

# DESIGN SUPPORT SYSTEMS FOR STRATEGIC MANAGEMENT OBJECTS: A RESEARCH AGENDA

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## ***ABSTRACT***

Information Systems (IS) research has substantially contributed to improving decision-making and its support in organizations. In this paper we argue that IS research can make similar contributions in the field of designing organizational strategies by investigating the use of Design Support Systems for Strategic Management Objects. We propose three research areas that build on each other. Firstly, the identification and formalization of the core constructs and models of interest related to the design and analysis of strategic business issues. Secondly, the exploration of how design techniques and tools might contribute to improving the design of answers and alternatives to strategic business questions. Thirdly, the research of “Design” Support Systems assisting in the process of designing Strategic Management Objects.

Keywords: Business model, Design attitude, Computer-Aided Design, Strategy

# INTRODUCTION

In this paper we explain why and how information systems research can assist organizations in the field of business strategy by complementing its traditional focus on decision-making, organizational design, and operations with a focus on the design, selection and management of strategies and its support through systems. We argue for a research agenda that investigates Design Support Systems for Strategic Management Objects.

Decision-making and its support constitutes a large part of IS research, as demonstrated by Taylor et al. (2010). This perspective portrays the manager and entrepreneur as facing a given set of alternative courses of action from which a choice must be made. It implies that it is easy to come up with alternatives to consider, but difficult to choose among them (Boland & Collopy, 2008).

In this article we argue, similar to Boland & Collopy (2008), that it is equally difficult to come up with strategic alternatives from which to choose from and suggest that information systems research is well equipped to substantially contribute to business strategy by enabling the design of strategic options. Notably the use of “design” support systems could have a particular impact on business strategy design by assisting managers and entrepreneurs in the task of designing, selecting and executing strategic options. The cost of not considering new viable options in today’s rapidly evolving competitive environment might be higher to an organization than the cost of making the “wrong” decision. Hence, it is of interest to increase an organization’s ability to design strategic alternatives. The four key requirements principles suggested by Jarke et al. (2011) confirm this interest in addressing strategic, thus complex, issues in organizations, especially when they emphasize the intertwining of requirements and organizational contexts (1<sup>st</sup> principle), and the need to recognize unprecedented levels of design complexity (4<sup>th</sup>).

We suggest three major areas of potential contribution that build on each other consecutively and are mutually influenced. Firstly, IS research can help shed light on modeling, formalizing, representing and visualizing the concepts, constructs and models of interest related to the design and analysis of strategic business issues. Examples are, for instance, an organization's business models, its value propositions, its channel strategies, or strategic portfolios (e.g. product portfolio, patent portfolio), etc. We call these concepts Strategic Management Objects. This proposition is based on IS's large body of knowledge with regard to modeling constructs, concepts, ontology, and artifacts for information systems design across disciplines.

Secondly, we believe IS research can help understand how design techniques and tools can improve the process of designing answers to strategic business questions. For instance, an organization has to design (and adapt) its business model in an ever-evolving competitive environment. We call this process the design (and adaptation) of Strategic Management Objects. This proposition is based on the fact that IS research has a strong foundation in investigating the rules and principles related to the process of designing artifacts.

Thirdly, IS research can also clarify why and how design support systems can assist business developers, strategists, and entrepreneurs in the design of answers to strategic business questions. We call this Design Support Systems for Strategic Management Objects. This proposition is based on two of IS's traditional focuses. On the one hand IS has a history of researching processes in order to better support decision-making through systems (Taylor et al., 2010), such as is the case for Decision Support Systems (DSS), or for Group Support Systems (GSS). On the other hand IS research develops computer-aided tools in the fields of software engineering (CASE), requirement engineering, human-computer interaction, or process design.

This research agenda we propose builds on the principles of design science as outlined by March & Smith (1995), Hevner et al. (2004), Gregor et al. (2007), and others.

