

Business Transformation and the Strategic Role of IT in Enabling Business Process Redesign

التحول التجاري والدور الاستراتيجي لتكنولوجيا المعلومات في المساعدة على
إحداث تغييرات لإعادة تصميم إجراءات الأعمال

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Executive Summary

The forces of market demand and requirements are unstoppable and unanticipated. A strong rivalry between companies and the increased level of quality services using technology advances put pressures on companies to transform to reach the rapid pace of change in the economy. Structuring supply chain by any means for example, building a solid logistics to serve customer around the world or integrating supply chain activities with 3rd parties or logistics service provider is a signification business transformation that required rethinking of business processes. It encourages organizations to redesign its business processes to add value to enhance and create more efficient business processes, through utilizing IT in enabling business process changes.

Abu Dhabi Polymers Limited Company – Borouge - was studied as a case to examine the research paper question of business transformation and role of IT in enabling business processes changes. The research paper found that during Borouge's business transformation a lot of intersections occur among people, processes, technology and data. Managing the overlap of these four elements is important to be analyzed and resolved to reduce its negative impact on the success of any given business transformation. Borouge's employees found to be functional driven rather than process driven because they depended on IT systems and IT team in designing business processes rather than embracing business process logic, which promote less efficient business processes due to misalignment among different functions specially when using IT systems.

The problems in business processes in Borouge advocate the need for business process redesign project to review Borouge's business processes to add value, eliminate problems within the business processes and establish clear objectives and set of metrics to evaluate the effectiveness of business processes. Managing the conflicts between people, business processes, technology and data will ensure a good level of harmonization during business transformation which would optimize IT to establish efficient and integrated business processes to assist Borouge to compete strongly and globally.

The research paper will present introduction of the research project, literature review on the topic, research methodology, and information about the studied organization, data analysis, discussion and conclusion.

الملخص التنفيذي

إن قوى الطلب والاحتياجات السوقية غير متوقعة ولا تنتهي، حيث أن المنافسة القوية بين الشركات و مستوى الجودة المتزايد للخدمات المقدمة باستخدام التكنولوجيا المتقدمة وضعت الضغوط على عاتق الشركات للتحويل حتى تواكب وتيرة التغيير السريع في الاقتصاد، فهيكلة سلسلة التوريد بأي الوسائل وعلى سبيل المثال: بناء خدمات لوجستية متينة لخدمة العملاء في جميع انحاء العالم أو إدماج أنشطة سلسلة التوريد مع أطراف أخرى أو مع مزود الخدمة اللوجستية يعتبر نقلة تجارية نوعية تتطلب إعادة النظر في العمليات التجارية، حيث تحت المؤسسات على إعادة تصميم العمليات التجارية لإضافة قيمة لها من شأنها خلق الإجراءات التجارية الفعالة وتعزيزها من خلال استخدام تكنولوجيا المعلومات لإحداث تغييرات في العملية التجارية.

وقد أجريت دراسة حالة على شركة أبو ظبي للدائن البلاستيكية المحدودة - بروج - لبحث مسألة التحويل التجاري ودور تكنولوجيا المعلومات في إحداث تغييرات في العمل التجاري. وقد تبين من خلال ورقة البحث وجود الكثير من الفروق التي تحدث بين الناس، والعمليات، والتكنولوجيا، والبيانات خلال تحويل أعمال بروج التجارية، ولكن إدارة هذا التداخل بين هذه العناصر الاربعة هام جداً من أجل تحليلها وإيجاد الحلول المناسبة للحد من تأثيرها السلبي على نجاح تحول أي عملية تجارية. وقد أظهرت الدراسة أن موظفي بروج كان توجههم وظيفي أكثر منه عملي، لانهم اعتمدوا على أنظمة تكنولوجيا المعلومات وعلى فريق نظم المعلومات لتصميم العمليات التجارية بدلا من احتضان منطق العمليات التشغيلية التي تعزز أعمال تجارية أقل فعالية نظراً عدم الموازنة بين الوظائف المختلفة وخاصة عند استخدام أنظمة تكنولوجيا المعلومات.

إن المشاكل في عمليات الأعمال لدى بروج تؤيد الحاجة الى مشروع لإعادة تصميم عملية الأعمال و إعادة النظر في عمليات الأعمال لبروج، لإضافة قيمة لعمليات الأعمال والقضاء على مشاكل عمليات الأعمال، و رسم اهداف واضحة ومجموعة من المعايير لتقييم فعالية العمليات التجارية. إن ادارة الاختلافات بين الناس، وعمليات الأعمال، وتكنولوجيا المعلومات والبيانات ستضمن مستوى جيد من الانسجام خلال فترة تحول الاعمال مما سيؤدي إلى تحسين المستوى التكنولوجي للمعلومات بإنشاء عمليات أعمال فعالة ومتكاملة لمساعدة بروج على التنافس بقوة على الصعيد العالمي.

سوف تعرض ورقة البحث مقدمة لمشروع البحث، واستعراض المنشورات حول الموضوع، ومنهجية البحث، ومعلومات المؤسسة الخاضعة للدراسة، وتحليل البيانات، والمناقشة والاستنتاج.

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1.0 Chapter One: Introduction

The research paper focuses on business transformation and role of IT as an enabler of business processes changes. It has been noticed that business departments request IT to implement system changes during business transformation phase as an IT project to cope with the changes in the business strategy; however, lack of understanding of an organization as an integrated system and lack of understanding business processes logic, create a lot of problems and issues in the business processes when using information systems. Luftman, Lewis and Oldach (1993) investigated why it may not be sufficient to work on harmonizing business strategy and IT only. They disclosed that enterprises pay greater attention to the technology rather than to the business processes. IT is more than just a tool to invest money in. IT role in an organization becomes more effective if it is understood and aligned with business strategy to serve the goals of the organization. Therefore, initiating business process redesign exploits IT to add value to create an efficient business processes through optimizing IT systems functionalities.

1.1 Background Information

The dynamic nature of the market and the significant rivalry between companies keep organizations observing market's trends closely and alter its strategy accordingly to respond to the changes using the advantage of the technological growth. The globalization of the economy puts pressure on an organization to expand its product range and to modify its supply chain concept to have products and services available across the market worldwide by establishing a solid basis logistic infrastructure to serve customers at lower cost and higher speed. This induces business process changes which enable employees to handle and manage the increased number of customers more efficiently using information technology. This means initiating a business transformation phase. Thus, business transformation is about organizational change that the organization go through for instance to expand its manufacture, reengineer business processes, restructure the organization which aims at aligning people, business processes and technology to meet organization new status quo.

Generally, a business process is a set of interrelated activities formed together to perform particular outcomes using inputs. These processes start from customer demand planning to supply of the raw materials to produce the products, distribute them through logistics and replenishment, and deliver them to the customer. Functional operation perspectives encourage

silo thinking in organizations which means people operating and taking care about their own activities within the business process regardless of the other activities in chain. This is against the definition of business processes. These issues generate lots of problems in business processes which, unless it is reviewed to establish strong alignment and integration among business processes, will affect the firms' position in the market. One of the approaches to resolve bottlenecks is business process redesigning. It means revising critical business processes and redesigning it with the aim to remove bottlenecks and add value to make it more efficient and aligned with other activities.

IT has a strategic role in enabling business processes redesign given the appropriate organization culture that is process driven and willing to adapt new ways of doing the business. A good alignment level between business strategy and IT strategy enables IT to effectively add value to business processes and may drive changes in business processes indirectly. Data, business processes and technology formulate the operation value of the organization, however, people as human capabilities and organization's resources, who are responsible about managing the organization's operation, are important elements to direct and manage the integration of the three elements.

Business transformation theories for example, Lewin's force field theory (Grieves, 2010) emphasizes on the preparation of the employees and communication of the new desired status quo. It should address and manage organization's resources and capabilities to direct their efforts, time and knowledge toward achieving the desired results. In addition, the theory shows the importance of stabilizing people and business processes and to ensure that the new status quo becomes the organization norms.

In summary, aligning people, business processes and technology is crucial to the success of business transformation. A good level of alignment between these elements guarantees an effective exploit of IT to create efficient business processes.

1.2 Motivation for the Study

The research problem of business transformation, business processes and IT was the basis for the initial searching stage. There are lots of researches emphases on organizational changes; however, few studies tended to focus on IT enabled business process change. Through searching

the terms of “organizational change” alone and IT and “business process change”, using sciencedirect.com, JSTOR, wiley online library and EBSCO Hosts, the search engine gave more results for “organizational change” as shown in table 1.

Research Engine	Topic	Results of Journals
ScienceDirect	organizational change	14,216
	IT and “business process change”	303
Wiley Online Library	organizational change	15,988
	IT and “business process change”	133
JSTOR	organizational change	10,902
	IT and “business process change”	29
EBSCO Hosts	organizational change	10,936
	IT and “business process change”	22

Table 1 - Search Engine Results

A case study of an organization in Abu Dhabi city called Abu Dhabi Polymers Limited Company (Borouge) is studied to examine the IT role in the business transformation of the organization. The case study conducts semi-structured and unstructured interviews with employees from IT department, supply chain management (SCM) department and corporate support department. The research paper aims at understanding the relationship between business transformation, business processes and technology to realize the role of IT in supporting business transformation in Borouge. The research field is chosen due to Borouge’s exiting issues with business processes being ineffective and inefficient when utilizing technology as claimed. The research will assist Borouge in realizing the main issues between business processes, people and technology and will highlight the importance of aligning these elements for the organization’s success in the long term.

1.3 Research Objectives & Aim

The research paper aims at understanding business transformation concept and IT role in enabling the business processes, which should be aligned with business strategy to exploit IT to achieve company’s goals. IT-business enabled change should ultimately drive changes in business processes to create efficient processes to serve customers with higher speed and lower

cost. Thus, business process reengineering is one of the well-known approaches aimed at redesigning business processes to fit the new changes in the market. Therefore, the research objectives identified are to:

- Investigate the driving forces of business transformation
- Examine the challenges and difficulties IT asset & business stakeholders confront during business transformation
- Investigate the extent to which business process redesign concept is realized, formalized and established in the context of supply chain management
- Examine how business process redesign approach in supply chain management can leverage IT capabilities to accomplish supply chain objectives

1.4 Assumptions & Limitations

Investigating about business transformation and IT enabled change will certainly highlight the strategic role of IT in today's business world. In addition, it will spotlight the importance of understanding IT capabilities and business processes in order to be able to optimize IT business benefits.

It is assumed that business processes redesigning/ reengineering concept in Borouge is realized and established during Borouge's business transformation in 2008 – 2010, when any new or major changes in business processes are introduced in the company; for the fact that Borouge's business processes is in a continuous change manner. It is also assumed that IT play a critical role in the success of business processes changes during Borouge business transformation for the reason that IT team supports business application systems and embraces business processes knowledge of Borouge. The relationship nature between business processes and IT embraces various aspects, given the dynamic nature of the economy that promotes rapid business process changes. Hence, it is important to study and address the relationship between business processes and IT and the factors influencing the business processes changes outcomes.

There could be some limitations to this research paper. First the interviews planned to be within supply chain management department, which will not give an insight on other department's problems. Second, the research will be giving more examples of business processes changes

rather than focusing on one business process where issues of that process can be studied, analyzed and discussed to resolve the issues using IT.

The research paper is divided into six chapters. Chapter one starts with introduction about the research topic/ problem and the reasons of selecting the research by presenting the motivation of the study and the research objectives and aims. It follows by a literature review in chapter two to have an in-depth study on the topic of business transformation and IT enabled change in the field of supply chain management to understand the subject, what has been already done on it and what the key issues are. A case study of a single organization is used to examine the conceptual framework developed at the end of the literature review and to answer the research questions. Thus, chapter three clarifies in more details about the research methodology used and the research design processes, while chapter four provides information about the organization studied. Chapter five presents the case study analysis which analyzes the acquired data from the interviews with the employees in the organization studied. It follows by chapter six, where the data analysis is discussed with reference to the research objectives and the conceptual framework which enabled the researcher to draw a conclusion on the research topic, provide recommendations, and highlight research limitations and the potential future research topics.

Key words: business transformation, business processes, silo thinking, IT-enabled business change, business process redesigning, business process reengineering, business process changes

2.0 Chapter two: Literature Review

The below literature review provides background knowledge on business transformation and IT-enabled change in the supply chain management. The literature review will cover three main sections. The first part presents information on the business transformation nature, how to manage it and what is IT-enabled business change. The second part refers to supply chain management and IT-enabled business change in this field. The third part is about an approach used to enhance supply chain management (SCM) business processes which is business process redesign.

2.1 Business Transformation

The business world started modernizing to satisfy customer and increase its wealth in the early twentieth century, which was the beginning of the new machine age that was all about transformation. The new machine age is linked with the principles of scientific management “Taylorism”, which study the work process systematically and breaks it down to increase productivity and efficiency, and “Fordism” of the mass production by assembly line which aimed at decreasing the production cost (Grieves, 2010). It can be seen that Taylor and Ford approaches of breaking down the business processes aimed at understanding the value added of each process in the work cycle. Though Taylor was concentrating more in his studies into the workers to increase productivity, for example by increasing the wage of the employee, managing the work time and giving more attention to the employee, he initiated the replacement of rule-of-thumb work methods with practices based on scientific study. In addition, Henry Ford initiated adjusting business processes to speed up the production and optimize the use of the skilled labor. These theories urge management to see the functionality of the business processes and initiate a change to improve it. They facilitate the growth of many organizations by redirecting their current situation to another more effective one for the purpose of increasing profit and decreasing cost; however, today’s turbulent business world crossed over the past challenges to increase profits and decrease production through workers and new business transformation perspectives are commencing in organizations to sustain the competitive advantage. Firms try to be more flexible to face the intense rivalry by altering its strategies in response to the volatile market. Seeing an organization as one component functioning to serve one vision and set of goals facilitates the understanding of the nature of business transformation.

2.1.1 Nature of Business Transformation (Organization as Systems)

In general, enterprises viewed as systems that are collaboratively working together to achieve its objectives and address challenges. Logically, in any system for example the biological system, it is a dynamic mechanism that incorporates input and output. This is a state of equilibrium. However, external factors occur suddenly without any control from the internal elements' of the systems and can emerge unexpectedly into the systems which consequently cause disorder of these systems. System in response interacts with its parts and components according to its procedures to accommodate the changes. These changes can be planned change if the system (organization) is aware of the turbulent market or unplanned change in away to sustain the systems survival.

The open system theory model shows input forces as of human, financial, informational and materials, while output results are the goods and services as shown in figure 1. The elements of the operation that interact using the inputs are task, technology, structure, people and the management. The system theory considers enterprise as interrelated components that adjusting one variable impact the other (Amagoh, 2008; Bennet and Bennet, 2004). The assumption regarded an enterprise as systems of processes that are flexible to be reengineered to transform the enterprise to attain its goals (Bennet and Bennet, 2004). Kast and Rosenzweig (1972 cited in Grieves, 2010, p. 80) refer to it as the state of dynamic equilibrium, in which organization seeks to sustain this equilibrium against external and internal forces. Rouse (2005) believed that organizations have similar strategic challenges that are being treated by strategic actions. These challenges are; firm's growth to meet the global market needs, the added value into business processes for profit and cost, adopting opportunities to facilitate the growth of the firm, changing the way business is running to cope with market change, the future rate of return out from investment, knowledge as an asset to be well managed to assess the changes in the external and internal environment and lastly is the time spent to create the value of the organization (Rouse, 2005). Organizations approach these challenges through different strategies for example creating new products, creating new business processes, redesigning the existing ones or adopting new business models. As explained in the concept of organizations as system, it has been seen from real life that lack of understanding the systematic way of organization operation, establish the silo thinking as a way of working. As a result, each department operates as a separate unconnected function with others. It is more likely that such way of working makes business

work practices longer that waste time and efforts, which eventually will impact the service level negatively and displeasing the customers. Therefore, approaching the organization challenges requires strategic analysis and formulation to implement the best fit strategy in the organization. This leads us to the definition of business transformation. Morrison defined business transformation as:

‘a change management strategy which has the aim to align people, process, and technology initiatives of a company more closely with its business strategy and vision. In turn this helps to support and innovate new business strategies.’ (Morrison, 2009 cited in Stratton 2011, p.15).

