

BUILDING INFORMATION TECHNOLOGY CAPABILITY AND ORGANIZATIONAL LEARNING

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Abstract:

IT capability has been touted as the “fourth era” in the development of information technology. It has been shown by researchers to make positive contributions to a firm’s business performance, competitive advantage and organizational effectiveness. But how can a firm build its IT capability and reap these benefits? This question is especially difficult to answer for firms in developing countries where such capability is lacking, and budgets are limited. This study focuses on understanding the building of IT capability and the role of organizational learning, using a case study in a developing country. It was found that organizational learning has positive effects on IT capability; especially on two out of its three dimensions: IT human resources, and the relationship between IT and business. This will hopefully help other firms in the same situation to find another option in their challenge of building an IT capability.

Keywords: Building IT capability; Organizational learning;

1. INTRODUCTION:

The business value of information technology has been debated for many years. “While some authors have attributed large productivity improvements and substantial consumer benefits to IT, others report that IT has not had any bottom line impact on business profitability” (Hitt & Brynjolfsson, 1996). Carr (2003) argued that IT is ubiquitous, increasingly inexpensive and accessible to all organisations, thus, it can not provide differential advantage to any company because scarcity, not ubiquity, is the basis for a sustained competitive advantage. He compared IT to infrastructural technology, like railroads and telegraphs, which is far more valuable when shared than when used in isolation. Its benefits are accessible to all and cannot create competitive for any individual firm (Carr, 2003). However, Ross, Beath, & Goodhue (1996) argues that although firms buy the same software packages, hire similar contractors, outsource to the same major vendors, some of them generate significant business value from IT while others do not. The difference is in their ability to build and leverage unique IT management assets which can generate sustainable competitive advantage for a firm. Mata, Fuerst and Barney (1995) show that IT itself cannot deliver any sustainable advantage, but the management of IT can.

Recently, some researchers have discussed IT capabilities and argued that managing IT is a capability that can create uniqueness and provide organisations a competitive advantage (Bharadwaj, 2000; Bhatt & Grover, 2005; Santhanam & Hartono, 2003). In their research Peppard & Ward (2004) anticipate that IT capability would become the “fourth era” of information technology development.

In the context of emerging markets in the developing world, IT can be seen as one of the most significant forces of modernization and competitive tools (Zhang, McCullough, & Wei, 2004). How should IT capability be developed? By buying a ‘total solution package’ of software and systems or by hiring competent staff and paying them high salaries? Even for those companies with a strong financial status in developed countries, these standard solutions may not help. How then for companies in developing countries in a less fortunate financial situation? This study will report on a case study in which a company in a developing country wanted to take advantage of IT. Its senior management recognized that IT was an increasingly important basis of the company’s operation, competition and efficiency, however it was still a weakness rather than a capability. The case will be analyzed using the organizational learning and IT capability related literature.

2. THEORETICAL BACKGROUND

2.1. IT capability:

Capabilities represent a firm’s capacity to deploy resources using organizational processes to affect a desired end. They are often developed in functional areas or by combining physical, human and technological resources at the corporate level (Amit & Schoemaker, 1993). Extending the traditional notion of organizational capabilities to an organization’s IT function, Bharadwaj (2000) defined IT capability as the ability to mobilize and deploy IT-based resources in combination or copresence with other resources and capabilities. Those IT-based resources are IT infrastructure; human IT resources comprising technical and managerial IT skills; intangible IT-enabled resources such as knowledge assets, customer orientation, and synergy- the sharing of resources and capabilities across organizational divisions. Ross *et al.* (1996) argue that highly competent IT staff, a strong partnering relationship between business and IT management and a reusable technology base are the three key IT assets that bring IT capabilities. In turn, IT capability will enhance an organization’s competitiveness.

Peppard and Ward (2004) mention three interrelated attributes of IT capabilities: a fusion of business knowledge with IT knowledge; a flexible and reusable IT platform; and an effective use process (itself with two aspects: using the technology and working with information).

With the focus on which IT capabilities are core to the business's future capacity to use IT successfully, not on whether IT is core or non-core in organization, Feeny and Willcocks (1998) identify the nine core capabilities that an organization must maintain. They suggest that this core IT capability model should be seen as a blueprint for sustaining an organization's ability to exploit IT.

