emerging from the data analysis of the case study by drawing on the literatures on systems thinking, dynamic capabilities and business model evolution. These themes highlight the organizational capabilities that enable business model evolution. The three themes are balanced redundancy, requisite variety and cognitive discretion. Balanced redundancy refers to the ability of the firm to stretch and create additional overlapping resources in order to perform experiments while running the existing business model.[5] Requisite variety refers to the extent to which components of the system obtain a variety of information to understand the environment better. Cognitive discretion refers to the freedom to perceive and construct an idiosyncratic meaning. We explain how these three constituents of dynamic capabilities have enabled I-AGRI to evolve its business model in order to explore and develop an appropriate customer value proposition to create and capture value.

The study makes two contributions to the literature. First, we shed light on the business model as a system and how its evolution might unfold. Our analysis points to the systems

[5] Although our paper examines the case of a single business model of a firm, we acknowledge that a new firm could have multiple business models.

thinking lens as a theoretical frame in order to articulate how business model evolution takes place. The study contributes to the literature on business models, in particular how a firm needs to develop capabilities to enable a business model to evolve in order to achieve dynamic consistency. Second, we contribute to the organizational capability literature to show what type of firm-level capabilities might be required for firms to enable business model evolution. In particular, we explicate the micro-foundations of dynamic capabilities that enables business model evolution.

The next section reviews the relevant literature, while Section 3 describes the data and method adopted for the case study; Section 4 uses the empirical evidence to extend the business model evolution literature by linking it to systems theory. Finally, Section 5 discusses the theoretical and managerial implications, and Section 6 concludes.

2. Literature review and theoretical framework

2.1 Business models and systems perspective

Business models are a particular kind of configuration that link the inside of the firm with the customer value proposition of the external market environment and how value is monetized (Baden-Fuller and Mangematin, 2014; DaSilva and Trkman, 2014). In this sense, business models are the 'architecture' that provides the bridge between value created for customers and the value captured by the business in terms of profit. Business model evolution is the process of aligning the components of the business model through voluntary or emergent changes to achieve a better fit or congruence between them in order to create and capture value more efficiently (Demil and Lecocq, 2010). Scholars have argued that business models can be defined both objectively and subjectively (Doz and Kosonen, 2010). The objective definition captures the economic manifestation in terms of structure of the firm's relationships and processes (Teece, 2010). The economic manifestation relates to the financial viability of the business proposition in terms of value creation and value capture. The subjective definition corresponds to the cognitive manifestation that shapes managerial choices (Baden-Fuller and Mangematin, 2014). The cognitive manifestation relates to how senior management conceptualize the business model as a model-like device as the basis for their actions in order to create and capture value.

The cognitive and economic manifestations of the business model are inter-related, as the actions taken by management using a cognitive frame will have economic implications. This inter-relationship can be examined by viewing the business model as an activity system and exploring how managers make decisions. The business model as an activity system consists of a set of interdependent organizational activities centred on the focal firm and its constituent partners and customers in order to create and capture value (Zott and Amit, 2010). The business model as an activity system can be seen as having three key design parameters, namely, content, structure and governance. Content relates to which activities are part of the business model. Structure concerns how these activities are linked to one another. Finally, governance relates to who is in charge of them.[6] Casadesus-Masanell and Ricart (2010) emphasize the choices made by management and the consequences of these choices within an activity systems approach to business models. Some scholars have argued that such choices and consequences are evaluated by management through a simplified or model representation of the real world (Aversa et al., 2015). Therefore, business models can be seen as a set of cognitive configurations that are ‘manipulable instruments’, which can be used either by managers of established firms or by entrepreneurs to categorize the business world and better explore cause and effect (Baden-Fuller and Mangematin, 2014). Such cause and effect analysis constitutes the economic implications of

[6] Such a conceptualization of the business model is similar to that articulated by Afuah and Tucci (2001), whereby the business model is a system made of components, linkages between components and the corresponding dynamics.

the actions taken by management. Often there are disconnects between the cognitive conceptualization of the business model and the actual activity system that represents the business model in the real world (Aversa et al., 2015). Managing the mismatch between reality and managers' perceptions of reality of the business model is often a challenge.

The activity system of the business model has components that form part of the value proposition to the customer, the means of value creation and the method used to capture value. These components need to be aligned with one another in order to develop an efficient mechanism to create superior performance for the firm while delivering value for the customer. The business model can be viewed as a complex system that acts as the mechanism to enable the core value proposition to be transferred as benefits to the customer (Seelos and Mair, 2007). General systems theory has several analogies with business models. In particular, general systems theory applied to organizations states how they continuously interact with their environment to obtain energy and transform it into output (Bertalanffy, 1950; Katz and Kahn, 1978).[7] The theory states that there will be negative entropy, whereby all organizations will move towards disorganization or death as a result of importing more energy than they expend. However, to counteract negative entropy, organizations need to be in control of their environment, which requires adaptation and change. In order to adapt and change, organizations need to obtain feedback and process the information received to take corrective action. Such adaptation means differentiation in the form of creating new businesses and deleting old ones or morphing the existing business. However, to maintain stability such differentiation needs to be matched with a certain degree of integration and coordination. Therefore, the theory states that achieving successful adaptation implies the need to maintain congruence within the various

[7] The energy that firms draw from the environment comes from various sources, such as materials and people.

components of the system (Burke, 2014). A final characteristic of general systems theory is equifinality, whereby there are multiple paths that organization members can take to achieve the same goal or outcome.

Systems theory covers a wide body of literature that encompasses an understanding of physical, biological and social systems. However, for the purposes of this paper, we focus on systems thinking as a basis to encapsulate the key principles from systems theories that are relevant for business models. We posit that systems thinking is significant in the effective functioning of business models because the latter typically exhibit four characteristics that are evident in systems thinking (Cabrera, Cabrera and Powers, 2015; Midgley, 2003). First, *distinctions* can be made among the components of the business model. Such distinctions enable differentiation between internal parts and also the internal and external boundary of the business model that is to be designed. Second, the components can be organized into sub-systems, whereby both the parts and the whole can be identified as a *system*. The part–whole structure involves being able to break things into constituent parts while grouping parts into their larger wholes, enabling both a micro- and macro-level perspective in order to understand complex phenomena. Third, *relationships* can be made among the component parts, taking the form of feedback loops, correlations and causality. Moreover, such a relationship can be either structural or dynamic, whereby parts interact with one another to create complexity. Fourth, the components and their relationships can be viewed from different *perspectives*. When perspective-taking is introduced, it is possible for parts and wholes to have different meanings from different points of view. Such a perspectives' view can be seen as the mental model of reality to expand or focus on the key components and relationships. Such mental models are germane to the cognitive manifestation of the business model in order for managers to take actions to understand the cause–effect relationship better and explore the economic consequences accordingly.

Studies have distinguished between the static and dynamic views of the business model (Demil and Lecocq, 2010). The static view describes the configuration of elements of the business model that seeks to enhance performance. The dynamic view, on the other hand, focuses on how the business model evolves over time. Managers' capability to maintain congruence between the components of an existing business model, in light of changes in the external environment or when developing new business models, has been termed 'dynamic consistency' (Demil and Lecocq, 2010). Entrepreneurs or managers shape and design both the organizational activities and the links that connect these interdependent activities into a system. Often the entrepreneurs or managers need to refine and evolve the customer value proposition in order to develop a business model that has a coherent configuration of key activities within the firm that also fits the external environment. Such a process of evolution has been termed 'morphing' of the business model and might require augmentation, reinforcement and deletion of activities and processes over time (Rindova and Kotha, 2001; Siggelkow, 2002; Dos Santos, Spector and Van der Heyden, 2015). There are challenges inherent in enabling business model evolution. On the one hand, the components of the business model need to be tightly coupled in order to attain efficiency and produce a good performance (Demil and Lecocq, 2010). On the other hand, tight coupling can create dissonance between the components of the business model when there is a mismatch between external market requirements and the value creation and delivery mechanism. Hence, loose coupling is needed in order to enable flexibility in the business evolution. Therefore, efficiency needs to be carefully balanced with flexibility to enable business model evolution (Burke, 2014; Eisenhardt, Furr and Bingham, 2010; Orton and Weick, 1990). However, achieving such a balance between efficiency and flexibility to enable business model evolution requires firms to possess dynamic capabilities (Rindova and Kotha, 2001).

2.2 Dynamic capabilities and business models

The organization's value proposition and its approach to value creation and value capture represent how the activities of the firm work together to execute its strategy[8] (Casadesus-Masanell and Ricart, 2010); hence, choosing a particular business model means choosing a particular way to compete. Strategy can be seen as an action plan that responds to a high-stakes challenge and requires diagnosis, guiding policies and coherent action (Rumelt, 2011). In order to do this, and to achieve a superior competitive position, firms must possess both ordinary and dynamic capabilities (Teece, 2007; 2014).

