Identifying Core Information System Capabilities

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ABSTRACT

This paper analyses three seminal papers on identifying core information system (IS) capabilities. Core IS capabilities are the ones that should not be outsourced when companies plan outsourcing IS services. By the way of analyzing the three seminal papers, different views on IS services are taken, namely functional, process, and hierarchical views. This paper also provides a summary of the findings, comparing the three views for their merits and weaknesses; this comparison can be considered as the original contribution of the paper.

INTRODUCTION

More and more companies are outsourcing information system (IS) services. This trend is driven by ever increasing global competition, the newer manufacturing practices like agile manufacturing and lean manufacturing (Wikipedia, 2008), and the newer organizational structures like adaptive enterprises and virtual enterprises.

The primary argument for outsourcing is cost-saving: a company can harvest IS services much more cheaply by outsourcing than realizing it in-house. There are, however, limits on what should be outsourced; IS capabilities that are close to the company's business model should not be outsourced as outsourcing will prevent future growth of the company and will also make the company unwittingly ever-dependent on the outsourcer.

But if the decision to outsource IS services is a difficult one, the decision of precisely what to outsource seems impossible; in other words, what are the Core IS Capabilities of a company that should not outsourced. How do we identify Core IS Capabilities of a company?

This paper is basically a literature study on identifying core IS capabilities. The literature study analyzes three seminal papers on this topic. In the final part of this paper, a summary of the findings is given comparing the three papers for their merits and weaknesses.

WHY OUTSOURCE?

Carr (2003) underlined the basic reason for outsourcing; Carr (2003) implied that companies should not over invest on IT; this was because, over the past couple of decades, IT has become an "infrastructural technology" (or "commodity") from the state of a "propriety technology"; see figure-1. Carr believed that, as far as the art of running businesses were concerned, IT has become an infrastructural technology based on the following facts:

1. IT can not only fulfill the needs to run any companies, it can offer much more.

2. The price of IT functionality has dropped from cost-prohibitive levels to the level where it is affordable by any company
3. The capacity of IT (e.g., Internet) has grown with the demand, and it is abundant now.
4. IT vendors are positioning themselves as commodity suppliers (or even utilities, serving the needs of business through web service or application service providers (ASP))
5. Recently, investments in companies that exclusively used IT as the strategic tool failed to provide ROI.

As an infrastructural technology, IT itself does not offer any strategic advantage, rather an enabler to do business; IT is accessible and affordable by all the competitors, thus investing in IT alone will not give any strategic edge. In addition, the opportunities for gaining IT-based advantages (strategic edge) are very low these days, as the best practices are now quickly built into (or already implemented in) commercial off-the-shelf software (COTS).

History shows that businesses that tried to exploit infrastructural technology as strategic edge technology have run out of business. This is because, not only businesses overspend money on an infrastructural technology ('IT'), but also they tend to focus wrongly on infrastructural technology rather than concentrating on the strategic business models.