Those core capabilities are:

IS/IT leadership, Business system thinking, Relationship building, Architecture planning, Making technology work, Informed buying, Contract facilitation, Contract monitoring, and Vendor development. p.9-21(Feeny & Willcocks, 1998)

In research of the relationship between types of information technology capabilities and competitive advantage, Bhatt and Grover (2005) operationalised the IT capability construct with three dimensions: IT infrastructure, IT business experience and relationship infrastructure. By studying the primary data from over 200 corporate CIOs, they found that each of these dimensions except IT infrastructure has a positive effect on the competitive advantage of the firm. IT capability is also shown to be positively related to organizational effectiveness (Zhang et al., 2004), and to a firm's business performance (Sanders & Premus, 2005, Bharadwaj, 2000, Santhanam & Hartono, 2003).

Based on the above literature review, we adopt the Bharadwaj (2000) definition of IT capability as "the ability to mobilize and deploy IT-based resources in combination or copresence with other resources and capabilities" and using three dimensions: IT staff competence, IT and business staff relationships, and IT infrastructure as the IT capability main constructs in this study.

2.2. Organizational learning

The concept of organizational learning is currently enjoying considerable attention among both academics and practitioners seeking to improve organisations. It is a dynamic concept with its use in theory emphasizing the continually changing nature of the organization. Reviewing the literature, there is little agreement as to what learning is. According to Argyris and Schon (1978), organizational

learning involves the detection and correction of error. It was later defined as the process of improving actions through better knowledge and understanding by Fiol and Lyles (1985). Huber (1991) assumed that “an entity learns if, through its processing of information, the range of its potential behaviours is changed”. Nevis, DiBella, & Gould (1995) defined organizational learning as “the capacity or processes within an organization to maintain or improve performance based on experience” while Dodgson (1993) describes organizational learning as the ways organisations build, supplement, and organize knowledge and routines around their activities, and adapt or develop organizational efficiency through improving the use of their workforce’s broad skills.

Huber (1991) mentioned four constructs relating to organizational learning: knowledge acquisition, information distribution, information interpretation and organizational memory. Those constructs were described as: “*Knowledge acquisition is the process by which knowledge is obtained. Information distribution is the process by which information from different sources is shared and thereby leads to new information or understanding. Information interpretation is the process by which distributed information is given one or more commonly understood interpretations. Organizational memory is the means by which knowledge is stored for future use.*” (Huber, 1991)

In their study, Nevis et al (1995) identified three stages of the learning process:

- + Knowledge acquisition – the development or creation of skills, insights, relationships
- + Knowledge sharing – the dissemination of what has been learned
- + Knowledge utilization – the integration of learning so it is broadly available and can be generalized to new situations (Nevis, DiBella, & Gould, 1995).

In other research, information acquisition, information dissemination and shared interpretation are also characterized as subprocesses of organizational learning (Sinkula, 1994; Slater & Narver, 1995).

From the literature, there are various types and levels of learning which are classified by different researchers. They can be distinguished by higher and lower level of learning (Fiol & Lyles, 1985), adaptive and generative learning (Senge, 1990) or strategic and tactical learning (Dodgson, 1991). These could be matched with the Argyris and Schon (1978) three-fold typology of learning: single-loop learning, double-loop learning and deuterio-learning.

Although there is no organizational learning without individual learning, organizational learning is not simply the sum of the parts of individual learning (Dodgson, 1993; Fiol & Lyles, 1985; Argyris & Schon, 1978). Learning in the organization comes from both individuals and organisations: “Individual learning occurs as people acquire tacit knowledge through education, experience, or experimentation. Organizational learning occurs as the systems and the culture in the organization retain learning and transfer ideas to new individuals. This kind of learning is shared across organizational boundaries of space, time, and hierarchy” p.55 (Ulrich, Von Glinow, & Jick, 1993). So, if management wants to build a learning organization they must focus on both kinds of learning.

