

# Information System Strategy for Opportunity Discovery and Exploitation: Insights from Business Model Transformation

*Research-in-Progress*

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## Abstract

*For a large enterprise to design a new business model, business managers are unlikely to determine the precise set of choices required to create and capture value. Instead, they are more likely to organize processes to determine the set of choices. Traditionally, an information system (IS) is viewed as the facilitator for opportunity exploitation when a new business model is assumed to be fully formulated; however, when the business model is not fully formulated, the role of the IS as the facilitator for opportunity discovery has been greatly overlooked. Using an in-depth case study of a large enterprise that is designing its next business model, we find that an IS can be used to facilitate opportunity discovery in formulating the narrative and numeric logics of a new business model and can facilitate opportunity exploitation in reconfiguring IS resources.*

**Keywords:** IT-enabled change, IS-strategy implementation, Strategic information systems

## Introduction

A business model represents the core business concept of an enterprise; it depicts the logic of the enterprise, and, in particular, it outlines how an enterprise creates and captures value. For instance, entrepreneurs ingrain their visions into compelling business models in new ventures. Thus, the business model reflects the ambitions of the entrepreneurs' time, scope, and size (Morris et al. 2005). The creation of a business model for a new or existing enterprise is fundamentally a creation of a "business idea" that facilitates the pursuit of "entrepreneurial opportunities". In this sense, opportunities are "situations in which it is possible to recombine resources in a way that generates a profit" (Shane 2012, p. 15).

Opportunity discovery and opportunity exploitation are two core processes in opportunity development (Shane and Venkatraman 2000). From the perspective of a business model, opportunity discovery enables the formulation of a business model that identifies and selects new goals, new means, or both goals and means to create and capture value, whereas opportunity exploitation enables the implementation of a business model that configures or reconfigures resources to execute the new or revised business model. There are theoretical delineations between these processes. However, in today's complex and dynamic competitive landscape, we cannot assume that business managers are able to formulate a business model fully. The delineations of these processes are usually fuzzy in practice; thus, a dynamic view of these processes is increasingly necessary today.

The information system (IS) strategy, which has traditionally assumed that the positioning decisions of business managers are correct and do not change, requires new approaches to enable the dynamic repositioning of an enterprise (Tanriverdi et al. 2010):

*"From an alignment perspective, IS strategy no longer can assume that the firm is positioned in profitable product markets to start with. Rather, it must recognize the dynamic shifts in the profitability levels of product markets and enable the firm to identify emerging profitable product markets. Aligning IS strategy with competitive strategy alone might offer limited and inconsequential results. The alignment quest needs to tackle how the IS strategy co-evolves with both corporate strategy and competitive strategy together."* (Tanriverdi et al. 2010, p.862)

A business model is typically not well formulated or apparent at the beginning of the enterprise. In certain cases, an entrepreneur may be able to intuit a new business model without being able to fully rationalize or articulate it (Teece 2010). In such cases, we posit that there are effective IS strategies to enable opportunity discovery and opportunity exploitation in a business model. IS strategy related to opportunity development processes is greatly overlooked in the IS literature. In response to calls for research on IS strategies that enable the dynamic repositioning of an enterprise (Tanriverdi et al. 2010), we use entrepreneurial opportunity as our theoretical lens to inform the new phenomenon of IS strategy. Specifically, our research question is: *How do IS strategies enable opportunity discovery and opportunity exploitation in the context of business model transformation?*

Before discussing our case study and its preliminary findings, we review previous research on business models, opportunities and IS strategy for opportunity development processes. We conclude our study with a summary of limitations and future research directions.