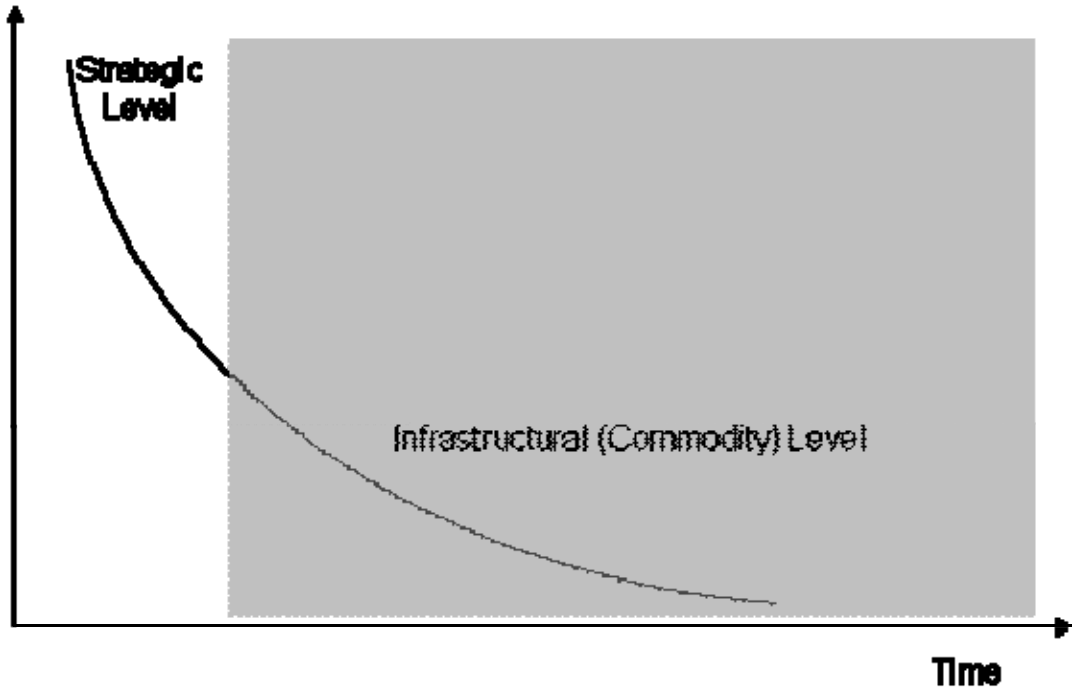

Figure-1: Transformation of IT from strategic level to infrastructural level

Finally, Carr (2003) advices that businesses rather improve efficiency of the existing IT systems than spending lavishly on IT:

1. Spend money on IT sparingly, making sure that IT expenditures translates into superior financial results
2. Delay on investing on new and unproven IT (rather be a follower than the leader)

3. Increase or improve the efficiency of existing IT systems, eliminating wastes and sloppiness (e.g.,deleting older and outdated files, emails, pictures, MP3 files, etc., in the data storage, thereby eliminating the needs to buy additional data storage)