Ordinary capabilities are those that involve the performance of administrative, operational and governance-related functions to accomplish tasks. Dynamic capabilities are the higher-level capabilities that can direct the ordinary capabilities towards high pay-off endeavors by managing the firm's resources to address and shape changing business environments (Teece, 2014). Dynamic capabilities help firms to achieve congruence between customer needs with technological and business opportunities (Teece, 2014). Dynamic capabilities can be disaggregated into three clusters of processes, namely, sensing, seizing and transforming. Sensing involves the identification and development of customer needs. Seizing involves the mobilization of resources, both internally and externally, in order to address the opportunities

[8] Strategy formulation and implementation are an integral part of business model design and evolution (Santos, Spector and Heydon, 2015). Strategy is determined by answering three questions: *What* is the offer, *who* constitutes the target market and *how* is the offer delivered to the customer? Business model selection constitutes the realized strategy that principally resides within the 'how' question.

identified and to capture value from doing so. Transforming is the continuous renewal of the organization and the associated business model.

Business model evolution is important for both incumbent firms facing changes in environmental conditions, such as a shift in the technological landscape, and start-up firms trying to configure the most salient way to deliver the customer value proposition. Such intertemporal management of the value creation and capture underlying business model evolution is a key dynamic capability. The extant research on the organizational capabilities required to explicate the micro-foundations of dynamic capabilities that enable its evolution is still at a nascent stage. In order to examine such organizational capabilities, we now study the evolution of a new business model of a mobile-phone-based information service provider for farmers in India from ALPHA. Next we describe our data and empirical content.

3. Method and empirical context

Our primary case study setting is the launch by ALPHA of I-AGRI, a unique, mobile-phone-based information service for farmers in India in October 2007. We use extensive qualitative data drawn from interviews to explore the issues discussed above. This business model offered a particularly suitable setting for an in-depth case study of the central research question for several reasons. First, the market for the provision of information to farmers did not exist and I-AGRI was the first to provide such a customer value proposition. Second, I-AGRI conducted various experiments on its business model in the process of trying to evolve it to become more viable. Third, I-AGRI's business model evolved in order to deliver the appropriate customer value proposition.

3.1 I-AGRI and business model evolution

I-AGRI initially provided individual farmers with ‘customized, localized and personalized’ weather forecasts, local crop prices, agricultural news and relevant information (i.e. crop advisory) – in the form of SMS messages sent to their mobile phones in their local language. This allows subscribing farmers to plan irrigation, the application of fertilizers and harvesting – thus, managing some of their risks – as well as to decide when and where to sell their produce to maximize profit.

Among the many challenges faced by farmers in India, which account for India’s poor productivity when compared to other leading agricultural countries – such as over-regulation and inefficient government policies, poor physical infrastructure (e.g. irrigation), inadequate access to land and finance and weak natural resource management – a key problem is poor access to information that could help farmers with both cultivation and selling. I-AGRI provides a solution to the lack of information faced by farmers. As a result, many farmers have attributed significant cost savings to their I-AGRI service. For example, the I-AGRI service is estimated to have generated $2–3 billion in additional income for farmers, while over 50 per cent of them reported reduced spending on agricultural input. I-AGRI’s business model evolution can be classified into three major phases. Following the information-based business model in Phase 1, I-AGRI evolved its business model to a transactions- and engagement-solutions-based model in Phases 2 and 3 respectively. We describe these phases next.

Phase 1 – Information business model. Phase 1 involved developing the business model as an information business between 2007 and 2012. The opportunity for I-AGRI’s proposition was identified as part of the ALPHA’s Innovation Programme (AIP). AIP was an internal venture capital programme, whereby any employee could write a one-page new business idea, which would be reviewed and approved for funding by the Innovation Board of ALPHA if deemed a viable proposition that might contribute to the company's long-term revenue and profitability. The I-AGRI idea was created by an ALPHA Research Fellow and selected for funding in December 2005. After much strategic analysis of the opportunity via interviews with farmers, discussion with traders and analysis of agricultural reports, ALPHA concluded that there was a viable business opportunity. Farmers in India earn as little as 25 per cent of the value of the final price of their raw produce, which compares less favorably with the 40–50 per cent figure in developed countries. This is a result of poor price discovery in the value chain due to disaggregated demand and a lack of reliable and timely information affecting prices, leading to price variations of up to 20 per cent compared to the same crop, even in nearby markets.

The opportunity identified through the above strategic analysis, coupled with the growth of mobile phone adoption in India, prompted ALPHA to launch I-AGRI as a pilot scheme in the spring of 2006. I-AGRI realized that it needed to build the entire supply chain in order to create the business model. It had to source crop prices from local markets, purchase weather forecasts from a specialist firm and source content on news about agricultural produce from market reporters. In addition, I-AGRI initially used a single mobile carrier to deliver the SMS text messages based on the subscriptions purchased by the farmers. I-AGRI carried out all activities across the value chain – from content sourcing to customer support and accounting – in connection with the service that customers receive, other than operating a mobile network. Such a vertically integrated business model was necessary to create the market for I-AGRI's services, which were initially available in three states of India – Maharashtra, Haryana and Punjab – and the firm had expanded sales to 13 states by 2014, with over 1.3 million farmers across 50,000 villages using the service.

Phase 2 – Transactions business model. Phase 2 of the development of the I-AGRI business model took place from 2012 to 2013, whereby the focus was predominantly on enabling transactions between buyers and sellers – the transactions business model. In 2013 I-AGRI launched ConnectCrop, a transactions platform for connecting agricultural communities. ConnectCrop brings farmer groups on one side and agricultural stakeholders (such as agricultural buyers and government institutions) on the other to enable transactions. ConnectCrop enables farmers to aggregate their supplies via a Farmer Producer Organization (FPO) before selling them to buyers via the platform. The farmers are first profiled by I-AGRI in order to collect information about them. Regular calls are made by I-AGRI staff to collect information about the selling of crops and other service requirements such as warehousing, logistics and insurance. I-AGRI provides the agricultural information via its text message service to members of the FPO, and the ConnectCrop platform then aggregates the farmers' supply of commodities. Moreover, buyers that are typically large organizations, or the government, also input their demand to buy on the system. The ConnectCrop platform matches trade from sellers and buyers and informs them through an appropriate medium (e.g. SMS/call/email/Web portal). This is followed by on-the-ground support by the I-AGRI team to complete the transactions.

Phase 3 – Engagement solutions business model. Phase 3 of the development of the ALPHA business model took place from 2013 to 2014, whereby the focus shifted to an engagement-solutions-based business model. Farmers were increasingly using smartphones, and I-AGRI decided to take this opportunity to develop its business model, launching a model based on selling solutions and advice generated from the vast amount of information being collected by the marketing and sales team, as well as the I-AGRI Consumer Care Centre within the operations team. I-AGRI shifted its business model from being a distribution to a marketing company. The engagement-based business model focuses on selling solutions to help other firms (e.g. banks) market their products and services better. I-AGRI in turn aims to receive fees for providing such information and advice based on the information it has collected about the farmers. I-AGRI's core text-based information on crop prices, weather and best practice is given free to farmers, which increases access and creates greater demand for the services, thereby enabling more information to be collected about the farmers.

3.2. Data collection

Our data about I-AGRI's business model evolution decisions came from both semi-structured interviews and secondary data sources. In choosing our interviewees, we followed the method of 'purposeful sampling'. We initially contacted the chief executive officer of I-AGRI and the chief innovation officer at ALPHA, whom we believed would be most able to inform us about our research question regarding the organizational capabilities that enable business model evolution. We then asked each interviewee for recommendations about who could best provide further details regarding our research question. We followed this approach to create an ongoing sample of interviewees, focusing our data collection on emerging themes until further interviews yielded no substantial new information. The author and a research associate meticulously managed the data collection to ensure its trustworthiness, writing up notes within 24 hours to ensure reliability.

We interviewed 15 senior executives from I-AGRI and the head office of ALPHA, resulting in 30 interviews. The executives were from various divisions, including strategy, sales and marketing, human resources, information technology and finance. Some executives were interviewed several times. In addition, workshop-style discussions were held with the senior executives to explore the issues. The interviews and workshops took place during multiple face-to-face visits and by telephone between April 2009 and April 2014. The interviews were semi-structured (interviewees were provided with a broad list of questions beforehand but were not constrained by them during the interviews) and examined how the decisions associated with the business model evolution were made. Most lasted between 60 and 90 minutes and, while they were not recorded for confidentiality reasons, the interviewer took extensive notes during the interviews and workshops, which were then typed up immediately. The interviews were conducted by the author, as well as a research assistant with extensive interviewing skills. They covered the history and background of I-AGRI, innovation in the industry, competition, the network of relationships between industry firms and the managerial processes through which I-AGRI adopted new business models. In addition, we were provided with archival data such as organizational charts, brochures, internal presentations and promotional videos.

A qualitative case study approach is appropriate for answering research questions that call for rich, process-oriented analysis (Yin, 2003). However, there are possible disadvantages associated with this method, as retrospective bias and an 'official firm line' might exist. To overcome some of these shortcomings, we further corroborated our interview data from archival and other secondary material – including press reports (e.g. via Factiva), company brochures and industry reports – and used a combination of coding, grouping, triangulation and discussion to analyse our interview data. Moreover, we interviewed organizational members from different parts of the firm. Finally, we also interviewed two officers working in rival firms offering similar dissemination of mobile-phone-based information to farmers, and two agricultural organizations, to corroborate the data further.

3.3. Data analysis

The data analysis for the case study consisted of three stages:

(i) The case study data was coded based on the theoretical classification developed around business models as our initial analysis framework.

(ii) Our initial concepts were refined and iterated between emerging categories and the literature on systems thinking, s model evolution to revise our analysis framework continuously.

(iii) We confirmed and refined the mapping of evidence to the revised framework through discussion between the interviewing author and two research associates.