## Theoretical Foundation

### ***Business Model***

A business model is fundamental to every enterprise because it describes the underlying logic of how the enterprise creates value for its customers and captures value for itself. There is no consensus on the definition of a business model (e.g., Al-Debei and Avison 2010; Hedman and Kalling 2003; Osterwalder et al. 2005). A business model may be expressed as an organizational narrative that describes how an enterprise works (Magretta 2002). It has been referred to as "a statement, description, a representation, an architecture, a conceptual tool or model, a structural template or a framework, a pattern and a set" (Zott et al. 2011, p.4) that abstracts a firm's activities (Seddon et al. 2004; Zott and Amit 2010), components (Morris et al. 2005; Osterwalder et al. 2005), or the logic of how an enterprise conducts business (Casadesus-Masanell and Ricart 2010). Despite these different approaches, emerging themes have approached the business model as a new unit of analysis and as a holistic view that links value creation, value capture, and stakeholders (Zott et al. 2011). Consistent with these emerging themes, our

study considers a business model as expressing “*the logic of the firm, the way it operates and how it creates values for stakeholders*” (Casadesus-Masanell and Ricart 2010, p.196).

One of the many roles of the business model is to act as a “facilitative intermediary in the opportunity-creation process” (George and Bock 2011, p.6). In this view, the business model depicts transactive elements of the firm through opportunity exploitation (Amit and Zott 2001) and actions associated with exploitation that require significant experimentation and learning (McGrath 2010). Strategic experimentation (instead of intuition) is utilized to minimize risk and maximize learning during business model development (Yunus et al. 2010). The learning process triggers the constant renewal, adaptation, and fine-tuning of a business model (Sosna et al. 2010). It has been suggested that a business model reflects management’s hypotheses about various stakeholder behavior; through learning, a business model can be adjusted to work better (Teece 2010).

The business model is commonly conceived of as the result of strategic choices. For example, it may be a reflection of a firm’s realized strategy (Casadesus-Masanell and Ricart 2010) and/or an abstraction of certain aspects of that strategy (Seddon et al. 2004). The business model may also be used to facilitate communication of strategic choices (Osterwalder et al. 2005; Shafer et al. 2005). Because the business model “focuses attention on how all the elements of the system fit into a working whole” (Magretta 2002, p.6), it embodies a consistent and holistic logic for decision makers to select from among “the myriad choices and actions involved in execution” (Richardson 2008, p.135).

Magretta (2002) suggests two important criteria for a good business model. First, the narrative aspect of the business model must be coherent; second, the numbers associated with the narratives must be able to produce the desired outcomes. In a case study of a new venture, Doganova and Eyquem-Renault (2009) use the concept of calculative devices as market devices (Callon and Muniesa 2005) to analyze both the narrative and calculative aspects of business models and find that entrepreneurs use business models as narrative and calculative devices to explore a market. The creation of a new business model is an enactment of entrepreneurial opportunity (George and Bock 2011) in which opportunity is “an idea or dream that is discovered or created by an entrepreneurial entity and is revealed through analysis over time to be potentially lucrative” (Short et al. 2009, p.55).

## ***Opportunity***

Grounded in earlier contributions to the field of entrepreneurship, opportunities are defined as “situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends, or means-ends relationships” (Eckhardt and Shane 2003). Unlike earlier definitions (Shane and Venkatraman 2000), this definition, which reflects the dominant view today (Short et al. 2009), explicitly states that opportunities may be based on new means only or new ends only.

The nature of opportunity has also been the subject of studies. Scholars have categorized opportunities differently based on the studies or perspectives they have selected. For example, in analyzing the role of opportunities, Eckhardt and Shane (2003) categorize opportunities using three dimensions based on their subjective and objective aspects – the locus of change that generates opportunities, the source of the opportunities, and the initiator of the change. Murphy (2011) uses pluralism’s ontology to characterize the nature of opportunities. Based on the notion of temporal distance, Tumasjan et al. (2012) study the effects of desirability and feasibility of opportunities. In addition, Companys and McMullen (2007) propose six types of opportunities (technological, market, producer, consumer, network, and political) based on the economic, cultural, cognitive, and sociopolitical schools of thought.