# STRATEGIC MANAGEMENT OBJECTS

Organizations and their managers need management objects or concepts that everybody understands; concepts that facilitate the description of objects of strategic interest, which improve their discussion and enhance related decision-making. For example, Osterwalder and Pigneur (2010) show that while the term business model is widely utilized in organizations and literature its understanding is not always clear. To overcome this they provide a structured visual language to describe, analyze and design business models. We propose a similar approach for other objects of strategic interest, such as value propositions, strategic portfolios (e.g. product portfolios, patent portfolio), and others to be identified and suggest regrouping them under the term Strategic Management Objects.

Strategic Management Objects are either objects of strategic design decisions (e.g. an organization's business model) or objects that influence or constrain design choices (e.g. the evolving competitive environment, technology, environmental, or social trends, stakeholders, or the legal context).

Strategic Management Objects can provide a shared or common language that allows everybody involved in strategy design to start from the same point and talk about the same thing. Moreover, in order to support a domain through systems, the underlying constructs and models have to be identified, formalized and visualized.

This is a major preoccupation of IS research rooted methodologically in design science thinking (Gregor et al., 2010), conceptual modeling and requirement engineering (Jarke et al., 2011). In IS modeling has started with a focus on modeling information, over transactions, to steadily advance to more organizational concepts, such as processes and Enterprise Architecture. We believe IS research can equally contribute to identifying, conceptualizing, and representing more abstract strategic concepts, which we call Strategic Management Objects (SMOs).

Under Strategic Management Objects we understand the constructs and models that are either subject of strategic choices or have an influence on them. For example, decision makers and entrepreneurs design and decide on the business model of an organization in either an explicit or ad-hoc manner. The design of this business model is likely to be influenced by external factors like competition, or technology trends. Business model, competition and trends are all three examples of Strategic Management Objects, as illustrated by Osterwalder and Pigneur (2010).

While strategic Management Objects originate in organizational and management research, we believe IS research can contribute through its body of knowledge and principles in conceptually modeling and formalizing such objects. This will help clarify them and improve their usage in strategic design processes as well as enable their application in design support systems. While management research discusses such concepts, it is often less rigorous about their conceptualization. Concepts like “value proposition” are frequently mentioned in scholarly management journals, but their depiction into tested constructs and models remain rare.

We propose a focus on two major research streams.

### **R1a: Identification and formalization of Strategic Management Objects**

We suggest that IS research focuses on the three usual facets in IS (Jarke et al., 2011) for (a) discovering the Strategic Management Objects relevant to the design of organizational strategies, (b) turning them into explicit specifications of a conceptualization, and (c) validating them.

As recommended by the design science paradigm (Gregor & Jones, 2007), we suggest that IS research also evaluates (validates and verifies) the identified and formalized Strategic Management Objects by developing criteria for their assessment and measuring their performance against those criteria. In his seminal work Herbert Simon (1969) outlines that

concepts and objects, such as Strategic Management Objects, are artifacts and as such constructed by humans, as opposed to something that occurs naturally. This means there are no natural laws telling us what are and what aren't Strategic Management Objects. Nor are there any natural laws telling us what constitutes a good or complete conceptualization of a Strategic Management Object. Therefore it is important to evaluate such constructs to base them on sound methodological foundations. While concepts and models are frequent in strategic management thinking, few satisfy the design science criteria of evaluation outlined by March & Smith (1995).

### **R1b: Visualization and usability of Strategic Management Objects**

We suggest that IS research investigates the visualization and usability of Strategic Management Objects as to their applicability in organizations.

Recent advances in visualization technologies [Tegarden, 1999] provide the capability to begin to use human visual/spatial abilities to solve the abstract problems found in business. Strategic Management Objects could be considered as blueprints for a strategy to be implemented through structures, processes, and systems. In a design attitude approach, it is important to be able to represent these objects using visual representations that allow a group of business designers to easily and jointly sketch, create, manipulate, assess, and discuss Strategic Management Objects to create new strategic alternatives. Figure 1 illustrates such a representation for designing a business model.