In this study, we use the Dodgson (1993) definition of learning as “the ways organizations build, supplement, and organize knowledge and routines around their activities and adapt or develop organizational efficiency through improving the use of their workforces’ broad skills” and determine organizational learning to follow the four constructs mentioned by Huber (1991): knowledge acquisition, information distribution, information interpretation and organizational memory.

2.3. Organizational learning and IT capability

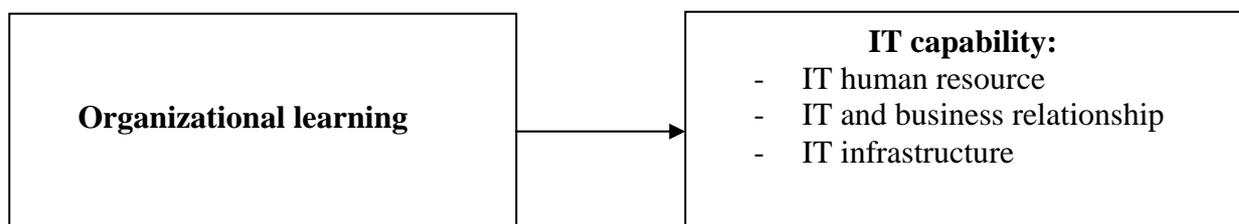
Recently, information technology has been linked with organizational learning. It can be identified in two different related streams of research. The first stream studies organizational learning as a tool to explain and resolve the problems faced by firms implementing new information technology. This originated from the argument of Argyris that organizational learning would be an instrument in overcoming implementation problems in organisations (Robey, Boudreau, & Rose, 2000). The second stream concerns the design of information technology applications to support organizational learning. Within this stream, there are two conflicting viewpoints of researchers. One is that information technology is an enabler of organization learning; the other is it is a disabler of organization learning by supporting rigid systems that are not adaptable to changing conditions of use.

In their research Robey et al. (2000) argued that “information technology may increase the capacity of organisations to learn and, simultaneously, learning capacity may affect the degree to which new technologies are adopted and used effectively” and “in the most optimistic scenario, these two effects

reinforce each other: the capacity to learn is increased steadily through increased technology adoption and use” (p. 147).

Andreu and Ciborra (1996) show in their model that an organization, through the learning process, can transit from lower levels of capabilities to higher levels and IT can be used for the development of those capabilities in the organization. Learning contributes to the building of an organization’s capabilities and competencies. IT capability is one of an organization’s capabilities, thus it is not an exceptional case, and then learning contributes to the building of an organization’s IT capability.

Conceptual framework for this study:



IT capability is a three-dimension construct including: IT human resource, IT and business relationship, and IT infrastructure. Although IT infrastructure components can be seen as commodities, the processes of integrating components to build an infrastructure to meet an organization’s strategic context takes time and effort and involves experiential learning.

The IT human resource includes IT technical and managerial skills and IT business knowledge. IT skills and business knowledge evolve over time through the accumulation of experience and learning. We believe that effective learning will lead to good IT human resources. Creating a good relationship between IT and business groups might take several years. Continuous interaction and communication between IT groups and other functional groups is required to get IT projects delivered quickly to meet business demand. Thus, organisations that have strong learning capabilities can leverage feedback cycles of experience more effectively, thereby building stronger IT capabilities (Bhatt & Grover, 2005). Recently, Bhatt and Grover (2005) found that the intensity of organizational learning has a positive effect on IT infrastructure, IT business experience and the relationship infrastructure. As the literature review shows all three components of IT capability are related to learning, we believe that there is a positive relationship between organizational learning and IT capability.

3. RESEARCH APPROACH:

A case study investigation has been conducted on site at the head office and Hanoi branch of Bao Viet Life. More than 40 managers and IT staff were involved in a study that used interviews and questionnaires. Semi-structured interviews were conducted concerning the evolving capabilities in IT then simple questionnaires were used to extend the coverage. The interviews were semi-structured based on the above-mentioned conceptual framework and had an average duration of some 2 hours. They were not taped, instead notes were taken. The risk in this procedure is being not completely faithful to the words using by the interviewees, but it made them feel more comfortable. The questionnaire design was also based on the conceptual framework specifically focusing on the IT capability dimensions. The study protocol received ethics approval from the researchers' university. Besides the interview and questionnaire survey results, many of the company's written documents were collected for the purpose of later analysis.

