Exploring the Role of IS Strategy in the Development of IT Capabilities:
An Investigation of an Oil and Gas Construction Company in Iran

Hamed Hemmatdar
Alwan Said

Supervisor: Jonny Holmström
Abstract

Organizations are becoming increasingly dependent on information technology for different purposes, such as project and resource-management systems, cooperative work systems and organizational memory systems. There is a need to make a dynamic roadmap for IT capability usage to facilitate organizational performance. The aim of this research is to gain a deeper understanding of the role of IS Strategy in utilizing IT capabilities for operationalizing and integrating business process information for the purpose of organizational performance from the lens of the resource-based view (RBV). This research makes use of single case study analysis of a construction organization in the oil and gas industry in Iran. This case study is expected to fill a gap in the literature in the specific context of a strategic situation and the critical environment in Iran.

Keywords: IT capabilities, IS strategy, co-evolution, organizational performance, resource-based view (RBV)

1. Introduction

Information technology (IT) is an essential resource in today’s business landscape that all organizations have to manage to some extent. IT is part of an organization’s knowledge base in the sense that it allows information to be generated, stored, retrieved and transmitted. As such, the design and application of IT in an organization affects its ability to effectively leverage, generate and store information and turn it into operational performance. While research has shown that IT does affect an organization’s performance (Brynjolfsson and Hitt, 1998) access to standardized solutions does not in itself generate improved operational performance (see e.g., Ciborra 2000; Carr, 2003). Instead, it has been argued that an organization’s IT capability, i.e., the ability to generate, mobilize and deploy IT resources that are well adapted to the organizational context, is the main indicator of organizational performance from IT (Bharadwaj, 2000; Peppard and Ward, 2004). Data storage, processing and transferring are the core functionalities of IT (Carr, 2003).

Organizations are becoming increasingly dependent on information technology for different purposes, such as record tracking, and mediated communications, such as email (Stanton et al., 2005). Examples of IT resources and IT-leveraging capabilities include project and resource-management systems, cooperative work systems and organizational memory systems (Pavlou and El Sawy, 2010).

Many researches have been conducted in the area of information technology, and most of these researches show that information technology can have some impact on individual processes and help improve firm performance (Brynjolfsson and Hitt, 1998; Bharadwaj 2000; Kohli and Devaraj, 2003; Wade and Hulland, 2004; Ray et al., 2004; Pavlou and El-Sawy, 2006). Ives and Jarvenpaa (1991) address some issues that can help improve process performance though information technology. Because information technology improves the business process, it is important managers consider IT investments that can enhance organizational goals.

Since the use of IT systems has become increasingly common, more and more people have
come to believe information technology is the backbone of every business and commercial venture. It helps companies operate and work internally; it improves cooperation with other partners in the supply chain; and it helps companies manage relationships and operations with customers (Carr, 2003). Managers have become more aware of the strategic value of information technology and the way they can leverage IT investments to gain competitive advantage. This has led to managers discovering new perspectives, one of which is that the more information technology grows, the more important a strategic perspective on IT becomes. Because of this development, Carr (2003) has mentioned that there is a need for managers to change their approach to IT investment. Some managers believe heavy investment in IT capabilities and systems will guarantee an increase in organizational and operational performance. Carr (2003) argued that the ubiquity of IT is not the source of competitive advantage, but that scarcity is the resource that can generate differentiation for a company. This means by doing something others cannot do you can beat the competition. That suggests availability and low cost can cause commodity inputs from IT.

However, research shows that 80% of IT systems implemented have failed and wasted a huge amount of organizations’ investments. This is not because of the functionality of the specific system but because of the way in which the system procedures have been managed (Lacity and Hirschheim, 1993). According to Arvidsson et al. (2014), there are three crucial levels in the IS strategy of an organization in which failure can damage the whole organization. The first is aligning strategic intent and system capabilities; second is the system implementation in the organization; and third is the way of achieving alignment of strategic intent with the way the system has been used and is implemented (Arvidsson et al., 2014).

There is an increasing need to make a dynamic roadmap of IT capability usage, which can facilitate a company’s process performance. Utilizing IS strategy might be helpful in operationalizing and integrating business process information due to an improvement in the performance of the firm’s business processes. According to Peppard et al. (2014), some scholars have called for more practical research concentrating on micro actions rather than on macro analysis. There is a need to fill the gap in the literature on actual day-to-day activities and processes related to strategic outcomes and the way people are becoming engaged with the development of strategy and strategizing.

Information system strategy acts as a competitive advantage and can help different levels of management in the decision-making process. This study aims to gain a better understanding of the role of IS strategy and the details of facilitating such strategy with the use of IT capabilities at different organizational levels, such as planning operation, organizational relationship monitoring, business process management and decision-making processes. This means that understanding or finding out what the actual relation is between IS strategy and IT capability in the organization’s overall levels might be something new this study can contribute to what we know already about this subject in general. But it is also important to specify the impact of IT capability on the various levels of organizations.

It is important to figure out which levels of an organization can be affected by the use of IT capabilities. This study explores a single case study of a construction company in the filed of oil and gas in Iran. Regarding this investigation, the following research question has been
How do organizational IS strategies affect organizational abilities to leverage IT capabilities in order to obtain organizational performance?