We began the data analysis using open coding to identify initial concepts in the data and then grouped them into categories (Gioia, Corley and Hamilton, 2012; Van Maanen, 1979). We then examined and searched for relationships between and across the categories to gather them into higher-order themes, and then grouped similar themes into several overarching dimensions to develop some of the key constructs for our framework on systems thinking and business model evolution (Strauss and Corbin, 1998). Where possible, secondary source material was also used to triangulate our data to increase its reliability. This was a recursive rather than linear process, and was repeated until no new relationships were revealed. These themes formed our first-order concepts. The second stage of analysis involved refining our first-order concepts by iterating between emerging categories and the technology and innovation management literature. Attempts to map the evidence pointed to the systems thinking literature as applied to physical, biological and social systems as a basis for refining our framework to map the second-order concepts, resulting in the identification of balanced redundancy, requisite variety and cognitive discretion concepts. In the third analysis stage, we used peer debriefing, which involved the field researcher having discussions with research associates (not involved directly in the fieldwork) to obtain an independent view of the themes, which also enabled us to consider and eliminate alternative explanations.

Insert Figure 1 here.

We present our data structure in Figure 1 by highlighting the first-order concepts, second-order themes and aggregate dimensions from which we developed our model. We also provide additional selected quotations supporting our interpretation of the data and mapping to the first-order concepts in Appendices 1A-C (Gioia, Corley and Hamilton, 2012; Pratt, 2009).

4. Findings

Our research question asked about the organizational capabilities of new firms that enable business model evolution. We found that three organizational capabilities were central to enabling business model evolution in our study: balanced redundancy, requisite variety and cognitive discretion. These organizational capabilities were evident across the firm over time, which enabled business model evolution to take place within I-AGRI.

4.1 Balanced redundancy

Resources are a key source of competitive advantage and the capacity to evolve the business model. I-AGRI needed to make its resources work harder in order to evolve its business model and, at the same time, not to have surplus resources given their limited availability. Two themes emerged from the data analysis: (1) resource fungibility; and (2) resource constraint.

Resource fungibility. I-AGRI's service was officially launched in August 2007. It was involved in all the main activities of the value chain, from content sourcing to customer support and distribution. I-AGRI's customer value proposition aims to cater to farmers' needs for customized, localized and personalized decision-critical information. Three key benefits were repeatedly stressed by the farmers, including improved profitability through knowledge of market prices, the mitigation of weather-related risks and improved knowledge of crop cultivation and disease control.

The firm employed multi-skilled staff in order to develop and test new propositions. As one senior employee said: '*Our finance officer had experience across many business functions that enabled us to seamlessly add further responsibility by adding the sales function to the officer's portfolio.'* This was captured neatly by one of I-AGRI's senior team: *'We often needed to redeploy resources quickly from one initiative to another as we were experimenting with different propositions. Therefore, having employees who are multi-skilled is very helpful.'* The multi-skilled nature of the staff meant that inevitably there were redundant and overlapping skills. However, the multi-tasking nature of its staff's skills enabled some redundancy to be built into the resource planning, which was helpful when it came to experimenting with new business models. This was achieved by ensuring there were overlapping skill sets among employees.

One of the major issues faced by I-AGRI was that its service was sold to farmers on a monthly or quarterly basis. Although farmers stressed the value of having the service, they often needed to be reminded to renew their subscription to the service. As one of the executives put it*:*

> *Farmers often bought the I-AGRI service for a particular season. Some crops could have several harvesting seasons per year. However, the farmers often did not need the I-AGRI service in between a harvesting season for the crop. Therefore, farmers often needed to be reminded to renew their I-AGRI service in the following season as they often were busy with immediate crop related issues.*

The initial business model of I-AGRI was to distribute the service to a single mobile phone carrier; the rationale being that it would provide superior content and the mobile phone carrier would therefore become the sales unit. However, sales were relatively low from this business model. As one executive put it: '*We did not have any sales and marketing and hence,* *getting the farmer to subscribe and repurchase was difficult.'* Therefore, I-AGRI decided to have its own sales force in order to take greater control of the distribution and marketing of the service. In order to take fuller responsibility for marketing and distribution, the firm decided to have its own 200-person direct sales force to visit the farmers and explain the benefits of the service to encourage them to register. This was summed up by a member of I-AGRI's senior team: *'We had to be involved in the distribution and marketing in order to create the demand for the I-AGRI service.'* The addition of the sales force enabled I-AGRI to conduct various experiments by leveraging and stretching the installed sales force. This was done by encouraging and incentivizing the sales force to perform additional complementary tasks beyond their principal duties.

In addition to selling via mobile operators and using its own direct sales force, I-AGRI also decided to sell via agricultural retailers. The key element of the experiments was to match the additional cost of the resources only when there was additional revenue. When the firm decided to trial an outsourced distribution model it approached other firms that had established sales forces. The idea was to sell scratch-card-style recharge coupons for the service via general retail outlets that already had a sales force and distribution channel. A senior sales executive said: '*We are a small company and could not afford to get our costs and revenues misaligned. Therefore, when we were developing and testing new ideas to overcome some of our early low take-up issues, we specifically focused on how to make our cost base variable where we would only pay if there is a gain.*' Therefore, I-AGRI negotiated with the agricultural input firms (firms providing some input into agricultural production, such as seed, fertilizers, tractors) that they would pay only when the firms' sales teams were able to persuade farmers to buy the scratch cards as a bundle with the core offerings of the respective firms.

Resource constraint. Although the firm was creating and stretching its resources in order to conduct experiments, this had to be balanced by the need to conserve resources. In particular, there was pressure from the parent firm, as well as external funders, to keep the level of any excess resources to a minimum. This was mentioned by one of the senior executives: '*We always needed to fight and defend any resource buffer we hold as our stakeholders who provided funding wanted us to be a lean firm in terms of resource use. However, some resource buffer was often allowed as long as we experimented quickly and failed fast when needed to do so.*' Therefore, any excess resources were monitored to avoid having more than necessary with a view to being flexible when experimenting with new business models.

In keeping with the tight monitoring of resources, the senior management team decided to focus on a restricted number of initiatives across a limited number of geographies. This approach was based on the idea of focusing on learning quickly from failures, thus enabling resources to be optimally utilized and lessons to be learnt from experiments. For example, only when the initiatives with the agricultural input firms via the sales outsourcing model failed to provide returns did the firm expect to conduct a new experiment on bundling its product with motorcycle sales to keep up with the variable cost/benefit approach to experimentation. In 2009 I-AGRI decided to develop its business model further by providing the information service as a package that was offered for free when a farmer purchased a motorcycle. One executive explained:

> *The farmer needs a motorbike to go around the farmland. We thought one of the best ways to overcome the lapses in repurchasing the service is to bundle the I-AGRI proposition as part of a motorbike purchase. I-AGRI then gets paid by the motorcycle dealer based on the number of motorbikes sold.*

The firm also had to manage the efficacy of the existing business model while trying to evolve the business model further. As the firm's resources were being reconfigured and stretched to experiment with new business models, the firm ensured that staff motivation was not affected by these new initiatives. This was achieved by a conscious process of active communication with staff on the experiments being conducted and their outcomes. This approach meant that resources were not overstretched. Such a behavioural aspect regarding the economic use of resources also helped to provide a countervailing force from developing an excess of resources. Further analysis of quotes that mapped to the first-order concepts are shown in Appendix 1A.

In summary, the case illustrates how balanced redundancy facilitated the business model evolution process. The literature pertaining to biological systems suggests that *redundancy* refers to cases in which functions of one element can be performed by another element, either partially or fully. This overlapping functionality refers to the extent to which system components have in-built segments that could perform one another's functions. It has been argued that such overlapping functionality allows the system to evolve better, either because it enables emergent functions to be developed that neither one can perform alone or because it absorbs shocks in the system, which contributes to resilience (Thomas, 1993; Kafri, Springer and Pilpel, 2009)[9]. On the one hand, resource fungibility, whereby additional overlapping resources are created from stretching existing resources, enables such resource redundancy to emerge. However, simply having redundant resources can be detrimental to the efficiency and lean requirements that are often a prerequisite for the survival of new firms. Therefore, although the systems literature has highlighted the need for redundancy, our study builds on this and shows that such redundancies need to be balanced. In particular, our analysis shows that it is necessary to have a measure of

[9] Studies have shown that Yeast displays functional genetic redundancy whereby there is partial overlap in the functions of the genes. Such functional redundancy makes the Yeast a robust organism that is able to evolve as a result of mutations and stresses from the environment (see Kafri, Springer and Pilpel, 2009).

duality encouraging an opposing force that restrains excess resources. Therefore, such fungibility of resources needs to be constrained in order to minimize excessive resource use and to keep staff focused on delivering well on existing initiatives. We posit that balanced redundancy is related to the concept of distinctions in systems thinking. In particular, we argue that the concept of distinctions needs to be extended whereby partial overlap in the components are needed to enable business model evolution.

There are two forms of redundancy, namely, stand-by and active (Streeter, 1991). Stand-by redundancy is a back-up function whereby one component takes over the function of another only when the latter fails. Active redundancy is where two components simultaneously perform the same role. The redundancy built by I-AGRI is related to the active type, whereby they could perform two types of function, namely complementary controls or auxiliary services. Complementary controls are where the redundant components are able to perform a system control function to monitor the functioning of the other components and take corrective action. Auxiliary services are where individual components are actively involved in ongoing operations in which their functions display redundancies. Such redundancies can be seen as the micro-foundations of dynamic capabilities across the clusters of processes for sensing, seizing and transforming.