The case study will be presented then analysis and discussion will follow.

4. CASE AND ANALYSIS

4.1. Introduction:

The case study presented here concerns the process of building IT capability in a Vietnamese insurance organization. The holding company, Baoviet Insurance Company, has some 45 years of experience in providing insurance services, until 1995 however excluding life insurance. By this time, Vietnam had experienced a sustainable economic growth rate of about 6% during a 10 year period. The demand for life insurance emerged when those with higher incomes started thinking about their longer term living conditions and investments. Baoviet Insurance Company decided to develop this potential using its own efforts but hoped to avoid the risks and complications of this new form of business. The process of developing this new business from scratch was entirely by a process of trial and error. The major challenge for life insurance development was the lack of appropriate experience across the board – in product development, business procedures, product knowledge of agents and staff, IT development and use, and risk management.

The business model of Baoviet Insurance Company was (and remains) decentralized, in which all branches are relatively independent in providing services to customers. The head office is responsible for product development, guiding business processes, training and support. The branches are responsible for directly providing products and serving customers. Because of the limitations of the telecommunication infrastructure and low experience in IT development in Vietnam, online data centralization was not feasible at all until recently. That is, branches were required to maintain their own data about policyholders. Thanks to its fast growth, the life insurance business was separated from Baoviet Insurance Company and became a separate company in 2004, called Baoviet Life.

It is worth mentioning that foreign-owned players in the Vietnamese insurance business have significant IT know-how and are using this effectively to build market share. Baoviet Life needed to build an IT system for its newly-created life insurance business, while the main objective was that the business units would learn about IT and the IT unit would learn about business needs, and that this learning would happen 'on the job', thus IT capability would be improved.

4.2. Building IT capability:

4.2.1. Early stage

In 1996, Baoviet Insurance Company launched its life insurance business. This was the first, and monopoly, provider doing life insurance business in the marketplace. This business was undertaken in few branches initially, then, at all 61 branches located in all provinces across the country.

At first, Baoviet's Insurance Company's life insurance business was still small in terms of number of customers and premium income. The first attempt at IT development was undertaken by a business staff member in 1996 for the management of policies using FoxBase. It was first used in two branches in Hanoi and Ho Chi Minh City and then was installed in all branches with life insurance business.

Under the pressure of fast business growth and unforeseen management requirements, the software did not meet business demands and was not stable. In 1998, a replacement, more comprehensive FoxBase application was launched by the IT department. This new system had more functionality and could work with larger volumes of data. However, IT problems were still mounting. At that time, the life insurance business was still a challenging business to staff. Both IT and business staff had insufficient

knowledge about this business. Business staff were learning how to establish the new business processes. So they kept changing their business procedures especially when launching new products. Also the IT staff were exploring business procedures and enhancing their IT skills at the same time. A senior software developer in the current Baoviet Life IT Centre said:

IT staff hadn't got enough knowledge and experience in the life insurance business at that time. So, building in house software was the right decision. It helped IT staff to learn more technical skills and business knowledge so that they could assess software that external partners offered later.

By 1999, the information technology market in Vietnam was growing, with more IT companies and increasing awareness of IT's role in business. Some foreign insurance companies were permitted to open for business in Vietnam in 1999 ending Baoviet's monopoly in life insurance. Competition became the emerging issue that Baoviet's executive management had to be prepared to cope with. They decided that an essential step was outsourcing IT. So they called for presentations from several software application vendors, both local and foreign.

4.2.2. Local outsourcing and then insourcing

After considering all aspects including the company's finances, the current business situation, organizational structure, staff skill and knowledge and comparing vendors, Baoviet's executives decided to go with one local vendor to build its life insurance software using an Oracle environment. With that choice, they could both learn from the partner as well as learn by doing. They could also avoid losing a lot of money and making a big mistake if the project failed because of its risks.

Baoviet started its life insurance IT project with the local vendor in 1999 while still using the old software. Baoviet established an IT project group to cooperate with the partner. They had to work intensively to share knowledge of the life insurance business and to specify Baoviet's requirements for the partner.