In the past decade oil and gas construction companies in Iran have been looking to develop IT capabilities in the firm because IT has transformed into a strategic tool in organizations that can have a direct and strong impact on core business. There are some powerful, knowledgeable and experienced companies already working in construction in the oil and gas industry in Iran that are trying to utilize IT capabilities throughout the company to increase their process performance. However, decision makers are not completely aware of the capabilities of IT, which already exists in the organization, and how it can be used in their operations.

For the proposed research objectives we conduct a literature review on the study area to draw a frame of reference regarding IT strategy and capabilities, which can be a guide for answering the research questions. We then present the research methodology of the study containing the research strategy and data collection. The data analysis and discussions then reveal the results of the study. The study concludes by answering the research question and discusses the contributions of the study, managerial implications, limitations and avenues for further research.

2. Related Research

This chapter presents a review of previous relevant scientific studies in the area of the research problem. The aim of this chapter is to gain a deeper understanding of the topic by creating a frame of reference for fulfilling the study’s purpose and answering the research question.

2.1. Information System (IS) Strategy

The literature lacks a clear definition of the concept of IS strategy (Peppard et al., 2014). According to Arvidsson et al. (2014), information systems (IS) are important and strategic because they are used to understand the strategic intent of an organization. There are different ways of defining the concept of IS, which is typically based on the concept of handling business work systems. Technology and infrastructure are both parts of the work system framework. Based on this description, a computer is not an IS because it does not offer certain products or services to specific customers.

Based on the definition of Roponen (1993), strategic information systems are “designed to bring competitive advantage or have resulted in a competitive edge” (p. 101). For example, when an organization intends to purchase a software package such as ERP, it would not be enough to implement the IS and it should be treated like a system rather than a tool. Kräftner (2006) described service-driven strategy that has been designed to show where the organization is, where it needs to be, and how it should reach its final destination. Strategy is a plan that aims to achieve something over the next five years; the plan should be modified eventually and the need for changes in technology development should be based on
organizational business perspectives (Kräftner, 2006). In fact, strategy is the art of creating value. It runs the intellectual frameworks, conceptual models and governing ideas that allow a company's managers to identify opportunities to bring value to customers and to transport that value at a benefit. In this regard, strategy is the approach the company takes in describing its business and combines two important economic resources in this disruptive environment: knowledge and relationships or an organization’s competencies and customers (Normann and Ramirez, 1993). As Martin (2014) recently argued, strategy and planning are two different concepts.

Studies in the field of information systems strategy have observed a couple of movements through different ages (Peppard et al., 2014). The first movement was characterised by an emphasis on building and developing different systems with the full effort of IT staff. This was an ad-hoc, bottom-up approach, based on determining the computing requirements of an organization, rather than any strategy determination (Peppard et al., 2014).

However, the second movement was a top-down approach, in which IS planning was done and requirements considered for the purpose of fulfilling business objectives and goals (Peppard et al., 2014).

The next era of studies was concerned with strategic planning for information systems with the help of senior managers and IT staff as a team. This stage was mainly to look for new opportunities to gain competitive advantage from IT (Peppard et al., 2014). IT can help organizations improve their product and service qualities and customer services to establish competitive advantage (Lacity and Hirschheim, 1993). As Wade and Hulland (2004) mentioned, overall strategic change would be a source of competitive advantage of IT capabilities. They also mentioned that the resources that can bring competitive advantage are those that are rare, valuable and hard for competitors to imitate.

The next movement was the building of an IS capability with the help of all employees in the organization by knowing that having a strategy is only part of what is needed. In this stage, it was important to continuously find new opportunities by deploying IT (Peppard and Ward, 2004; Peppard et al., 2014).

According to Peppard et al. (2014), one of the leading areas of study in IS strategy is focusing on the concept of strategizing and the way usage can be critical for IT performance in organizations. In this practice all employees are involved in a high level of communication between IT and business executives. An important issue facing organizations is strategic alignment, where business and IT strategy co-evolve (Peppard and Breu, 2003; Benbya and McKelvey, 2006).

Arvidsson et al. (2014) define the term strategy blindness as meaning the “organizational incapability to realize the strategic intent of already implemented IT capabilities”. This shows the importance of keeping a close relation between the strategic intent of the organization and realizing the existing IS implementation strategy. Another contribution of IT could be decreasing the cost to the company by sharing services, atomizing procedures supporting different tasks that can bring organizational efficiency (Lacity and Hirschheim, 1993; Arvidsson et al., 2014).

According to Arvidsson et al. (2014), investing in IT capabilities as instruments is crucial in the long term for organizations. But that is not the only issue; the way in which companies
embed IT capabilities in their practices is important (Doherty and Terry, 2009; Peppard and Ward, 2004). Although the literature gives a lot attention to aligning IT capability investments with organizational strategic intent, there is still a need to achieve successful implementation of overall strategic change. Considering the rapid increase of IT capabilities, this study sets out to discover more about the way in which IT strategy and business strategy co-evolved and the way IT capabilities can trigger changes in the actual business. This can help organizations find new opportunities when it comes to business strategy.

Alignment is a “continuous co-evolutionary process” of establishing consistency of rational design (top down) and emergent processes (bottom up) containing all components of IS and business for the purpose of increasing the level of organizational performance. Strategic alignment describes the level of fitting IS strategy with corporate strategy (Benbya and McKelvey, 2006).