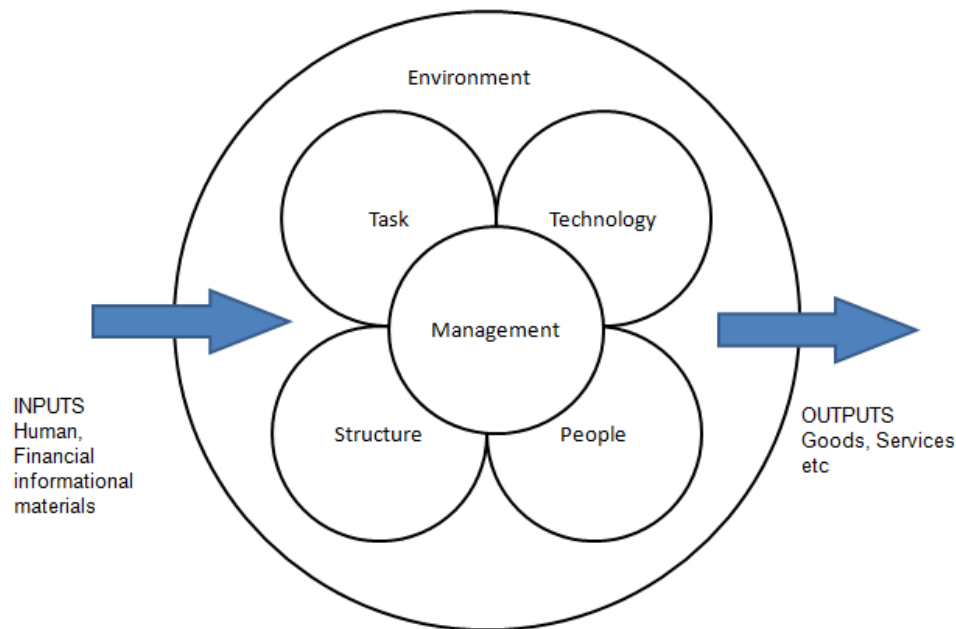


Figure 1 - Open System Theory (Grieves, 2010, p.80)

There are many types and approaches of changes. Organizations take up changes either through revolutionary change and/or evolutionary change. It is the firm's strategic decision that tackles the kind of change the firm should experience. Revolutionary change involves radical changes to the current business practices over a period of time in response to internal or external environment factors. It is also called a transformational change due to the fact that it is complex and unpredictable (Grieves, 2010). It induces significant changes to the structure, business processes, culture and the way of thinking to successfully implement the strategic change (Karis, n.d.). Other researchers categorize transformational change to modular transformation, which

leads to major restructuring of a department or division, and corporate transformation that brings on substantial change in the organization's mission, structure and processes (McKenna, 2006). For example, a new CEO who sees an opportunity for international growth of the business by building a new manufacturing plant in another geographic location to serve the global market or the expansion of the manufacturing plant to increase production capacity. Such change is planned change which has a start and an end date. It has defined objectives that aimed ultimately to achieve the mission of the organization, for example, increasing the production capacity and reaching a global market helps the organization to increase its sales and satisfying the customers of that geographical region by delivering the products on shorter time. On the other hand, evolutionary change involves gradual changes during a long period of time. Eventually, the end results of the evolutionary change are as same as the revolutionary change results. The advantage of this type of change is the learning process individual's acquire during that period especially if the changes are deployed in-house, as it takes time for individual to learn and adapt to the change (Henry, 2008). In the context of IT, changes can either be driven or enabled via IT, which will be explored throughout the research paper.

Embracing the system concept explained above provides a holistic view of the organization and yet assists in understanding the integration of the input elements that creates a fit among the sub-system to produce the desired output (Bennet and Bennet, 2004; Amagoh, 2008). The different work nature of the systems, makes the systems more specialized and complex and yet differentiated from other systems. The more differentiated the system, the more integration and coordination between its processes it requires (Durant, 1999). It can be concluded from Alex, Bennet and Amagoh point that the enterprise system concept urges the employees to think from integrated business process perspective instead of silo perspective, which clarifies the fact that any changes might occur have an impact in the other elements of the organization or processes. In addition, it is understood that the flow of information either from internal elements or external factors is the essential element in the systems that keeps it dynamic and complex. This is where information technology plays a signification role in any business transformation, which will be explained later in section 2.1.2. Before deeply investigating the nature of IT business transformation, it is essential to understand how to manage the enterprise as a system against the market changes and prepare the organization to sustain the competitive advantage.

2.1.1.1 Managing Business Transformation (Managing System Changes)

Many theories and studies have been developed to deal with certain or overall perspectives on managing organizational changes as a system (Walton, 1993; Grievies, 2010). When addressing business transformation generally, a lot of factors need to be taken into consideration. Focusing on one factor in transformation will not guarantee organizational success, without considering the other factors and managing them. Planning changes must be part of an organization's strategy to respond to market changes and to anticipate it. Lewin's three steps of planned change model gives a holistic view on managing large-scale system change. It is a foundation for any studies in the organizational change field. Kurt Lewin, a social psychologist specializing in the science of group dynamics, strongly believed that democratic values could avoid the worst cases of social conflict (Burnes, 2004). The power of Lewin's model is the view of human system processes for organizational change. The combination of human psychology and sociability is conceived as the blockage forces to the change due to its unique combination of educational and organizational measures. These forces, which act as barriers, should be challenged to enable the individuals/ groups overcome the psychological and social barriers (Grievies, 2010). The model aims at changing the behavior of social groups to facilitate the organization change process. It states three steps of change processes which are unfreezing, moving to a new level and refreezing— figure 2.

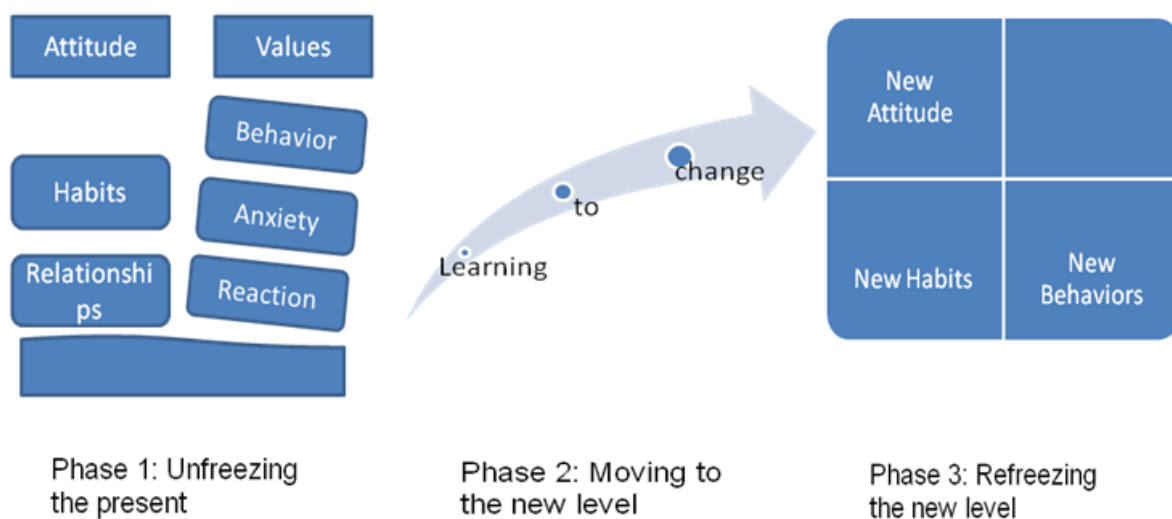


Figure 2 - Lewin's model of Forces Field Analysis (Lewin cited in Grievies, 2010, p89)

Unfreezing the status quo is the first phase of planned change which aims at preparing people for the change. It is necessary that employees realize the need to change. Lewin believed human

behavior as “quasi-stationary equilibrium” which is an interaction of two opposing field forces; driving forces that promote changes and restraining forces that maintain the status quo (Burnes, 2004; Schein, 1995; Change-Management-Coach.com, 2002). Lewin indicates that the situation of quasi-stationary can be changed by unbalancing the driving forces and the restraining forces (Grieves, 2010; Change-Management-Coach.com, 2002). Schein (1995) identifies the first step for unfreezing as the disconfirmation of organization expectations. The disconfirmation process is one of the driving forces, which can be achieved through communication of the status quo that intends to change for the survival of the organization. Studies have shown that employees respond more actively to change if they feel that it is required (Flat world knowledge; n.d.; Burnes, 2004). Changes create uncomfortable emotions in humans. Schein (1995) recognizes it as learning anxiety which causes individuals to respond defensively against the change. Individuals are afraid of losing their egos, when admitting that something is wrong, and they might lose their self-esteem (Schein, 1995). Therefore, companies should address new changes by their abilities to create a safe environment for the employee to unlearn the old way of working. Psychological and safety needs, demonstrated in Maslow’s hierarchy of needs, should be considered when planning the change as motivator. Lewin and Schein both agree on the importance of relieving the negative feelings by allowing individuals to express their anxieties, listening to their concerns and expressing a belief in their abilities to achieve the desired status (Mckenna, 2006; Schein, 1995; Grieves, 2010). Additionally is the involvement of the employees in the change to develop sense of ownership, so that they will shape the change efforts and redirect it to accomplish the planned change (Flat world knowledge; n.d.). As it has been demonstrated in the above, there is a strong influence of organizational culture while adopting an organizational change. Therefore, it can be considered as one of the critical success factor, which will be explained later in section 2.3.3.

Following to the readiness of the employee, is the moving to the new level. It is getting rid of old processes or way of working to a new better way. It is the transition phase where the five elements explained in the system theory earlier are interacting to reach the desired status quo. The change phase is full of uncertainty and feelings of anxiety that are experienced by involved participants as explained in the above paragraph. Employees will go on a long path of learning through trial and error (Grieves, 2010; Burnes, 2004). Organizational change can be driven by strategic changes on a large-scale, which is classified under revolutionary change or on a short-

scale that is referred to evolutionary change (Henry, 2008). During change execution, the field forces should be acquired to imbalance the situation by increasing the driving forces and decreasing the resisting forces (Grieves, 2010). This can be done through the adaptation of the action research model of Lewin. It is the fact finding way of working that tends to investigate certain problems and find solutions to solve them. Lewin's approach of action research was a fundamental basis for several change theories that developed later and were used in many fields (Burnes, 2004). The first step in action research is about examining the idea deliberately through fact finding. This stage is also considered part of the planning stage of change, which can be a high level plan or in-depth plan of the overall change, in which decisions are made on actions to be taken. After taking action, Lewin emphasizes the evaluation of the results and getting feedback to enable amendment to the plan to satisfy the objectives (Smith, 2001; Grieves, 2010). As seen in the action research model in figure 3, it is a spiral model rather than linear processes which support the process of continuous organizational change and problem solving, which also is clearly illustrated by the curved arrows. It stresses the importance of the collaborative efforts of individuals and learning from experience.

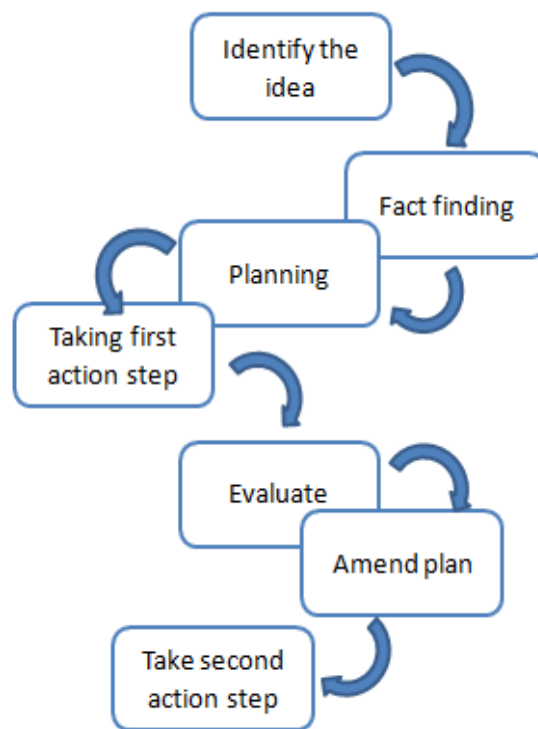


Figure 3 - Action Research Model - (Lewin cited in Smith, 2001)

Refreezing the desired status quo ensures that the new rules, processes and procedures are part of the norms and organizational culture (Flat world knowledge, n.d.). It can be seen with Lewin that a change is short lived and people can easily return to the previous condition. Thus stabilizing the new “quasi-stationary” is important to avoid regressing to the old way of working (Grieves, 2010; Burnes, 2004; Change-Management-Consultant, 2011). One way to ensure the consistency of the new status quo is to define the permanency of the new level as an objective, which supports Lewin’s beliefs on reinforcement and refreezing the new status quo to guarantee that new status becomes the routine and way of running the business (Grieves, 2010). Affirming the new status quo is critical issue that should not be ignored. Accordingly, forces field factors should be also revised after the change to ascertain the sustainability of the change (Change-Management-Consultant, 2007). Sharing the results of the successful change for instance, how much money did the company save?, what was the reduction in accidents after new procedures were put in place? and what was gained from the implemented changes?, will increase the confidence level in employees and motivate the learning process through the change (Flat world knowledge, n.d.). Moreover, a successful transformed organization should adopt an effective reward system, that need not necessarily linked to financial reward, but can praise the individuals by names in public in front of their peers (Flat world knowledge, n.d.; DeVos, R. n.d.; Change-Management-Consultant, 2007). This praise increases employees’ self-esteem after the learning anxiety period and motivates them to adapt to the changes whenever required.

Lewin’s model refers to a planned change that evolves the organization; however, the turbulent nature of today’s business world stimulates rapid responses for survival (Burnes, 2004; McKenna, 2006). Other researchers disagree with Lewin’s refreezing stage, because reaching a state of equilibrium means no changes occurs in systems, which according to the dynamic nature of system as explained earlier in section 2.1.1, the system will die (Burnes, 2004). It can be seen that business transformation can be evolutionary change in context that is influenced by different degree of forcing factors that enforce a revolutionary change. For instance, a planned change executed as a project which has a limit time, cost and scope, for example implementation of (ERP) enterprise resource planning by an external consultant. After implementing successfully the planned change, the internal support team of an organization supports the business department on their daily changes or new requirements from information system that was not fulfilled during the implementation project due to some reasons. The above example is everyday

work of any IT department. Working condition changes cause change in the business processes which eventually change the information system that supports the business process. In fact Lewin proved this by describing social life as a slow motion, by stating that:

‘We do not refer to a stationary but to a quasi-stationary equilibrium, that is, to a state comparable to that of a river which flows with a given velocity in a given direction during a certain time interval. A social change is comparable to a change in the velocity or direction of the river’ (Grieves, 2010 p.88)

As observed from the action research model in figure 3, it is a spiral model that indicates continues change throughout the organization or social life. The model builds up a systematic way of solving problems that is utilized to resolve conflicts in the society and the organization. Adapting the habit of action research will become a routine in the organizational culture. Generally, IT departments in well established organization have their own defined policies and procedures based on international standard that manage and control the changes in their systems for example, change management process in (ITIL) information technology infrastructure library. It is a set of concepts and practices for IT department in general that streamline the IT service and IT operation to respond effectively to the business needs while maximizing value and minimize the impact of the system availability.

Understanding the nature of business transformation facilitates the smooth implementation of any business changes. Overall, as understood from the described models that an organization operates as a central system with sub-systems. The degree of coordination and collaboration of the internal elements with the external environmental factors depends on how the executive management would like to position the organization in the market. This dynamic interaction proves the nonlinear correspondence of the organization to the pressures of the surrounding environment factors. It indicates as well the instable nature of the organization that depicts the adaptive characteristics of the organization as a system as explained earlier. The more complex the system, the more interaction it requires to increase the synergy of the organization’s element to respond to the strong rivalry. Information is not only the source of life in systems, as stated earlier, but also in today’s business world system depends heavier on information, communication and technology to increase the dynamic integration among business processes and the exchange of the information to assist management to make strategic decisions. Today’s

information technology field is used as an opportunity to enable business changes or drive the organizational change as it will be described in the below sections.