In particular, redundancies help the sensing capabilities by collating information on suppliers, customers and developments in the environment. Having redundancies enables not only the capture of more holistic information but also, as systems thinking would suggest, different perspectives of the same information to be considered in order to filter and calibrate the opportunities. Redundancies also enable opportunities to be seized more effectively. This is because such redundancy of resources facilitates more effective sharing of risks, in terms of being able to conduct multiple experiments simultaneously in the face of ambiguities and also a willingness by management to support such initiatives even in light of potential failure. Finally, redundancies enable better transforming activities. In particular, they facilitate looser coupling of the components of the business model, which permits increased responsiveness to changes that might be required as result of feedback from the market. However, too many redundancies could also result in less effective delivery by core functions as a result of a lack of focus. Moreover, too much redundancy might result in 'over sharing' and, hence, no one taking full responsibility for actions that could result in errors of omission or commission. Hence, our study shows the need for balanced redundancy.

4.2. Requisite variety

The acquisition and interpretation of relevant information is a key enabler of business model evolution. I-AGRI needed to obtain information on how each component worked while also acquiring knowledge about how to integrate these pieces of information in order to evolve the business model. Two themes emerged from the data analysis: (1) component knowledge; and (2) architectural knowledge.

Component knowledge. I-AGRI experimented with various distribution models as part of its business model design in Phase 1. However, each of the new distribution models experienced its own difficulties. First, agricultural input companies such as retailers were concerned with the cannibalization of other possible high-value sales if the sales staff focused on selling I-AGRI subscriptions. This was articulated by one of the executives: *'The agricultural retailers were concerned that selling I-AGRI subscription scratch cards might result in the customer buying fewer fertilizers as often the customer has only limited resources and time.'*

Moreover, farmers with smallholdings had difficulty getting a good price for their crops.

This issue was summarized by one of the executives interviewed: ‘*The farmers who typically purchased motorbikes were farmers with 2–3 acres of land. However, with such a smallholding of crops, they were often unable to get a good price for their crops.’* Moreover, the telephone contact centre staff were often asked by the farmers how they could trade their crops in order to get the best price for them.

In addition, farmers were also obtaining crop advisory information from fertilizer companies. The sales staff of fertilizer companies such as DuPont and Monsanto talked to the farmers regularly, providing them with crop advice. Farmers, in turn, often trusted the advice provided by the sales staff of these companies more than that received via the I-AGRI text service because of the close relationships built with the farmers over the years. As a result, the sales staff of the fertilizer companies would get in touch with farmers during the lifecycle. This approach was subsequently adopted by I-AGRI. Moreover, the search for new opportunities was facilitated by information sourced from various sub-units such as marketing and operations within I-AGRI. This was initially confusing but the different perspectives helped shape a deeper understanding of the potential opportunities.

The strategy and competitor analysis by I-AGRI also provided further information about the development of the competitor landscape. The agriculture ministry, India Meteorological Department (IMD) and the Indian Council of Agricultural Research (ICAR) launched an SMS service for farmers, called mKisan, to provide crop and weather advisory services. The service was launched in 2013 and provided to farmers for free. The mKisan initiative was driven by the government of India to render the agricultural sector more efficient in cultivating crops and delivering food to farmers, and was part of the national electronic government (National e-government plan) initiative. As one executive in the strategy section of I-AGRI said:

Although the mKisan service was less comprehensive and less reliable compared to our service, farmers were increasingly less willing to pay the premium price for our service. Therefore, we needed to think hard on how to add other complementary services in order to differentiate our proposition to that of mKisan.

Moreover, the competitive landscape was becoming crowded, as similar mobile-phone-based propositions were being developed by rival firms. Our interviews with the industry executives clearly established that I-AGRI was the first to provide information distribution to farmers via mobile phones. However, other firms were quick to emulate the offering by I-AGRI. Two rival propositions are noteworthy. The first was driven by a major mobile handset provider, and the second a major mobile phone carrier; both were looking to provide additional content in order to stimulate demand for their respective products and services. As the executive in charge of sales said:

The entry into the provision of agricultural information to farmers was becoming attractive as penetration of mobile phones in rural India was growing exponentially. Hence, competition in the marketplace was intensifying as new entrants entered the market with rival offerings. Our sales staff were telling us that farmers were often purchasing the rival offerings because these firms could influence the farmers at the point of purchasing the mobile phone. This puts us at a distinct disadvantage as we were not engaging with the farmers until much later when they have purchased the phone.

The information from varied sources – both internal and external – such as the different distribution channels, the call-centre and operations data and the competitors’ offerings, showed the I-AGRI team that the business model for the provision of information alone was not viable. The management team discovered that, in order to provide a more viable proposition, I-AGRI needed to enhance its offering by building on the core proposition.

Architectural knowledge. The knowledge provided by each information source for I-AGRI was not sufficient in itself to inform a decision about how to renew the business model. However, senior management had different views about how to move the I-AGRI business forward. Although there was agreement that the business model needed to be changed, there was little agreement on what the new business model should be. The information being provided by sales, marketing, operations, the call centre and competitor analysis were all giving different reasons for why the information-based business model was not viable. The sales and marketing departments were concerned about the information for farmers from the sales representatives of agricultural input companies (AIC), operations were concerned about the repurchase rate by farmers in order to keep resources fully utilized, call-centre staff were concerned with farmers querying how to get the best value when selling their produce, and competitor analysis showed declining margins as a result of competitor activity. Therefore, there were often serious disagreements among the senior team at I-AGRI regarding the way forward. As one executive explained:

> *Some were of the opinion that I-AGRI should become a distributor and not be involved with collection of data while others were of the view that I-AGRI should focus on collection and aggregation of information and not be involved in distribution and a whole host of other ideas in between.*

The I-AGRI team was increasingly aware that it was difficult to build a viable business from the provision of information alone, but needed an overarching story to connect the disparate pieces of information about why this was the case. During this period, a number of state governments in India were concerned that there was an increasing mismatch between the demand and supply of food items. One of the executives said: '*Food security and sustainability is a major issue for the government. Reducing uncertainty of food supply was a critical objective.*' The I-AGRI team knew one of the members of the Farmer Producer Organization (FPO), who knew the executives at the National Commodities and Derivatives Exchange (NCDE) and also the Small Farmers' Agri-Business Consortium (SFAC). One of the senior members of I-AGRI said that discussions with the FPO, NCE and SFAC enabled the team to understand more clearly why merely providing information was not going to create value. As one of the executives summarized: *'The provision of food security was the reason that got all of us aligned to a common cause. We were passionate about being part of the solution for such a food security related initiative as the benefit to society was enormous.'*

A senior executive explained how the idea to set up a trading platform came to them:

> *We were sitting at a Café Coffee Day (a modern coffee shop) and toying with how to be a solution provider for the government on food security. It dawned upon us that part of the problem with food security is the imbalance between the demand and supply of commodities. Therefore, we felt that if we were to provide a means of aggregating the supply and demand and enable trading in commodities this would go some way in resolving the issue.*

The need to address the provision of food security enabled the senior team to 'connect the dots' and realize what the solution might be in connecting the sellers (the farmers) with the buyers of the agricultural commodities. The discussion enabled the formation of a joint liability group, in which farmers come together to create the opportunity to aggregate the supply and demand of agricultural commodities; such aggregation enables trading of the agricultural commodities and, hence, the launch of ConnectCrop. Further analysis of quotes that mapped to the first-order concepts are shown in Appendix 1B.

In summary, the case illustrates how developing organizational capability to gather information from multiple sources enables the process of business model evolution. The literature on systems theory on loose coupling suggests *requisite variety* as a way to improve the diversity of products and achieve efficiency (Steensma, 2001). Requisite variety refers to the extent to which components of the system obtain different sources of information in order to understand the environment better. Registering the information improves when elements become more numerous and the constraints among them weaken (Orton and Weick, 1990). The firm that embraces requisite variety as an organizational capability enables a deeper knowledge of each component of the system. Deep component knowledge enables understanding of issues or a 'bottleneck' at a detailed functional level of the business. However, in order to overcome these issues, knowledge of how these functions fit together and the means to change the inter-relationships between components are needed. Such knowledge has been termed 'architectural knowledge' (Baldwin and Clark, 2000; Henderson and Clark, 1990). Our study builds on the notion of requisite variety to increase the firm's ability to obtain architectural knowledge, which is the capability to comprehend the connections between each of the knowledge components and to see the bigger strategic picture regarding how to evolve the business model as a system. We posit that requisite variety is related to the concept of relationships in systems thinking. In particular, we argue that the concept of relationships needs to be extended whereby the combination of component and architectural knowledge are needed to enable business model evolution.

The principle of requisite variety calls for a system to possess as much variety internally as the externally encountered variety in order for it to survive and evolve (Ashby, 1952).