Despite the wealth of IS strategy literature, there is a lack of research and knowledge addressing the role of IT capability in relation to IS strategy. The aim of this research is to explore this issue in detail by examining how organizational IS strategies affect organizational abilities to leverage IT capabilities in order to enhance organizational performance.

2.2. Information Technology (IT) Capabilities

In all organizations the IT team has different tasks and is in charge of some regular IT service provision, such as cabling, hardware maintenance, desktop installation or software development, tasks that can be done inside the company or outsourced to a third party. The team management is usually in charge of managing the processes, making operational decisions and designing policies and standards (Kräftner, 2006). IT can be enlarged by computing power, smaller devices and the development of network capabilities, elements that have deeply affected how and where computing technology can be used (Jonsson et al., 2008).

Sanchez et al. (1996) describe capabilities as “repeatable patterns of actions in the use of assets to create, produce, and/or offer products to market”. Present companies and their general managers use IT as an efficient instrument to enable new business processes, but it seems IT is a stronger capability; they need to recognize that IT is a powerful solution. According to Wade and Hulland (2004), capabilities can include processes such as developing systems and integration and also containing managerial and technical skills and abilities. The authors define resources as “assets and capabilities that are available and useful in detecting and responding to market opportunities”. These resources can be tangible or intangible, such as different models of technologies or managerial processes, knowledge, human resources and business information processes (Mahoney and Pandian, 1992; Bharadwaj, 2000; Peppard and Ward, 2004; Bhatt and Grover, 2005). Specific organizational IT resources can be categorized as IT infrastructure, human IT resources and IT-enabled intangibles (Grant, 1995; Bharadwaj, 2000). Tangible resources are the physical assets; intangible assets are elements such as reputation and image and knowledge; know-how of personnel is another resource of an organization (Grant, 1995; Bharadwaj, 2000). For example, the ability of an organization to fulfil customers’ requirements is the result of the
integration of operational capabilities, the business processes of marketing and IT (ibid).

Brynjolfsson and Hitt (1998), using the productivity paradox, questioned whether computers contribute to an increase in a firm's productivity. They suggested the success of an organization is due to the amount of value delivered to their customers with less capital and input. They also described that technology itself is not the only part of IT investment, but that it also includes training, redesigning business processes and other organizational changes. This study proposed that computerization may not necessarily lead to productivity but that it is a crucial component of an organizational change that ends up with an increase in productivity. It is important to consider organizational changes and integration with business processes (Brynjolfsson and Hitt, 1998).

Considering the literature that has been reviewed, and following the purpose of this study, it is important to explore the way organizations are facilitating IS strategy with the help of IT capabilities to achieve improved organizational performance.

3. Theoretical Framing

After reviewing the literature in the area of IT capabilities, organizational performance and the role of IS strategy, this section describes the conceptual framework of the study. The frame of reference is the way literature can help fulfill the research purpose and answer the research question raised in the first chapter.

The research question (RQ) of this study is: How do organizational IS strategies affect organizational abilities to leverage IT capabilities in order to obtain organizational performance?

Considering the research problem and the research question, several studies have described the same purpose and used resourced-based view theory and other theories, such as economic theory, to describe the situation. Different frameworks have been proposed and tested based on resource-based view theory. Some studies have taken the process-oriented view (Mooney et al., 1996) to investigate the issue, with the intermediation of business processes variables to performance (Bharadwaj, 2000).

The theory of the resource-based view (RBV) is very useful for thinking about the way information systems and IT capabilities can be related to organizational performance and strategy (Wade and Hulland, 2004). The focus of the resource-based approach is on key success factors of an organization due to the achievement of specific competitive advantage with differentiated skills and unique proprietary know-how (Mahoney and Pandian, 1992; Prahalad and Hamel, 1990). This theory proposes that organizations can gain competitive advantage by using valuable, rare and not imitable resources. By using these resources companies can establish organizational capability; however, competitors can easily imitate this capability by buying the same software and hardware. The extent to which a company can leverage IT investments and capabilities to create unique and sustainable competitive advantage will determine the company's success in increasing overall productivity and effectiveness. With the help of the RBV framework, companies can devise strategies for creating and sustaining competitive advantage (Santhanam and Hartono, 2003; Ross and
This theory has its roots in the strategic management literature, since the resource-based view focuses on a company's intangible assets, such as customer orientation and organizational knowledge; it can offer a unique opportunity to explore the relationship between IT capabilities and organizational performance (Bharadwaj, 2000). Furthermore, some studies have used this theory to empirically test the relationship between IT capabilities and organizational performance. This has been done by comparing the superior financial performance of a company with other leading companies in the particular industry. This means they decided to establish some benchmarks to establish the relationship between the cost ratio of the firm and the profit ratio of the benchmark in the industry (Santhanam and Hartono, 2003; Bharadwaj, 2000).

In addressing the mentioned research question, Peppard and Ward’s (2004) model can deliver a better understanding. This framework was used as the instrument to investigate the issue in the context of Jahanpars Construction Company in Iran’s oil and gas industry. The justification for choosing this model as the frame of reference is because of the way Peppard and Ward (2004) describe the role of IS strategy in leveraging IT capabilities for improving organizational performance. They explored the sustainability of competitive advantage through IT and, with the help of resource-based view theory, described a model of organizational IS capability (see figure 1).