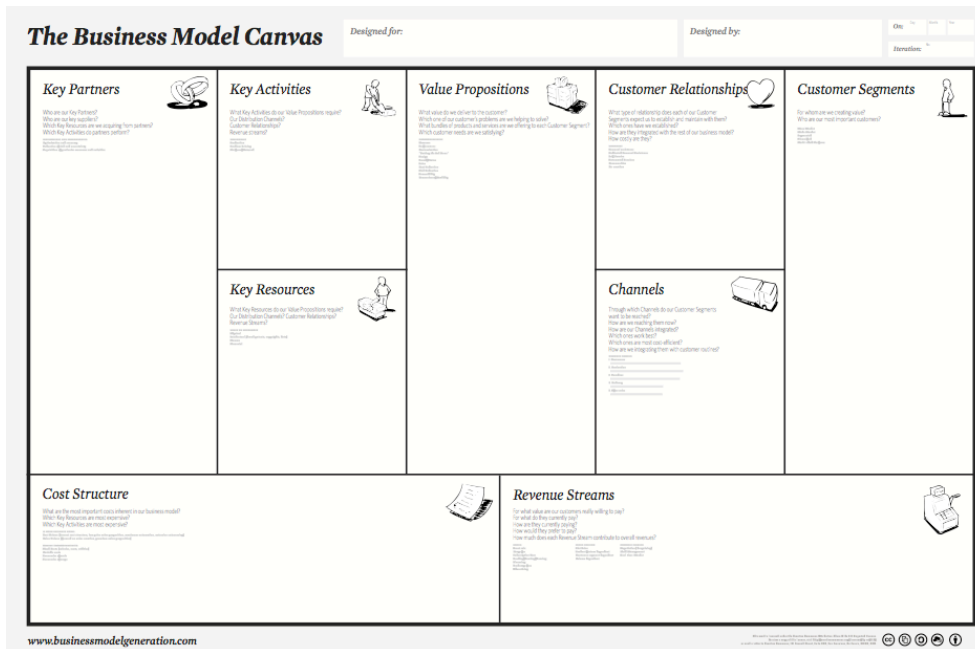


Figure 1. Business Model Canvas (Osterwalder & Pigneur, 2010)

## STRATEGIZING AS A DESIGN PROCESS

As a second research area we propose an investigation of how design techniques and tools might contribute to making existing answers to strategic business questions more explicit to subsequently improve the design of new answers and strategic alternatives.

For example, an increasing number of companies are facing strategic questions regarding their business models and their evolution. Yet the question is not about choosing between several known business models in an industry, which would require a decision attitude. The question is about making the current business model explicit so it can be examined, shared and critiqued in order to come up with entirely new and viable business model alternatives, from which to choose from. This requires a design attitude.

However, the existing body of knowledge of strategic planning and decision-making does not hold up to the reality of this type of strategic design question, which is the outcome of a fast moving, rapidly changing, and global business environment. This type of design question



requires a whole new range of tools, techniques, and skills to come up with viable strategic answers.

We believe IS research is relatively well equipped to help with this type of challenge given its historical focus and its body of knowledge specifically related to the design process. Various IS disciplines research and employ different design techniques. Systems design employs design techniques like usage scenarios, or requirements engineering, which investigates the needs of users.

We propose a focus on two major research streams.

### **R2a: Applying Design Techniques to Strategic Management Objects**

We suggest that IS research studies the use of design techniques in the process of crafting Strategic Management Objects. Such techniques include, but are not limited to, ideation, visual thinking prototyping (Lim, 2008), customer insights, storytelling and scenarios (Rasmussen, 2008). Figure 2 illustrates ideation with a group-based brainstorming session using the Business Model Canvas.

While design techniques are common in IS or in professional domains, such as architecture or product design, it is not yet clear how and at what benefit they can be applied to questions of strategic importance to an organization. We believe that a design attitude and the application of the according tools could help organizations design, for example, better business models, value propositions, channel strategies, customer segmentations, or strategic portfolios (e.g. product portfolio, patent portfolio). Applying design tools and methods are likely to enable the generation of alternative strategic answers, increase learning, facilitate discovery, and improve the refining of designs.