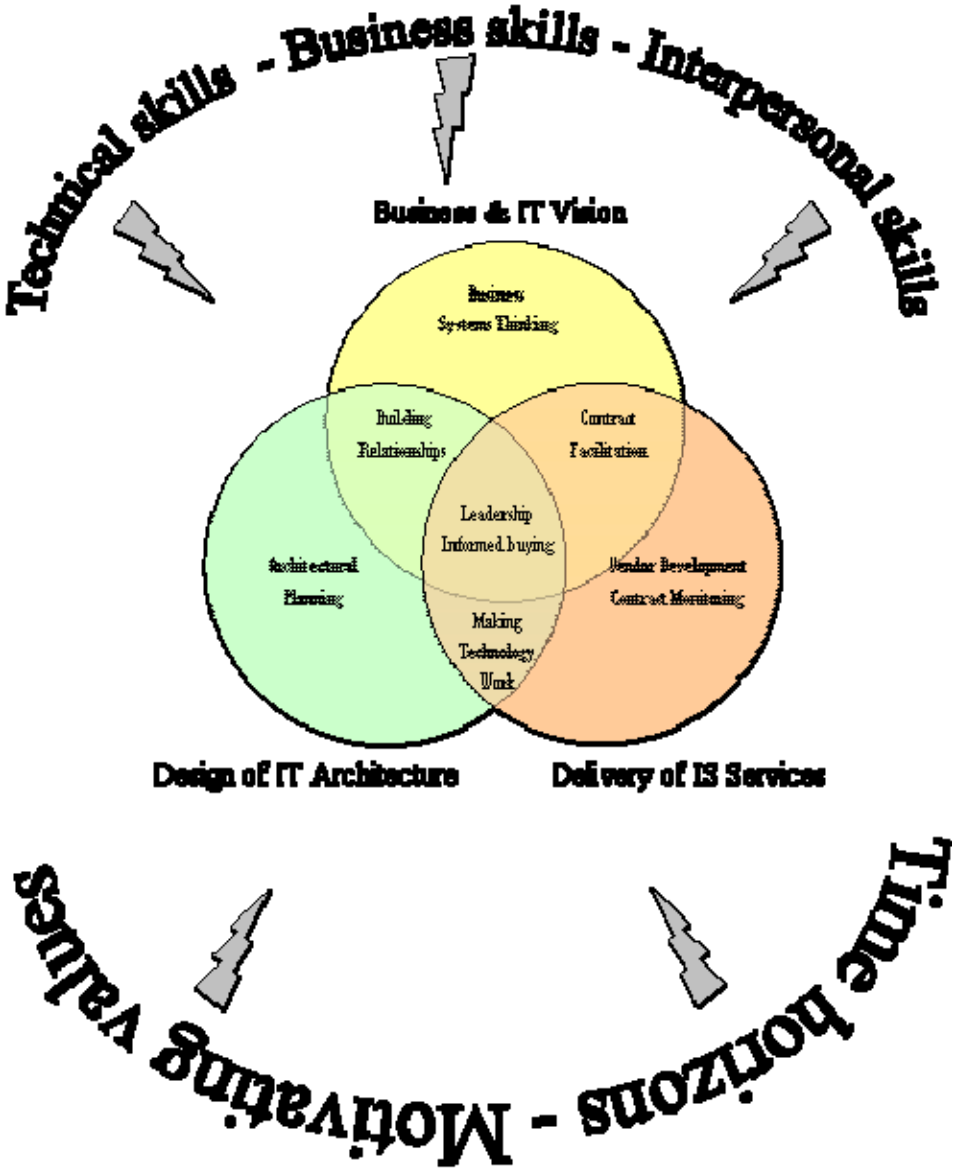

Figure-2: Core IS Capabilities: Identifying and cultivating

A FUNCTIONAL VIEW ON IDENTIFYING CORE IS CAPABILITIES

Feeny and Willcoks (1998) argue that core IS capabilities are those that are needed to endure challenges in the exploitation of IT that a company must successfully address over time; a company must retain the core IS capabilities for strategically positioning itself in the dynamic market environment.

The Challenges in IT Exploitation

Figure-2 presents Feeny and Willcoks (1998) overlapping functional view based on the challenges in IT exploitation. This functional view identifies three challenges in IT exploitation:

1. *Business and IT vision*: The challenges of using IS services for business-IT (or business-technology) alignment.
2. *Delivery of IS services*: The challenges of delivering high quality IS services cheaper.
3. *Design of IT architecture*: The challenges of designing and implementing an IT architecture that is inter-operable with existing and future intra-enterprise systems within the company and intra-enterprise systems that are running on collaborators platforms.

The Core IS Capabilities

In order to face these three challenges, Feeny and Willcoks (1998) identify a set of nine core IS capabilities:

1. Leadership: The capability of integrating IT efforts with business purposes and activities. This capability is to manage organizational arrangements, structure processes and staffing- tacking any challenges in these arrangements
2. Business Systems Thinking: The capability of ensuring optimal business-IT arrangement; this capability is about business problem solving with IT perspective, process reengineering, and strategic development.
3. Relationship Building: The capability of facilitating wider dialogs between business and IS communities.
4. Architectural Planning: The capability of creating IT architecture that can respond to present and future business needs, and allow future growth of the business.
5. Making Technology work: The capability of rapidly achieving technical progress, making the company forerunner (leader), or a quick adapter (follower).
6. Informed buying: The capability is for analyzing the external markets for IT suitability the specific business opportunities and for selection of a sourcing strategy to meet business needs and technology solutions.
7. Contract Facilitation: The capability of ensuring the success of existing contracts for IT services; this capability is about contract facilitating to ensure that problems and conflicts are to be solved fairly. This is basically about forming a single point of contact for customer relationship.
8. Contract Monitoring: The capability of measuring performance of suppliers and managing suppliers.
9. Vendor Development: The capability of identifying the potential added value of IT business service suppliers. This capability is about creating the Win-Win solution with collaborating partners and for forming a long-term relationship, which may – among other benefits – avoid switching cost.

Cultivating Core IS Capabilities

Feeny and Willcoks (1998) not only identify nine core IS capabilities, they also suggest some ways to cultivate the capabilities; Feeny and Willcoks (1998) list five essential skills that a company should posses. The five skills are:

1. Technical skills,
2. Business skills,
3. Interpersonal skills,
4. Time horizons (balancing short-term and long-term interests), and
5. Motivating values (multi-talented work force).

Figure-2 also depicts the five skills as cultivating factors of the nine core IS capabilities.

A PROCESS VIEW ON IDENTIFYING CORE IS CAPABILITIES

In order to find the core IS capabilities, Marchand, Kettinger and Rollings (2000) explore about how does the interaction of three fundamental elements - people, information and technology - affect business performance; Marchand et al., (2000) believe that core IS capabilities are those that makes the interaction (of people, information and technology) that help boost business performance.

Marchand et al. (2000) identify the core IS capabilities primarily by a process-theory based approach; the core IS capabilities are identified by measuring the capabilities of a large number of companies on how effectively they manage and use information. The results of the measurement are grouped into three independent pillars, associated together with 15 competencies (or skills) that cultivate the core IS capabilities.

The Core IS Capabilities

Marchand et al (2000) found out that there were three core IS capabilities:

- Information Technology Practices (ITP): The capability of a company to effectively manage appropriate IT applications and infrastructures in support of operational decision-making and communication processes.
- Information Management Practices (IMP): The capability of a company to manage information effectively over its life cycle.
- Information Behaviors and Values (IBV): The capability of a company to install and promote behaviors and values in its people for effective use of information.

