

IT Value Creation through Value Chain Processes: The Effect of CIO/TMT Engagement and Knowledge of Senior Executives

“Research in Progress”

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Outline

- Introduction
- Literature review
- Conceptual model
- Hypotheses
- Research design
- Discussions

Introduction

- With increased competition in the business environment, Information Technology (IT) has become critical in improving the operational efficiency of business activities to gain a competitive advantage.
- Many companies have used IT as a means to achieve this objective. (Lin and Shao 2006)
- *IT value* emanates from the use of IT in *value chain processes* (Kohli and Grover 2008) because the first-order impacts of IT occur on the value chain processes. (Tallon et al. 2000)
- There is the need to explore the role of IT in contributing to the creation of business value through an entire value chain.

Knowledge of Senior Executives

- *How does the knowledge of senior executives affect the firm's ability to use IT in business activities?*
- IT and business knowledge of the CIO and TMT members becomes important to better understand the role of IT in value chain activities, and to enable companies to use IT successfully. (Armstrong & Sambamurthy 1999)
- *CIO's IT and business knowledge* affect the effectiveness of CIO in the use of IT. (Smaltz et al. 2006, Feeny & Willcocks 1998)
- *TMT's IT knowledge* is an important factor with regards to the deployment of IT in organizations. (Bassellier et al. 2003)

CIO/TMT Engagement

- *How does the CIO/TMT engagement affect the firm's ability to use IT in business activities?*
- The extent of CIO/TMT engagement is the important factor that determines the firm's ability to use IT in business activities. (Armstrong & Sambamurthy 1999)
- *CIO/TMT engagement* contributes TMT heterogeneity by providing the wide range of IT related ideas, and enables firms to better use IT in business activities. (Ranganathan & Jha 2008)

IT Assimilation

- *How does the effective use of IT in business activities enhance the capability of companies to improve value chain processes?*

- IT assimilation:
 - *“the effective use of IT in supporting, shaping, and enabling firms' value chain activities”* (Armstrong & Sambamurthy 1999)

- IT affects business processes through three effects (Mooney et al. 1996, and Radhakrishnan et al. 2008)
 - **Automation effect:** reflects the role of IT as a substitute for labor
 - **Informational effect:** reflects the capability of IT to collect, store, process, and disseminate information
 - **Transformation effect:** refers to the ability of IT to facilitate and support process redesign, innovation and transformation

Topology of Value Chain Processes

- Value Chain Processes are categorized into two groups: (Mooney et al. 1996, Davenport 1993)

- **Operational processes**
 - consist of the activities related to *the doing of business*.
 - (i.e., marketing and intelligence processes, design and development processes, procurement and logistics processes, production processes, and product/service delivery processes)

- **Management processes**
 - consist of the activities related to *information processing, control, coordination, and communication* within organizations.
 - (i.e., information handling processes, coordination processes, control processes, communication processes, and knowledge processes)

Value Chain Model

- Value Chain Model is used by researchers in developing *a process oriented framework* in which the business value of IT is created with the impact of IT on value chain processes. (Radhakrishnan et al. 2008, Mooney et al. 1996, Tallon & Kraemer 2006, and Tallon et al. 2000)