2.1.2 Nature of IT-Enabled Business Change

It is the information age that shapes today's business world around information and technology to achieve a competitive edge. Since the nineties the IT role has been seen as a strategic role in transforming industry, while in the twenty first century, the IT role evolved to be more of a value creation (Pearlson and Saunders, 2006). Information has become a critical resource in today's business. It must be managed as wisely as business resources, people, money and machines. The emerging of IT and the sophisticated integration of information systems influences executive managers to think critically about IT to mesh it with people to bring about benefits. Bob L. Martin – CEO of Wal-Mart Stores- described the influence of IT in Wal-Mart by saying that:

‘As technology has become pervasive in the business; it has changed the way we work at Wal-Mart. We are placing in the hands of our associates more information than ever in order for them to make decisions closer to the customer and respond quickly to competitive situations’ (Bob L. Martin cited in Harvard Business Review, 1999. p38).

IT alters the way business runs if it contributes alongside a greater understanding of the business models and processes, to serve the volatile market. Organizations which are better at embracing information can dominate their specialized industry, however, the strong rivalry of the market and the emergence of IT increases the level of competition by many forces for instance the number of new entrants and the imitation of technology and products. This may increase the potential of companies with strong position to lose its competitive advantage. Therefore, it is not only about achieving competitive advantage, but also about sustaining that position. With the concept of the equilibrium status of the field forces, Porter (1996 cited in Mazzucato, 2002) demonstrates the importance of creating fit among the company's activities through its strategy. The dynamic revolution of the information technology industry advocates firms to continue improve their operations effectiveness and tighten the fit among their activities to obtain their uniqueness. Therefore, companies should address the changing conditions by its ability to transform for better responsiveness to the market through changing its strategy.

Through strategy management, it is almost certain that companies will be able to recognize their internal resources and capabilities of IT to formulate the best strategy that can streamline the interaction of the internal and external environments toward minimizing the production cost, earning a return on capital and improving production quality. This leads to the concept of IT-enabled business change, which is defined as the changes that have occurred in the organization systems which consist of; structure, processes, and working practices as a result of exploiting the benefits from IT (Gregor, et al., 2006; Ward and Elvin, 1999; Manwani, 2008). Although the changes are taken through IT project, “business change” pertains to the changes in the business processes enabled by IT (Manwani, 2008). The nature of changes that IT can drive or enable along with the business can be detected generally at different levels:

- IT change may involve doing something new to the organization, which creates the opportunity for change,
- IT change may be the result of a threat that is anticipated
- IT change may assist in sustaining the continuity of business as a result of competitors’ initiatives (Ward and Elvin, 1999; Peppard, Ward and Daniel, 2007; Rouse, 2005).

IT business change can either be evolutionary or revolutionary as explained earlier. There have been a lot of arguments on the gained value from IT business change. Business managers claim that IT investment benefit has no link to the improvement of productivity (Gregor, et al., 2006). This is called the productivity paradox. It has been argue the information paradox, because information and technology is used by business to transform the business processes to achieve certain goals and objectives of business strategy, however, the misunderstanding of using IT causes failure when deploying IT. In addition, it has been noticed that lack of identification of the objectives when using IT makes the payoffs from IT unclear and yet unrealized. This has been proved in the quantitative research conducted by Smith, Dombo and Nkehli (2008), to determine to what extent IT project benefits identified prior undertaking an IT investment in South Africa, the research revealed that it is seldom the benefits are identified at the early stages of the IT project. Exploiting IT is not like a wizard stick that boosts the profitability of the organization without understanding the way IT can change business and the tradeoffs the business should undergo. The below section, illustrates the degree of the involvement IT contributes into the business transformation.

2.1.2.1 Five Levels of IT-Enabled Business Transformation

It can be seen with Venkatraman that successful business is based on the ability of the management to continually adapt the organizational and technological capabilities to keep the dynamic alignment of business and IT rather than treating IT as either a driver or magic bullet for competitive advantage (Venkatraman, 1994).

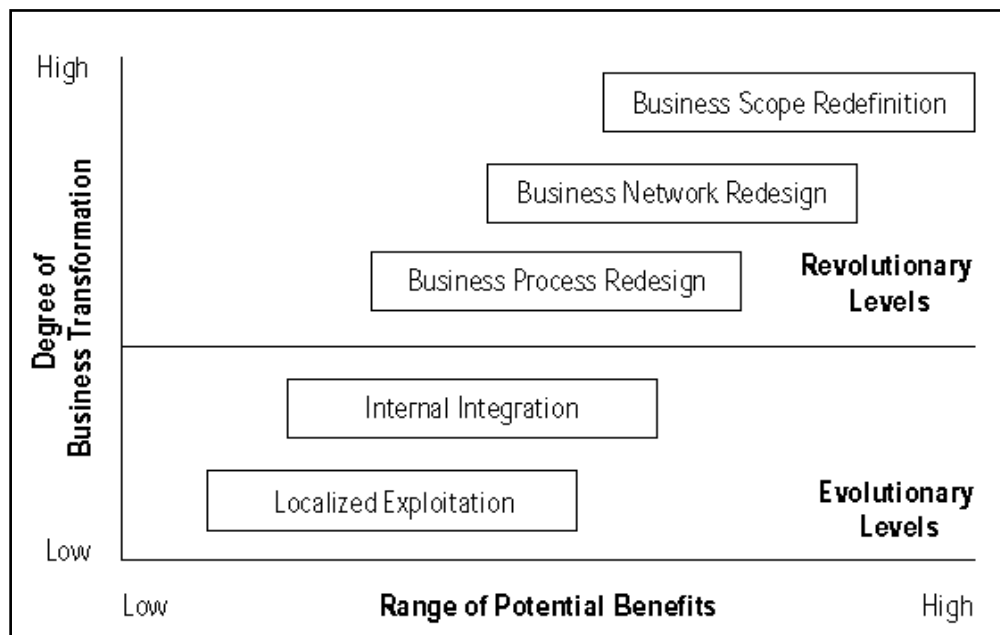


Figure 4 - Five Levels of IT-Enabled Business Transformation (Venkatraman, 1994)

Venkatraman (1994) introduces a schematic framework of five levels of IT-enabled business transformation in figure 4. Venkatraman, classified these levels based on the changes impact on the organization. The lower levels (one and two) are viewed as evolutionary changes or transactional changes. The first level is called localized exploitation which refers to the deployment of off-the-shelf IT application to overcome some operational difficulties for example, the twenty-four hour, toll free- 800 customer service system to respond effectively to the customer. It can be easily identified by managers and imitated by competitors. Though any systems implemented can be configured to fit the existing business processes of the company, some changes to the business processes need to be considered to utilize the benefits from the application system. Thus, Venkatraman suggests managers to identify the success criteria of the selected application and the performance assessment after implementing the application to monitor the benefits on productivity. It is also supported by Peppard, Ward and Daniel (2007) through creating metrics to ascertain the completion of the change.

The second level is internal integration; that is more about inter-organizational relationships, which can be into two forms, technical connectivity and/or business process interdependences. It can be seen that technical connectivity involves IT individuals more than business individuals due to the technical knowledge requires for the implementation, however, business minds is as important as IT minds when configuring the inter-organizational relationships between systems. Venkatraman (1994) has proved through his studies in several organizations that focusing on technical connectivity alone will certainly reduce the actual benefits of the technical platform, no matter how powerful it is. It is the business processes changes that drive the change in the IT platform. Integrating business through the information system allows flow of data along the supply chain, for instance exchanging transactional data such as invoices, purchase orders and inventory management to view the movement of the goods and its impact on finance. One example of a powerful integrated ERP system is SAP R/3, which stands for Systems Applications and Products. Creating value of the business process activity by exchanging information drive the need of integrating business processes to enhance the performance along the supply chain which is enabled through technology change. One of the successful stories of this level of change is Lexus and Infiniti. They established an internal integration system to transfer data collected on the cars performance during the service visit with their design and manufacturing database to analyze the car's performance systematically and to detect early signs of problems, which urges the preventative maintenance actions (Venkatraman, 1994).

The higher levels (three, four and five) advocate radical changes to the business processes. It possesses logic behind the motive of the change. Level three is business process redesign (BPR). It looks at the current states of the business processes and compares it with the industry to determine the demanded change. Hammer (1991) and Henry (2008) stated that reengineering business processes (redesign) is about removing the outdated business rules. BPR will be discussed further in sections 2.3.1 and 2.3.2.

While level three presents the business process redesign specifically within the boundaries of the organization, level four embraces the business network redesign (BNR). This approach shows the interdependent relationships between business processes of a given organization with its partners and network of customers and suppliers. A significance business transformation level is changing or expanding the business scope which articulates and drives dramatic changes in the

business processes. Exploiting the full potential of IT competences can compel a strategic change in the business scope.

A lot of companies are moving toward outsourcing services, especially logistics, in supply chain management to take advantage of the specialties have in the particular activities. For example, BMW is using TNT as a strategic partner for their specialties in logistic services to add greater value to the BMW supply chain (Henry, 2008). IT role will be the enabler of the business scope change. This represents the level five which is called business scope redefinition. It initiates a strategic question of the kind of business the firm is in and why. The IT role in this level of change is about the influence IT capabilities play on defining the business scope and the logic beyond redefining the business network. Organization should strive to establish a flexible basis of competencies to adapt and adopt the “best in world” that serve the organization needs from internal and external network (Venkatraman, 1994).

Despite Venkatraman’s framework classifies the IT-enabled business change based on IT efforts in driving the organizational change and the potential benefits, we may not totally agree on the line that distinguishes the level two from three, four and five. Business process redesign can be radical or incremental change. As described earlier regarding the systems continues changes in section 2.1.1, it can be seen that BPR is more likely to be evolutionary change unless any of the three different levels of IT change driving forces, defined in section 2.1.2, takes place that alters the strategy to be of revolutionary change.

Additionally, the overall framework certainly rotates around business processes, whether it is a radical or incremental change. The question is how executive managers view IT to enhance the organization’s capabilities and competencies in the market. It starts with the transactional changes (level one and two) to prepare for the revolutionary changes (level three, four and five) (Venkatraman, 1994). Nevertheless, there is no starting point; a change can start at any level, as long as it considers the coordination and collaboration of the organization systems’ structure, process and people to enable the transformation. These can be seen as critical success factors explained briefly in section 2.3.3.

Despite the fact that many organizations have spent huge investment on IT to implement systems serving their operation effectiveness, executive management are still unclear on the IT business

value. This is probably due to the fact that IT business value on productivity is unveiled in the long term as concluded by Brynjolfsson (1993) (Gregor, et al., 2006), however, another reason is more likely to be, as reveals in the study of Peppard, Ward and Daniel (2007), that organizations focus on what IT can do rather than on the changes that must be implemented in the business processes to use the most out of IT capabilities and technology. Earlier research done by highlights that .The successful realization of the benefits from any IT enabled business change is dependent on what Earl (1992 cited in Ward and Elvin, 1999, p. 198) concluded it on earlier research as “understanding the business, committing it to change and aggressively pursuing the end not the means”. Therefore, the influence of the organization systems on the success of the IT-enabled change is important to understand the tradeoffs organizations should accommodate on its business processes (Mazzucato, 2002). This is what Hammer has introduced first as business process reengineering. Since today’s market is all about supply chain efficiencies to bring about higher quality, lower production cost and yet more revenue, it’s worth linking the topics of business processes in supply chain management and IT business enabled change. The below sections will describe the supply chain management and one of the strategic benefits from IT which is information sharing.

2.2 Supply Chain Management and IT-Enabled Change

The 21st century increases the fierce global market competition. Companies are in a race to supply customers with products and services with shorter life cycles. High customer expectations’ forces companies to emphasize more in leveraging supply chain management. IT influences tremendously the evolution of supply chain, especially in information sharing. The more information provided on time, the more able the management to make strategic advantage decisions.

2.2.1 Supply Chain Management Nature

First let us understand the concept of supply chain management. Supply chain is a network of firms connected through a direct or indirect relationship among upstream and downstream processes to deliver products, services and information to customers (Towill, n.d.; Mentzer, et al., 2001). Supply chain management (SCM) is the holistic view of supply chain as a single entity that efficiently integrate supply chain members for example, suppliers, manufacturers, warehouses and stores in order to produced the right product to the right location on the right

time at the right cost, which will impact positively the performance of the organization (Mentzer, et al., 2001; Levi, Kaminsky and Levi, 2009). The definition above draws attention to certain observations about SCM. First, SCM is about integration capabilities of the various supply chain parties. This is where IT plays effective role in providing integrated systems and tools to interconnect supply chain parties. Second, delivering the right product to the right place at the right time and in the right condition and for the right cost is a requirement for being in the market. It creates pressure on companies to plan customers' demand, while focusing on the other hand in reducing production cost. The goal of using the integrated information system for example SAP R/3 is the exchanging of information through different parties to coordinate their jobs and duties effectively. Thus, SCM is about managing and coordinating supply chain activities. Mentzer, et al. (2001, p.18) studied thoroughly the different aspects of SCM and concluded the definition of SCM as:

‘the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole’.

The above definition has defined the SCM in philosophical perspective. It presents SCM as a system that requires strategic formulation to manage the business operations. As described earlier, organizations function through business processes that are either internal processes or across the organizations processes. After understanding the organization as system through the open system explained in section 1.1, it is important to investigate about business processes and the added value of the SCM processes.

2.2.2 Supply Chain & Business Processes

When referring to supply chain activities, we often relate to business processes as defined in the above definition of SCM. Davenport and Short (1990, p.12) defined business processes as ‘a set of logically related tasks performed to achieve a defined business outcome’. It can be seen from the above definition that business processes form a business system in which different business units collaborate to carry out business activities. Business process has two characteristics, customer (internal and external) and cross organizational boundaries (that occur across or

between organization subunits). A precise definition of business process by Kaplan and Murdock (1991 cited in Craig and Yeton, 1992, p. 286) is:

‘a company being made up of three or four core processes, each of which consists of a related set of interrelated activities, decisions, information, and material flows, which together determine the competitive success of the company’.

The business processes can be summaries in general by saying that it is a chain of series of activities that have a start task and an end task that aims at achieving an outcome. Business transformation and IT enabled business change; means changing business processes to suite the drives forces of the market. The arguments of business changes and IT role in enabling business changes revolve around understanding the business processes as an interlinked chain. Employing effective IT stimulates analysis of the business processes to find out the bottlenecks to either eliminate it or move it to create efficient processes.

2.2.2.1 Value Chain Analysis

Michael Porter (1985 cited in Feller, Shunk and Callarman, 2006) first introduced the value chain analysis concept in his book “Competitive Advantage” that defined the organizational business processes. It is a technique which facilitates the analysis of organization’s resources and activities that added value to the final product (Stratton, 2011; Henry, 2008). The value of the organization to an extent is generated when the revenue exceeds the total cost of production. Porter views the supply chain activities as value chain systems that colligate each firm’s activities to the other to add value to the final product. The competitive advantage is more likely derives from specific activities in the organization. Thus, pursuing any strategy decision at most circumstances, for example cost leadership where organization aims at lowering cost of production, will urge re-configuring the value chain activities (Henry, 2008). Understanding the core processes will certainly assist the organization to optimize these activities. Nevertheless, identifying none core activities will help the organization to control its fixed cost (Stratton, 2011) or outsource it to other external parties as in the example of BMW and TNT partnership described earlier in section 2.1.2.

Porter grouped value chain activities into two categories; primary activities and support activities as shown in figure 5. Henry (2008) provided an analysis of the two category activities. Primary

activities incorporate activities that are directly involved in the creation and delivery of the product or service. It includes five generic activities which are:

- Inbound logistics: These are the value chain activities concerned with receiving, storing, and distributing inputs to the product. It also includes material handling, warehousing, inventory control, vehicle scheduling and returns to suppliers.
- Operations: These activities involve in manufacturing the final product, that consume input resources and convert it to final output product such machining, packaging, assembly, testing, printing and facility operations.
- Outbound logistics: These activities concerned with collecting, storing and distributing the product to the final buyers. It includes warehousing, product handling, delivery, order processing and scheduling.
- Marketing & Sales: It includes activities of promoting the products to buyers through advertising, sales force, promotion, quoting, channel selection, channel relations and pricing.
- Service: These activities associated with the services provided to the buyers to enhance and maintain its value such as installation, repair, training, parts supply and product adjustment.