The three IS capabilities are further divided into 15 competencies:

- ITP competencies:

    1. IT for operational support
    2. IT for business process support
    3. IT for innovation support
    4. IT for management support

- IMP competencies:

    5. Sensing information
    6. Collecting information
    7. Organizing information
    8. Processing information

9. Maintaining information

- IBV competencies:

10. Integrity: effective sharing of sensitive information
11. Formality: usage and trust of formal sources of information
12. Control: flow of information about business performance
13. Sharing: free exchange of non-sensitive (and sensitive) information
14. Transparency: openness about failures and mistakes
15. Proactiveness: reacting to changes in the competitive environment

Figure-3 depicts the three core IS capabilities and the competencies that can flourish them.

A HIERARCHICAL VIEW ON IDENTIFYING CORE IS CAPABILITIES

Influenced by the work of Caldeira (1998), Peppard and Ward (2004) present a model for identifying core IS capabilities; the model is a hierarchical one, consisting of three levels: the resource level, the organizing level and the enterprise level (see figure-4):

- The resource level denotes the resource components that are the key ingredients of the IS competencies, such as skills (e.g., business skills, technical skills), knowledge and experience, and behavior and attitudes.
- The organizing level is concerned with how these resources are utilized, via structures, processes and roles, to create IS competencies.
- The enterprise level is where the IS capability is visible and is recognized in the performance of the organization.

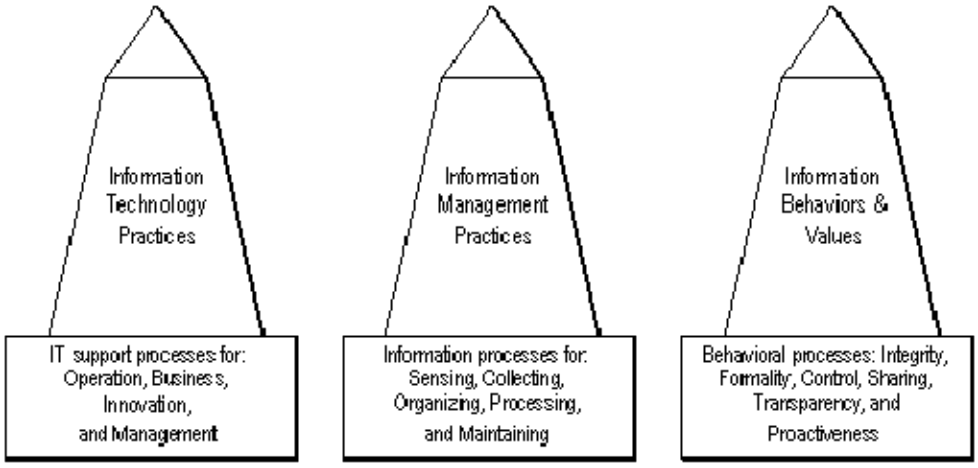

Figure-3: Core IS capabilities based on measurement of how effectively information is managed and used (Marchand et al, 2000)

COMPARING 3 VIEWS ON IDENTIFYING CORE IS CAPABILITIES

This paper analyzes three works on identifying core IS capabilities:

1. A functional view based on the challenges in IT exploitation: Feeny and Willcoks (1998) identify nine core IS capabilities within three overlapping functions,
2. A process view based on measurement of effective information use: Marchand et al. (2000) identify core IS capabilities as three independent pillars, based on supporting processes, and
3. A hierarchical view based on resource utilization: Peppard and Ward (2004) identify core IS capabilities based on resource utilization.