Opportunities seem to be abundant, but it is not necessarily true that individuals or firms may always be able to recognize and/or exploit them. For example, an empirical study shows that prior knowledge of markets, ways to serve markets, and knowledge of customer problems influences the discovery of a technological opportunity (Shane 2000). Compared with our understanding of opportunities, we know little about the processes in which individuals or firms discover or exploit these opportunities. There is much debate on whether opportunities are discovered through a process of ‘discovery’ or of ‘creation’ (Alvarez and Barney 2007). Alvarez et al. (2012) suggests that the information and decision-making setting used in the processes of discovery and creation are different; the former is a knowledge-driven process that allows for risk-based decision making, and the latter is a socially driven process that enables

incremental, inductive and intuitive decision-making. Short et al. (2009) believe scholars will move toward a middle ground, in which, depending on the context, certain opportunities are perceived to be discovered, whereas others are created.

Opportunity discovery and opportunity exploitation are two core processes of entrepreneurship (Shane and Venkatraman 2000). Opportunity discovery is the process to “perceive a previously unseen or unknown way to create a new means-ends framework” (Eckhardt and Shane 2003, p.339); opportunity exploitation is the process to acquire resources or engage activities to exploit an opportunity. Shane (2012) emphasizes that these processes (in addition to processes such as identification and evaluation) do not necessarily follow a planned sequence. Entrepreneurial processes are not restricted to individual entrepreneurs but may be embedded in corporate processes at the enterprise level. Enterprises can design their structure, culture, resource, and reward systems to enable such entrepreneurial processes to leverage growth- and advantage-seeking opportunities (Ireland et al. 2009).

### ***Information Systems Strategy for Opportunity Development Processes***

Merali et al. (2012) conceptualize the strategic IS domain as a complex adaptive system that co-evolves information technology and “organizational capabilities and business models to create social and economic value.” (p. 25). Information technology has contributed to the emergence of a complex adaptive system for enterprises by increasing their “diversity, adaptiveness, interconnectedness, and interdependency” (Tanriverdi et al. 2010, p. 823). Chen et al. (2010) suggests that this relatively recent perspective of strategic information systems requires dynamic alignments between IS strategy and business strategy. In such dynamic alignments, the roles of ISs and subsequent IS investment and deployment decisions will be based on a shared view across the organization.

The co-evolution of IS strategy and business strategy may trigger a business model formulation process when opportunities are discovered and may proceed to the opportunity exploitation process for implementation of the business model. The model of corporate entrepreneurship strategy developed by Ireland et al. (2009) specifies an organizational architecture set that can prompt and reinforce opportunity recognition and exploitation. For example, resources related to markets and technology that enhance forecasting proficiency are required to recognize opportunities, whereas resources associated with flexibility and decision-making speed support may be used in exploiting recognized opportunities (Covin and Slevin 2002). However, forecasting tools are often less effective in assisting with the emergence of new business models because there is typically an absence of historical data associated with the new model (Doz and Kosonen 2010).

Doz and Kosonen (2010) identify decoupling, modularizing, dissociating, switching and grafting as a repertoire of strategic actions with which to achieve resource fluidity and an internal capability to reconfigure capabilities and redeploy resources rapidly. From an extensive meta-analysis of IS strategy literature, Merali et al. (2012) notes that the dominant alignment challenge of IS strategy has shifted from developing networks and resource-based competition to complex, dynamic and distributed contexts. One such example may be observed in online social networks. Whereas these networks have typically been understood to significantly disrupt the rules of value creation and capture and to add levels of complexity, dynamism, and context to alignment challenge, they are increasingly becoming sources of opportunity as enterprises have come to understand technological changes directly through online customers (Wirtz et al. 2010).

## **Research Methodology**

To gain insight into IS strategy in opportunity development processes, we utilize an in-depth case study because our research is explorative in nature and its primary objective is to understand the content and characteristics of key components and their relationships in these processes. We have selected a systematic case study approach based on the structured-pragmatic-situational (SPS) method as SPS integrated different recommendations from past case research methods into a coherent whole and narrowed some of the existing theoretical gaps in case research (Pan and Tan 2011). SPS has the following three features: (a) it prescribes a systematic process to conduct an interpretive case study; (b) it incorporates techniques to ensure viability while maintaining expected rigor; and (c) it facilitates adaptability in response to contingencies and the emergence of surprising case data.

