

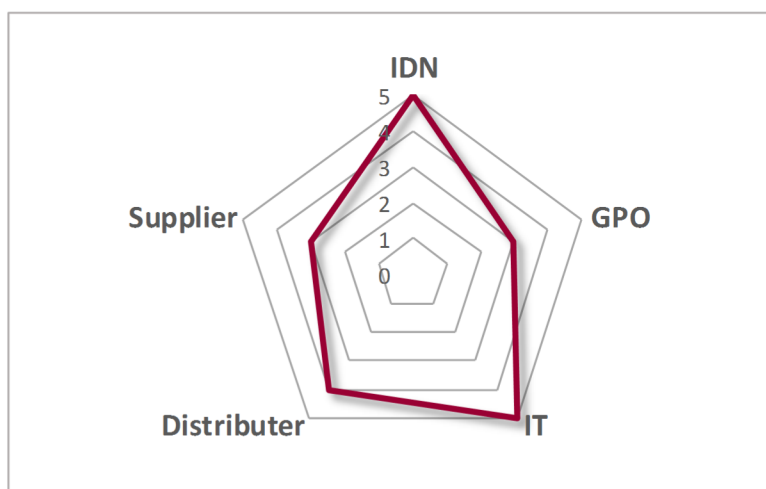
MAKING THE CASE FOR HEALTH SECTOR INFORMATION TECHNOLOGY

Fast Tracking Supply Chain Research to the Healthcare Industry

April 2014

Our research reveals uneven hospital system adoption of supply chain information technologies (SCIT) and the key role of governance and leadership for adoption. Important in an era of integration is the observation that while investment in system wide SCIT may lead to system efficiencies, innovation from IT may well emanate from individual hospitals rather than more corporate centralized structure. Linkage of SCIT to more global outcomes, such as overall system performance, has been lacking. This edition of “Fast Tracking Supply Chain Research to the Healthcare Industry” presents findings on the role of SCIT in enriching functional processes, towards higher overall performance.

Research suggests that investments in SCIT adds significant value to an organization’s supply chain efficiency. SCIT investment may not directly reflect onto bottom-line performance, but is instead reflected indirectly through other mechanisms such as inventory management performance and more informed procurement strategies.



Supply Chain technology integration at the top creates bottom line impact

A study of 412 manufacturing firms found higher-level procurement integration competence enabled firms to develop and deploy lower-level digital procurement competence. The impact of the **higher-level capabilities** were manifested entirely through **increased lower-level efficiencies and performance**.

(Mishra et al., 2013 [1])

Investment in IT capabilities results in higher stock returns

A study that analyzed IT capabilities and financial performance of firms over a period of ten years found that IT investments enhanced inventory efficiency, which, in turn, resulted in increased stock market returns. I.T. capability **reduced stock market risk** and **enhanced stock market value**.

(Mishra et al., 2013 [2])

HEALTH SECTOR SUPPLY CHAIN
RESEARCH CONSORTIUM

ASU W. P. CAREY
SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

High-Level Functional
Capabilities

Procurement
Integration
Competence

Low-Level Functional
Capabilities

Digital Procurement
Competence

Process
Performance

Procurement
Process
Performance

Research Framework

Mishra et al. 2014 [1]

SUPPLY CHAIN TECHNOLOGY INTEGRATION AT THE TOP CREATES **BOTTOM-LINE IMPACT**

ARTICLE Mishra, Abhay Nath, Sarv Devaraj, and Ganesh Vaidyanathan. 2013. Capability Hierarchy in Electronic Procurement and Procurement Process Performance: An Empirical Analysis. *Journal of Operations Management* 31, 376-90.

DEFINING CONCEPTS

- ◆ **Higher-level functional capabilities** (a.k.a. "operational capabilities") focus on change, renewal and transformation of existing capabilities to create new products, serve new markets and create other large-scale change.
- ◆ **Lower-level functional capabilities** (a.k.a. "task-level capabilities") allow firms to perform tasks at the individual level. High-level capabilities, in comparison to those for low-level capabilities, are less structured; need more cognitive load; more information processing wider knowledge and skills.
- ◆ **Process integration competence** enables organizations to be aware of their varied procurement requirements and to enter into relationships with suppliers to satisfy their idiosyncratic material requirements. Dimensions included *Internal Process Knowledge* and *External Relationship Knowledge*.
- ◆ **Digital procurement competence** the value-adding ways in which a firm is exploiting IT, both non-Internet and Internet-enabled, in procurement activities; such as online ordering, online search and procurement digitization.

PREMISE The study explored how supply chain technology capabilities cascade to process performance. The technology-enabled procurement processes and relevant performance across 412 manufacturing firms via a survey instrument was assessed.