Organizational design to cope with external variety could take two forms, namely the machine approach or the hologram approach (Berthon et al., 2008). On the one hand, the machine approach corresponds to increasing differentiation of the components so that there is increasing specialization; the components become more and more unique and less and less like the whole. The machine approach emphasizes specialization to capture depth in component knowledge. This could raise the problem of integrating disparate elements. On the other hand, the holographic approach calls for the components to be enriched in that it develops the abilities of the whole; the whole is increasingly reflected in the parts. The holographic approach focuses on the scope of components' activities to capture depth in architectural knowledge. This could create problems regarding the reconciliation of quite different mindsets within the different parts of the organization. Our findings posit that organizational capability needs to reflect elements of the machine approach, as well as the holographic approach, in order to build dynamic capabilities. Such a balance between specialization and broad scope can be seen as the micro-foundations of dynamic capabilities across the clusters of processes for sensing, seizing and transforming.

In particular, requisite variety helps the sensing capabilities by collating information from external and internal sources in order to provide depth of intelligence while providing sufficient scope to understand the broader patterns. Requisite variety also enables opportunities to be seized more effectively. This is because such requisite variety enables more effective changing of the business model components while understanding the complex interdependencies to keep the system integrated with a view to keeping the revenue and cost architecture in continuous alignment. Finally, requisite variety enables better transforming activities. In particular, requisite variety enables better alignment of incentives and minimization of agency issues, as it requires balancing both benefits to individual units and optimization of the economic benefits for the firm as a whole.

4.3. Cognitive discretion

The cognitive aspect is a key component of the business model. I-AGRI needed to refresh the cognitive aspect of its business model in order to enable its evolution. Two themes emerged from the data analysis: (1) deductive logic; and (2) inductive logic.

Deductive logic. Initially the farmers were using regular phones to receive the SMS text services provided by I-AGRI. However, from 2012 onwards the adoption of smartphones by farmers was increasing. Therefore, I-AGRI looked at ways to monetize data from the transactions business model.

The provision of information to the farmers often raised a series of questions from the farmers that prompted I-AGRI to find solutions. For example, one of the executives remarked:

> *As we were often limited to 140 characters on an SMS text we would use abbreviations in the text messages to the farmers. For example, we would send a text about the use of water for plants as H20. Farmers would often come back to us asking what is H20 and we would explain that it is meant to be short-hand for water. The farmers would then ask what kind of water – is it Kinley or Bisleri (branded bottled water). Once we have answered that they will then ask where they can buy the water from and we would provide advice on that as well. This process would continue to its logical end where the farmer needs to buy the seeds but needs a loan to do so and hence, we needed to provide advice on where to get the loans from.*

Such questioning by the farmers prompted executives at I-AGRI to see the issue in a step-by-step deductive line of enquiry from the perspective of the solution providers to the farmers.

This is captured succinctly by a remark made by one of the executives:

> *We analyzed a seed provider firm and thought systematically on how to make it easier for it to deliver better customer value proposition. We examined their value chain activities and matched it with I-AGRI's value chain activities. We discovered that we could provide information we collected about the farmers, such as the type and amount of seed purchased to a company that sold sprinklers. The sprinkler firm would then be able to sell sprinklers more effectively*.

The above analysis demonstrates the use of deductive reasoning to solve issues that drove the development of the value proposition and, hence, business model evolution.

Inductive logic. One of the senior executives said: '*I-AGRI was often told by the corporate holding company that its existing business model was not what the firm does. This prompted us to think further about reinventing our business model*.' The discussions of the Board focused on looking at related businesses, ranging from Netflix and Google to Apple, to draw inferences for the I-AGRI business.

Systematic data collection and analysis of different business models ranging from *The Economist*, the BBC and other information-heavy businesses, together with social media businesses such as Facebook and WhatsApp, made I-AGRI realize that a commonality between these businesses was that they gave away certain propositions for free while charging for other services. This made I-AGRI think consciously about an equivalent service that it might need to give away for free in order to attract customers, and which services it could charge for to monetize the proposition. Such an analogical reasoning enabled I-AGRI to discover that information was becoming ubiquitous and the pricing of information was key in order to create and capture value: '*We needed to reduce the price of providing the information to zero to attract* *customers in order to generate revenue from other sources.'*

As one executive said: *'Initially financial services were not one of our key target markets. In fact financial services was one of our lowest priority areas. However, we managed to connect with one of the major state banks in India, which altered its core banking system in order to sell SMS text services to farmers.'* Initially, I-AGRI looked at the bank as a distribution channel and the bank managers were incentivized to sell I-AGRI services based on commissions. However, when the bank increasingly requested data on the farmers in order to improve its credit assessment in granting loans, I-AGRI realized there was a potential solution to be provided based on the rich data collected about the farmers. As one I-AGRI executive said: *'I-AGRI would get paid by providing information about the farmers to the bank and effectively remove the marketing costs and reduce the credit monitoring costs for the bank.'* This led the senior team at I-AGRI to consider changing the underlying business model to an engagement-solution-based one.

The I-AGRI team studied the other related business models closely, and the metaphor of a 'community' appeared to be one of the core principles of social-media-based business models. Therefore, I-AGRI positioned itself to become a community platform for the farmers. As it was the first to do so, I-AGRI created the rules of engagement and brought the relevant stakeholders together to create this market. One executive said: *'For example, we learnt that farmers shared music videos among themselves using specially designed "share apps" in order to avoid charges. This enabled us to think about how we could enable best practices on crops that are video based to be shared among farmers as a service in order to monetize our proposition.'*

The above analysis shows an inductive type of reasoning that draws analogies from other contexts in order to innovate the business model. Further analysis of quotes mapped to the first-order concepts are shown in Appendix 1C.

In summary, the case illustrates how cognitive discretion enables the process of business model evolution. The literature about systems theory on loose coupling suggests *cognitive discretion* as a means to improve the diversity of products and achieve efficiency (Orton and Weick, 1990). *Cognitive discretion* refers to the freedom to perceive or construct an idiosyncratic meaning. Business model evolution requires a cognitive change in the mindset of the senior management. On the one hand, the cognitive change took place as a result of systematic analysis of the data based on a technological change to smartphone adoption using deductive reasoning. On the other hand, the cognitive change took place as a result of analogical reasoning by formulating metaphors and borrowing analogies from other industries in order to identify opportunities. Our analysis shows that I-AGRI developed the capability to embrace cognitive discretion in order to enable both deductive and deductive reasoning to unfold, which in turn enabled business model evolution. We posit that cognitive discretion is related to the concept of perspectives in systems thinking. In particular, we argue that the concept of perspectives needs to be extended whereby the combination of deductive and inductive reasoning are needed to enable business model evolution.

The development of a business model and its evolution is closely tied to the strategy formulation process (Martins et al., 2015). Three major views of strategy formulation are relevant for business model evolution, namely, the rational positioning school, the evolutionary learning school and the cognitive school. The rational positioning school assumes that the business model is a purposefully designed system that reflects rational managerial choice and the consequences of these choices (Zott and Amit, 2010; Casadesus-Masanell and Ricart, 2010). In doing so, the rational view emphasizes the importance of deductive reasoning in business model design and evolution. However, in a world in which there are highly interactive systems, such a rational and deductive approach might be problematic in being able to identify clearly cause–effect relationships. Therefore, the evolutionary learning school emphasizes that business models evolve as a result of local searches in response to problems and opportunities. The evolutionary learning school views business model evolution as a result of initial experiments followed by constant fine tuning based on trial and error learning (Sosna et al., 2010). Both approaches emphasize changes in the external environment as a stimulus for change. However, the external environment might not be objectively determined, but enacted by management and represented by cognition (Martins et. al 2015). The cognitive school argues that business models are based on mental schema to cope with complexity. Hence, the business model is a cognitive process as a means to simplify the world to bring problems within the bounds of processing power and to come up with effective solutions. In this context, the cognitive school emphasizes the power of analogies when conceptual or rule-based knowledge is not readily available. Analogies are based on an inductive process whereby structured knowledge is applied from a familiar to a novel domain. Our findings posit that organizational capability needs to reflect both deductive and inductive reasoning in order to build dynamic capabilities. Such a balance between deductive and inductive reasoning can be seen as the micro-foundations of dynamic capabilities across the clusters of processes for sensing, seizing and transforming.

In particular, cognitive discretion helps the sensing capabilities by collating information from both external and internal sources in order to see common patterns emerge across the key areas within the business model with other novel domains. This enables analogical reasoning while applying deductive logic to ensure that the business model design elements are appropriately aligned. Cognitive discretion also enables opportunities to be seized more effectively. This is because such cognitive discretion enables more effective designing of enterprise boundaries in business models by ensuring that value creation and capture are realized from analogical examples, while ensuring that similarities are maintained so that the value proposition is acceptable to the target customers. Finally, cognitive discretion enables better transforming activities. In particular, cognitive discretion enables better management of strategic fit so that asset combinations are value enhancing. Management needs to learn about potential co-specialized assets to create and capture value from analogical examples. However, it also needs to use deductive logic to understand how it might work in the context of the evolving business model, as routines and processes are already being established. Hence, our study shows the need to embrace both capabilities based on deductive and inductive reasoning to enable business model evolution.