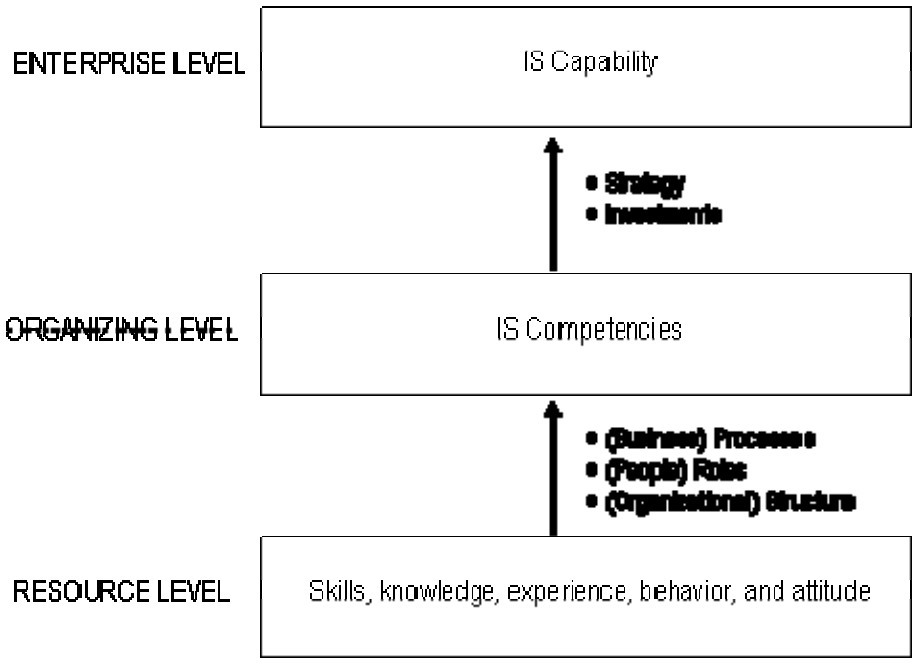

Figure-4: A Model for the IS capability (Peppard and Ward, 2004)

Functional View based Identification

Feeny and Willcoks (1998) is very informative and provide many insights into IT services outsourcing dilemma. The functional view describes the 'what' of the system, in other words, how a system is perceived by an outsider, taking a neutral view of the system. It is easy to identify contents of a system (or product specification) by taking functional view. By taking functional view, Feeny and Willcoks (1998) provide a set a core IS capabilities as the contents of a business IS system that are visible from outside, and hence an opportunity to check whether the system performs according to the specification.

There is one issue that is absent in Feeny and Willcoks (1998); they fail to mention one of the important IS capabilities that have become a decisive factor lately: the agility. In contemporary market, the changes are quicker and a company has to be adaptive and agile for its survival. Thus, agility – the ability to change or adapt quickly - must be emphasized at every level of the business activity. However, agile factor is absent in Feeny and Willcoks (1998), neither as a challenge in exploiting IT, as a core IS capability, nor as a skill.

Process View based Identification

The model by Marchand et al. (2000) is elegant and simple as it is based on process theory. Soh and Markus (1995) describe many works that have proposed different theoretical models based on process theory. Some of these models are "Appropriate Use" model (Lucas, 1993), "Strategic Fit" model (Grabowski & Lee, 1993), "IT Assets" model (Markus & Soh, 1993), "Leveraging IS process" model (Beath et al., 1994) and "IT Impacts" model (Sambamurthy & Zmud, 1994). These models investigate the connection between IT investment and business value creation. Since these models are process-theory based, they share some common character: the models contain a cause-effect argument of the "*necessary, but not sufficient*" form that characterizes process theories and differentiates them from variance theories.

The process theory versus variance theory (Soh & Markus, 1995): The variance theories explain *both necessary and sufficient conditions* to produce a certain outcome; the process theories are based on *necessary conditions*; for models that are intrinsically uncertain (as with the case of IT investment and business value creation), process theories are advantages over variance theories, as each element in process-theory based models would specify a sequence of necessary (but not sufficient) conditions which explain how the outcome occurs when it does.

The lack of sufficiency conditions is the main weakness with process theory based models, e.g., the model by Marchand et al. (2000).

Hierarchical View based Identification

Hierarchical structures have an unambiguous semantics because they show only a single flow of path between any two layers, thus abstracting away complexities in vertical connections between the layers. Thus, we could concentrate on the horizontal connections at each layer, layer for layer, as we move from the lower level to the top level.

Building on the resource utilization principles, Peppard and Ward (2004) provide an elegant model summarizes all the activities starting from the resources (lower layer) and ending with utilization of IS capabilities (top layer). The model clearly shows the extent and caliber of a company's IS competencies and its influence on IS capabilities; from this perspective, the IS competencies define the company's ability to identify and deliver successfully IS/IT related changes, making it *adaptive* to face the market dynamics, and to be *agile* to respond to changing market conditions *faster*.

However, as Peppard and Ward (2004) depict, hierarchical structure need not be single-columned (or single legged; figure-4 shows a single legged structure, whereas figure-3 shows a multi (three-) legged structure). A primary advantage of a full hierarchical structure is that it can define any combination of the legs necessary to process multi-leg query (David, 2005). In fact, many companies these days (e.g., virtual companies, distributed horizontal companies) are multi-legged. Peppard and Ward (2004) do not show any facility for multi-leggedness.

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