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Creating and Evaluating Business Cases for Complex IT Investments: Towards a New Process Theory

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Abstract

A business case document is an important project management decision-making tool for planning and evaluating potential investments in technology and process improvement projects. However, the effectiveness of traditional business case approaches for evaluating complex information technology (IT) investments, such as enterprise systems implementations is often questioned. A business case is a document created by an organization that outlines the expected benefits, costs, risks, and feasibility of a possible investment. Creating an effective business case for complex IT investments is difficult due to the uncertainty around the expected benefits, costs, risks, and timing for these complicated organizational projects that typically involve significant technological and organizational change throughout the lifecycle of the IT system. This paper reports on our analysis of the current challenges and outlines a framework for guiding further study.

Keywords

Business case, IT investment, enterprise systems, project management, multiple case study, process theory.

1. Introduction

With the tremendous advancement of information technology (IT) and a rapidly changing market environment, enterprises increasingly adopt complex enterprise information systems such as Enterprise Resource Planning (ERP) systems to manage their operations and supply chain. The selection and governance of such complex IT investments is consistently one of the biggest challenges facing IT decision-makers due to the uncertainty in predicting future benefits, costs, and risks over the lifecycle of the investment. Therefore, many organizations create and evaluate a written business case document to guide the investment decisions (Gambles 2009; Remenyi 1999). A business case document is an important project management decision-making tool for planning and evaluating potential investments in technology and process improvement projects. However, the effectiveness of traditional business case approaches for evaluating complex information technology (IT) investments, such as enterprise systems implementations is often questioned.

A business case is a document created by an organization that outlines the expected benefits, costs, risks, and feasibility of a possible investment. Creating an effective business case for complex IT investments is difficult due to the uncertainty around the expected benefits, costs, risks, and timing for these complicated organizational projects that typically involve

significant technological and organizational change throughout the lifecycle of the IT system. This paper reports on our analysis of the current challenges and outlines a framework for guiding further study.

For many years, an uncomfortably high rate of failure has been experienced in IT projects (Doherty 2012; Jordan and Silcock 2005). A clearly established business case can help set expectations and gain organizational buy-in. Without a clear business case, inappropriate IT investment decisions can be made which have major adverse effects on organizational performance. Senior managers must understand the purpose and nature of a business case and be able to accurately interpret the business case to position their enterprises' high-value technology investments and to achieve success with emerging market opportunities.

There is extensive research literature that highlights the *need* for a business case to be created prior to investments in process improvement projects in general and IT investments specifically (Gambles 2009; Harvard Business School 2011; IT Governance Institute 2006; Remenyi 1999). In contrast, there is little research that focuses on *how* to create an effective business case for complex IT investments. By investigating the process of creating and evaluating business cases and identifying the challenges that decision-makers face, this research provides a practical contribution to the knowledge base on business cases for complex IT investment and by extension to the project management and investment governance domains.

2. Background and Literature Review

A business case document is a decision support and planning tool for practitioners seeking financial resources from an organization (Keen 2011; Schmidt 2002). It outlines the predicted financial results and other business consequences of a plan of action and is often a trigger for deciding whether or not to proceed with a project. A business case often assists with setting the scope and objectives of projects, determining the financial and technical feasibility a project, and assists in decision- making about the future (Hogbin and Thomas 1994). A business case contains scenarios analyzed quantitatively and qualitatively with recommendations that are necessary in making an informed investment decision (Rottgers and Ritter 2011). For IT investments in particular, creating a business case document is particularly useful for establishing what resources are required and who will govern the project and deliverables given that future ownership of IT investments is not always clear (IT Governance Institute 2006; Remenyi 1999). For example, a business case document for a planned ERP implementation can act as an initial clarification of which business unit or department will fund the project and which stakeholders are responsible for governing the ERP system once it is implemented.

The traditional practice for creating a business case (see Table 1) involves identifying the business needs and projected costs, benefits and risks of a project. This traditional approach is well suited for most simple and short-term IT investments such as upgrading existing IT infrastructure only when the forthcoming changes from the current state (people, processes, and technology) are well understood and easy to predict. However, it is inherently difficult to create an effective business case for more complex IT investments where the potential benefits, costs, and risks over the lifecycle of the system are difficult to predict. Furthermore, traditional business cases typically fail to adequately address intangible benefits and indirect costs in IT investments (Ward, Daniel, and Peppard 2008). They may rely too heavily on the opinions and past experiences of influential decision-makers and consultants. The existing literature lacks an explanation for the inter-relationship among each element in a process of creating business case and also a lack of exploring different level of performance

improvement targets and potential benefits in the combinations of IT enablers and business changes by the business cases.