Support activities are those activities that are not directly associated with production, but ensure the effectiveness and efficiencies of the primary activities. These activities include the following activities:

- Procurement: it is the process of purchasing the resource inputs that support the primary activities like raw materials, office supplies, equipment ...etc.
- Technology development: It is the supportive information systems that facilitate the not only the supply chain processes, but the entire organization.
- Human resource management: It is the activities that associated with recruiting employees, training, and development.
- Firm infrastructure: it is the activities that support the entire organization like corporate strategic planning, finance, accounting and quality management (Henry, 2008).

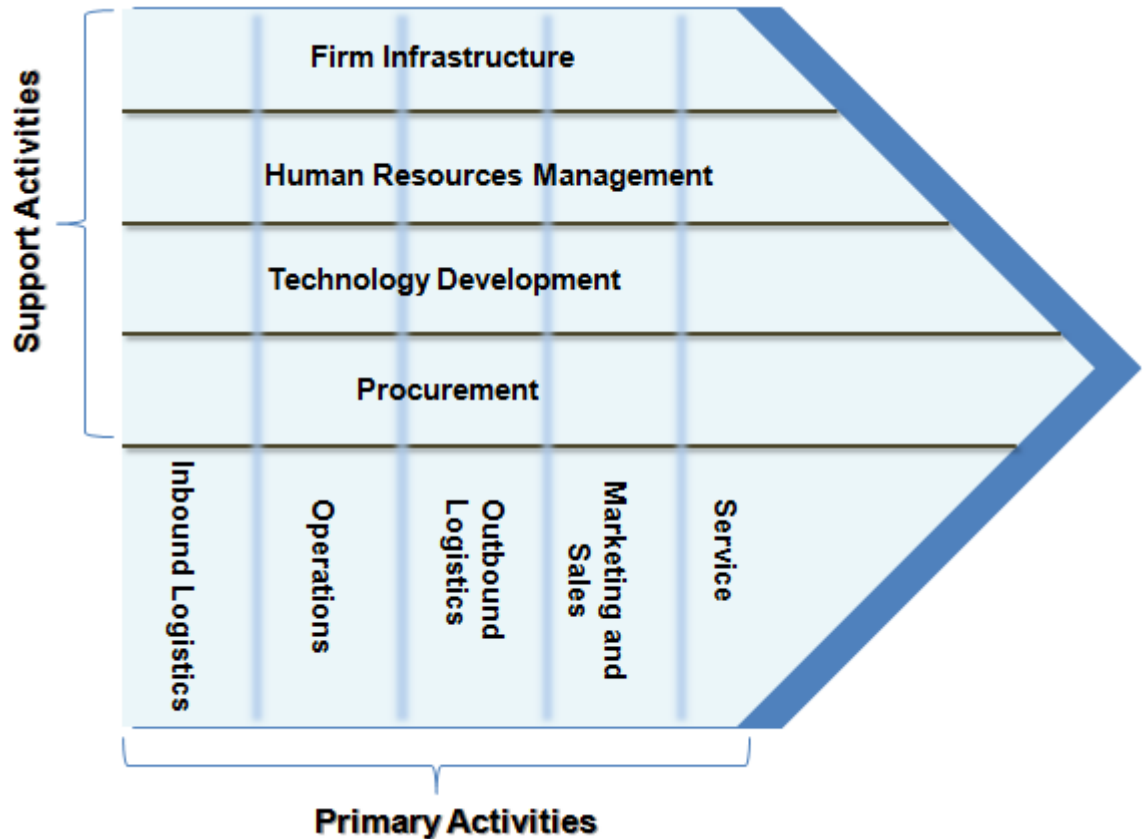


Figure 5 - Value Chain Analysis (Porter cited in Henry, 2008)

Breaking down business processes through the value chain analysis theory illustrated above proved the systematic way the enterprise operates. It enforces the organization to understand each activity and its impact on performance and cost, when an organization is looking to add value to its supply chain activity. It will certainly facilitate configuring information systems to manage the flow of information for strategic decision making. For example, using the value chain analysis concept eases the identification of the activities where using of internet can add value to the process to increase its efficiency for instance using internet websites to enable customers to place their orders which will be logged automatically into the organization system to be processed accordingly. The ability of the organization to manage the linkage between its internal value chain and its external value chain like suppliers can steer the market driving forces to its own advantage. For instance, optimizing firms own value chain forces improving the coordination with supplier's value chain which lead to a win-win situation (Levi, Kaminsky and Levi, 2009). This in most circumstances will reflect positively on the bargaining power of

suppliers. One of the famous examples in this strategy is Wal-Mart which has a big influence on its buying power, while benefiting its supplier with economies of scale.

When referring to value chain analysis, business process reengineering is a requisite for adding value to the supply chain. It is not an easy challenge the organization should undertake when competing through adding value to improve performance and reduce operating cost. This will be further studied in sections 2.3.1 and 2.3.2. IT is one of the supportive activities, as shown in figure 5, in adding efficiencies and effectiveness to the value chain cycle. The ability of the organization to be value creation is depended on the maturity level of the organization being a process driven organization rather than functioning in silos. The below section will explain briefly about sharing information through the supply chain cycle for more efficiency.

2.2.3 IT and Supply Chain Agility

Supply chain management seeks to cut down the uncertainty with supply chain activities for rapid responsiveness to the volatile market. This is termed as supply chain agility, which defined by Christopher and Towill (2002, p.13) as ‘business-wide capability that embraces organizational structures, information systems, logistics processes and in particular, mindsets’. Previous study conducted by business technology management cooperation (n.d., cited in Hoque, 2011) aimed at examining whether responding at the right time can be a key to gain competitive edge found that companies are agile because they have aligned their business and technology. This proved that business IT alignment, which will be described later in section 2.3.3, is one of the success factors in business IT-enabled change.

The extensive rivalry in the market and the emerging of IT-enabled transformation intensified the focus on SCM integration. Companies worldwide are looking for adding value to the downstream activities in the supply chain to minimize production cost and maximize profitability. The availability of information along the supply chain units -suppliers, manufacturers, warehouses, and stores- increases the analysis of the abundance data for effective decision making and efficient interaction along the chain to create visibility and identify bottlenecks (Power, 2005; Levi, Kaminsky and Levi, 2009). Nicols (1999, cited in Power, 2005) identified three main drivers for integration which are the information revolution, the increased level of global competition and the new types of inter-organizational relationships. Though some

may argue that the more information is being shared, the more complex the supply chain activities are (Levi, Kaminsky and Levi, 2009). Sharing information along supply chain management will definitely increase the control of the value chain activities to manage the uncertainty and risk in supply chain management. Nevertheless, the argument can be on the confidentiality and trust when sharing information among the companies units and partners. Avoiding having IT enabled SCM is a risk that threatens the survival and productivity of the organization (Gunasekaran and Ngai, 2004). Various studies have suggested that the key of seamless supply chain is on the availability of up-to-date data at every node of the supply chain (Maslaric and Groznik, 2010). The information system infrastructure enables the sharing of information and integrates the operation business processes to evaluate the organization capabilities and to utilize information to make strategic business decisions.

2.2.3.1 Supply Chain and Information Sharing

One of the most common issues in supply chain management is “bullwhip effect”. The phenomenon occurs when the demand seen at the upstream suppliers is more fluctuated than the orders seen in the downstream suppliers – retailer- (Power, 2005). For simpler explanation, company ABC produces product A and distribute it through distributor, wholesalers or retailers. ABC Company has a chain of suppliers, for instance company XYZ, to supply it with certain spare parts. Another OPQ company supplies some raw materials to XYZ Company. XYZ Company supplies multi companies, so that, in order to meet the unknown requirements of ABC Company, XYZ Company should have high level of safety stock. In addition, OPQ Company should also keep a higher safety stock to meet the unknown requirements of XYZ Company. This ends with significant variabilities as we move along the upper stream than downstream. Procter & Gamble executive’s management examined the sales and demand on one of their products “Pampers”. The number of sales orders in retailers was on steady rate to some extent; however, the distributor’s orders were high. When examining the orders of materials at P&G from their suppliers, it was even higher (Lee and Padmanabahan and Wheng, 1997). Lack of information sharing of demand planning through the supply chain streams amplifies the inventory level at upper stream and influence the operation efficiency negatively. This creates a bottleneck in this business process. The example above shows that silo thinking of each business process forms bottlenecks in the business processes, which should be looked at from the relationship of demand and supply data and the value of exchanging the information through the

whole chain. Wal-Mart is one of the success stories in information sharing systems. Its continuous inventory replenishment system allowed Wal-Mart to reach to an operational efficiency, with overhead of roughly 16.6% compared to industry average of over 20% (Keng, 2003). An experimental study conducted by Croson and Donohue (2005) on upstream versus downstream information and its impact on the bullwhip effect, found out the sharing downstream information significantly reduce the orders level especially at the distributor and manufacturer with improvement of 63% & 68.5% respectively. This indicates the importance of sharing an accurate and on time information through supply chain. Croson and Donohue experiment the bullwhip effects in a simplify way using the Beer Distribution Game, it shows the importance of not only sharing information, but also the use of IT in adding value to the value chain. However, the authors might expand their experimental studies to apply it in organizations to more of realistic findings that can actually benefit the organization being studied.

Information, communication and technology enabled the flow of information between trading parties to improve the value chains. This populates the term of inter-organizational system which was firstly introduced in 1980s (Hong, 2002). Hong (2002) classifies inter-organizational systems as two dimensions; role linkage and system support level. Horizontal linkage support business of common operation, while the vertical linkage engages companies with different roles of other organization to add value to the existing product. Both linkages in Hong's framework have either an operation support or strategic support. It can be seen that these kind of supports involve sharing of information of inventory, orders, production, delivery which encourage organizations to establish alliances to support firms by adding value through large investment for example decrease the lead time and improve inventory management. There are a lot of technologies to enable the sharing of information for example the use of (EDI) electronic data interchange that exchange documents in electronic format between two companies.

Hong's article of IOS provided examples on each support level (operational and strategic) with identification of the technology used in each example and the benefits acquired. Despite its many strengths there are number of small, but important, weaknesses. We believe that the article can be supported with some more statistics to show the real value of IT in the business. In addition, the article highlights the benefits of IOS, without considering the tradeoffs business has to pay-off when implementing IOS. It can be seen as important element to mention while speaking

about IT in SCM is to highlight the importance of business process redesign role in the success of the technology being used.

Certainly, information sharing is one of the strategic strength for any organization, especially among partners. Through looking at the value chain analysis, organization can establish alliances and partnership to handle some of value chain activities for example, logistics to handle the distribution of their own product to reduce overhead cost of production; this linkage is a vertical linkage (Hong, 2002). On the other hand, organizations can coordinate and share information for benefit exchanging for instance the American airline reservation system that creates a horizontal partnership with other airlines to support its operation to improve customer satisfaction (Hong, 2002).

Sharing information and exploiting IT in general at any transformation degree require changes in business processes. It is certainly that tradeoffs associate with exchanging information versus benefits. Therefore, companies are required to evaluate and analyze their business processes to transform it to fit the new trends and factors driving evolution of SCM (White, Daniel and Mohdzain, 2005). Cottrill (1997, cited in Power, 2005) highlights the key to any implementation of integration in supply chain operation is centralized on introducing internal changes within the company and extending it to include suppliers and customers. The complexity of supply chain processes creates a lot of challenges in SCM IT. At the basic level is the information integration, where different partners should agree on the level of information to be shared and the security of the information. In addition, it should imply a trust between partners in order to be able to solve issues that may arise. Next level is the synchronized planning, which shares the demand planning information, forecasting and replenishment. Supply chain managers/ partners need to agree on the design of the planning data and set of actions that should be taken accordingly. Lastly and the most complex is the workflow coordination between the integration business processes. For example, the integration of the manufacturing company system and the third party logistics system who manage the replenishment processes (Pearlson and Saunders, 2006).

As can be concluded from this section is the IT value added in the business processes through sharing of information. As described earlier in Venkatraman's framework on IT-enabled business transformation and Porter's model of value chain analysis, that any business changes

need assessment analysis of the business processes. This definitely directs the discussion on the business process redesign.

2.3 Approaches of Improving SCM

All the above challenges highlight the dynamic of supply chain management which advocate change in business processes to adapt to the changes for better responsiveness to customers and performance. A study conducted by Heinrich and Simchi-Levi (2005) with 75 supply chains disclosed that companies who invest only in technology without appropriate business processes lead to negative returns. Earlier study by Fletcher and Wright (1996), on the strategic use of IT and marketing in financial services, found a high degree of strategic ambiguity and lack of strategic time frame for IT investment decision, although there were a good degree of strategic alignment in planning processes. They interpret the cause due to the lack of understanding of business processes and lack of clear justification for a suitable IT system for SCM (Gunasekaran and Ngai, 2004). The results emphasis on evolving business processes through reengineering by value chain analysis in respond to the dynamic supply chain. As John Martin, the CEO of Taco Bell stated ‘Throughout the total reengineering effort, we maintained just one simple rule – enhance those things that bring value to the customer and eliminate those that don’t’ (Hammer and Champy, 2003, p. 7).

2.3.1 Business Process Redesign Concept

The business process definition, as defined earlier in section 2.2.2, is all the activities or tasks designed to utilize the organization resources to add value to a specific product or service. With the high dependencies on ERP systems, business analyst creates a business process model that exemplifies the business process cycle. Business process should have a sense of competitive advantage in terms of customer focus. In addition, it should be flexible that it can adapt any change in responsive to the market forces. This refers to the business process redesign as named by Dr. Thomas Davenport. The concept has many terminologies differences for example business process improvement, business process reengineering (Hammer, 2003, business process management ...etc. All of them refer to the same business process changes concept whether it is radical or incremental.

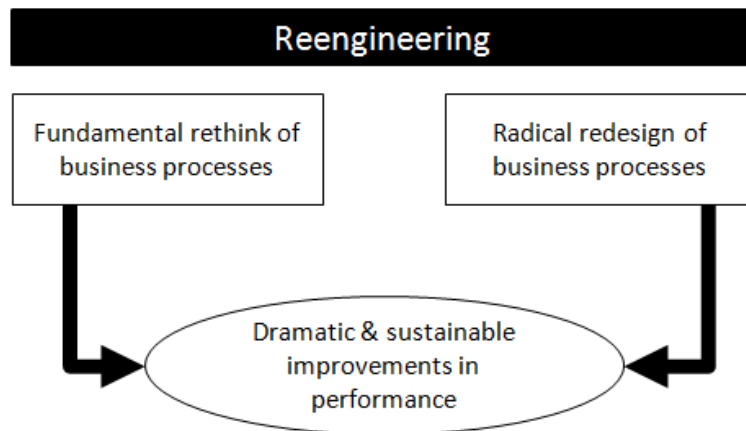


Figure 6 - Business Process Reengineering (Hammer and Champy, 2003)

The concept originally published by Dr. Michael Hammer in 1990 in Harvard Business Review article titled “Reengineering Work: Don’t Automate, Obliterate” – figure 6. He believed that a source of competitive advantage comes from disregarding old rules of doing business and starting all over again from a clean white paper (Hammer and Champy, 2003). Reengineering will certainly impose a significant change in the way firm is doing business in the future. Hammer (1990) defined reengineering as ‘the fundamental rethink and radical redesign of business processes to generate dramatic improvements in critical performance measures – such as cost, quality, service and speed’. Davenport and Short (1990) promoted IT to work closely with business to analyze and design the new business processes to alter the way business is running and to identify the skills required to function the new processes (Davenport and Short, 1990). Analyzing the two points of view of Hammer, Davenport and Short, it can be seen that they manifest strong contribution of IT to enable the redesign of the business processes through innovative ideas that add value to the business process.

2.3.2 Business Process Redesign Approach

A case study of Serbian oil downstream company, who distributes the oil using their own truck through different distribution centers, conducted a business process reengineering to refine the procurement process (Groznić and Maslaric, 2010). The main aim was to reduce the lead time of 33.60 hrs and the process execution cost of 60.10 €. The reengineering team formed to collect data about the whole process and the information that interfere to carry on the entire chain via interviews. Through analyzing the value chain cycle, the team observed a number of problems to be considered during the redesign process. Mainly, bottlenecks found in the purchasing,

transportation and shipment processes which were executed by different operation functions. Groznik and Maslaric (2010) noticed that business processes suffers lack of integration that depicts the silo thinking and inefficient way of sharing information. The whole targeted business processes were prototyped in form of AS-IS model. In addition, the team also develops some measurement of the main added-value activity to be used as a base to quantify the benefits of utilizing IT in the new “TO-BE” model, which were inventory cost and lead time value. The focus was on how IT can facilitate sharing information for better coordination and optimization between the gas station inventory and the distribution center. “TO-BE” model proposed focused on:

- Introducing a central unit with a strategic role in collecting data on demand and inventory;
- Automating the measurement of petrol levels in the petrol stations and exchanging the inventory data with the central unit for replenishment
- Introducing demand planning tools to manage the production stock out.