In addition to the lack of understanding of the new business and the weakness in project management of Baoviet staff themselves, the Vietnamese partner was similarly inexperienced and lacking in

insurance knowledge. After a pause in 2000 to evaluate the project's achievements, it was eventually terminated in 2001, with an estimated 70% completion.

Baoviet's IT staff had gained experience and knowledge from the partner, and, in the process they also increased their business knowledge. So, they felt capable to continue the project in-house. Senior management then made the decision to continue building the software in-house. The IT staff had to develop the remaining uncompleted 30% and to modify and correct it to meet business requirements.

In spite of the failure of the project, Baoviet still implemented the partly developed software to all branches across the country because this software still was much better than the old software. The initial period of in-house development was a very hard time for the IT staff. One IT Manager said:

“The incomplete software was too difficult to use and it had many mistakes. The partner did not support us because of the project cancellation. Correcting mistakes as well as developing the last 30% was an overload for the IT staff.”

An 'IT Centre' was established by Baoviet in June 2001 to include personnel from the IT Department and personnel from the project group. This helped a more confident continuation of the development and modification of the life insurance software in-house. The Software Development Manager reported:

“The establishment of the IT Centre demonstrated the investment and concern of Senior Management. It has brought some efficiency. We have about 30 IT staff with more servers, better information systems and especially improved working and development procedures.”

They had software development procedures to apply which they did not have before. Thus, the systems were more accurate and robust than before.

When initially installed, the software had so many mistakes that IT staff had to upgrade it almost every day. It was very frustrating for both business and IT people. In a situation of swimming or sinking, the IT staff had to learn and cope with the situation very quickly and very intensely. They had to train users and also gave them written instructions on how to use and upgrade the software. They strongly believe that they learnt while doing their jobs. One of the IT management commented:

“In the past, we had to upgrade the software almost every day. And after that the frequency was once per 5 days. Now, it is once a week (7 days). And in some weeks, there is only some small thing or nothing to upgrade.”

By 2003, the IT staff had completed the software. The previously incomplete 30% were fulfilled. The software now has enough functionality and can satisfy the operational requirements of the business departments.

5. DISCUSSION:

The discussion will first analyze evidence of organizational learning in the process of building IT capability. Then, based on the frameworks mentioned earlier, an analysis will be done to see if there are improvements in the company’s IT capability.

5.1. Organizational learning:

The organizational learning evidence will be analysed following the four main constructs of organizational learning process: knowledge acquisition, information distribution, information interpretation, and organizational memory.

Table 1: Organizational learning in Baoviet:

	Knowledge acquisition	Information distribution	Information interpretation	Organizational memory
Definition	the process by which knowledge is obtained	the process by which information from different sources is shared and thereby leads to new information or understanding	the process by which distributed information is given one or more commonly understood interpretations	the means by which knowledge is stored for future use
Evidence	Learning from IT project partner Learning by staff themselves Learning from doing the job and through training	Giving instructions Training	Training and giving oral and written instruction directly	Written procedures and instructions Training

Knowledge acquisition: IT staff have learnt project managerial skills and, technical skills when collaborating on the outsourcing project with the partner. In addition, because they had to learn about

the new insurance business to try to meet the business needs, they got technical and business knowledge doing their job and through self-training.

Information distribution: periodically the IT function had to train IT and business users how to use the software as well as hardware. In the period of high frequency software upgrade, they trained on site and gave the users written and telephone instructions.

Information interpretation: the communication between IT and business users is through training, written papers and instructions and telephone. All these communication channels made the process of information interpretation accurate and effective.

Organizational memory: Written procedures and instructions, together with training are the means of storing organizational knowledge. Even if the staff has been changed, the knowledge stayed with the company. Thus, new staff had opportunities to access and be trained in the knowledge that the company had gained. This is the important criterion to suggest that organizational learning has been taking place in this company. However, an important question is whether this organizational learning affects the company positively? Baoviet's IT capability will now be analysed.

5.2. IT capability/organizational learning outcomes:

This section will analyze the achievements to see whether Baoviet's IT capability has improved in each dimension mentioned in the conceptual framework.