According to Peppard and Ward (2004), IS strategy impacts business performance in an organization. For this reason they introduced a model, which we use as a base in this study. The model contains three levels: resources, organizing and enterprise. In the first level, resources, there are the resources of skills components, knowledge and behavioural attributes of internal and external employees, which are crucial ingredients of IS competencies. The second level, organizing, looks at the way different roles (behaviour of individuals), structure (systematic arrangements) and processes (set of activities) can work together to leverage IS competencies (Peppard and Ward, 2004).
These competencies contain important elements, such as the formulation of strategy, defining IS contributions and strategy, defining IT capabilities, exploiting the maximum benefits of investments, delivering IT solutions through implementation and operation and supplying the appropriate technology and maintenance (Peppard et al., 2000). The final level of the model is the enterprise level, in which the capabilities and performance of the organization are reflected (Peppard and Ward, 2004). In conclusion, organizational performance results from the IS capabilities of an organization.

As mentioned before, this study intends to gain a deeper understanding of the way IT capabilities can affect different levels of an organization in the actual running of the business. The main focus is to explore the co-evolution of business strategy and IT strategy from the perspective of different levels of co-evolutionary IS alignment.

4. Research Methodology

This chapter contains a description of the methodology of the study. The progress of the research method, its purpose, approach, strategy, data collection and data analysis will be illustrated. Moreover, quality measurements of reliability and validity will be described.

4.1. Research Design

According to Neuman (2003), research purpose is divided into three categories, depending on the researcher’s accomplishments. These are exploratory, descriptive and explanatory.
Following Marshall and Rossman (1999) an explanation of this study would have an exploratory and, to some extent, a descriptive purpose. This is because the study deals with an investigation of a phenomenon that is not well understood in the context. Furthermore, the study has the aim of exploring and gaining deeper insights into the role of IS strategy in developing IT capabilities for the purpose of organizational performance. In addition, the study continues to describe and document phenomena that would contain the descriptive purpose of the study.

According to (Yin, 2009), the choice of research strategy is based on the way research questions have been formulated. Since RQ in this study is the “How” question, and the aim of the study is to have a deeper understanding with a little control over events, the single case study is the best option for finding in-depth information because it meets the purpose of the study. The research approach would be qualitative, to picture and explore the situation (Yin, 2009).

4.2. Case Study Selection

Oil was discovered more than 100 years ago and since then has become one of the important strategic energy resources in the world. Hence, the oil industry is highly significant in modern times and an increasing number of companies have started operating in this field. IT plays a crucial role in the development of this industry because of its time and cost-saving potential, and its ability to raise the level of operational quality and organizational performance.

Jahanpars Construction Company (henceforth JP) established an IT department in 2002 with the purpose of creating a secure environment for generating and protecting operational information. During the first stage, IT operations started with two network-based servers with antivirus and other official and technical software. The functionalities of this department have been developed gradually alongside modern technologies and definitions. The integration stage was a critical time for this company because it aimed to cover different software platforms due to alignment and modification with the company’s strategy.

Following this challenge in JP, the purpose and research question of this study, we conducted an empirical investigation on a single case study featuring JP to understand the ways IS strategy can affect organizational abilities to leverage IT capabilities in order to obtain organizational performance. Moreover, we chose this company largely because of the access the authors had to the source of data. Also, this company agreed to cooperate with the authors in this regard. It is important to mention that due to JP’s market position, it is a special case to explore.

4.3. Data Collection

The process of data gathering is a complex stage in the case study (Yin, 2009). Semi-structured, personal in-depth interviews were chosen as the primary data collection technique. The instrument of interview guide was designed based upon the frame of reference, with open-ended questions aimed at gathering accurate, in-depth data (Appendix A). Units of analysis were engineering, procurement, financial, IT and construction processes inside the company regarding the aim of research.

Semi-structured interviews were conducted with managers and experts in JP. These are
summarized in Table 1. Interviewees were selected based on their experience and level of involvement in business processes and IT capabilities. Seven participants were interviewed, with interviews lasting an average of 70 minutes (between 45 minutes and 1.5 hours). All the interviews were conducted face to face and were recorded for the purpose of documenting evidence and being scripted for qualitative data analysis.

Table 1: Descriptive information about the case study interviewees

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Experience /years</th>
<th>Responsibilities and duties</th>
<th>Department size/person</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Procurement Manager</td>
<td>20</td>
<td>Supply chain management, Product and service procurement</td>
<td>15 / central office, 25 / project fields</td>
</tr>
<tr>
<td>B. Engineering Manager</td>
<td>23</td>
<td>Basic engineering design, Detailed engineering design</td>
<td>40 / central office, 70 / project fields</td>
</tr>
<tr>
<td>C. Financial Manager</td>
<td>35</td>
<td>Budget allocation, Accounting, Salary and commission</td>
<td>25 / central office, 45 / project fields</td>
</tr>
<tr>
<td>D. ICT Manager</td>
<td>10</td>
<td>Providing ICT services, ICT Infrastructure design/implementation, ICT maintenance</td>
<td>7 / central office, 10 / project fields</td>
</tr>
<tr>
<td>E. Construction Manager</td>
<td>25</td>
<td>Operational and executive process management</td>
<td>10 / central office, 100 / project fields</td>
</tr>
<tr>
<td>F. Project Coordinator</td>
<td>8</td>
<td>Project coordination, Project reporting, Technical estimation</td>
<td>2 / central office, 4 / project field</td>
</tr>
<tr>
<td>G. Tender Officer</td>
<td>12</td>
<td>Project planning, Tender’s estimation, Tender document delivering</td>
<td>10 / central office</td>
</tr>
</tbody>
</table>