The results of the business process reengineering by utilizing IT showed a substantial reduction in the lead time by 28% and inventory holding cost by 20%. The example demonstrated above, highlights a successful execution of business process redesign project and the use of IT in enhancing the value chain of procurement. Groznik and Maslaric not only presented a valuable case of successful business reengineering using IT, they have also demonstrated in a very coherent manner two “TO-BE” models using new IT tool, one without amending the procurement process and the other with redesigning the whole process. They aimed at proving that using new technology tool without redesigning the whole business process does not exploit the IT benefit.

2.3.2.1 Five Steps in Process Redesign

Now let us explain in more details the method of business process redesign using the five steps in the BPR model developed by Davenport and Short (2008). The model in figure 7 shows the steps that are mostly common in a lot of methods for the reengineering exercise. These are; developing business vision and objectives, identifying the processes to be redesigned, understanding and measuring the current processes, identifying the IT levers and designing the prototype of the process.

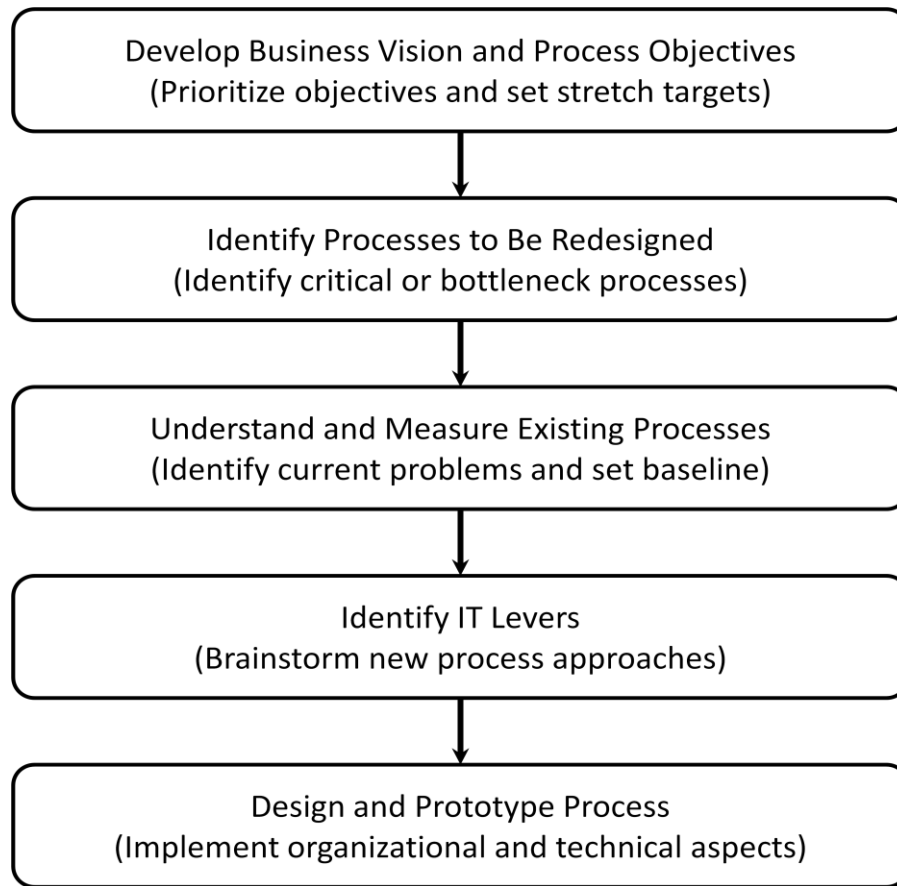


Figure 7 - Five Steps in Process Redesign (Davenport and Short, 1990)

Conducting any changes should follow a set of goals that drive the required changes to its desired status quo. Rethinking of business processes aims at influencing profitability, productivity and customer welfare. This implies that there is always a motive to any changes, which can be articulated through setting up objectives or mission. A process owners or managers should always ask a basic question: “why do we do what we do”. Identifying the benefits in terms of objectives will facilitate the communication among the involved parties in the change task. Davenport and Short (1990) agreed that redesign business processes should be attempted under specific business vision and objectives in mind. Maslaric and Groznik along with the reengineering team had defined their aims before working on redesigning the procurement process as the first step in their exercise. Without having a clear target to achieve during the redesigning of the business process, the firms’ units will continue focusing on the optimization of silo operation and yet losing track of the overall organization strategy. Silo’s thinking creates a lot of complexity, redundancy of activities and drives the focus to local optimization benefit rather than to global optimization benefit (Pearlson and Saunders, 2006; Groznik and Maslaric,

2010). Barrett (1994 cited in O'Neill and Sohal, 1999) highly agrees that the successful redesign exercise relies on the development of vision of the process. As can be seen from Lewin's model of managing changes, described previously in section 2.1.1, setting the objectives removes the doubts from the employee to enable them contribute strongly and confidently in the change. Thus, developing business vision and process objectives is the first step in Daven and Short model.

Groznik and Maslaric's team identified the procurement process to be redesigned, which is the second step in the business process redesign model. The team examined the bottlenecks in the process to be resolved in the BPR. At this stage, the business analyst should analyze the bottleneck processes that cause problems or emphasis on the value added activities which have a high impact on the organization performance. On the other hand, some firms, which undergo a huge business process redesign, identify their business processes and prioritize them. This more likely can consumed time and put organization at high risk of resistance which will hinder the reengineering process as one of the elements to redesign processes (Davenport and Short, 1990; Hammer and Champy, 2003). Hammer and Champy (1990) found out from their experience that 12 months duration for successful reengineering is sufficient to finalize the business process redesign. Furthermore, Davenport and Short (2008) stress the importance of having a process owner, who usually is the department manager, and a cross functional reengineering team, as one of the best ways to work on reengineering project (Maslaric and Groznik, 2010; Hammer and Champy, 2003; Olalla, 2000; Esteves, Pastor and Casanovas, 2002). The team will be responsible to analyze the current status quo having in mind the big picture to deliver the optimal value creation to the organization (Pearlson and Saunders, 2006; Harvey and Millett, 1999).

After forming the reengineering team, who is in charge of analyzing the current situation, the team should analyze and measure the existing processes; this is the third step in the BPR model. Groznik and Maslaric's team created the AS-IS model of the current status quo in the above case that illustrates the entire process to identify the non added-value activities. In addition, the team measured the main objectives as explained above to be compared with the results after the redesigning of the process. It is essential that measurement goals represent strategic objectives that can be followed with questions to support the interpretation of the new design (Esteves, Pastor and Casanovas, 2002). Davenport and Short (1990) believes that measuring the current

process creates a baseline to avoid repeating the problem while designing. In IT-enabled change, it has been argued that IT investment value is more obvious in the long term rather in the short term (Kohli and Devaraj, 2004). A more recent framework balance scorecard can be used to measure the performance of the organization in order to reflect the IT-enabled business change value (Purohit and Minor, 2002). For example, in measuring the lead time of delivering the final product to the customer, balance scorecard identify the actual status and the aim that the business process redesign team should achieve during the transformation exercise. It is one of the good approaches that can facilitate a better understanding of the success of any strategic change utilizing IT.

The fourth step is the identification of IT levers, which means analyzing IT capabilities to add value to the business process design. IT role in business process redesign has a productive insight into the performance of the organization (O'Neill and Sohal, 1999). Throughout the paper, IT role in transformation organization have so powerful capabilities to turn not only organization, but also the entire industry upside down. It can create new process options than just support the existing one (Scott, 2004; Rouse, 2005), by the way technology can ease the share of information geographically and integrate different processes for more accurate and decisive information. The integration of supply chain activates the industry competition through increasing the implementation of inter-organization relationships and increases outsourcing. One of these technologies is the electronic data interchange (EDI), which enabled a new practice in SCM and is a widespread key success of supply chain management (Henry, 2008). It has been noticed that IT-enabled change success requires IT involvement from the beginning of the strategy planning, which will be explained later in section 2.3.3, can be attained by IT-business alignment (Baets, 1992). One of the best examples of IT-enabled business transformation is Wal-Mart case. Wal-Mart has created a new business practice through their initiative of redefining the retail industry by optimizing the information systems to collect data and link directly from its stores to its central computer system and from that system to its supplier's computers. The strong integration permits better coordination with suppliers which forced them to respond effectively to the improved value chain cycle and to lower the cost of manufacturing (Rouse, 2006, Scott, 2004). This helped Wal-Mart to reduce the overstocking of low selling merchandise (Scott, 2004).

The fifth step is designing and building a prototype of the process. The Groznik and Maslaric's reengineering team started working in designing the new process after gathering the required information of problems, risk assessment, objectives, and successful criteria. The new design should certainly interpret the flow of information and the integration between different functions in the firms. In the Gronznik and Maslaric case study, two models was developed, one with employment of IT only as a tool and the other included IT and changes in the business process. The figures proved that IT complements the business redesigning process. The lead time reduced by 25% and inventory cost 8 %, while after aligning IT with the business process the lead time decreased by 3% less and inventory cost reduced by 12%. The change occurred in this case was IT-enabled change that also influence the change in the structure of the organization.

There are a lot of models and approaches that have been developed by various researches. They all agree on three main elements for any kind of changes; objectives (why), current situation (AS-IS), measurement and new situation (TO-BE) (Hammer and Champy, 2003; Davenport and Short, 1990; Esteves, Pastor and Casanovas, 2002; Aalst and Hee, 1995, Hamilton, 2003). There are lots of success stories of business process reengineering; Hammer and Champy (1990, p. 6) quoted in their article on the success results of Ford Motor Company reengineering program of procurement:

‘.... the new processes are not just the old programs with new wrinkles. They are entirely new processes that could not exist without today's information technology. We say that in reengineering, information technology acts as an essential enabler. Without information technology, the process can't be reengineered’. (Hammar and Champy, 1990).

2.3.3 Business Process Reengineering Critical Success Factors

The above model is a way of managing the reengineering exercise for better results. Though, there are certainly some critical success factors that should be considered when attempting for business process reengineering for more control and successful outcomes. These CSFs are:

- Business IT alignment is the most popular topic in today's business world which is invaded by information technology. Duff (2002 cited in De Haes, S. & Van Grembergen, W, 2009) defines business IT alignment as ‘the process and goal of achieving competitive advantage through developing and sustaining a symbiotic relationship between business

and IT' (Haes and Grembergen, 2009). Luftman (2000) refers business IT alignment to harmonizing the adaptation of organizational strategies (assessing IT-bus align). Survey conducted by Society for Information Management International (SIM) with top IT executive from 112 companies across a different industries, showed that 42% of management top concern is IT-business alignment (CIO Insight, 2007). Ross (1996, cited in Peppard and Ward, 1999) claims in his research paper, the ability of any organization to apply IT to enhance its competitive advantage is depend on the effective deployment of IT capabilities. He concludes that these capabilities comes from three IT assets; mainly strong partnering relationship between IT and business management. Companies worldwide are seeking to find ways to manage IT to integrate it to its business strategies (Luftman, 2000). This advocates the importance of understanding the alignment between business and IT strategies and understands the best way to utilize IT to drive the strategic decision process.

- A firm's ability to emerge strategic change depends upon the cooperation and coordination of its resources and capabilities. Grant (1991) distinguish among resources and capabilities. Resources are the input of the production process that include people, skills, plants, equipment and so on, while capability is the capacity of the resources to perform certain task or activity. The blend of technological capabilities and human capabilities form the organizational capabilities. Thus, the firm should conduct an analysis on its technological capability and identify its potential capabilities that will support the business strategy. The development and implementation is governed with the principals and policies to ensure the adaptation of the technology to acquire the benefits in the long term. In this regards, resource-based view of strategy strongly emphasizes enterprise's internal capabilities to achieve sustainable competitive advantage, which highlights the importance of deploying company's' resources around the firm.
- Managing resistance to change should be part of the strategic change analysis. As explained above people are company's resource (Yogesh, 1998). As people go on the anxiety of learning phase, the uncertainty increases which translated by employee as a threat, this increases the resistance forces. However, Lewin's model, demonstrated above in section 2.1.1, explained in details the way organization executive can manage organizational change in people. During the resistance of change, people tend to unlearn

what they have learned in order to get rid of old way of working. The support of the management leadership is part of the organization cultural change that influences the belief and attitude of the employees towards shaping the new business. This also falls under the unfreezing stage of Lewin's model.

- Management support and commitment is one of the critical factors that have an influence on business reengineering process project. The reengineering process is a challenge which more likely faces inhibitors to put it down, unless it was managed and committed by top management to enforce it with clear objective. This falls under the unfreezing stage of Lewin's model. This is why business process reengineering was stated in various research papers to be part of strategic plan. The management role in reengineering project is important to provide the right resources and to fund the project. Additionally, considering the project as part of strategic formulation is to ensure that the message of the reengineering task is known throughout the whole organization and efforts are clapped for the success of the reengineering (Omnex Resource Center, n.d.).
- Realistic scope of the reengineering task. The business case should be specific and should point out critical business processes with deficits. It should aim at simplifying and adding values to the business process to reflect an ease way of managing the value chain cycle (Hammer and Champy, 2003). As explained earlier, the reengineering task must remove duplicate work steps and investigates the integration of the business processes geographically for information sharing using IT as an enabler. Since the BPR project should move fast as advised by Hammer and Champy (Hammer and Champy, 2003), the scope of the reengineering project should focus on increasing value on core processes of the organization and eliminate the cost of the others. In addition, the team of the reengineering project should be from the internal team as they are the only ones who understand their business very well.

These CSFs have to be studied further and taken into consideration when studying business transformation. Each of the above points will definitely have a positive or negative impact on the business transformation. Therefore, it is essential to analyze these factors in the strategy analysis and take actions during the strategy implementation. As it can be seen, preparing the

organization for any change is another challenge that must be addressed strategically in order to keep the business sustaining its competitive advantage.

The literature review covers different aspects of business transformation definition and how to manage business transformation within people to better results. In addition, it covers IT enabled business change approach and how IT plays critical role in supply chain management (SCM) field. Furthermore, it discussed about business processes and importance to redesigning business processes when aligning business processes using IT to get efficient business processes. After discussing the above, the following chapter presents the research methodology used to investigate the research objectives.

3.0 Chapter Three: Research Methodology

The research paper studies the combination of IT and business in a dynamic economic world which is influenced by information technology revolution in the early twentieth century. The research paper answers the research questions which will lead to achieve the research objectives and aims through interviews with IT and business departments, which will be analyzed and discussed further in chapter five and six. Thus, this chapter presents the research questions and the research methodology applied throughout the research project.

3.1 Research Questions

The main research question of this research paper is “what is the strategic role of IT in enabling effective transformation of an organization?”. The research question is more likely followed with subsidiary questions to be answered. These questions are:

- What are the driving forces of business transformation?
- What are the challenges and difficulties IT asset and business stakeholders confront during business transformation?
- How is the concept of business process redesign realized, formalized and established in the context of business transformation?
 - How critical IT is in enabling business process redesign?
- How can business process redesign leverage IT capabilities to accomplish supply chain objectives?