Some 45% of the survey respondents agreed that the information systems now satisfy or fully satisfy the business requirements while another 47% said information systems do satisfy business requirements but need to be improved. Due to the decentralized data model and the need to transport and merge each branch's data, sometimes reports did not meet the head office management requirements, nor were they timely. Most respondents (85%) agreed that, although Baoviet Life's IT capability still has some weaknesses; it has been progressing in comparison with the past several years.

Baoviet Life staff have improved their managerial and technical skills as well as their business knowledge: they have learnt how to manage projects better and gained technical and management skill from the partner. More significantly, they (IT staff) have learnt by doing their own modification and

correction of software, and they have gained good knowledge of the life insurance business – this was agreed by 87.5% of both IT and business people replying to the survey.

One IT staff's opinion in assessing the staff skills and competency:

“Business staff have been getting a better understanding of life insurance business. Thus their requirements are much more sufficient and understandable now. They are no longer making so many changes in their business procedures.

“IT staff's technical skills and business skills are much better than before. They have also got more experience in managing and solving problems.

One IT Manager said:

“For technical problem solving, IT staff are now really much faster than before thanks to their strong experience, knowledge and better technology. At present, IT staff are good at Oracle. They are even better than staff of all other IT companies except FPT¹”.

Most of the interviewees believed that *“the relationship between business and IT staff has been getting better over time”*. Most people (92.5%) believed that Baoviet Life's senior management has strongly encouraged their staff in using IT applications in their job. Due to the “culture gap between techies and users” (Feeny and Willcocks, 1998), IT and business staff had only a basic working relationship in the beginning. They would only talk with each other if needed. Later, IT and business staff had to cooperate strongly together to get their job done. For their mutual benefit, they had no choice but to cooperate closely with each other. Thus, their working relationship has been getting closer and better. Now, there is a mutual confidence, shared purpose and efficient communication. The relationship building competency has improved significantly over time. It is stated by one senior software staff: *“The relationship between IT and business staffs has been surely getting better.”*

¹ FPT is currently recognised as the leading IT company in Vietnam.

In its SWOT analysis in 2004, one of the main strengths identified in Baoviet Life's IT Centre, was that: "Baoviet Life IT staff are qualified and active enough to manage, to absorb and to develop its information technology systems".

The above analysis shows that IT capability has improved substantially in two dimensions: in IT and business knowledge and skills, and in the relationship between IT and business people. With the third dimension of IT capability - technology infrastructure, we have insufficient evidence to conclude that it has improved. One of the critical weaknesses recognized by the IT manager and IT staff is the inflexibility of the technological platform. It is reported by one IT manager as "meets current business demands but may not meet business future needs". This area is the one that need to be focused on and improved by senior management and IT leaders.

The strategic objective of information systems for Baoviet Life was specified in 2003 as:

"To meet the insurance and investment business requirements, to support the decision-making process and management, to improve service quality and to create competitive advantage in the market for Baoviet Life".

During 2006-2007 the plan for Baoviet Life information systems is to redesign the whole system for the centralization of management direction. In October 2005, vendors were called to present package solutions for the life insurance business. Baoviet Life has found itself back in the decision situation it faced in 1999, only this time it is far better prepared. Moreover, senior management is prepared to abandon the solutions so painstakingly developed over the intervening period. Baoviet Life also faces this decision as an autonomous business unit.

6. IMPLICATIONS

IT capability plays an important role in organisations. But building IT capability is not an easy task. Building IT capability in this case has been shown to be a process of organizational learning while doing the job. The business was expected to simply do-its-best with the goal of learning. What has been learnt by individuals was stored purposively as organizational memory. In this way, knowledge has been acquired and transferred between members of the organization both old and new. That knowledge has helped Baoviet staff to develop their work practices substantially (regularly upgrading

IT systems and software and improving their knowledge, skills and working relationship). Baoviet's IT capability has been developed through day-to-day work practices and has been transformed from lower levels to higher levels of capability. This is what Andreu and Ciborra (1996) called basic learning processes. This case shows successful development which might be a good example for other companies in the same situation, especially in developing countries, to learn from. It also suggests that investing in learning and creating a good environment for individual learning as well as organization learning could be seen as one important way to build IT capability.

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