Considering that JP Company is located in Tehran, with project fields in the south of Iran close to the Persian Gulf, interviews were in Persian. The interview guide was translated into Persian and translated back into English to double check. A translation was done for the data as well. Organizational documents and Web sites have been used as secondary data for the purpose of using triangulations of sources of data. Using multiple sources of data as evidence for the study provides an opportunity to increase research validity (Yin, 2009). The organizational chart of JP Company is illustrated in Appendix B.

4.4. Data analysis

Data analysis was employed the open, axial and selective coding technique used by Strauss and Corbin (1990). Iterative coding processes were involved extracting the concepts, finding support from empirical evidence and matching similar concepts to explain the idea. The scripted data were reviewed and organized into different themes corresponding to three levels: resource, organizing and enterprise, based on the frame of reference. In the second round of reading data the main concepts from the research model were extracted and
categorized. These categories were mainly the different roles of business and technical skills, knowledge and experience. The other codes were structure, processes and IS competencies. Regarding different IS competencies, the main codes were formulating strategy, IS contribution, IT capability, exploitation, solutions delivery and supply. The final categories of the codes were organizational goals, investment and strategy. In order to establish the role of IT capabilities and IS strategies in the organizational performance of JP, the identified codes were integrated in the final stage to present a storyline to describe and explore the case.

5. Results

Results of the case study reported in this chapter are based upon the opinions of interviewees and discussions with them about IT capabilities, IS strategy and organizational performance in JP. This section illustrates the importance of IT results in three levels of the model of the role of IS capability adapted from the study by Peppard and Ward (2004). These three levels are resource, organising and enterprise.

5.1. Case Study Introduction

JP is a general contractor in Iran’s oil and gas industry, and is regarded as one of the major players in this field, with more than 40 years of experience. This company comprises a main office and some branches in Tehran, as well as a couple of site projects in southern Iran. Some of JP’s customers include the National Iranian Oil Company (NIOC) and other international oil companies.

JP Company includes some operational and functional departments, which are located at the company’s headquarters and in its project fields. In each of them there is one head or director managing all processes and also coordinating staff right to the bottom of the division. However, all of the departments are located in both the central office and project fields. Some processes could be managed and observed in the matrix shaped between the workshop manager and the department manager in parallel at the same time (see JP Organizational Chart in Appendix B).

The IT department is one of the company’s executive departments responsible for providing different IT services in the company. This department provides the network and telecommunication, hardware and software services. There are three different categories of duties: design, implementation and maintenance. It is important to mention that this company is also making use of third-party companies and vendors for some IT tasks and for IS service delivery.

Specifically, the IT department is responsible for designing and implementing the information technology infrastructure in this company. It takes care of information and communication technology (ICT) requests, diagnosing needs and solving problems from all the employees in different divisions (from the central office to the project fields). It also decides on the allocation of resources and capabilities. The IT department has central policies and procedures for configuring the domain and user access rights for data security.

The IT department serves as a strong platform for file serving into a Storage Area Network (SAN) and by using a virtualization technique to establish redundancy and managing all
servers in a centralized dashboard to prevent any failure and service downtime. The department makes use of the benefits of that system to ensure information and settings can be retrieved in the event of disaster.

Another task is to provide the company’s Web site services as an external communication channel and informational interface with clients and stockholders. This channel also delivers a reliable and stable Internet connection for users within the central office and project fields. Another role of IT is to secure and maintain mail services as one of the critical communication tools of the organization by supporting its Web services against potential risks with a firewall and anti-spam and antivirus software.

One of the major duties of the IT department is to provide an infrastructure and maintain a Document Control Centre (DCC) for different projects. This system supports and structures project documents with specific templates. This system classifies documents, integrates desktop and document archiving, and employs event management based on the chain of events. Each project in JP Company is utilized by an individual DCC, which works separately, gathering data and storing it in the DCC system. This information is used in the project fields and is distributed to the relevant departments as well. There is a two-way transaction between the DCC and the project. However, there is only one-way information usage between DCC and the project managers, the project management board and users. (See figure 2).

Figure 2: DCC structure in JP Company
5.2. Resource Level

As mentioned in figure 1, the resource level includes three kinds of resource: business, technical and behaviour.