3.2 Research Design Processes

Business and management studies are more about professional practices that assists management to understand organizations’ practices and its impact on organizations’ elements and performance (White, 2002). There are lots of research methodologies presented by various researches on designing the research, like research onion methodology, research project approach, design science research ...etc to study business and information system. Each methodology has its own advantages and disadvantages. In this paper, the research methodology followed the common steps in describing the research design. Thus, the research design processes utilized below covers the development of the knowledge, data collection methods plus the justification of using the research approaches and strategy. These are:

- Research Philosophies
- Research Approaches
- Research Strategies
- Research Techniques and procedures

3.3.1 Research Philosophies

Research philosophy is about the way we think of the development of the knowledge (Saunders, Lewis and Thornhill, 2003). Developing philosophical questioning creates confusions and instability in our thoughts which encourages more in-depth investigations about the phenomenon to find out answers. This makes the research philosophy of special benefit. The research philosophy in nature can be of ontological “our assumption on the nature of reality”, epistemological “what and how the knowledge can be known?” and/or axiological “the study of values and theory”. There is no best way of studying certain phenomenon; the same topic can be studied by any of the types (Crossan, n.d.). It is based on the type of questions to be answered during the research. However, when it comes to the study of business and IT, epistemology becomes more relevant to understand the rational of human behavior toward IT systems (Maylor and Blackmon, 2005).

The literature review focused on understanding the business transformation and its linkage with IT, business processes and people. It shows how the whole organization is operated as an open system using these elements. The research paper is aiming at understanding the relationship between IT, business processes and people. Hence, this research paper is more epistemological in nature, in the way it explores and studies the phenomenon between business transformation and IT role in an organization and the familiarity of the business process reengineering using information technology. The research paper considers objectivism as it studies an organization with an existing phenomenon and tries to understand its practices in the concept of business transformation and IT enabled change. The knowledge source of this study is observational and interactively talking to people asking about their views and assumptions and how the phenomenon of business IT enabled changes is influenced by people. This makes the research interpretative and realism in nature. It is interpretative because the research study focuses in details on the factors influencing the relationship between IT, business processes and people. It is also realism because the research is interacting with people to understand the social aspects that

influence the relationship between the three elements and how it influences the business transformation results (Saunders, Lewis and Thornhill, 2003).

3.3.2 Research Approaches

Research approach is about general logic of how to answer research question. There are two types of research approaches; scientific approach and ethnographic approach. The scientific approach is developing hypotheses and test theories then collecting data. Such data is expressed in terms of numbers and measurement. This type of research has been used in management by Taylor in the manufacturing company when measuring the performance of the worker by changing the condition and type of work (Maylor and Blackmon, 2005). It used measurement to understand a phenomenon. On the other hand, ethnographic approach is more about acquiring information during the research and concludes the results of the phenomenon. Ethnographic approach studies the situation in its natural setting (Maylor and Blackmon, 2005).

For the scientific approach, the research question should be converted into detailed specific questions – surveys - or hypotheses to answer what and how much, which will determine the type of data to be collected (Saunders, Lewis and Thornhill, 2003). Thus, the data collected in this approach is quantitative, which will agree or disagree with the hypotheses. This is known as deductive approach. It will help to control the phenomenon research outcome (Maylor and Blackmon, 2005). On the contrary, ethnographic approach the research does not have as much as detailed questions as the scientific approach, because this approach focus on answering why and how. The data collected is qualitative data because the information is developed from what it is available from other sources like meeting people, observation of human behaviors then later develops the analysis based on the understanding of the context. This makes the approach inductive (Maylor and Blackmon, 2005).

Both approaches can be used in business and IS studies. However, in this research project, ethnographic (inductive) approach is relevant because the intension is to understand the phenomenon in a specific situation where human interaction is important to reveal the reality of phenomenon. The data will be collected from various studies, theories, literature reviews and interviews, which will help the researcher in analyzing the key findings of the case study of a single organization to answer the research question.

3.3.3 Research Strategies

Research strategy is about the method to be used to meet the research purpose. It is a generic plan on how the researcher is going to answer the research question (Saunders, Lewis and Thornhill, 2003). It underlies the selection of the most appropriate sources of data collection to be analyzed and formulated to answer the research question or to develop frameworks or theories. There are various types of research strategy to be used depend in the research approach and research question, like survey, experiment, action research, case study ...etc (White, 2002).

Survey and experiment are two means of quantitative strategies research when collecting data. Both types are one of the widely used strategies in scientific research as stated earlier. It mainly studies cause and effect relationships of a situation based on developed theories and laws (White, 2002). This type of strategy as explained earlier requires a hypothesis and theory that to be examined and tested, where numbers are to be taken before and after the experiment. Quantitative research in information systems considered the technological, information needs and user features as constant factors and objective rather than dynamic. It does not count the rapid pace of change in information systems. Furthermore, quantitative method should perform a quality check on the collected data to remove errors, which might put responses into categories that might not fit into it (Johnson, Onwuegbuzie, 2004). Fred Kerlinger (1994 cited in Colorado State University) started his argument in his book - "Qualitative Data Analysis, Quantitative Research"- "There's no such thing as qualitative data. Everything is either 1 or 0". This allows more generalization on the conclusion, which is less in qualitative research. Though, the results of quantitative research are displayed in terms of tables and diagrams, eventually, the interpretation of these statistics are qualitative in context. This has been supported by the researcher D. T. Campbell by saying: "all research ultimately has a qualitative grounding" (Colorado State University).

A case study is one means of the qualitative research. It attempts to study a phenomenon in its natural setting on contemporary events. There is no specific means to collect data when employing a case study. Case study is a descriptive rather than experimental method, as it answers questions of why and how (Maylor and Blackmon, 2005). When studying information systems management, usually technological, managerial and people aspects are involved. The interaction of these variables can be best understood by studying the phenomenon in reality to

understand the nature and the complexity of the interactions. Benbasat, Goldstein and Mead (1987) found in their investigation on the research strategy in information systems studies, that the dynamics of the information systems field emerges new topic in this field from the interaction with people, which case study is the most appropriate approach to clarify the underlying phenomenon that affect organization's performance. Rosen (1991 cited in Orlikowski and Baroudi, 1991), stated that “..... understanding social process involves getting inside the world of those generating it”. Thus, developing the knowledge of the phenomenon and analyzing it will enable the researcher to provide recommendations to solve problem.

On the other hand, the same topic can be experimented and measurement can be taken to quantify the results and the success of the recommended solution, this research approach is called the mixed methods. No research strategy is better than the other; however, the selection of the research strategy is based on the topic, the main purpose of the research and the preferences of the strategy.

From the above information about research approaches, the research paper will study the underlying phenomenon qualitatively to examine the problem in reality on single organization to draw the attention of the management about it, yet to provide recommendations that can be used to make the situation better. Although using mix approach can be a good idea if the research paper is intended to study and analyze particular business process and measure its effectiveness before and after employing IT when redesigning business processes. However, the phenomenon studies the interaction between business transformation and the IT role in either driving or enabling the change in the organization. It is the information age and the virtual business world, where IT is a key player in not just competing in the market, but also to sustain the company's competitive position. Since the research aims at answering what is the strategic role of IT in a enabling the transformation of the organization, a case study strategy is the best method to use as it will study in-depth the phenomenon in single organization. I will conduct a semi-structured interviews with professionals from IT department and from supply chain department – represent business side- and unstructured interviews with experts on the area of the business processes developments in the organization. More detail about the case study data sampling is in the below section.

3.3.4 Research Techniques and Procedures

As explained earlier in the research strategies section (3.3.3), a case study will be created to examine the phenomenon of business transformation and role of IT in enabling business process redesigning. The case study is aiming at investigating the driving forces of changing business processes, examining the realization of business process redesign concept, examining how business process redesign can leverage IT capabilities, and lastly investigate the challenges and difficulties IT asset and business face during business transformation and business process changes.

3.3.5.1 Sample Selection

Abu Dhabi Polymers Company Limited (Borouge) is a petrochemical organization specialized in producing polyethylene and polypropylene materials and selling them to various customers all over the world; more detail about the organization will be provided in chapter four. The company is a young rapidly growing organization, which makes it the best choice to study the interaction between business transformation and information systems inductively. Limiting the study to one company aims at examining the phenomenon more in-depth; using the opportunity of being part of the studied organization to get closer to the event and provide suitable recommendations.

The selection of the data will come from different business roles in IT department, supply chain (SCM) department and corporate support department. The diversity of the selections will create a strong case that combines different perspectives from IT, business and experts (corporate support department) on the phenomenon in the studied organization. It diagnoses the problem from IT window to understand the current role of IT in the organization and the pressure IT department is receiving to support business organization. On the other hand, it diagnoses the phenomenon from SCM perspective, as being a dynamic department interacting with the market world, which urges them to transform and continuously change business processes to suite customers' preferences and adapt to the market changing conditions. Lastly, the corporate support department which consists of three departments; governance and business continuity, performance management and leadership business processes development. The latter is responsible for revising organization's business processes and to assist in reengineering them to improve the efficiency and productivity of the organization. The department was formed last year 2010 and includes experts in business processes reengineering. It was important to take experts thoughts on the

organization's business processes situation and how the department is going to support the organization. The sample selection of the interviewees will be from different business roles and managerial levels as shown in table 2, with work experience range from 7 – 31 years and a maximum of 11 years experience in Borouge organization.

Department	Position
Corporate Support	VP, Corporate Support
Corporate Support	Business Process Development Dept. Manager
SCM	VP, B3 Program
SCM	Senior Customer Service Manager
SCM	Supply Manager – PE
SCM	Supply Chain Process Development Manager
SCM	Business Process Leader (Order to Cash Processes)
SCM	Business Process Specialist (Demand Planning Processes)
SCM	Team Leader - Shipping Specialist
IT	Strategy & Planning Dept. Manager
IT	IT Projects Dept. Manager
IT	Business Application Systems Dept. Manager
IT - BAS	System Analyst (Sales and Distribution SAP Specialist)
IT - BAS	System Analyst (Finance & Controlling SAP Specialist)
IT - BAS	Senior System Analyst (Supply Planning and Material Management SAP Specialist)
IT - BAS	Senior Systems Analyst (Finance & Controlling SAP Specialist)

Table 2 - Sample Selection - Interviewees Business Roles

3.3.5.2 Data Collection & Data Analysis

Two types of interviews are to be used in this research; semi-structured interviews and unstructured interviews. Semi-structured interviews will be firstly conducted based on a theme

and questions to be covered, which were varying from interview to another given the department specific context and the business role of the interviewees. This type of interview will be conducted with 14 interviewees from IT and business (SCM department). Unstructured interviews are to be conducted secondly with two experts in the area of business processes development from corporate support department to get more in-depth views on the topic of the research. These interviews will be conducted after acquiring a clear idea on the current situation in the organization. They talked freely about the topic and their observation, analysis and beliefs on the organization situation in relation to the research topic.

The data analysis activities in qualitative approach are quite different than the quantitative approaches, where the analysis part is prepared and based on number that can tell the indications and conclusion be drawn through the use of diagrams and statistics. The collection of data is non-standardized and needs to be categorized before analyzing the data to establish the relationships to draw a conclusion from the research paper (Saunders, Lewis and Thornhill, 2003). The data collected in the qualitative approach has a conceptual frame work, which will be used to test the end results concluded from the data analysis of the studied organization. In summary the processes which will be approached in this research are the; categorizations of the questions, comprehension and management of the themes developed from the conceptual framework, establishing the relationship between the data and draw a final conclusion.

3.4 The Conceptual Framework

The literature review highlights four main elements in any business transformation which are; people, business processes, technology and data - figure 8. Planning strategic change should have an extensive strategy formation that is linked strongly to the supply chain management strategy. Any given organization plans for business growth switches on transformation manner. The market pressures emphasis on changing the way business is running, which implies two kinds of changes; changes in people and changes in business processes.

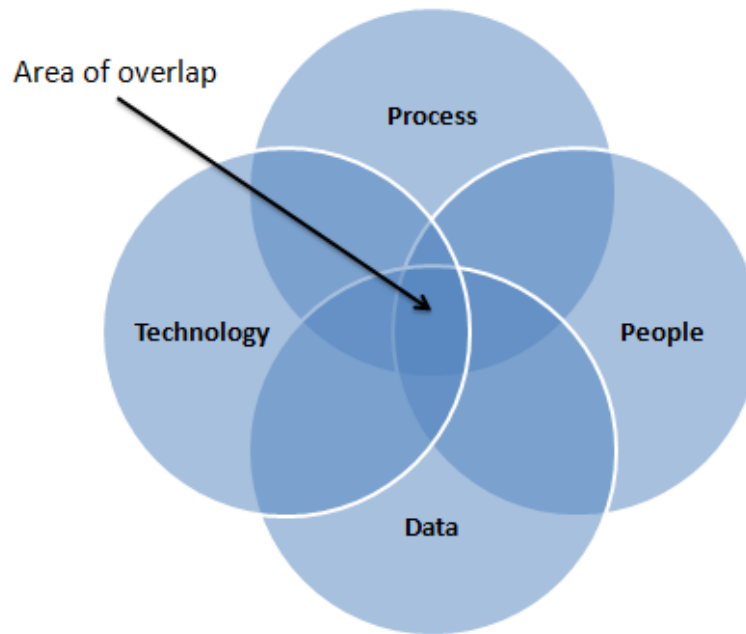


Figure 8 – The four elements of the research topic

Managing changes in people is the first step in organizational transformation which triggers an organization's culture to adapt the new ways of working. Technology on the other hand is a tool used to fit business processes changes and create value of the data being fed into the system to the rest of the business process. The interrelationship of sharing data using technology is what supports the business process. Business process is interrelated activities where the quality of data and information flow determines the value added of one activity into the other activity to function efficiently as shown in figure 9. The strong integration of business processes depends highly on the technology being employed. This is why IT and business processes are intimately interconnected, however, understanding the business process logic from customer demand till the delivery of the goods, including other processes whether directly or indirectly involved in the upstream and downstream of supply chain, is crucial to the success of exploiting IT. Functioning in silo breaks the linkage of the business processes and will result in inefficient business processes that take a lot of time to operate one activity. In addition, no matter how powerful technology is employed in the organization, if all the elements in figure 7, are not aligned effectively.

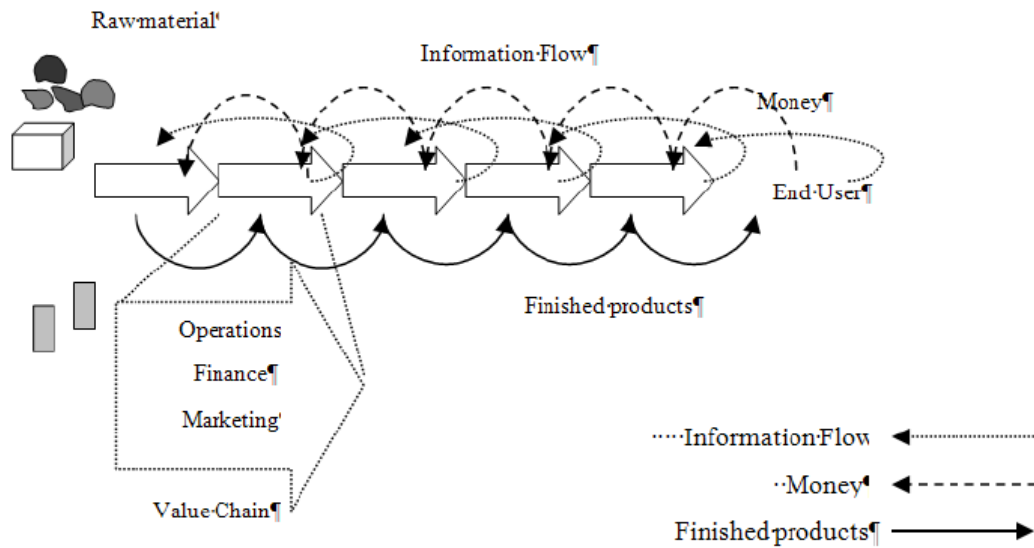


Figure 9 - Information Flow in the Business Process (Shukla, Garg and Agarwal, 2011)

Diagram in figure 9 demonstrates the importance of each chain output into the other throughout the business process. An active SCM depends heavily on information flow to the whole supply chain parties, which means an integrated supply chain management information system. The information from the market demand coming from the customers determines the production cycle scheduling and planning to produce and deliver the products to the customer. It illustrates also the exchanged value of money among the processes. The double arrows indicate the data exchanged in business processes which determine integrated business processes. It certainly shows the integration of business processes from the beginning of the process from demand to supply of raw materials till the delivery of goods to customers.