Table 1 – Typical Steps for Creating a Business Case for an IT Project

1. Gather input from a variety of project stakeholders on the goals, expected timeframe, and expected budget for the project; Analyze the environment; Identify future business directions and information technology needs;
2. Create a statement of the measurable organizational value that the project should deliver;
3. Identify the potential alternatives for delivering the organizational value (typical alternatives include buying versus building something; implementing the basics versus implementing the full functionality, etc.).
4. Estimate the total cost of ownership (TCO) of each of the alternatives which should include not just the costs of purchasing or building a solution, but also the costs of maintenance, training, hiring new staff, lost productivity, etc.
5. Estimate the total benefits of ownership (TBO) of each of the alternatives which should include not just the direct cost reductions or revenue increases from the planned improvements, but also the indirect benefits that may accrue from increased morale, productivity, or customer satisfaction.
6. Analyze each of the alternatives ideally using several criteria such as ROI (using TCO and TBO), payback period, and Net Present Value (NPV) at a minimum. Note that many organizations will have minimum ROI and payback period requirements and a project must meet both to be approved.
7. Summarize the recommendations based on Step 6 and outline the justification for the recommendation. Note that the recommendation should be not be to implement a specific solution or design; instead, the business case should recommend whether or not the project should proceed to the planning phase based on whether a feasible solution exists.

The selection and justification of IT investments is of strategic importance for modern firms and can be difficult for decision-makers in the presence of technological, organizational, and market complexity (Adomavicius et al. 2008). From a senior manager’s perspective, the business value (risk-adjusted net benefit) will be the central consideration for a potential IT investment. Cost-benefit analysis should include the concepts of Total Cost of Ownership (TCO) and Total Benefits of Ownership (TBO). TCO goes beyond listing to the simple purchase price to also include the total cost of procuring, implementing, maintaining, and changing work practices in a project over an extended period of time. TBO is a similar concept involving the total monetary benefits that accrue from a project, rather than merely the most obvious revenue increases.

In addition to costs and benefits, risk and timeframe must also be considered. Risk management is critical to project success (Tesch, Kloppenborg and Frolick 2007). One of managers’ main tasks is to pro-actively identify risks manage the risks throughout the life of the project (whether that is to accept, avoid, mitigate, or transfer the risk). However, future risks, costs, benefits, and competitive impact are difficult to forecast for complex IT investments (Clemons and Weber 1990). While criteria or principles for conducting IT investment have been widely discussed, criteria or principles for making effective business cases are lacking. Since the literature is vague about the process of how to create a better business case, especially for ERP implementations, the purpose of the research is to explore the understanding in creating a business case, address this problem by providing industry practitioners with a novel process for creating a written business case by theory-based conceptual approaches, make sense of the interdependent relationships among technologies, decision-makers and stakeholders, and to enhance our understanding of decision-making for complex IT investments. In addition, this research also will help senior business and IT managers evaluate their IT investments and IT projects effectively in order to make

appropriate decisions.

To develop a new process theory for creating and evaluating business cases for complex IT investments, future research will be conducted to examine the patterns that emerge from a thematic analysis of the interview transcripts and compare and contrast the new insights with prior theory from the areas of process design, relationship management, decision-making, investment governance, and IT project management. For example, concepts from sensemaking theory (Klein et al. 2006), theory of inventive problem solving (Hua et al. 2006), theory of decision-making (Cohen, March and Olson 1972; March, Olsen and Christensen 1979), structuration theory (Giddens 1984), actor network theory, and agency theory (Fama 1980; Jensen and Meckling 1976; Long and Walkling 1984) may all contribute important concepts in developing a new process theory. However, which guiding theories will be most relevant to the emerging theory will not be known until the initial patterns or themes begin to emerge from the analysis of evidence.

3. A Framework for Creating and Evaluating Business Cases for Complex IT Investments

Although the current literature on business cases has established their usefulness, such literature is largely anecdotal and descriptive, lacking formal analysis, empirical evidence and theoretical foundation to support the principles and practices of creating a business case for complex IT investments. Based on our analysis of prior research as well as informal discussions with experienced decision-makers, we have developed the following preliminary framework to guide future research into the process of creating and evaluating business cases for complex IT investment. The main purpose of this framework is not to be validated by hypothesis testing but rather to offer a visual representation of the proposed relationships among constructs and provide guidance for exploring and furthering our understanding the constructs.