The major business source in JP is based on the contracts the company gets through various tenders. Then, depending on the nature of the contracts the company enters into, it begins to build a project team to do all the necessary jobs. The fact that the major structure of the workflow in this company is project-based means there is a variety of activities to attend to. Three major criteria that should be met in every project are time, scope and cost. Time is a critical issue in strategic projects in this company because of the nature of the oil and gas industry. There are always specific deadlines to reach with predetermined progress in the scope of the company’s projects. Considering that quality is important in all these criteria, the company is expected to be able to meet the project plan. In order for the project to reach its goal, different people with different backgrounds of skills, knowledge and experience are required. There are many employees in different positions with business backgrounds that are embedded in JP’s business operations. These employees have different kinds of appropriate skills and knowledge of how the business should run, but as the engineering manager mentioned, the problem is:

“Our employees have accumulated a wealth of information. When they go, they take with them all that information as well as skills, knowledge and experience”

When it comes to technical aspects in JP, the company has an integrated IT system, which integrates some of the company’s departments. JP’s IT department is one of the company’s executive departments (as mentioned above), in which skills, knowledge and experience are limited to those systems JP has experienced until the present. Otherwise, the company would have to find a third party to take care of the rest of the jobs. JP tries to make the most of having an external professional consultancy in different areas such as business process design, re-engineering and information system implementation. This is because of the weaknesses JP has in some areas. In relation to this problem, the procurement manager states:

“... Still we are far from having innovative ways of delivering sustainable performance in IS development plans.”

Hence, the IT department declares that there are not enough technical and knowledge resources for software development, a factor that is considered in regular and periodical general managerial meetings. These meetings focus on operational and executive project processes. The IT manager states:

“It seems there is not enough time left for IT in meetings to clarify the needs in response to expectations. Maybe IT is in the last priority in the meetings!”

The third channel of the resource level is behaviour and attitudes. In JP good relations exist among different departments and employees. But sometimes these relations are not as effective as they should be. For example, the IT department has established a good reputation
for providing technical administrative services with existing resources, and tries to communicate effectively with users in delivering IT services and in constructing and building relationships with external partners and third-party vendors. However, the IT department has experienced some weakness in service delivery to other departments due to a lack of personal resources, and there have been delays in addressing requests.

5.3. Organising Level

Organising is a level in which various competencies are combined from the resource level. These competencies then lead to the creation of IS competencies through employees’ roles in departmental processes within the company. Most of the processes in JP are project-based work, as mentioned earlier. The work is well done within each of those processes separately, but there is a lack of collaboration between different processes in different projects. The structure of work processes is based on benchmarks, and follows the steps of other competitors and partners. The financial manager stated:

“Managers and employees around the company started to recognize the problem of departments acting separately as “individual islands”; while there was a clear need to have systematic relationships.”

It is worth mentioning that JP has enough employees with the required skills and knowledge in different areas; for those areas in which they have some problem, they hire a third party to fix it. But the current integrated system they have involves separate departments collaborating with each other. These departments do a lot of projects together, which works well practically: they cooperate together, but not systematically. For example, the tender officer said:

“… My team and I need to collect every piece of updated information from different departments such as machinery, human resources, financial etc. to fulfil the tender application. The other crucial part of our job is to communicate with project departments to prepare an actual resource and time planning. We must be sure about the practicality of the project plan and that it will work in reality!”

Through an overall understanding of this case study, it becomes clear that IT systems are playing an important role in JP, because managers are making use of information and knowledge based upon reports that have been generated by different information systems in decision-making procedures. For example, due to the estimation process of the annual budget in a specific project, the committee of project managers needs to have access to a variety of information, such as financial, human resources, performance evaluations and experiences from other projects. All the required information that has been generated and stored over time, using different systems, should be available for the committee to discuss and decide on the project budget.

There are different processes running in parallel in different departments, but the only system JP has today is called an integrated system, which unfortunately cannot handle
operations at all levels within JP. This system is unable to deliver a total solution for all departments in the company. Practically speaking, some parts of the business, such as financial, inventory, procurement and human resources could make use of this facility. However, other departments, such as project planning, engineering, construction and even IT itself were not integrated into the system. On the other hand, when JP started to conduct quality management systems based on ISO standardization, this step increased additional requirements for skills and knowledge in some of the processes’ operations. The lack of effective integration between all departments in JP is probably the key issue when it comes to IS competencies.

According to the engineering manager in JP, having people with the required skills and knowledge in the current situation is not enough. He stated:

“... We can’t improve our business procedures and remain aligned with information strategy unless we move toward having a central and relevant R&D in JP.”

5.4. Enterprise Level
One of the main strategic organizational goals in JP is to compete with other players in the oil and gas industry to get new projects. To achieving this goal JP should apply for different tenders and submit specific documents to show its financial and technical qualifications as well as its capabilities of delivering the scope of the project. Responsible staff need to collaborate and communicate closely with different planning groups or departments for the purpose of synchronizing the project plan.

Most interviewees explained that the absence of an integrated information system and functional strategies in JP could be a barrier to achieving organizational goals. Moreover, an integrated information system and functional strategies could help information workflow and transparency due to the knowledge-sharing process. In this company duplication or loss of information and knowledge could have detrimental impacts on different shareholders of the business. The need for a new, capable IT system in JP is clear, as the IT manager stated:

“There is a clear need to have an accumulated strategic plan for IT capabilities that can meet the needs of organizational business processes. Unfortunately, we do not have such a written strategic plan in JP now. A combination of different elements can shape IS strategy for JP, including benchmarks from competitors and market leaders and lessons learned from inside the company.”

Another way of successfully gaining projects is based on the company’s previous experience, reputation and negotiations that may elicit a direct project invitation from a client (e.g., the National Iranian Oil Company (NIOC)). These can happen in the case of specific micro-environmental turbulence that requires an agile response to gain a new project in the organization. The following case is a good example.