IT has been ultimately recognized as the receiving end of the business requirement change; however, the turbulent changes in the technology field reverse this fact. IT's role effectively goes along the life cycle of the organization. It is the backbone of any organization, which should be strong enough to hold and keep the organization operating. The rivalry of the market and the ultimate objectives of supply chain, that is producing the right product to the right customer in the right condition to the right location at the right time and cost, encourage more integration between suppliers and customers. This urges transformation of the supply chain strategy for example, moving to globalization, strengthening logistics networks with an emphasis on integrating logistics 3rd party systems within the organization. The bigger the integration of SCM

systems is throughout the supply chain network, the more sophisticated information system in the organization becomes. This makes IT's role critical to the success of supply chain management. It enforces redesigning of business processes to collaboratively work to integrate and create more value to the business processes throughout the supply chain to reduce cost and increase the service quality.

As explained earlier, any given enterprise operates using people, data and technology to perform business process activities. Strong competition causes organization to transform, which lead to change in business processes and people as mentioned earlier. Recognizing IT in the strategy of supply chain will make IT role effective in enabling the changes to achieve the ultimate objectives of the company. IT enables business process change which creates new ways of running business in the presence of the willingness of people to adapt the new change – figure 10. Nevertheless, the phenomenon of depending on IT to drive the changes in the business processes turns the wheels to the opposite side and creates issues in the overlap zone as shown in figure 8. In addition, lack of understanding the whole chain of business process as an interlinked activities, results in failing to get the optimum outcome from using information systems to resolve bottlenecks in business processes. The turbulent market nowadays urges organizations to focus on business process redesigning (BPR) rather than quick fixing the old ways of working. It is all surrounded around people, information, technology and business processes. The ability to manage the overlap between the three aspects creates a solid base to support the transformation of the organization.

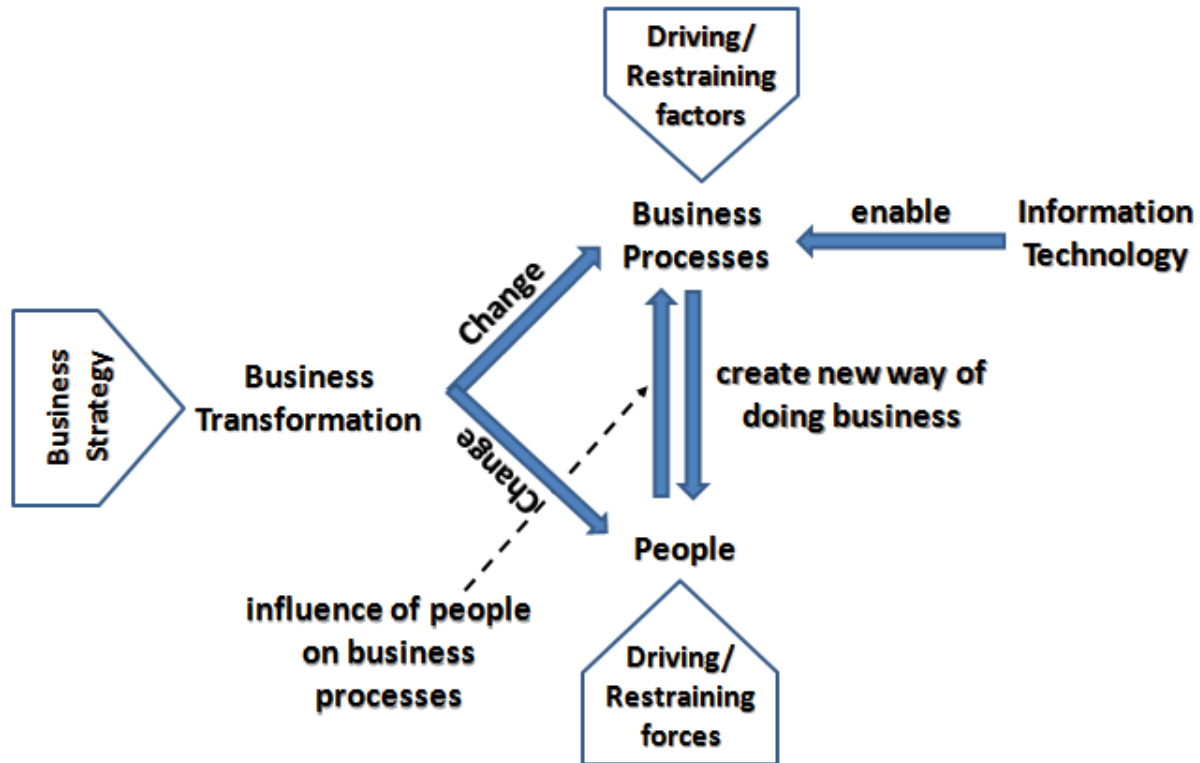


Figure 10 - The Conceptual Framework of the Research Paper

Figure 10, the conceptual framework developed from literature review, shows the business strategy as the starting point of business transformation which influences changes in business processes and people. It also illustrates the IT role in enabling the business process changes which create new ways of running the business. The diagram represents the influence of people on business processes by the driving and restraining forces that determine the business transformation success. In addition, it depicts the driving and restraining forces that affect business processes changes which promote to change the ways of doing things.

3.4.1 Interview Themes

The case study explores the transition phase of Abu Dhabi Polymers Company (more information about the organization in chapter four). The case study substantiates the conclusion drawn in this research paper to capture the emerging issues of business transformation and IT. From the conceptual framework developed in figure 10, the research will revolve around the following themes:

- SCM and IT departments preparation for Borouge's business transformation

- Driving forces for business processes changes
- Realization of business processes redesign concept
- IT role in enabling business process redesign (BPR)/ change
- IT role in supporting SCM department
- Critical Success Factors & Challenges

3.4.1.1 Theme One: Preparation for Borouge's Business Transformation in SCM and IT Departments

Business transformation is undertaken as a big scale or as a continuous improvement in the organization. The above conceptual framework - figure 10 - shows the influence business transformation caused in business processes and people. People are the core driver of the change. Clear understanding of the driving forces of change and communication of strategy motivates employees and directs their efforts toward a clear roadmap. Therefore, the first theme will investigate:

- The approach SCM and IT departments/ organization are following to prepare their employees for the transition period
- How will each department manage the organizational change

The questions related to the preparation of SCM and IT departments for Borouge's business transformation are:

Business Questions	IT Questions
• How do SCM department prepare for the new transformation of Borouge?	• How does IT prepare for the business transformation? Does IT participate in the business strategy study?
• To what extent did the business users adapt to the redesigned business processes using IT solution?	• How does IT assist business users to adapt to the IT solution used for the redesigned of the business processes?

Table 3 - Questions asked to examine the preparation for Borouge's Business Transformation in SCM and IT Departments

3.4.1.2 Theme Two: Driving Forces for Business Process Changes

Strong market competition force organization to transform its supply chain concept to make its products available to customers in different geographical locations. This change considered strategic change leads to business transformation that forces business processes changes. Changes in business processes can be related to various reasons for example, external factors that enforce organization to alter its business model for instance government regulations and/or bottlenecks that cause for example higher inventory in warehouse, which increases inventory cost. Reasons driving business processes to change are important to be realized by the employees when reviewing, redesigning or creating new business processes. The lack of clear reasons behind changing or redesigning a business process will not guarantee successful results especially when employing IT. That is why a clear understanding of the reasons behind redesigning or changing business processes is critical. Thus, the second theme examined the nature of driving forces for changing business processes. The questions asked to explore the driving forces for business process changes are:

Business Questions	IT Questions
- Do the changes in the business processes aim at automating the business activities or aim at creating more efficient and effective processes that add value to the business? - Do external factors have an influence on changing the business processes? To what extent?	Do the changes in the business processes aim at automating the business activities or aim at creating more efficient and effective processes that add value to the business?

Table 4 - Questions asked to explore the driving forces for business process changes

3.4.1.3 Theme Three: Realization of Business Process Redesign (BPR) Concept

As an organization grows, changes in its business processes are a must in order to create an efficient business processes to handle the demanding customers with lower cost and higher services. This is where business process review sessions are advised to distinguish the bottlenecks in business processes to remove them. It is not necessarily that business process change/ redesign occurs during business transformation. An effective supply chain examines and

keeps closer attention to business processes. The third theme will examine the realization of business process redesign concept in Borouge and its benefits in enhancing and removing bottlenecks in business processes. Hence, this theme covers:

- Business processes review
- IT involvement in business processes review

The questions asked to examine this theme are:

Business Questions	IT Questions
• Do you conduct review workshops for the business processes? If Yes ○ How often do SCM department review the SCM business processes?	• As an IT system support person, do you involve in the business processes review conducted by your respective business support function?
○ What approach is used to conduct the review?	• To what extent, do the business process owners accept the redesigning of the business processes, when you realized there is a need to redesign a particular business process?
○ What are the functions participate on the business processes review? What are the business roles of the participants?	
○ If not: how do you improve your business processes?	
• Do you think redesigning the existing business processes will solve lots of bottlenecks in the business processes?	

Table 5 - Questions asked to examine the realization of the BPR concept in Borouge and its benefits in enhancing and removing of bottlenecks in business processes

3.4.1.4 Theme Four: IT's Role in Enabling Business Process Redesign (BPR)

Redesigning business processes is enabled through effective exploiting of IT resources and systems. The complexity of IT and the external market changing factors that forces business process change emphasize the clashes between business and IT. IT contributes to the success of business process changes by its role in facilitating the best use of IT system to enhance business processes. Therefore, theme four examined IT's role in enabling business process redesign/changes. It covers the following points:

- How does IT manage business process change requests?
- Communication of business process change objectives
- IT assessment on business process change requests
- IT system's influence of business processes designs
- Measurement of IT-business added value

The questions related to this theme are:

Business Questions	IT Questions
• How do the changes in the business processes address to IT?	• How do the changes in the business processes address to IT?
• Do you communicate the objectives behind the reasons for redesigning the business processes?	• Do the objectives of the business processes change requests clear enough to implement the change?
• How are the redesigned processes assessed against the capabilities of the company's system?	• Does IT department have set of standard procedures to handle changes in the business processes? What are these procedures?
• Does the current system have an influence on driving the changes in the business process? Give example?	• Do these procedures have an influence on the way business utilize IT resources toward any business IT-enabled change?
• To what level did the implementation of any big change in the business processes impact the business structure? Give example?	• How do you assess the business process changes?
• After any redesigned business processes	• Does the current system have an influence

whether the change was handled in-house or through external consultant, how did you measure the effectiveness of the implemented IT solution?	on driving the changes in the business process? Give example?
How do you manage the interaction with other department if there are integration parts? How difficult it is?	- To what extent, do the business process owners accept the redesigning of their business processes, when you realized that there is a need to redesign a particular business process? - To what extent does the efficiency of the implemented IT solution on the business processes is realized to the IT and business?

Table 6 – Questions asked to explore IT role in enabling business process redesign/ change

3.4.1.5 Theme Five: IT Role in Supporting SCM

Common complaints about the supportive role of IT to enable business processes reflect the conflicts between business and IT. IT as a service provider should support business departments to optimize the powerful IT systems employed and to assist the growth of the organization. Theme five investigates IT's role in supporting SCM objectives. It includes the following points:

- Examining the optimization of SAP functionalities in Borouge
- The importance of SAP knowledge versus business knowledge in assisting both IT and business personnel in utilizing SAP functionalities
- How effective is IT department's support of the SCM department?

The questions asked to investigate the different aspects of supportive role of IT are:

Business Questions	IT Questions
- To what extent do you utilize the IT system capabilities to support the objectives of the SCM? - Does the functionalities of the current system are aware to you, that can help you to ask for	How does the IT management support IT resources to acquire the knowledge of the up-to-date IT solution?

business process enhancement?

- To what extent do you think IT department is flexible in enabling the business process changes in the system?
-

Table 7 - Questions asked to investigate the IT role in supporting SCM

3.4.1.6 Critical Success Factors and Challenges

Finally, challenges and difficulties during the organizational change are the restraining forces and obstacles that typically hinder the success of the company's goals. Investigating and analyzing the critical success factor and the challenges during the business process changes will assist the management to develop a controlling plan on the driving and restraining forces. Theme six investigates further the challenges and difficulties both IT and SCM personnel confront during business processes changes. The theme covers the following points:

- The critical success factors
- Difficulties and challenges

The questions asked under this theme are:

Business Questions	IT Questions
• What are the challenges SCM confront during business process change?	• What are the difficulties faced during business process changes?
• What do you think was critical in allowing the success of any project that aimed and redesigning business process?	• What do you think was critical in allowing the success of any business process changes project?

Table 8 - Questions asked to investigate and analyze the CSFs and challenges

In brief, this chapter presents the research methodology and approach which will be used in the research paper to examine and investigate further the research objectives. It also included the developed conceptual framework formulated from the literature review and how it is used to develop the themes for the data collection interviews. The following chapter presents general information about Borouge Company and related information about Borouge's business transformations, IT system used and Borouge's business processes.

4.0 Chapter Four: Borouge's Business Transformation and IT

As explained in the literature review that today's business world urges companies to transform to cope with the rapid pace of change. Borouge is one of the international companies that face a strong rivalry in the market which advocates its management to rapidly grow and transform to reach market edge. This chapter will provide information about Borouge and its business transformations. In addition, it will explain Borouge's IT department role and the approach used to support business departments in particular SCM department, which will assist in understanding the case analysis.

4.1 Borouge Story

Abu Dhabi Polymers Company Limited (Borouge) is one of the leading companies in providing plastics solutions to more than 50 countries across the Middle East, Asia-Pacific, Indian Sub-Continent and Africa. Borouge established in 1998 as a joint venture between Abu Dhabi National Oil Company (ADNOC), one of the world's major oil and gas companies, and Austria based Borealis, a leading provider of chemical and innovative plastics solutions. Borouge vision is "shaping the future with plastic", while its mission is "value creation through innovation". Borouge values create its own culture to help the organization grow and achieve its mission. These values are: respect, exceed, create and focus. Borouge is working with respect of the environment surrounding other communities and ensure building a safety and healthy environment to its employees where they can contribute to the growth of the company, while the company takes care of their growth as well through empowerment. Borouge is exceeding customer expectations through delivering their promises. They encourage creative and innovation ideas to its own products by their employees. Lastly, Borouge always focus on its customer to ensure that their products and services exceed customers' expectations and satisfactions (Borouge, 2008).

Borouge has two headquarters one for running the manufacturing plant called Abu Dhabi Production Company based in Abu Dhabi city - Ruwais area, 250 kilometers west of Abu Dhabi city – and one for running sales and marketing of Borouge products based in Singapore called Borouge Pte. Together with Borealis, Borouge employs a unique Borstar technology in Ruwais plant, which has a total manufacturing capacity of 600,000 tons of polyethylene per year (Borouge). The plant consisted of one ethane cracker and two Borstar polyethylene units.

Borouge has several sales offices & representative offices distributed in different locations; Singapore (HQ), Hong Kong, Shanghai, Guangzhou, Beijing, Australia, New Zealand, India, Abu Dhabi and Lebanon. Borouge production company manufactures polyethylene (PE) & polypropylene (PP) used in a wide range of plastics applications of water, gas and industrial pipe systems, medical devices, power and communication cables, advanced packaging and automotive components (Borouge, 2008). Borouge had 19 products when it first started and now it has 56 ranges of products.

4.2 Borouge Transformation Journey and SAP

Borouge experienced its first major business transformation during 2008 - 2010 to cope with the pace of change and to meet the ever-increasing demand of polyethylene (PE). Borouge owners decided to invest a multibillion dollar in expanding its plant facilities by constructing one of the largest ethane crackers producing 1.4 million tons of ethylene (EU) per year and the world's largest olefins conversion unit (OCU) producing 540,000 tons per year of PE and for the first time two new units of producing polypropylene (PP) with capacity of 800,000 tons per year. This project was called B2 project – Borouge 2 (Borouge). The new expansion plant was on operation in mid of 2009. Today, Borouge total capacity is; 2.1 million tons ethylene per year, Olefins Conversion Unit 752,000 tons per year, 1,140,000 tons polyethylene per year and 860,000 tons polypropylene per year. The second major business transformation is the next planned Borouge 3 transformation; a further expansion of Borouge petrochemicals complex in Ruwais in Abu Dhabi city, which expect to add approximately 2.5 million tons per year of capacity by 2014 (Borouge, 2008). In B3, Borouge's total products ranges will increase to 80 products to be sold globally to more than 3,500 customers.