As shown in Figure 1, there are five main categories of research constructs: guiding theories, processes, IT projects, stakeholders, and decision variables (such as costs, benefits, and risks). The process of creating an IT business case includes elements such as identifying a need for an IT project, defining scenarios and alternatives, and estimating and evaluating costs, benefits, and risks.

The potentially useful theoretical perspectives include process design theory, garbage can theory, behavioral decision theory, structuration theory, actor-network theory, agency theory and possibly others. A process is a set of constructs that refer to actions of individuals or organizations and a sequence of events that demonstrates how things change over time (Van de Ven, 1992). Process theory is seen as offering an explanation of the temporal order in which a discrete set of events occurred, based on a story or historical narrative and encompass three components that are a set of starting conditions, a functional end-point, and an emergent process of change (Huber and Van de Ven 1995, Van de Ven 1992). The theory of inventive problem solving (Hua et al. 2006) is a useful tool that can guide the process design process. Failure Mode and Effects Analysis (FMEA) is used as an analysis tool for a design or a process in order to identify weakens and opportunities for enhancement (Frenklach and Savransky 1998).

Since the purpose of a business case is to support decision-making, we also look for guidance in decision-making theories such as the garbage can theory of organizational choice. Garbage can theory suggests that decisions result from the random collisions of participants, choice opportunities and solutions (Cohen, March and Olson 1972; March, Olsen and Christensen

1979). Behavioral decision theory (Carter 1971; Cyert and March 1963) is a theory of human decision-making in an organization. It is based on Bayesian decision-making and tries to incorporate decision-making patterns of individuals such as underweighting or overweighting of probabilities, decision or choice framing, and trade-offs. It will complement garbage can theory to better understand the human actions. Prospect theory that is a behavioral economic theory is utilized to make decisions that involve risks in terms of loss and gain between alternatives, where the probabilities of outcomes are known (Thomas and Fernandez 2008). Since this theory emphasis risks management in decision-making, it can be utilized to analyze risk part in a business case.

In addition, contingency theory is a class of behavioral theory that claims that there is no best way to organize a corporation, to lead a company, or to make decisions, rather the optimal course of action is contingent on the internal and external situation (Woodward 1958). Some important contingencies for organizations are technology, customers, and competitors. These contingency elements should also be examined in future research. Concepts from sensemaking theory (Klein, Moon and Hoffman 2006) such as creativity, comprehension, curiosity, mental modelling, explanation and situational awareness can help understand connections among individuals, contexts and events in order to anticipate their trajectories and act effectively. Institutional theory suggests that organizational governance and decision-making are significantly influenced by the need for institutional legitimacy (Xue, Liang and Boulton 2008). Even when a top management approval is required, a wide variety of IT governance archetypes may be used that IT organization is not involved in the initiation or development stages of the IT investment decision process, while other IT organizational actors involved in by initiating and developing IT investment proposals.

The process of creating business cases involves diverse departments and each of them reacts by their own characteristics, roles and the context. Therefore, theories related with agency and structure should be considered in the preliminary research phase. Agency theory can be used to explain the relationship between principals and agents in business (Fama 1980; Jensen and Meckling 1976; Long and Walkling 1984). A principal is pervasively considered as shareholders and an agent represents the principal in transactions with a third party such as managers or company executives. Agency theory can address the conflicts between principals and agents in order to solve problems that exist in the relationship between these two parties. The practitioners such as senior IT, finance, and business managers would be the agents in such a model and other stakeholders such as senior IT project managers would be the principals. They have different goals and different risk tolerances that incline to take different actions in the process of creating business cases for complex IT investments. In addition, without the efficient communication and inaccurate information, the process will be inefficient and mislead the decision-making.

Structuration theory examines the relationship between agency and structure (Brugha 2005; Orlikowski and Robey 1991). Structure is what gives form and shape to social life and agency does not refer to individual's intentions in doing things but rather to the flow or pattern of individual's action (Giddens 1984). They interact with each other since actions are conditioned by structures while structures are recreated by actions. The agency will be the flow or pattern of participations' actions in the process of creating business cases for complex IT investments.

In addition, actor-network theory is a method of thoroughly exploring the relational ties within a network. The actors that can be human or non-human in a network form an apparently coherent whole while contain conflicts as well. The practitioners and IT projects will be the actors in this research. They act as a whole within the network of the process of

creating business cases. There are conflicts among the practitioners depending on their own preference and priority. Other elements including context and strategy may also influence the network.