The firm we examine is LEX (not real name), a large supplier of diversified products and services in the agricultural products and food industry in China. We find LEX suitable for our study because it has recently announced a highly ambitious goal of creating a fully integrated value chain that will integrate many of its diverse business entities to create new value. LEX also provides adequate access to executives strategizing information system decisions and to executives strategizing business decisions for key business entities. Given the rich data available to us in this single-case study, we believe it will be feasible to generalize certain theoretical statements from our empirical research (Lee and Baskerville 2003; Walsham 1995).

At the beginning of the *SPS framing cycle* (Pan and Tan 2011), we gathered background information to conceptualize the context by focusing on LEX's organizational structure, the ecosystem of the agricultural products and food industry in China and the entrepreneurial vision of a fully integrated value chain. In Sept 2012, we visited the site and conducted 15 semi-structured and open-ended interviews that lasted between 60 and 90 minutes with key decision makers for IS strategies and for business strategies. In the initial stage, we conceptualized the phenomenon with a simple theoretical lens to understand the strategic IS actions deployed for the new business model. As data collection progressed, an extended theoretical lens emerged that included the entrepreneurial processes of opportunity discovery and opportunity exploitation. We will explain our preliminary framework in the discussion section.

Currently, we are in the *SPS augmenting cycle* (Pan and Tan 2011). In this cycle, we continue to obtain additional data by scanning secondary data from internal documents (e.g., additional scripts from the CEO's past interviews), internal articles written by senior managers (e.g., 48 articles on value chain management, 18 articles on information systems and 124 articles on business models) and external publications. This process was undertaken to archive data triangulation, to reduce self-reporting bias and to resolve any incongruence that might arise from the collection of these extra data.

## Case Description

LEX is a large supplier of diversified products and services in the agricultural products (e.g., wheat, corn, rice, and sugar) and food industry in China. In addition to branch offices located in different countries, LEX operates through 12 business entities, seven of which are publicly listed in China and Hong Kong. Except for a real estate and a financial services entity, all business entities are connected to some part of the food-chain ecosystem. Although the outputs generated from the value chain of a business entity can be inputs for the value chain of another business entity, these entities do not require close collaboration with the others because of their autonomy. LEX basically plays the role of a key stakeholder and/or shareholder; to a certain extent, it simply governs the business and IS strategies of these entities. In March 2009, the CEO of LEX wrote an article in LEX's printed publication to explain his vision of a Fully Integrated Value Chain (FIVC). The CEO's opening statement was:

*"FIVC is not a closed but an open system. It consists of multiple chains and comes in different forms and sizes. Each chain stimulates other parts of the system, and value adds to the overall performance. Thus, FIVC is our new model for growth. It is a strategic choice and is also our goal; and it reflects our philosophy of how LEX operates."* (CEO March 2009).

Of its approximately 110,000 employees, LEX has fewer than 600 IT professionals; only a fraction of these are based at IS headquarters (LEX-IS). Many of the IT projects, and even certain important components of IS strategic planning, have been outsourced to top global business/IT consultant firms and to certain of China's largest IT vendors. Beginning in 2010, LEX-IS engaged consultants to strategize regarding its information systems. It took more than a year to analyze all the entire business activities and to plan the allocation of resources for these information systems. Simultaneously, as its first step toward realization of FIVC, LEX-IS implemented a common information platform (CIP) that allows all the business entities to manage their common operations. The CIP consists of 12 shared services, including knowledge management, legal and governance systems, human resource management, and risk management. In 2011, LEX-IS revised and compiled all IS policies and guidelines into a handbook that consisted of more than thirty sets of documents to ensure standardization of IS resources and practices.