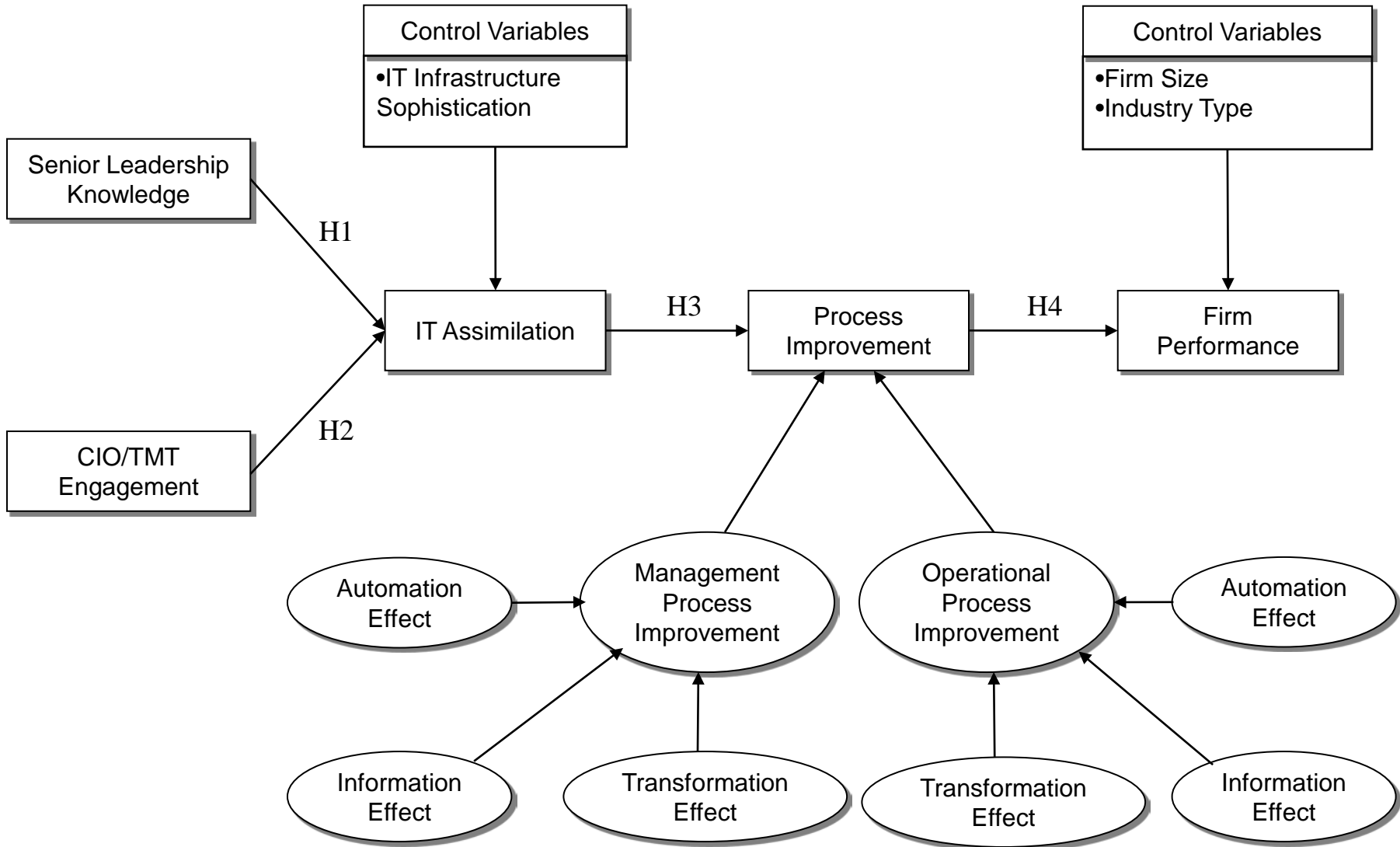
- The value chain model:
 - It consists of technological and economical processes that are performed in order to do business. (Porter & Millar 1985)
 - Organizations create business value through their value chain activities. (Porter & Millar 1985)
 - The use of IT in the value chain enhances the value-creating potential of the organization. (Tallon et al. 2000)
 - IT creates value for organizations by improving individual business processes, or inter-process linkages, or both.



Research Questions

- This study
 - analyzes the impact of IT assimilation (the effective use of IT in business activities) on business activities, and
 - assesses the business value of IT through the improvement in value chain processes.

- This study also investigates
 - the role of business and IT knowledge of senior executives, and
 - the CIO/TMT engagement in increasing IT assimilation.



Hypotheses

The knowledge of senior executives

- The CIO's IT knowledge enables the CIO to better advise the TMT about IT related issues,
 - The CIO's business knowledge enables the CIO to understand the business activities and their requirements, and
 - TMT's IT knowledge enables TMT members to understand the importance of IT in business processes.
- *Hypothesis 1 (H1): The business and IT knowledge of senior executives significantly enhance the firm's IT assimilation.*

Hypotheses

The CIO/TMT engagement

- It develops strong communication among the CIO and TMT members
 - It pools of IT and business knowledge, and blend them together to foster higher levels of IT assimilation
 - It develops a mutual understanding of the business and IT issues
- *Hypothesis 2 (H2): The CIO/TMT engagement significantly enhances the firm's IT assimilation.*

Hypotheses

Process Improvement

- IT improves management and operational processes through three effects: automation effect, information effect, and transformation effect. (Mooney et al. 1996)
 - The higher IT assimilation enhances these three effects, and improves both operational and management processes.
- *Hypothesis 3 (H3): There is a positive relationship between IT assimilation and the process improvement for the value chain processes.*

Hypotheses

Firm Performance

- The improvement of *management and operational processes* results in
 - Productivity improvements
 - Downsizing, labor savings, cost reductions
 - Improved decision quality
 - Enhanced organizational effectiveness

- Hypothesis 4 (H4): *The improvement in value chain processes has a positive impact on the firm performance.*

Research Design

□ **Survey Method**

- The survey method is adopted as a research methodology.