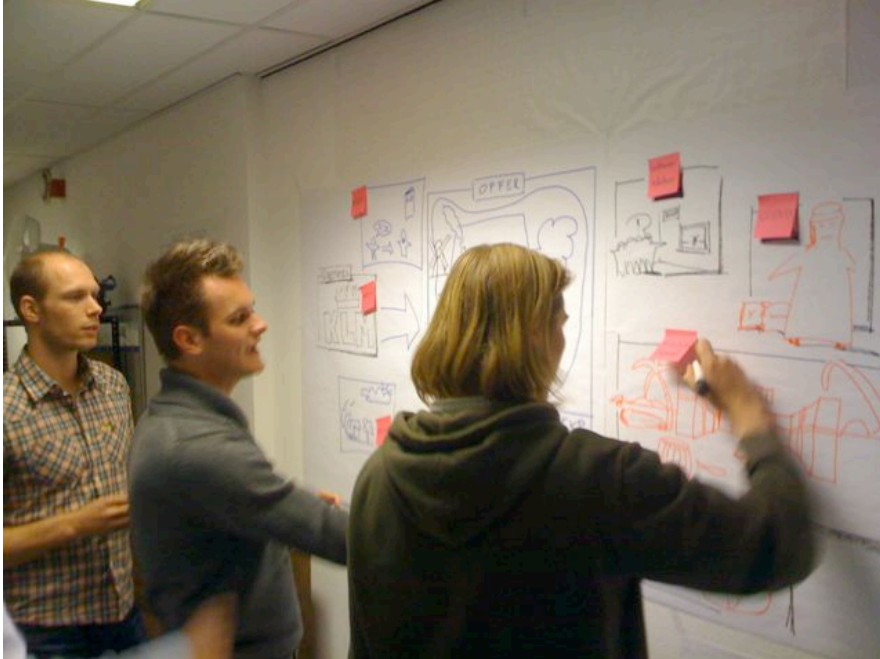


Figure 2. Brainstorming session using the Business Model Canvas (Osterwalder & Pigneur, 2010).

Among the design techniques, the role of prototyping is well established in the field of IS and Human-Computer Interaction (HCI) design. However Boland and Collopy (2008) and Lim et al. (2008) highlight that one can “view prototypes not only in their role in evaluation but also in their generative role in enabling designers to reflect on their design activities in exploring design space”. This way of working is not an established practice for business people, and additional transversal research could benefit both, the IS and management community.

### **R2b: Testing Strategic Management Objects**

We suggest that IS research explores the testing and validation of instantiations of Strategic Management Objects.

For example, it is not enough for organizations to design viable business models inside the boundaries of their organization. As demonstrated by Steve Blank (2010), it is important to go

outside of an organization to validate the business model design hypotheses with potential external customers.

IS and HCI research are well positioned to leverage their body of knowledge and inform management research on testing the usability of artifacts. However, more research is still required in IS to deal with Strategic Management Objects, which are much more complex constructs than screen interfaces, online services, or even business processes.

## **DESIGN SUPPORT SYSTEMS**

As a third area of research we propose the investigation of “Design” Support Systems assisting in the process of designing Strategic Management Objects, in a similar way to how Decision Support Systems (DSS) have been designed, developed and used (Taylor et al., 2010).

Under Design Support Systems (DgSS) we understand information systems that assist a person or a team in the task of conceptualizing and conceiving management objects. In IS Design Support Systems constitute an important area of research in the field of Computer-Aided Software Engineering (CASE). In professional domains, such as architecture and industrial design, but also in the organizational domain, such as for process design or information systems design they are widely adopted. Design Support Systems are much less researched and applied in organizational strategy.

### **R3a: Applying Design Support Systems to Strategic Management Objects**

We suggest exploring the application of Design Support Systems to design tasks, such as for example, the prototyping, simulating, iterating, and versioning Strategic Management Objects.