After plans for standardizing IS and the CIP adoption were in place, the next task was to create new value by determining new ways of operating within a business entity or across different business entities. This task posed a higher level of difficulty that required deep exchanges of knowledge between business

entities and LEX-IS and between business entities. During this process, LEX-IS experienced many challenges. For example, the new value creation from a business entity might benefit overall FIVC performance, but it may not necessarily benefit the business entity itself, or a business entity might resist change to its business model because it was doing relatively well. Similarly, a business entity might be highly uncertain about its business direction and may not want LEX-IS to reconfigure its information systems as per its current operation, or another business entity might have previously established a tightly integrated system that would be costly to amend.

A new CIO was hired in September 2011 specifically to provide the leadership required to tackle these challenges. In September 2012, the CIO selected a vendor to implement a business intelligence system, which is a system that collects key summarized data from all the business entities to generate key performance indicators (KPIs) for LEX. The decisions on what data are to be collected are based both on business needs and regulatory compliance. This approach helps reinforce the notion that business entities are responsible for providing accurate and timely data for corporate decision making and has indirect effects on business entities because they must now consider whether they must leverage an enterprise resource planning (ERP) system to fulfill such responsibility.

The CIO also selected three business entities that are closely related in the ecosystem to share a common ERP system. This is an important decision for FIVC because there has been much debate about whether LEX should deliver FIVC as a single large-scaled ERP or interoperate among multiple ERPs. LEX-IS has decided to use this as a pilot test to experiment on how new values may be created by reconfiguring or recombining three value chains. Simultaneously, IT professionals are assigned to other business entities to understand their operations. The level of organizational change will be significant from introducing an ERP to their entities (Devadoss and Pan 2007). But from the initial interaction among different roles, LEX-BI noticed that there are strong demands for business information from various business entities because of the rapid growth of their businesses and the high expectations from LEX to source new opportunities for growth.

Based on the current stage of our data analysis, we will discuss the preliminary findings in next section.

## **Discussion**

### ***Opportunity Intention***

The ambitious vision to create a new growth model for LEX originated with the CEO. It began with an article of fewer than 1,500 words that rationalized the need to create a FIVC, and it represented the entrepreneurial vision of the top management (Ireland et al. 2009). It provided the value justification and the stimulus for subsequent strategic actions. The vision depicts a new business model and specifies that the opportunities of new value creation reside in reconfiguring the value chains of various business entities. The reconfiguration of a complex ecosystem requires significant business insights and technical knowledge. This mission might have been delegated to LEX's corporate strategic department or to a special team of senior representatives from different business entities and departments. Instead, however, the CEO delegated the mission to LEX-IT because he stated in his article that FIVC "*relies on information systems to win*". The delegation of this authority implied that the vision showed continuing merit and induced an even more intensive pursuit. A shared understanding of the opportunity began to emerge, and opportunity development began to transform from individual to organizational in nature (Dimov 2007).

### ***Opportunity Discovery of Narrative Logic and Calculative Logic***

The initial business model depicted in FIVC consists of the narrative component only. Despite the absence of details in the initial narrative, it is coherent and easy for employees to understand. Considering the business model as a boundary object constructed of narratives and calculations, Doganova and Eyquem-Renault (2009) find that business models are devices for 'collective exploration' that become a common platform for organizational members from different domains to contribute new possibilities of value creation. ***Narrative logic*** refers to the rationale of a business model's narrative. The narrative logic of a new possibility proposed by members may be challenged by other members because the logic may be based on flawed assumptions. The accuracy of these assumptions requires significant insight into related domains. For example, the decision to integrate two business operations may be based on a flawed

assumption that integrated rules and routines will not compromise the current values of stakeholders. The new narrative logic must make sense for an enterprise as a new opportunity. Covin and Slevin (2002) argue that organizational members must use an alternative perspective (other than their dominant perspective) to see certain opportunities. To explore a new narrative logic for the new business model, both IS strategists and business strategists may be required to reframe alternate perspectives to see plausible future scenarios.