□ **Data Collection**

- Data will be collected with a questionnaire from firms operating in the financial service industry in the United States.
- The financial service industry has been recognized as IT intensive. (Zhu et al. 2004)
- Respondents are TMT members (i.e., CEO's, CFO's etc.) and CIO's.

□ **Sampling**

- A random sampling approach is adopted in order to ensure the full representation of the entire population.
- The sample size is determined as 130 observations (i.e., 10 times 13 constructs as well as indicators) by applying a rule of thumb of 10 cases per indicators (Chin 1998a).

□ **Hypothesis Testing**

- The research model will be tested with Partial Least Squares (PLS).
- PLS can handle both reflective and formative constructs. (Zhu & Kraemer 2005)
- PLS places minimal demands on sample size. (Chin 1998a)
- PLS can be used for analyzing complex models. (Chin 1998b)

Research Design

Constructs

- Five constructs were identified from the literature:
 - Senior leadership knowledge
 - CIO/TMT engagement
 - IT assimilation
 - Process Improvement (i.e., Management and Operational processes)
 - Firm performance

Control Variables

- Three control variables are in the conceptual model:
 - IT infrastructure sophistication
 - Firm size
 - Industry type (i.e., Banking, Credit, Insurance, and Securities)

Constructs	Type	1 st Order Indicator	2 nd Order Indicator	Source
Senior Leadership Knowledge	Formative	CIO's IT knowledge		Armstrong & Sambamurthy (1999) Smaltz et al. (2006)
		CIO's business knowledge		Armstrong & Sambamurthy (1999) Smaltz et al. (2006)
		TMT's IT knowledge		Armstrong & Sambamurthy (1999) Bassellier et al. (2003)
CIO/TMT Engagement	Formative	Hierarchical level of CIO		Armstrong & Sambamurthy (1999) Bassellier et al. (2003) Smaltz et al. (2006)
		Extent of the formal interaction of CIO with the TMT		Armstrong & Sambamurthy (1999) Smaltz et al. (2006)
		Extent of the informal interaction of CIO with the TMT		Armstrong & Sambamurthy (1999) Smaltz et al. (2006)
		TMT membership		Enns et al. (2003) Smaltz et al. (2006)
		Extent of trusting relationships		Smaltz et al. (2006) McKnigh (1997)

Constructs	Type	1 st Order Indicator	2 nd Order Indicator	Source
IT Assimilation	Formative	Extent of usage of IT in Business Activities		Armstrong & Sambamurthy (1999)
		Extent of usage of IT in Business Strategies		Armstrong & Sambamurthy (1999)
Process Improvement	Formative	Management Processes Improvement	Automation effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
			Information effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
			Transformation effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
Process Improvement	Formative	Operational Processes Improvement	Automation effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
			Information effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
			Transformation effect	Mooney et al. (1996) Radhakrishnan et al. (2008)
Firm Performance	Reflective	Return on Assets (ROA)		Tallon (2008)
		Return on Sales (ROS)		Ravichandran & Lertwongsatien (2005)
		Return on Equity (ROE)		Bharadwaj (2000) Radhakrishnan et al. (2008)

Discussions

Contribution

- Capture the business value of IT through the value chain processes from the process-oriented perspective.
- Assess the first-order impacts of IT on the value chain processes
- Examine the impact of the CIO/TMT engagement and the knowledge of senior executives on the effective use of IT.

Limitations

- Doesn't address the inter-enterprise IT value creation (Kohli & Grover 2008)
- Doesn't address the different capacities of firms to capture IT value: "Absorptive Capacity" (Cohen & Levinthal 1990)

Thank you

Research Design

Constructs Validation

- *Reliability:*
 - Cronbach's Alpha and the covariance matrix
- *Content Validity:*
 - Expert opinion, review, and pilot-test
- *Construct Validity, Convergent Validity & Discriminant Validity*
 - CFA using Structural Equation Modeling

Senior Executives

- Senior leadership includes
 - the Chief Information Officer (CIO) and
 - the Top Management Team (TMT) members including the Chief Executive Officer (CEO), the Chief Operating Officer (COO), the Chief Financial Officer (CFO), and other business executives who are formal members of the TMT.