5. Discussion

One of the key issues in innovation management is to understand better how value is created and captured by firms. To address this issue, the business model has become a key unit of analysis. Business models can create value through efficiency, novelty, complementarities of resources and the ability to create a lock-in among customers (Zott and Amit, 2010). However, much of the focus of the business model literature has been on a static conceptualization of how value is created and captured, instead of a dynamic understanding of how the business model evolves. Recent studies have stressed the significance of understanding the evolution of business models by emphasizing the importance of anticipating and reacting to sequences of voluntary and emerging change between the core components of the business model (Demil and Lecocq, 2010). However, the question of which organizational capabilities enable business model evolution has not been adequately theorized. Such a theory of business model evolution has significant implications for practice as entrepreneurs and managers try to evolve their business models to deliver an appropriate customer value proposition. Moreover, such theorizing enables researchers to better articulate how both new and established firms need to evolve their business models to design a viable business.

Our study examines the dynamic capabilities that facilitate business model evolution to deliver the customer value proposition. The study shows three themes emerging from the data analysis of the case study by drawing on the literatures on systems thinking, dynamic capabilities and business model evolution in order to better understand the organizational capabilities required to facilitate the value creation and value capture processes. The three themes are balanced redundancy, requisite variety and cognitive discretion. Our data builds on these themes by showing the micro-foundations of the dynamic capabilities that enable business models to evolve. In particular, balanced redundancy refers to the ability of the firm to stretch and create additional overlapping resources in order to perform experiments while running the existing business model. Requisite variety refers to the extent to which components of the system obtain different sources of information in order to understand the environment better. Finally, cognitive discretion refers to the freedom to perceive and construct an idiosyncratic meaning.

The study makes two contributions to the literature. First, it provides a deeper understanding of the business model as a system and how it might evolve in order to create and capture value. In particular, the analysis pointed to systems thinking as the theoretical framework in order to articulate how business model evolution takes place. The study contributes to the literature on business model evolution, in particular how a firm needs to design its business model and to evolve it in order to achieve dynamic consistency. Second, it contributes to the organizational capability literature to show what type of dynamic capabilities might be required for firms to enable business model evolution. In particular, we explicate the micro-foundations of dynamic capabilities that enables business model evolution. Next we discuss the theoretical implications before examining the managerial implications of our study.

5.1. Theoretical implications

There are several theoretical implications of our study. We discuss them below.

Dynamic capabilities and business model design. The business model literature so far has examined innovation as the basis for transformation and change (Demil and Lecocq, 2010; Desyllas and Sako, 2013; Johnson, Christensen and Kagermann, 2008; Sosna et al., 2010). These studies examine experimentation, the use of intellectual protection to effect change and the redefinition of the customer value proposition to drive such business model transformation. While these studies have shown the transformative effects of business models on organizations, less is known about the organizational capabilities that might facilitate the change and transformation process.

Business models can be seen as complex systems whereby components of the business model need to interact and be aligned to each other in order to create and capture value. On the one hand, ordinary capabilities enable a chosen business model to be efficient in acting as the bridge between delivering value for the customers and profit for the business (Teece, 2010). On the other hand, dynamic capabilities are required in order to re-orchestrate the resources and evolve the business model (Teece, 2010). Such an organizational capability is particularly relevant as business model evolution examines the dynamic created in interactions between the components of the business model as it evolves from its existing form to a new one. Business model design involves the weaving together of key components of an activity system which covers the content, structure and governance. The challenge often is the ability to run the existing business model effectively whilst changing aspects of the content, structure or governance in order to help evolve the business model. Systems thinking can provide a rich foundation for understanding how to develop the organizational capability in order to add or change activities, linking these activities in novel ways as well as changing the parties that perform the activities (Zott and Amit 2010). In particular, systems thinking can provide further insights on how the existing information flows and governance mechanisms affect the ability of an organization to sense, seize and reconfigure resources to enable business model evolution. In addition, the ability to leverage and recombine knowledge is a key capability for business model evolution (Leih, Linden and Teece 2015; Velu 2015). Therefore, our study has implications regarding how to develop a more comprehensive theoretical framework to help develop dynamic capabilities for the firm to enable business model evolution (Teece, 2010).

Business model as a system. A business model is an activity system consisting of a set of interdependent organizational activities centred on the focal firm and its constituent partners and customers (Zott and Amit, 2010). However, as a result of the interdependent nature of the activities, the cause and effect of changes in the activities are likely to be complex and non-linear. Therefore, the business model can be seen as a system that is a complex combination of activities and information flow. Scholars have written about biological, physical and social systems. Organizational systems are a form of social system. Business models can be seen in this context as a form of organizational system. Therefore, there is merit in looking at the similarities and differences between how biological, physical and social systems evolve and the implications for how a business model as a complex system might evolve. Our study adopts and builds on concepts from systems thinking to develop a better understanding of business model design that would enable business model evolution. Our study provides an initial step in this direction, which opens up a plethora of possible areas for further development of this avenue to theorize about business model evolution.

Cognitive versus economic perspective. Scholars have emphasized both the cognitive and economic aspects of the business model; however, their interplay is not well understood. In particular, the way in which the cognitive aspects might influence the design of the economic aspects, and vice versa, has not been explored theoretically. The systems thinking literature through the perspective lens provides a basis for linking the cognitive viewpoint to the part–whole structure of a system. Hence, our study provides a preliminary conceptual understanding through a systems thinking lens of how the cognitive aspect could be influenced in order to stimulate change, which in turn has implications for the economic aspects of the business model.

5.2. Managerial implications

There are several managerial implications of our study. We discuss them below.

Balanced redundancy. Conventional business model logic focuses on efficiency through the elimination of redundant resources in order to create and capture value. However, such a conceptualization of the business model is applicable when the business model has stabilized and the focus is on the exploitation of an opportunity. The emphasis of such a business model is to gain efficiency from economies of scale and scope. However, our study shows that a balanced level of redundancy is necessary when there are economies of innovation. Firms that are able to create and stretch their resources in order to develop some redundancies, or specifically cater for some overlapping resources, are better able to morph their business models and enable them to evolve. Such a capability is useful in new firms as well as in established firms. In a new firm the initial planned customer value proposition is unlikely to create a profitable and sustainable business model but requires refinement over time. In established firms, the changing technological and competitive landscape might require continuous evolution of the business model in order to serve new and emerging customer value propositions.

Requisite variety. Our study shows that designing the business model in order to enhance the variety of sources of information is critical to enabling new opportunities to be identified. The multiple sources of variety help in two ways. First, they enable discrepancies to be reconciled and, hence, opportunities to be identified within components of the business model system. Second, the multiple information source enables the firm to connect the different components to see the architectural or overall picture of how to evolve the business model further. Our study shows that managers should build up the capabilities of the senior team to acquire and assimilate detailed knowledge of each component of the business model. The senior team should also be able to step back and develop the capability to see the bigger picture by examining relations between components in order to develop a deeper understanding of the workings of the business model. Such a capability plays to the part–whole structure of systems thinking.

Cognitive discretion. The challenges of business model evolution are both cognitive and economic. The business model is a cognitive conception (Doz and Kosonen, 2010; McGrath, 2010; Teece, 2010) and therefore, managers have to change the mental model of their business from one to another to enable business model evolution. The business model is also simultaneously an economic one because it is a description of the underlying routines and architecture of the business (Casadesus-Masanell and Ricart, 2010; Zott and Amit, 2010). Business model evolution requires changes in the cognitive, as well as economic, aspects. Our study has implications for managers in terms of how to effect cognitive change in the business model. The cognitive change can be realized on a variety of fronts, such as an adaptive or aspirational search. Our study shows that management should encourage the cognitive discretion of its senior team by giving them the freedom to perceive and construct idiosyncratic and semiotic worlds. Such a policy by management enables better opportunity identification and also business model evolution. Studies have shown that both deductive and inductive logic are useful in effecting innovations (Dunbar, Garud and Raghuram, 1996). Deductive logic enables incremental improvements to existing business models, while inductive logic enables analogical reasoning for more radical evolutions. Our study shows how cognitive discretion enables managers to use both deductive and inductive logic to identify opportunities in order to enable business model evolution. Table 1 provides a summary of the findings and implications.

Insert Table 1 here.

6. Conclusion

Understanding the organizational capabilities that enable business models to evolve is particularly important from both research and managerial dimensions. While conclusions drawn from one case study inevitably require some caveats, our research highlights how the business model can be seen as a complex system and, hence, systems thinking provides a preliminary understanding of how business models evolve. In doing so, we provide insights into how organizational capabilities based on balanced redundancy, requisite variety and cognitive discretion, and the associated mechanisms, can facilitate business model evolution. This framework may be useful as a tool to explore more generally how organizations need to develop dynamic capabilities in order to explore and exploit opportunities in nascent markets with significant ambiguity.

Scholars have also emphasized the importance of rational design, experimentation, as well as cognitive framing, as the basis to alter an existing business model and assemble a new one (Martins et al., 2015). Modularization can be seen from the perspective of a cognitive activity in order to simplify a complex system such as a business model by articulating it as a model of interconnected elements (Aversa et al., 2015). Business model evolution could arise as a result of the process of changing the business model elements, their linkages and their order, initially through a cognitive process, which could subsequently translate into actual practice. Such a process could be the result of cognitive framing, rational design, as well as experimentation. We show that organizational capabilities such as balanced redundancy, requisite variety and cognitive discretion enable such business model evolution.