Computer-Aided Design (CAD) systems brought speed, rapid prototyping, quicker visualization, integration, better collaboration, simulation and better planning to engineering, architecture and other design areas (Turkle, 2009). Cumbersome manual tasks, such as constant redrawing and

blueprint sharing were eliminated, and a whole new world of opportunity, such as rapid visual three-dimensional exploration and prototyping became possible.

Observing what CAD tools have brought to the fields of architecture, engineering and design (Turtle, 2009), we anticipate that, in the realm of Strategic Management Objects, Design Support Systems (DgSS) will make many tasks easier and quicker, while revealing as-yet unseen opportunities. At the very least, such systems will help visualize, store, manipulate, track, annotate, and communicate Strategic Management Objects. More complex functions could involve manipulating layers of information, managing alternative versions, or manipulating Strategic Management Objects dynamically to evaluate the impact in real-time. Sophisticated systems might facilitate the critiquing of Strategic Management Objects, provide a repository of design patterns and off-the-shelf building blocks, enable distributed development and management, simulate models (Gregoriades and Sutcliffe, 2008), or integrate with other enterprise systems (e.g. ERP or business process management).

Computer-aided design systems for Strategic Management Objects will likely evolve in parallel to interface improvements. Manipulating Strategic Management Objects on wall-sized touch screens would bring computer-aided design closer to the intuitive paper-based approach and improve usability.

For example, Figure 3 illustrates Design Support Systems for designing, assessing and simulating business models.

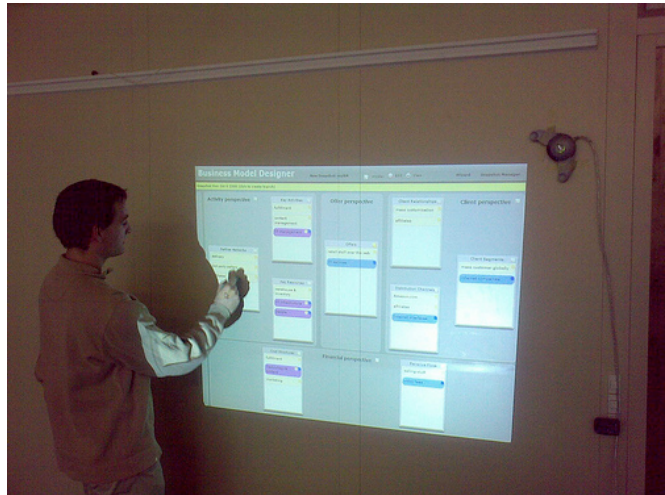


Figure 3. iPad and web applications for designing business models (Fritscher, 2010)

### **R3b: Supporting the shared understanding and co-design of Strategic Management**

#### **Objects**

We suggest that IS research examines how to support co-design and collaborative engineering (Briggs, 2009) of Strategic Management Objects, similar to how Group Decision Support Systems (GDSS) have extended the traditional DSS (Taylor et al., 2010), and how network-centric CAD has extended the individual CAD (Regli, 1997). In addition, we believe that a shared understanding across the organization, and the ability to co-contribute to disruptive innovations in a synchronous or asynchronous way can substantially improve the competitive performance of an organization. We suggest that Design Support Systems for Strategic Management Objects should be analyzed in combination with more recent IS research on social network theories and its impact on innovation performance.

When it comes to designing Strategic Management Objects the task of co-designing is central, as reminded by Fritscher (2010). Many of today's organizations are global with teams, functions and collaborators spread across the world. Furthermore, it is important to integrate the

perspectives of different stakeholders, which are affected by the Strategic Management Object under discussion.

## CONCLUSION

In this article, we argue for a research agenda that investigates Design Support Systems for Strategic Management Objects, according to the proactive engagement in the fashion-setting process of research as suggested by Baskerville and Myers (2009). Furthermore, we lay out how Information Systems Research is particularly well equipped to provide substantial inroads into the study of this organizational topic.

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