Iran shares some oil and gas fields with neighbouring countries such as Iraq and Qatar, which extract petroleum from these resources. The NIOC made a strategic decision to get involved with the utilization of natural resources. In such a turbulent environment, the client
decided to invite JP to join the project as a well-known, powerful contractor company. The client expected to have high quality of project implementation within the optimum cost, specific scope and even before the project deadline. Under the circumstances described there is a lack of strategic system capability for decision making to accomplish organizational goals.

When it comes to the investment issue within JP, the interviews revealed that JP does not have a systematic standard approach to investing on a general level. For example, changing the person responsible for handling investment in IT might change the vendors with whom the company does business. In short, JP does not have established criteria to evaluate suppliers for organizational technology acquisition. There are two separate approaches in JP Company regarding the budget allocation for information technology. The first is to allocate a budget to ensure technology performance, effectively maintaining applications and infrastructure components and ownership in the main office. Procurement policies and procedures are based upon organizational technology acquisitions, which can come about through users' needs and analysis of recommendations on technology trends. Traditionally, the IT manager is the one who obtains permission through discussions and bargaining with top managers and decision makers.

The second sourcing approach is in projects where, based on the project plan, the client would require a specific IT capability. Project managers are the ones who would discuss and share the list of capability requirements with the IT manager. This process involves resource analysis and budget estimation for defining and designing assets.

Overall discussions with interviewees in this case study revealed that IS investments have not been monitored, measured and evaluated due to recognition of the benefits they deliver. Although there has always been discussion on the managerial board about optimizing the cost of technological investments, there is an explicit need to identify the benefits of information system investments and to enhance them.

The IT department also provides technical training and educational services to employees and IT staff to keep them up to date. There is dialogue between the IT department and the IS department to create, revise and modify ICT business processes. However, this communication is not always synchronized and contains some conflicts.

6. Discussion

To accomplish the aim of research through our efforts in this area, it became clear that there are different variables that directly and indirectly affect operations to achieve organizational performance. To clarify the discussion on how each of those variables affects organizational performance in JP, which is the final goal, we will explain the following phases.

6.1. The Influence of Organizational Ability on IS Capability

First, it is worth mentioning that RBV theory has been used successfully as a basic approach to investigate this case study. Figure 1 explains all the variables that are important to introduce an effective IS capability. The reason why we use this model is because we believe IS capability has an impact on organizational performance, and the model provides a perfect
guideline to create or rebuild IS capability.

JP’s ability lies in its core competencies. This company has several departments (JP Organizational Chart in Appendix B), and there are shared skills and knowledge, which the employees in those departments own. Each of those employees expresses a particular competency through his or her knowledge and experiences. This is a complex process, which is rendered more complicated by the lack of an affordable IT infrastructure.

What JP has today in terms of IS/IT structure is a number of unconnected systems, which cannot help different departments in JP to collaborate effectively. Even the integrated system JP uses today cannot cover all departments in the company. It has been seen that when a wider knowledge base is being integrated to create particular competences, complex problems arise in shaping or creating IS competency (Peppard and Ward 2004), but the lack of appropriate organizational structure is also part of that complexity. According to this study, the nature of the current organized work in JP and the relations between different projects and their relation to project management (and further to the management committee) need to be restructured or at least improved. Anyway, the particular competencies such as formulation of strategy, exploiting the maximum benefits of investments are delivered to create IS competencies through the different parts of JP Company, but this process needs to be more effective than it is at present in order to provide better IS capability. However, IS competencies shape IS capability through the company’s strategy and investment allocation.

The most important goal for JP in the current situation is a capable IT system that can facilitate the implementation of strategy and translate this business strategy and JP Company’s core competencies into the long-term information architecture. The system should be able to assemble most of the particular competencies from different departments in JP. Furthermore, the system should be able to integrate all departments under the same umbrella. Then it can help build a better relationship between all departments, which is the reason for obtaining a better organizational structure.

As Peppard and Ward (2004, p. 181) state, “The structure of the organization can ultimately affect the performance of processes, particularly those that cross departmental or functional boundaries.” Another aspect that needs to be improved in JP is management perspective on IT because the managers’ perspective that IT relates only to technical tools that do some work probably decreases its strategic importance.

In this company IT does not participate in building organizational strategy, and even it cannot contribute to the creation of IS capability efficiently. Some major aspects need to be improved to enable JP to create an effective IS capability.

Through the explanation above and based on the model in Figure 1, it is clear IS capability is underpinned by IS competency. But it needs to be said that this capability is portrayed as having three inter-related attributes: a fusion of business knowledge with IS knowledge, a flexible and reusable IT platform and an effective use process (Peppard and Ward, 2004).

JP needs to improve two-directional relations between the areas of business knowledge and IS knowledge (See Figure 2). This would require a closer partnership both formally and informally at all levels of the JP organization. The second attribute is a flexible and reusable IT platform, which is something that absolutely needs to be improved, as explained through
the description of IT systems within JP. The third attribute, which is effective use process, is related to using technology and working with information. This means JP has to establish an IT system that effectively delivers benefits and competencies from JP's overall organizational structure to the business process. Throughout the discussions above, it has become clear that in order to realize effective IS capability, JP has to improve at least two of those three attributes (a flexible and reusable IT platform and an effective use process).