Investment governance theories may also play an important role. Entrenchment theory (Shleifer and Vishny 1989) can be used to interpret the behavior of corporate managers in terms of investing in businesses and making contracts. Finance operations such as the free cash-flows can permit the managers to increase arbitrary actions in decision-making that expand their authority towards the shareholders (Dhaoui and Jouini 2011). Real options theory can supplement concepts such as Net Present Value (NPV) to incorporate uncertainty about future cash flows (Benaroch 2002; Leiblein 2003). This theory is composed with five categories of real options: Waiting-to-Invest option, Growth option, Flexibility option, Exit option and Learning option.

IT project management is one of the main concepts related with creating business cases for complex IT investments. The following theories will enhance the understanding of elements in IT project management. First, complexity theory is applicable to IT project management. Since complexity is a key attribute of project behavior comprised of both linear and nonlinear activity, project managers learn to look at their project organizations as complex adaptive systems, they will become more adept to not only manage the internal, short-term, linear aspects of a project, but also to plan and better integrate capabilities focused on the nonlinear nature of projects (McKinnie 2007). Complexity theory explains how complex adaptive systems function, and thus we suggest that this theory can be used to explain the behavior of projects (McKinnie 2007).

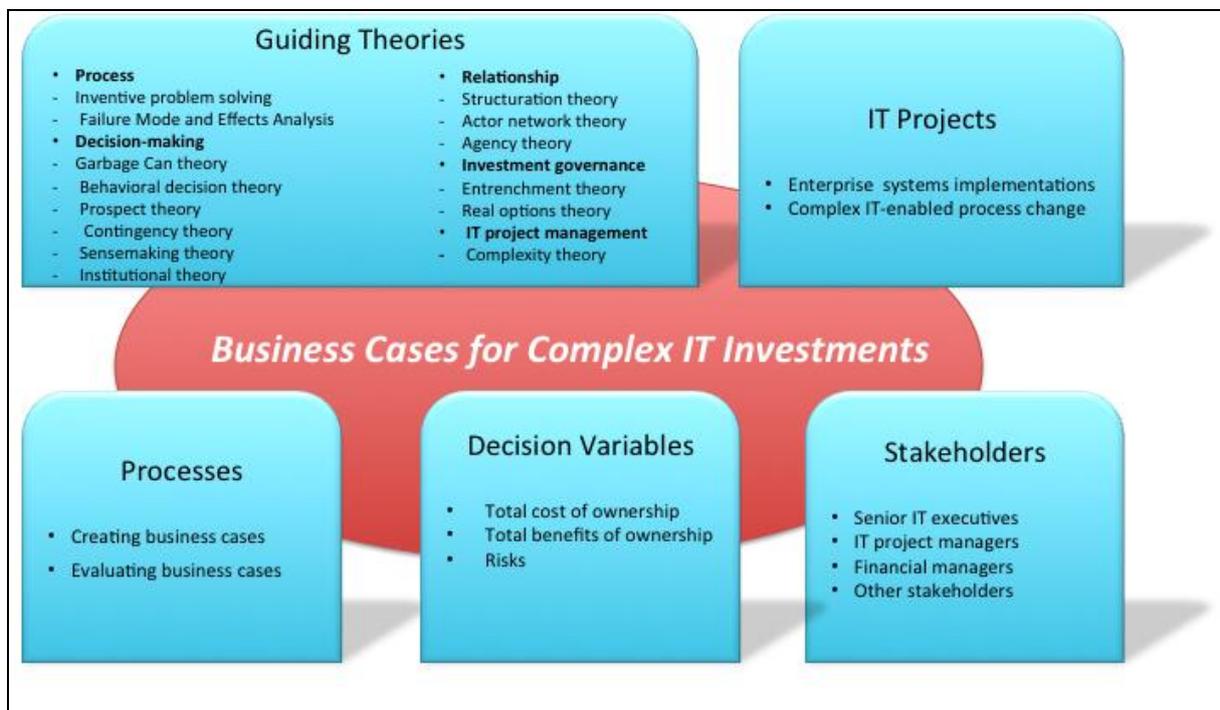


Figure 1: Five Categories of Research Contracts

4. Research Methodology

The overall research question that provides direction for this research is: How can the process of creating and evaluating a written business case for complex IT investments such as ERP implementations be done more effectively? In order to acquire an in-depth understanding of creating business case and provide direction for this exploratory research, the following additional guiding research questions are considered: (1) What elements does a business case comprise; (2) Why do we need a business case; (3) What types of IT projects or investments are not suitable for traditional business cases; (4) How can the business cases for these challenging projects be made better; (5) How to explore different level of performance improvement targets and potential benefits in the combinations of IT enablers and business changes by the business cases; (6) How to define a successful and effective IT investment.