FINDINGS Contrary to previous research which suggests higher-level capabilities can impact performance directly, this study argues that there is a hierarchy of capabilities wherein higher-level operational capabilities enables a firm to develop lower-level task capabilities, and shown in a procurement-related context. It is these lower-level capabilities that impact supply chain process performance directly.

Additionally, the knowledge gathering processes involved in creating systems at high-levels of IT contribute substantially to process improvement, as opposed to the mere implementation of the system itself.

"Higher-level capabilities can be developed independent of IT. This points to the need to start with a broader lens to understand processes and build competencies before investing in technology-based solutions. In other words, it is not technology for the sake of technology." (Mishra et al., 2013 [1])

INVESTMENTS IN IT CAPABILITIES LEADS TO HIGHER RETURNS BY WAY OF INVENTORY EFFICIENCY

ARTICLE Mishra, Saurabh, Sachin B. Modi, and Animesh Animesh. 2013. The Relationship between Information Technology Capability, Inventory Efficiency, and Shareholder Wealth: A Firm-level Empirical Analysis. *Journal of Operations Management* 31, 298-312.

STUDY INSIGHTS

- ◆ There was evidence of a curvilinear relationship between inventory efficiency and stock market returns, indicative of diminishing marginal returns.
- ◆ While inventory efficiency can reduce risk by way of reduced write-offs, it may also increase risk by exposing firms to supply chain disruptions.
- ◆ IT-based enterprise systems help enhance information visibility and inventory management at large, but in order to do so, must be supported by skilled IT personnel and IT-related intangibles.

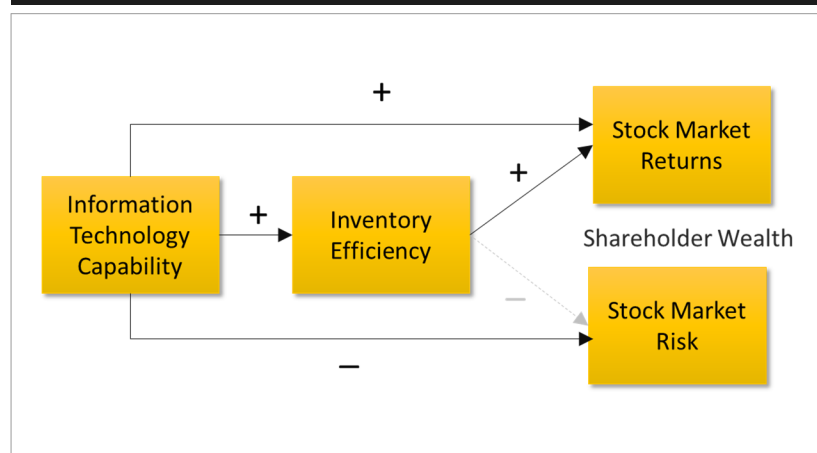
PREMISE The study attempts to empirically measure the causal link between IT capabilities (defined as a combination of superior IT infrastructure, IT human resources and IT-related intangibles that allow firms to achieve a competitive advantage) inventory efficiency (ratio of sales to average inventory) and ultimately to shareholder wealth, as measured by stock market returns and stock market risk. Data was gathered from a sample of 394 firms from multiple industries, across a 10-year time period from 2000-2009.

FINDINGS IT capability showed a positive and statistically significant effect on inventory efficiency. The intuition behind this relationship is that IT improves a firm's supply chain visibility and information sharing across functions and allows inventory management technologies to be more successfully implemented.

Inventory efficiency and IT capability showed positive effects on stock market returns, with IT capability being partially mediated by inventory management. Finding a mediating link between IT capability and stock returns contributes to addressing the "profitability paradox" in information systems research. Inventory efficiency however did not have a significant effect on stock market risk.

Research Model and Results

Mishra et al. 2014 [2]



QUESTIONS FOR CONSIDERATION

1. When should high-level (i.e. "strategic") SC IT capabilities be developed from within versus acquired from other industries?
2. What are ways to internally develop higher-level SC IT capabilities within your organization?
3. What other areas may the concept of capability hierarchy apply to in your health sector focused organization?
4. How can accumulated inventory & transaction data be analyzed for insights that reach beyond inventory management?
5. To what extent does your organization apply SC information technology in procurement and inventory management (such as bar coding scanning)?
6. What are the metrics that can accurately reflect the value of SC IT investments?
7. How can the results of these studies affect your SC IT investment strategy ?

HEALTH SECTOR SUPPLY CHAIN RESEARCH CONSORTIUM



The **mission** of HSRC-ASU is to provide actionable research to develop best standard practices for the health care supply chain that reduce risk and cost and to influence policy.

Our **vision** is that HSRC-ASU will be the thought leader for education and research and the strategic resource in health care supply chain.