The strategists must determine whether the enterprise can afford to implement a new set of coherent narrative logics. Affordability is based on the costs required to reconfigure resources. In addition to financial costs, these costs include opportunity costs, time costs, and productivity lost because of the change. We refer to **re-configurability assessment** as the assessment process to determine implementation cost. The business model revision triggered by a new narrative logic is not the alignment of business strategy and IS strategy but the co-evolution of both strategies. Having a coherent narrative logic is not a sufficient condition to warrant a change in the business model. The calculative aspect of a business model provides the quantitative evidence to the narrative logic. The quantitative evidence shows that the narrative logic is attainable and sufficiently compelling for the enterprise to pursue. The quantitative elements are not restricted to financial or numerical calculations related to cost and revenue; instead, they include time factors (e.g., time needed to attain a goal) and formulas modeling the narrative logic.

Elements of a set of quantitative data may be related in different ways; thus, for example, a set of such data may consist of formative and summative data, dependent and independent variables, estimation and actual values, and internal and external sources. **Calculative logic** refers to the logical relationships of quantitative data in a business model. Both the narrative and calculative logics may trigger a revision of the business model. The change induced by calculative logic is increasingly more important today because both data and data processing technology are more readily available. In our case, LEX leveraged on information systems to collect business intelligence, and KPIs and data reside on CRMs and ERPs to enable the discovery of new calculative logics. In this scenario, we see a move beyond the incremental enhancements of operations because the new calculative logic is akin to changing the formulas themselves instead of the variables of existing formulas. We refer to **cost-benefits assessment** as the process of evaluating the quantitative aspect of the business model. The criterion to select a new calculative logic is that its new set of equations must improve the cost-benefit relationships.

### ***Opportunity Exploitation of IS Resource Fluidity and Infrastructure***

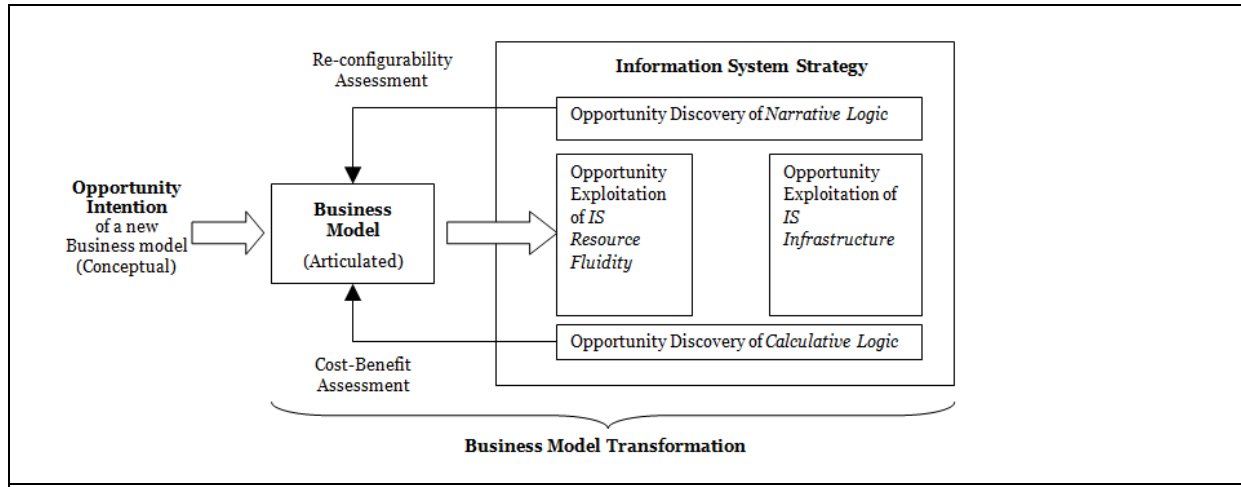
From our case study, we identified the following two strategic IS elements that may effectively facilitate the exploitation of opportunities: IS resource fluidity and IS infrastructure. Both increase the likelihood of discovering and exploiting an opportunity. Exploiting an opportunity in our context also implies implementing a new or a revised business model.