There are several possible extensions to this study. First, which other principles from systems theory can be applied to business model evolution? In particular, are there other characteristics of physical, biological and organizational systems that could be applied to achieving a better understanding of the capabilities needed to enable business model evolution? Second, what are the boundary conditions that should be applied to these organizational capabilities in order to stimulate business model evolution? Third, how do these organizational capabilities interact with one another to encourage the evolution of business models? Fourth, does the application vary for business models related to developing new products as opposed to services? In particular, do business models that are designed for delivering products require a different set of organizational capabilities to enable business model evolution compared to business models that deliver services as their key proposition? Finally, what can we learn from systems thinking in order to develop a deeper understanding of how business models linked to one another as an ecosystem might evolve?

Moreover, there are limitations to our study. First, the extension of the theory is being developed from a single case study. The study itself is based on a single case with its attendant context such as country- and industry-specific issues. Hence, the study needs to be extended to consider other case contexts in order to verify the robustness of the findings. Second, although we acknowledge that the business model transcends the firm to include other collaborative organizations, our focus has been on the capabilities of the single focal firm. Further studies should address inter-firm capabilities and how a systems thinking approach could help to provide a deeper understanding of such dynamic capabilities. Acknowledging these limitations and possible extensions, we argue that our study provides a useful framework for understanding how firms can develop the relevant organizational capabilities in order to evolve the business model to deliver the customer value proposition profitably.

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Figure 1: Data structure

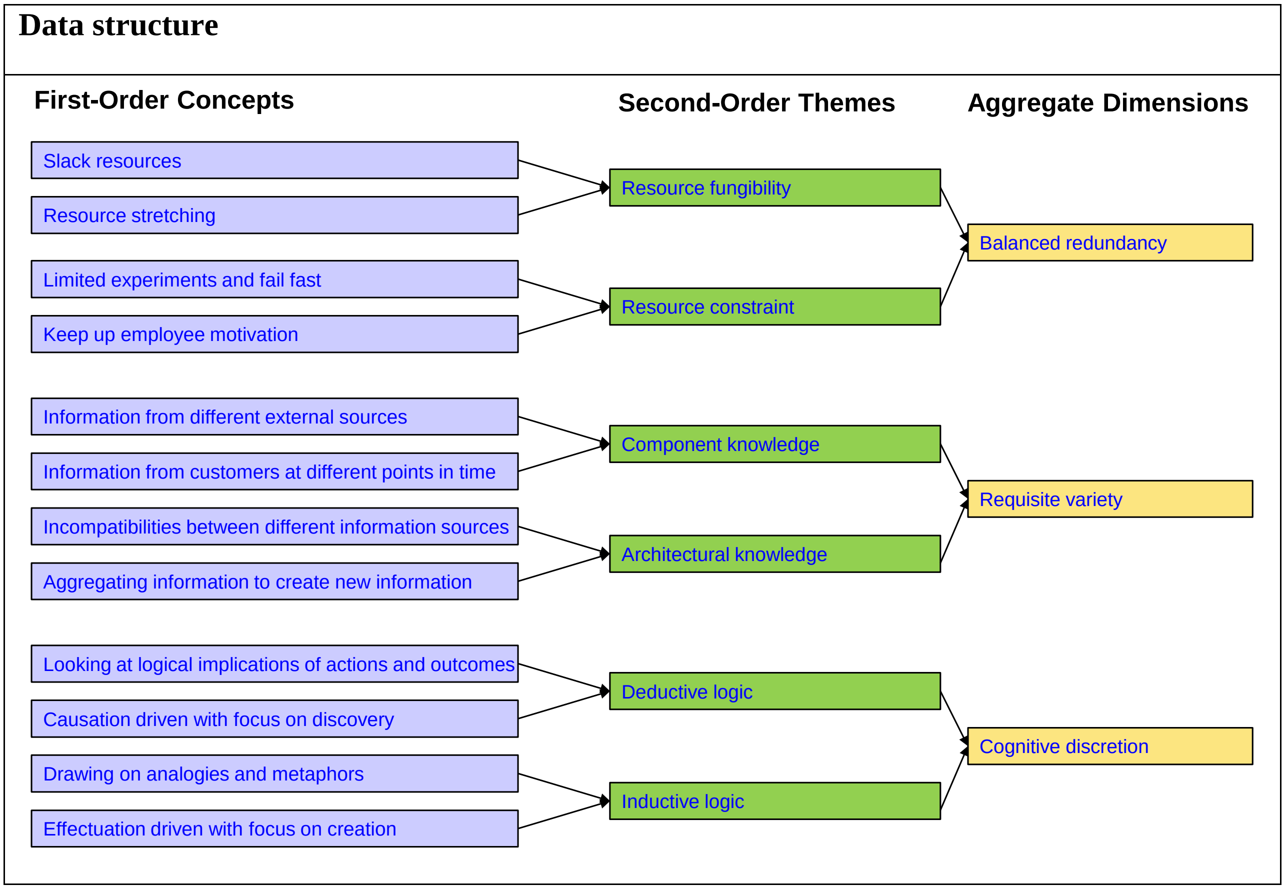

Table 1: Summary of findings and business model evolution

Organizational capabilities	Implications for business model evolution
Balanced redundancy – refers to cases where the functions of one element can be performed by another element, either partially or fully.	Firms that are able to create and stretch their resources in order to develop some redundancies in a balanced manner, or specifically cater for some overlapping resources, are better able to morph their business models and enable them to evolve.
Requisite variety – refers to the extent to which components of the system obtain different sources of information in order to understand the environment better.	Enables discrepancies to be reconciled and, hence, opportunities to be identified within components of the business model system. The multiple information enables the firm to connect the different components to see the architectural or overall picture of how to evolve the business model further.
Cognitive discretion – refers to the freedom to perceive and construct idiosyncratic	Enables the use of deductive logic by using more rational approaches and inductive logic, using metaphors/analogies to transform the cognitive aspects of the business model.

meaning.	

Appendix 1A – Balanced redundancy

First-order concepts	**Quotes**
Slack resources	*'We built some slack resources within the content team because of the unpredictable nature of the content we needed to develop.'* (Content manager) *'We had among our staff some overlaps in skills. However, we felt that such overlaps in resources are needed in order to be flexible and responsive when it came to experimenting with new models.'* (Operational manager)
Resource-stretching	*'If we wanted photos for marketing and promotion, we would create a contest for employees to participate and provide the photos from the field rather than pay an agency a lot of money to do so.'* (Finance officer) *'We learnt that staff out in the field were happy to spend their free time in the evenings doing some extra work which helped them earn some additional income.'* (Human resources officer)
Limited experiments and fail fast	*'There is often a tendency to want to conduct many experiments simultaneously to work out which is the best way forward. This pressure was particularly evident when many of our initial initiatives were not paying dividends. However, we often had to force ourselves to prioritize the initiatives in order to focus on the key ones and to have a list of what to do next in case they fail.'* (Sales officer) *'Managing the cash inflow and outflow was a major driver of how much resources we could have to develop the business.'* (Finance officer)
Keep up employee motivation	*'As we were conducting new experiments, we wanted to ensure that staff did not lose focus on the current initiatives. Therefore, we were open with the staff about new experiments that were being conducted through periodic communications such as town hall meetings. These communication sessions brought out any uncertainties and rumors that might have demotivated our staff. It also became imperative to us that we did not overstretch our resources in conducting these experiments.'* (Management team member) *'The venture capital providers were of the opinion that putting some constraints on resources would encourage creativity. The constraints acted as a way for employees to motivate themselves and find work arounds creatively.'* (Management team member)

Appendix 1B – Requisite variety

First-order concepts	Quotes
Information from different sources	*'Everyone had a different view about what opportunities to pursue. For example, the view from the marketing team was often different from the operations team in charge of delivering the service. At first this was confusing but such difference in views enabled us to better understand the existing opportunities from the market.'* (Strategy officer) *'In some states such as Punjab the concept of a door-to-door sales person was less acceptable and hence this made us rethink as to what should be our key customer value proposition.'* (Operations officer)
Information from customers at different points in time	*'The sales team at some of the major fertilizer companies would meet the farmers through the life cycle of the crops and hence were in a good position to provide crop advisory services in order to enhance the sale of fertilizers.'* (Sales officer) *'Some farmers wanted not only local market prices but also national prices because traders come from big cities to buy crops but we were not able to provide them with our focus on localized service.'* (Sales officer)
Incompatibilities between different information sources	*'We realized that merely providing the information on SMS to farmers was the antibiotic and not the vitamin. We needed to also provide the vitamin for the farmers.'* (Marketing officer) *'We moved from a crop-centric information provider to a farmer-centric information provider as we understood the issues better.'* (Strategy officer)
Aggregating information to create new information	'*In a sense, the last mile connectivity was not great. We needed to more efficiently connect the small farmers with the market and enable the transaction rather than merely providing the prices for the crops.'* (Technology officer) *'We needed to provide national prices and the only way we could make this work economically is to aggregate demand and supply through a platform and provide a transactions based service.'* (Technology officer)

Appendix 1C – Cognitive discretion

First-order concepts	Quotes
Logical implications of actions and outcomes	*'We initially thought that we would disintermediate the middleman that was serving as the conduit of price dissemination between the* mandi *(market place) and the farmer. However, we later realized that we need to work with these middlemen by enabling them and making them part of the beneficiaries of the service.'* (Management team member) *'The rapid growth of smartphones had implications for the business opportunities for us. We were increasingly collecting more and more information about the farmers based on our transactions business model. Hence, we looked at ways to monetize the value of this information.'* (Strategy officer)
Causation-driven with a focus on delivery	*'Farmers were rather impatient with the sometimes long waiting time from calling the free phone call center number. This made us realize that more immediacy is required which a smartphone is better able to provide through a library based system of providing access to information.'* (Sales manager) *'Farmers could access information on a smart phone as and when required rather than being delivered to them via text messages when the information was ready.'* (Sales manager)
Drawing on analogies and metaphors	*'It was clear that we needed a new business model. However, our challenge was to change the mindset of the team to look beyond a business model based on selling information and transactions. We had many discussions in the Board meetings about other related businesses such as Netflix, Google, Apple and other information-intensive business models.'* (Management team member) *'We studied many other successful information service firms globally and often had heated debates about not only what is similar about our business to the comparative set but more importantly what is different so that we can design our proposition accordingly.'* (Content officer)
Effectuation-driven with a focus on creation	*'Our close study of other information providers made us realize that we do not need to own all the content in order to deliver a suitable customer value proposition. We can rely on others to deliver but we needed to create the really novel propositions internally.'* (Content officer) *'We were aware that we would be one of the first in the world to create a community of farmers with an end-to-end solution of their needs via a mobile smartphone. We had to be creative in developing the proposition as we needed to learn from our customers in order to monetize the service.'* (Marketing officer)

References

Achtenhagen, L., Melin, L., Naldi, L., 2013. Dynamics of business models – Strategizing, critical capabilities and activities for sustained value creation. Long Range Planning 46, 427–442.