6.2. Achieving Organizational Performance

Many inter-related factors can affect organizational performance, but in this case study we focused on the impact of IS components that are explained as IS competencies, IS capabilities, organizational ability and business processes. The previous section illustrates the essence of each of these components and their impact in the context of the study (Jahanpars Company). We believe a new IS/IT alignment by Peppard and Ward (2004, p. 187) (See Figure 3) is a gap that provides opportunities for JP to enhance their organization. Referring back to Peppard et al. (2014), integration of IS with the discourse of business and knowledge is what JP needs to practice with the co-evolution of business and IT strategy, with the involvement of all employees throughout the company.

![Figure 3: The new IS/IT alignment: IS capability and organizational performance (Peppard and Ward, 2004)](image)

The figure above illustrates the relations between IS capability and all four mentioned areas (IT operations/services, business strategy, business operations and IS/IT strategy). Any weaknesses in any of those areas will affect IS competencies and IS capability with regard to organizational performance. The important thing here is that IT does not have any direct relation to organizational performance; rather, it happens through business operations. According to this model, IS/IT alignment is a bit different from what we found in JP. “The new IS/IT alignment is concerned with how well the organisation develops, nurtures and utilizes its IS competencies in relation to each of the four areas of the model. This view contrasts with the traditional view, which considers just the alignment of the business and
IS/IT strategies and the structures and processes of the IS function and activities in relation to the business organization” (Peppard and Ward 2004, p. 187).

According to our findings, IS competencies will determine the incorporated relations between IT and business strategy, effectiveness of organizational operation through different processes and projects, and the ability of IT infrastructure to facilitate delivery benefits within different parts of the organizational structure. These IS competencies are created by delivering particular competencies from all elements at the resource level (see Figure 1).

Throughout our effort in this case study and based on the models provided in Figure 3, we can see that there are some weaknesses in two of those areas, namely: IT operations/services and IS/IT strategy. This is also because of the use of inappropriate IT systems in JP where IT has not been a strategic issue yet. The second two areas in the model – business strategy and business operation – are running well but, of course, they are in need of continuous improvement as well. Hence, it becomes clearer how JP can achieve organizational performance through the use of IT capability, if organizational ability (competencies) can leverage it through an effective IS strategy by the explanation of a new IS alignment (model in Figure 3).

7. Conclusion

This study provided an empirical illustration of the ways in which specific IT capabilities play an important role when it comes to IS strategy in organization and the indirect impact of these capabilities on organizational performance through IT operations/services. This study presented an application of the resource-based view (RBV) theory in an empirical case study as another contribution to the body of knowledge.

The main contribution of this study is that it shows the importance of converging both IT and organizational aspects to leverage IT capabilities. This can help to increase organizational performance with the co-evolution of IT and business processes. This study shows some avenues for future research, such as exploring the organizational culture and managerial aspects in this regard as social elements of IS capabilities. The implementation of RBV is one of the main lenses considered in this study. Furthermore, finding solutions to problems that hamper both IT and organizational aspects in the same area, is another important consideration of this study.

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References:


Appendix A: Interview guide

1. What is your duty and what is your department’s responsibility? How many people are involved in your department?

2. How many years of experience do you have in this field?

3. How old is IT in your firm and how did it begin, grow up and develop?

4. What do you think about IT processes?

5. What is the role of IT in your department and how can IT affect your operations?

6. How important is IT in your firm? Is it possible to stop IT relations? Can your division work without IT services?

7. How does IT play an effective role in top management’s decision making?

8. Is IT just a technical tool or is it more than that in this company?

9. What has been the major evolution of IT in the company so far?

10. Is there any IT system or solution that has failed or been absurd in this company?

11. Has any replaced system been implemented in the same situation to gain better quality or continued improvement?

12. Do you have any suggestions for periodic auditing to raise the level of satisfaction with IT?

13. Did you sense any lack of IT service in your division? Was there any reflection or effort to solve this issue?

14. Do you have regular IT meetings that include members of the board and general managers?

15. Do you get satisfaction from IT procedures, software, hardware, telecommunications or other IT services?

16. Is there an annual pre-specified IT budget? Based on what?

17. Could you recognize/highlight IT capabilities in your firm? How do you use these for business process development?

18. Is there any planning for IS strategy or just simply matching the IS strategy of competitors?

19. How many times a year do you review your IS strategy?

20. How can IT impact organizational performance in this firm? What about the current situation?

21. How can IT help improve business processes in your department?

22. How can you sustain the impact of IT in your firm?

23. Do you believe IT activities provide a competitive advantage? If yes, how?

24. How can you convince top manager to develop IT capabilities in the company?
25. Is there any resistance to new systems/changes in your firm?
26. Are there any traditional views about IT in the company?
27. How do you create an attractive environment for IT cooperation in JP?
28. As an IT manager, what is your plan for ensuring IT effectiveness?
29. Can you enumerate some IT strengths and weaknesses in your company?
30. How do you achieve a utopian IT environment in this kind of company?
31. What do you think of outsourcing all/part of IT services?
32. How is the general manager involved in IT operation?
33. Do you have any suggestions? Give me your ideas...
Appendix B: JP Organizational Chart