The desirability and feasibility of an opportunity are two important factors that influence the decision to exploit such opportunity (Mitchell and Shepherd 2010). In the context of IS in opportunity exploitation, feasibility is a function of the flexibility to redeploy IS resources to exploit an opportunity. Doz and Kosonen (2010) refer to resource fluidity as an internal capability to reconfigure capabilities and redeploy resources rapidly. They suggest decoupling, modularizing, dissociating, switching, and grafting as a repertoire of strategic actions to achieve resource fluidity. **IS resource fluidity** may be obtained by using the same repertoire of strategic actions on information systems because IS resources are considered special types of resources. For example, in the context of software application, software-based configuration is commonly designed to allow the switching of routines, whereas ERPs are designed with loosely coupled modules to allow greater flexibility. Besides strategic actions, project-level actions facilitate the development of flexibility capability (Pan et al. 2006).

We refer to networking, hardware, software, applications, and IT-related processes such as IT support as **IS infrastructure**. Most hardware and software components of IS infrastructure are designed to support international industrial standards. Thus, to a certain degree, IS infrastructure is already designed for scalability, extendibility, and interoperability. To further increase the feasibility of exploiting opportunities, LEX-IT created CIP as an additional level of standardization of IS infrastructure; in fact, CIP is a modularized platform with twelve applications that allows new applications to be added. For business entities that were weak in IS infrastructure, LEX-IT emphasized enhancing their IS

infrastructure by deploying more hardware and software. The enhanced IS infrastructure helps discover opportunities in the calculative logic and increases the feasibility of exploring opportunities.

Figure 1 below shows our preliminary framework that organizes our findings discussed above. The proposed framework conceptualizes LEX as a complex adaptive system that allows a business model to emerge from a conceptual model to an articulated model. The articulated business model enhanced the narrative logic of the initial (i.e., conceptual) model, and added calculative logic. Table 1 below compares the differences between ISS for business strategy and ISS for opportunity development.



**Figure 1. Information System Strategy for Opportunity Development Processes**

<b>Table 1. Comparing ISS for Business Strategy and for Opportunity Development</b>		
<b>Dimension</b>	<b>ISS for Business Strategy</b>	<b>ISS for Opportunity Development</b>
Business strategy	Exploitation of business strategy	Discovery of business strategy
Business Model (BM)	Static	Dynamic
Narrative Logic of BM	Alignment with business goals	Co-evolution with business goals
Calculative Logic of BM	Analyse past data	Collect future data
Transformation of BM	Causation Process	Effectuation Process
Entrepreneurial Activities	Low	High

## Conclusion and Limitations

Our study, upon completion, can contribute to our knowledge of the links between (a) IS strategy and entrepreneurial opportunity development processes, i.e., opportunity discovery and opportunity exploitation, and (b) opportunity development processes and business model transformation. Formulating IS strategies for opportunity development processes offers IS researchers a fresh perspective to study the co-evolution of strategic alignment because many of the opportunity development processes (e.g., intention, discovery, and identification) imply that the business strategy has not yet been fully formulated and can be developed through co-evolution with IS strategies. For entrepreneurship and business model researchers, our study illustrates how narrative logic and calculative logic influence the development of a new business model. We have also found that decision makers use re-configurability assessment to evaluate the narrative logic and cost-benefit assessments to evaluate the calculative logic.

This study has at least two limitations that suggest the need for future research. First, changes in the business model, IS strategies, and business strategies as strategic actions of a co-evolution process are best observed with longitudinal field research. However, as an explorative study of a complex topic, our aim in this work is to identify the key constructs informed by different research fields and to gain a level of understanding about their relationships. Second, although we posit that a large enterprise is a complex adaptive system and although we adopt this perspective as the premise for our work, the notion of a complex adaptive system has not been fully explored in our study.



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