Since research on business cases for complex IT investments is still in its infancy and very little has been written about how to effectively create and evaluate business cases for complex IT investments such as ERP, CRM, or SCM enterprise systems we follow an exploratory theory-building research approach (i.e. Eisenhardt 1989) rather than a theory or hypothesis testing approach. Ultimately, we seek to develop a process theory (Langley 1999) to better inform the creation and evaluation of business cases for complex IT investments. The process theory approach has been used extensively in IS research, most notably as a base for structuration analysis and for modelling sequences of events (Adomavicius et al. 2008; Markus and Robey 1988).

To meet these research goals, we propose that future research combine the principles of process theory (Langley and Truax 1994) with the formal guidelines of theory building using a multiple case study approach (Eisenhardt 1989, Yin 2009). We propose a field study focused on interviews with practitioners to examine the current practices, challenges, and potential solutions. We also examine the contexts that lead this process to more successful decision-making and governance of complex IT investments. The focal unit of analysis is the IT decision-making organization. The strategy of using multiple case studies allows a replication logic in which the cases are like a series of experiments performed to develop a theoretical and empirical theory that is generalizable across different contexts (Bourgeois and Eisenhardt 1988).

The transcribed data from the interviews would be analyzed using Nvivo software to help with the searching, coding and comparisons of the interviews. The following coding process can be used to organize the data into categories and label those categories with a term: (1) divide the text into segments of information; (2) label the segments of information with codes; (3) reduce overlap and redundancy of codes; (4) collapse codes into themes. While developing the coding schemes, basic coding dimensions (construct types) include: (1) process components such as decision-makers, business cases, technologies and tools; (2) business case competencies such as perspective benefits, costs and risks; (3) contextual factors that influence the process like management support, stakeholder interests. The bottom-up development of the coding scheme by the researcher and a supervisor ensured a higher degree of reliability. As new evidence is analyzed, the research iterates between data analysis, searching for insights from the prior literature, and forming emerging propositions. The researchers will collect additional evidence to fully explore the emerging theory until theoretical saturation is achieved.

5. Conclusions, Discussion, and Next Steps

Creating an effective business case for complex IT investments is difficult due to the

uncertainty around the expected benefits, costs, risks, and timing for these complicated organizational projects that typically involve significant technological and organizational change throughout the lifecycle of the IT system. To develop a more effective process for creating and evaluating business cases for complex IT investments, this paper explores current issues and practices using prior studies to propose a preliminary conceptual framework for guiding further study.

Although this research is still in progress, we can put forth several observations resulting from our preliminary discussions with decision-makers with expertise in developing and evaluating business cases for complex IT projects.

In order to develop an effective business case (i.e., one that is accurate, reliable, and useful), the decision-makers involved need to be comfortable dealing with imperfect information. A convincing business case needs to make assumptions and judgments on the potential benefits, costs, and risks of a project. Some of the greatest challenges we have uncovered so far is in determining how to make sure the business case is: i) not too vague (which can result from a fear of incorporating imperfect information); and ii) not too specific (which can result from assuming you know what the solution should be before detailed project planning has begun).

Whittaker (1999) suggests that a good business case should *not*:

- Underestimate required changes
- Contain vague deliverables
- Include only fuzzy or intangible costs and benefits
- Have an inappropriately large, small, or vague scope
- Ignore business and technology risks

Indeed, our early discussions appear to agree with these suggestions. We can further this discussion by noting that a good business case should therefore:

- Explain all possible impacts, costs, benefits;
- Clearly compare the alternatives without jumping quickly to one solution; and
- Contain credible and quantified estimates rather than vague or qualitative claims. For example, "...implementing this enterprise system is expected to increase customer satisfaction and sales by 10% per year within the first 6 months..." rather than "... will help us develop world class customer service..."

We note that our formal interview collection and analysis process is in progress and not yet available at the time of this submission. Once the research is concluded, we anticipate being able to share more robust and detailed observations as well as a more theoretically and empirically supported new process model for creating more effective business cases for complex IT investments.

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