Afuah, A., Tucci, C.L., 2001. Internet business models and strategies: Text and cases. New York: McGraw-Hill.

Ashby, W.R., 1952. Design for a Brain: The Origin of Adaptive Behavior. London: Chapman and Hall.

Aversa P., Furnari, S., Haefliger, S. 2015. Business model configurations and performance: A qualitative comparative analysis in Formula One racing, 2005-2013 Industrial and Corporate Change, 24(3), 655-676

Aversa, P., Haefliger, S., Rossi, A., Baden Fuller, C., 2015. From Business Model to Business Modeling: Modularity and Manipulation. Advances in Strategic Management 33, 151–185.

Baden-Fuller, C., Morgan, M.S., 2010. Business models as models. Long Range Planning 43 (2–3), 156–171.

Baden-Fuller, C., Mangematin, V., 2014. Business models: A challenging agenda. Strategic Organization 11 (4) 418–427.

Baldwin, C.Y., Clark, K.B, 2000. Design Rules, Volume 1, The Power of Modularity. Cambridge MA: MIT Press.

Bertalanffy, L. von., 1950. An outline of general systems theory. British Journal of Philosophy of Science 1, 139–164.

Berthon, P., Pitt, L., Nel, D., Salehi-Sangari, E., Engstrom, A., 2008. The biotechnology and marketing interface: Functional integration using mechanistic and holographic responses to environmental turbulence. Journal of Commercial Biotechnology 14(3) 213–224.

Burke, W. 2014. Organizational change: Theory and practice. Sage.

Cabrera, D., Cabrera, L., Powers, E., 2015. A unifying theory of systems thinking with Psychological applications, Systems Research and Behavioral Science 32, 534–545.

Casadesus-Masanell, R., Ricart, J.E., 2010. From strategy to business models and onto tactics. Long Range Planning 43 (2–3), 195–215.

DaSilva, C., Trkman, P., 2014. Business Model: What It Is and What It Is Not. Long Range Planning 47, 379–389.

Demil, B., Lecocq, X., 2010. Business model evolution: In search of dynamic consistency. Long Range Planning 43 (2–3), 227–246.

Desyllas, P., Sako, M., 2013. Profiting from business model innovation: Evidence from Pay-As-You-Drive auto industry. Research Policy 42, 101–116.

Dos Santos, J.F.P., Spector, B., Van der Heyden, L., 2015. Towards a theory of business mdoel change. In: Foss, N., Saebi, T. (Eds.), Business Model Innovation: The Organizational Dimension. Oxford University Press, Oxford.

Doz, Y.L., Kosonen, M., 2010. Embedding strategic agility: A leadership agenda for accelerating business model renewal. Long Range Planning 43 (2–3), 370–382.

Dunbar, R.L.M., Garud, R., Raghuram, S., 1996. A frame for deframing in strategic analysis. Journal of Management Inquiry 5, 23–34.

Eisenhardt, K.M., Furr, N.R., Bingham, C.B. 2010. Micro-foundations of performance: Balancing efficiency and flexibility in dynamic environments. Organization Science 21 (6), 1263–1273.

Fligstein, N., 1996. Markets as Politics: A Political-Cultural Approach to Market Institutions. American Sociological Review 61 (4), 656–673.

Geroski, P., 1998. Thinking creatively about markets. International Journal of Industrial Organization 16 (6), 67–695.

Gioia, D.A., Corley, K.G., Hamilton, A., 2012. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organizational Research Methods, 16(1), 15-31.

Henderson, R.M., Clark, K.B., 1990, Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms, Administrative Sciences Quarterly 35, 9–30.

Humphreys, A., 2010. Megamarketing: The creation of markets as a social process, Journal of Marketing 74, 1–19.

Johnson, W., Christensen, C., Kagermann, H., 2008. Reinventing your business model. Harvard Business Review 86 (12), 50–59.

Kafri, R., Springer, M., Pilpel, Y., 2009. Genetic redundancy: new tricks for old genes. Cell 136, 389–392.

Kast, R.E., Rosenzweig, J.E., 1972. General systems theory: Applications for organization and management. Academy of Management Journal 15, 447–465.

Katz, D., Kahn, R.L., 1978. The social psychology of organizations. New York, Wiley.

Leih, S., Linden, G., Teece, D. 2015. Business model innovation and organizational design. In: Foss, N., Saebi, T. (Eds.), Business Model Innovation: The Organizational Dimension. Oxford University Press, Oxford.

Lubik, S., Garnsey, E., 2016. Early business model evolution in science-based ventures: The case of advanced materials. Long Range Planning, 49, 393-408.

Martins, L.L., Rindova, V.P., Greenbaum, B.E., 2015. Unlocking the hidden value of concepts: A cognitive approach to business model innovation. Strategic Entrepreneurship Journal 9, 99–117.

McGrath, R.G., 2010. Business models: A discovery driven approach. Long Range Planning 43, (2–3) 247–261.

Midgley, G., 2003. Systems Thinking. Sage Publications: Thousand Oaks, CA.

Mullins, J., Komisar, R., 2009. Getting to Plan B: Breaking through to a Better Business Model. Harvard Business Press, Boston MA.

Orton, J.D., Weick, K.E., 1990. Loosely Coupled Systems: A Reconceptualization. Academy of Management Review 15 (2) 203–223.

O'Reilly, C., Tushman, M.L., 2013. Organizational ambidexterity: Past, present and future. Academy of Management Perspectives 27(4), 324–338.

Pratt, M.G., 2009. For the lack of a boilerplate: Tips of writing (and reviewing) qualitative research. Academy of Management Journal 52 (5), 856–862.

Rindova V.P., Kotha, S., 2001. Continuous morphing: competing through dynamic capabilities. Academy of Management Journal 44 (6), 1280–3.

Rumelt, R. 2011. The Perils of Bad Strategy. McKinsey Quarterly 1, 30–39.

Seelos, C., Mair, J., 2007. Profitable business models and market creation in the context of deep poverty: A Strategic View. Academy of Management Perspectives 21 (4), 49–63.

Siggelkow, N., 2002. Evolution towards fit. Administration Science Quarterly 47 (1), 125–159.

Simon, H.A., 1962. The architecture of complexity. Proceeding of the American Philosophical Society 106, 467–482.

Sosna, M., Trevinyo-Rodriguez, R.N., Velamuri, S.M., 2010. Business model innovation through trial and error learning. Long Range Planning 43 (2–3), 383–407.

Steensma, M.A., 2001. The Use of Modular Organizational Forms: An Industry-Level Analysis. The Academy of Management Journal 44 (6) 1149–1168.

Streeter, C.L. (1991). Redundnacy in social systems: Implications for warning and evacuation planning. International Journal of Mass Emergencies and Disasters, 9(2), 167-182.

Strauss, A., Corbin, J., 1998. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 2nd ed. SAGE Publications, Thousand Oaks, CA, USA.

Teece, D.J., 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal 28 (13), 1319–1350.

Teece, D., 2010. Business models, business strategy and innovation. Long Range Planning 43 (2–3), 172–194.

Teece, D., 2014. The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. Academy of Management Perspectives 28 (4), 328–352.

Thomas, J.H., 1993. Thinking about genetic redundancy. Trends in Genetics 9 (11), 395–399.

Van Maanen, J., 1979. The fact of fiction in organizational ethnography. Administrative Science Quarterly 24, 539–550.

Velu, C. 2015. Knowledge management capabilities of lead firms in innovation ecosystems, AMS Review 5 (3-4), 123-141.

Velu, C. 2016. Evolutionary or revolutionary business model innovation through coopetition? The role of dominance in network markets, Industrial Marketing Management 53, 124-135

Velu, C., Stiles, P. 2013. Managing decision-making and cannibalization for parallel business models. Long Range Planning 43, 443–458.

Yin, R.K., 2003. Case study research: Design and methods. Thousand Oaks, CA, USA.

Zott, C., Amit, R., 2010. Business model design: An activity system perspective. Long Range Planning 43 (2–3), 216–226.