Borouge Pte hired an external consultant to assist Borouge's management in the strategy analysis by conducting market research study, study AS-IS business process models, proposed TO-BE business process models and analyze Borouge's organization environment. Borouge marketing & sales company – Borouge Pte - has announced its strategic change plan for managing and distributing the huge volume of production capacity to the market. The strategic change was announced on October 2011 under a big campaign called Borouge 2015. Borouge Pte's management, which includes supply chain management department, learned the lessons from the first Borouge transformation - B2 - and realized the importance of having a right structure,

organization, business processes, mindset and culture in plan. The supply chain aims at globalization to sell Borouge's products actively by serving customers in their locations. A significant strategic change in Borouge Pte requires a solid foundation and flexible business processes. Thus Borouge Pte aims at designing a flexible supply chain concept to be able to handle Borouge's production of 4.5 million tons in line with business requirements and competitive balance of cost and service. This lead to a significant business transformation of current Borouge's business models which impact the entire Borouge organization.

To support the transformation of Borouge, a new organizational structure has been announced to ensure the right organization in place to manage the new era of Borouge journey. The strategic analysis pointed out some challenges Borouge is facing for example, predominantly global functions and business units (represent the products range, for example, wire and cable business unit, film and molding business unit ...) with centralized decision making, insufficient regional focus and local empowerment, insufficient local people management and shortage of good sales people at regional level. The new marketing and sales company structure is formed to make the organization more regional-centralized and customer focused, by creating:

- Three regional sales organizations that cut across current application-based Business Units with full responsibility for strategy execution
 - China
 - South East Asia, Indian Sub-Continent & ANZ
 - Middle East, Europe & Africa
 - Exceptionally, Japan and Korea are classified as business development areas.
- Centralized marketing and technical support with selected activities performed/managed locally, such as technical service for new customer development and marketing promotion
- Centralized and regional supply chain management with each region responsible for demand planning and management of local hub operations and customer service
- Better coordination of shared services at local level to better support the local business
- Dotted-line reporting between the regional organization and central functions to ensure alignment
- Specific functions to support innovation focus and growth and infrastructure projects

B3 program team is a cross functional team structured into eight work streams. The program management team consists of Borouge employees who were released from their daily operation to be dedicated full time for B3 strategy formulation and implementation. The team will be working with their consultant in each work stream and responsible to acquire the information and feedback from the business owners and business users regarding business processes. The implementation of B3 program will cover the deployment of new logistics infrastructure to have a flexible and competitive network, transformation of Borouge business processes to create more efficiencies in customer service level, developing sales strategy to focus on capability enhancement and commercial excellence, aligning performance management across the organization, IT system to fit the various business processes changes, new structures to identifies resources and capabilities, and change management program to ensure that organization is ready for the transformation.

4.2.1 B3 and Business Processes

Borouge has some problems in their current business processes that were not succeeded after the implementation of B2 IT SAP expansion program due to various reasons which will be obvious in the case study analysis in chapter five. Prior the implementation of IT system expansion in business processes in mid of 2012, Borouge Pte strategy aimed at first to perform immediate improvement to some of their business processes which have been identified and called as – quick fixes – to solve prevailing issues of current B2 setup. B3 program is responsible for identifying scope of work of new business processes and redesigning business processes that should be implemented in IT systems either using SAP (more information about SAP in section 4.2.2) or other external systems that is integration with SAP. These requirements are collected in IT front end engineering design study – FEED study – in the second quarter of 2011 which identifies IT B3 program that will executed by mid of 2012.

4.2.2 SAP

Since the establishment of Borouge, the company runs through a business management enterprise system called SAP – Systems Applications and products in Data Processing-. It is an ERP (enterprise resource planning) software developed by five former IBM engineers in Germany in 1972. There are two main strengths of SAP (SAP, n.d.). The first strength is the comprehensive set of integrated, cross-functional business processes that allows real-time

exchange of data which improves the organization analytics and the decision making processes. The second strength is the system is designed and developed based on the world best practices which give its client the capabilities to configure SAP functionalities in each area to meet the needs of the business. The system comprised of set of modules such as financial supply chain management (FSCM), financial accounting (FI), controlling (CO), sales & distribution (SD), logistics execution (LE), material management (MM), plant maintenance (PM), production planning (PP), project systems (PS),etc (Klee Associates, 2011). In each module of SAP, there are lots of functionalities that represent different business processes worldwide. As any company grows, certainly any kind of changes whether radical or incremental will occur to business processes to enhance existing business processes and/ or to introduce new business processes.

During Borouge's business transformation in B2 project, Borouge's business processes have to change to adapt the new increased operation transactions and fast-growing demand of customers. The organization went through huge transformation and for the purpose of our research paper; I will be talking only about business application system of Borouge which is SAP. As Borouge's executive management decided to expand Borouge's business, each business department analyzes their business processes and studies how the significant capacity of business transactions will be accommodated and managed. This is where business departments submit their requirements for SAP expansion, which includes enhancement to business processes or introduction of new business processes. Furthermore, a case study of supply chain management will be comprehended in the following chapters.

When talking about SAP and business processes in Borouge, IT department, business application system function and business process development function appear in the scene.

4.3 Borouge's IT and SCM Departments

Borouge IT department structured into four main units which are: IT Projects, Manufacture Application Systems (MAS), Client Support & Technical Operation systems (TOS) and Business Application Systems (BAS). The IT department involves in huge IT investments managed via IT projects to the concerned units of; Client Support & Technical Operation systems (TOS), manufacture application systems (MAS) and business application systems (BAS). The latter is the

team who is responsible for implementing and supporting SAP business processes. The team consists of SAP specialists, who are specializing in different modules of SAP. The team is in charge of analyzing the requirements coming from business departments and the different issues in business processes, studying these requirements and addressing them by configuring SAP system to meet business purpose. The most important aspect of SAP specialist is the dual knowledge of IT and business. SAP specialist in each area also becomes the lead of any SAP project the company undertakes, whether the activities implemented using in-house or external consultants, in order to ensure that the team acquires the knowledge of the new functionalities if implemented. In addition, SAP specialist in each area is the linkage chain between business department and the rest of BAS team.

On the other hand, supply chain function is part of Borouge Pte which consists of different functions which are: global demand and supply department, global logistics department, customer service department, quality management department, material handling department and SCM process development department. Each of the department has a business owner who is responsible for the performance of the business processes, should actively look for enhancement in the business processes, has the authority to approve and make changes in the business processes changes required, should develop procedure and work instructions and ensure the business process changes communicated across other functional and testing thoroughly. A active department in SCM is SCM business process development department who consists of business process development department manager, business process leader (BPL) and business process specialist (BPS). Each business process leader assigned to particular department and below business process specialist is assigned to specific work stream inside the department. For instant, the BPL is responsible to support the business processes of all over logistics department and will be the person who involved in managing projects. Within logistics area, there are two BPSs; one responsible for logistics in the hubs and another one responsible for logistics in Ruwais. BPLs and BPSs are the first line of support to any SAP related issues that faces the business users while executing daily transactions. They communicate to BAS team any problems that they couldn't figure it out, to request enhancement in the business process or new business process model needs to be configured in the system. In addition, they are the business lead for any SAP project, the company undertakes; whether the activities are in-house or using external consultant. They act also as the linkage chain between business department and their counterpart from BAS

team to any SAP related issues. It can be seen that the role of business process development department plays an important role in facilitating the communication to the IT department. These personnel are having more of business processes knowledge than IT knowledge which creates one support unit with IT to support the organization to achieve its ultimate objectives.

4.3.1 IT and Business Processes Changes

IT receives business process changes through four methods as shown in figure 11. The first method is receiving the requests as planned projects submitted in the annual business and investment plan, where IT strategy and planning strategy needs to analyze it, validate it and prioritize it. The second method is for unplanned projects called (ad hoc projects) which are received via IT strategy and planning department or through IT system analysts as normal change requests. After the analysis of these requests, it is decided whether to implement it as change requests or as projects based on time frame, cost and complexity of the change, resource availability to implement the change ...etc. The change can be handled internally or by external resource for instance in B3 SAP project. In addition, there is an IT advisory committee (ITAC), which includes IT management and business owners to discuss and approve ad-hoc projects based on its urgency and importance of change to Borouge. The third method is service requests and change requests, through request for change system (RFC). Service requests are requests related to IT services, while requests for change (RFCs) are those requests with major and significant impact on the business. These requests are designed based on ITIL – Infrastructure technology information library-. The changes will be handled using internal recourses. The RFCs initiated should attach business case documents that describe in detail the problem, AS-IS design, objectives of the change, TO-BE design, benefits, authorizations, risk assessment, mitigation plan ...etc. Change requests of business processes using RFC system is referred to as part of continues improvement in business processes. The fourth method is incident requests which are received if there are incidents occurred in IT infrastructure that impacted the operation continuity.

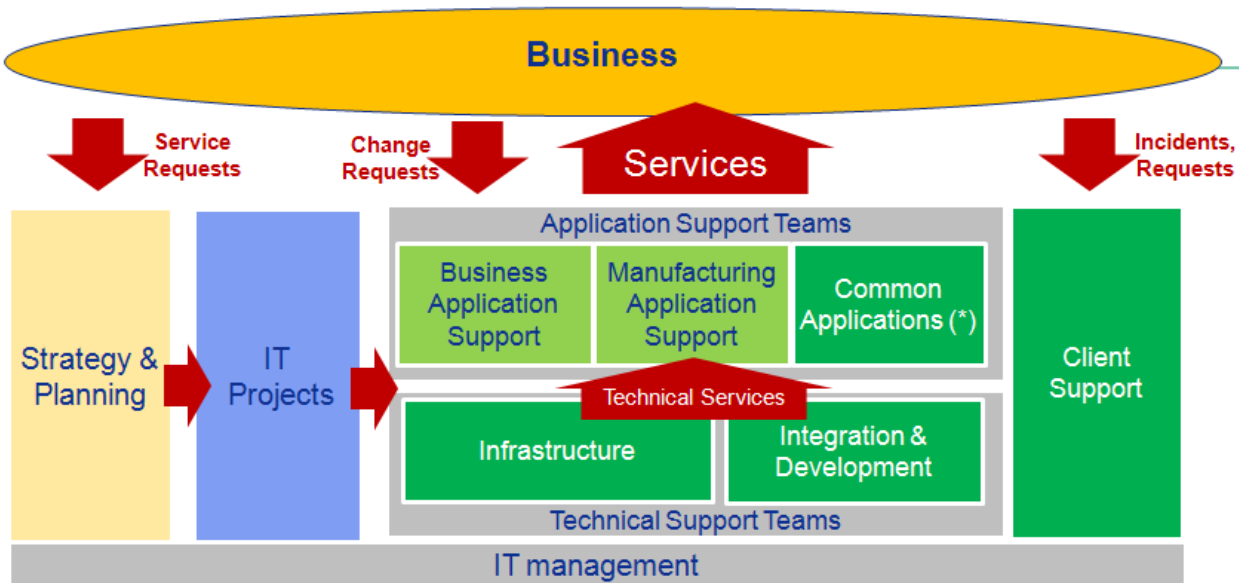


Figure 11 - How Changes are Addressed to IT

4.3.2 SAP Technical Upgrade Project

It is worth mentioning the role of IT in order to ensure having a strong infrastructure system to support Borouge organization. Due to Borouge's growth and the dynamic market the urged Borouge to transform, it is required to have flexible business processes that can be maintained accordingly based on the market requirements. IT department is currently executing SAP technical upgrade ERP landscape from ECC 5.0 to ERP 6.0 combined with Unicode conversion in order to enable Chinese characters as per the demanding requirements to enable foreign languages especially for financial statutory reporting in China market. The newest version of SAP has a lot of enhanced business processes functionalities based on best practices in the world and new functionalities that will support and align Borouge's business processes across the manufacturing and sales & marketing companies. This project will enable new functionalities to enhance business processes which will be configured during B3 IT SAP project which will be initiated by mid 2012.

This chapter provided information about Borouge's business transformations and IT and SCM departments. It also presented brief information about the business application system which is SAP that is employed to support Borouge's business processes. The following chapter will cover the data analysis of Borouge obtained from the semi-structured and unstructured interviews with the employees.

5.0 Chapter Five: Case Study Analysis

Business transformation and role of IT in enabling business processes changes was studied in Abu Dhabi Polymers Limited Company. The case study was examined through the conceptual framework concluded from the literature review to understand the relationship and factors incorporated between business transformation and IT role. The questions aims at answering the objectives of the research paper explained in chapter three – section 3.4.1. The themes developed from the conceptual framework are:

- Preparation for Borouge's business transformation in SCM and IT departments
- Driving forces for business processes changes
- Realization of business processes redesign concept
- IT role in enabling business process redesign (BPR)/ changes
- IT role in supporting SCM
- Critical Success Factors and Challenges for business process redesign

5.1 Strategy Preparation and Implementation in SCM and IT Departments

People are the driver of any given business transformation. Communicating the strategy and preparing employees are essential steps in strategy formulation to ensure employees are aware of the desired status quo. Both SCM and IT departments should prepare to implement business transformation strategy and ensure that people are managed to devote their efforts toward the success of the strategy.

5.1.1 Borouge Pte Strategy Preparation and Implementation

Borouge Pte - marketing and sales company- has developed its strategy to handle efficiently the increasing volume of 4.5 million tons of production to different growing customers with different purchasing patterns, industries and geographical locations. Borouge Pte management created a campaign called Borouge 2015 and announced its strategy in the quarterly forum to all Borouge's employees. Most respondents from SCM department felt that this is a good starting point to clarify the transformation's vision and goals to prepare Borouge's employees for the transition period they will go through and the challenges they will face to put up for sale the increased volume of Borouge's products in the new regions. The forum also highlighted the silo thinking problem in Borouge's employees and the need to change the way of doing the work in

order to survive in the strong market competition. From the forum presentation and the strategy awareness campaign, it seems the strategy communication is well structured and touched very importance aspects that were not seen in the previous business transformation. The B3 strategy in Borouge Pte aims at redesigning the supply chain concept and creating new logistics infrastructure, which will transform Borouge's business processes, sales strategy, performance management, IT system, roles, responsibilities and capabilities.

B3 program structured into different work streams; each work steam includes consultants and a representative from the business areas to work full time in the project to manage, coordinate and support the transition program, monitor progress and track impact and health of the project, identify and launch targeted interventions, frame and enable decision-making and prepare communication to key stakeholders. Involving and empowering Borouge's people either for input, coordination and decision making creates sense of ownership in employees and hold them accountable and responsible for achieving the desired status quo of Borouge's business strategy. The strategy recognized the importance of creating an efficient business processes utilizing IT, which lead to redesign the reporting structure in Borouge and business processes to create alignment among them across the organization.

5.1.2 IT Strategy Preparation

IT executed IT FEED study, started by the second quarter of 2011, via an external consultant to gather business processes requirements from business departments to recommend the required IT systems to enable business processes changes. IT respondents considered the IT FEED study a preparation approach to prepare IT team for the transformation of the business prior to the execution of B3 business processes changes. One of the advantages of running IT FEED study by 2011 parallel with B3 program strategy formulation is the reduction of the time gap between the IT FEED study and the implementation project by mid of 2012, yet business process requirements will not have big variations. In fact, this was the opposite in B2 IT program which cause scope creep that result in a lot of business processes problems at the end of the project. When executing B3 SAP project, IT system analysts will involved as IT project leader for their respective areas for instance, Finance and Controlling (FICO) IT project leader, production planning (PP) IT project leader ...etc. Their involvement alongside the consultants is to ensure the knowledge transfer to Borouge IT SAP team, coordinate the communication and discussion

with business project leaders and advice on changes suggested by the consultant whether it fit Borouge's business model.

5.1.3 People Adaptation to the Redesigned Business Processes

This is one of the most important factors that determine the success results of any organizational change. From the discussion with IT and SCM personnel, resisting changing and sticking to the old way of doing business are the major restraining forces in any business transformation. Few respondents highlighted the essentials of explaining why we are doing the change for the company. The vice president of B3 program stated “*people divert from the new way of working, if they face the first problem*”. Borouge learned a lesson from B2 project and planned to have a team formed as part of B3 program structure called change management and capabilities. The role of this team will be focusing on managing people and how to change their mindsets in order to influence positively Borouge's organizational culture. This is a good initiative Borouge Pte is taking into account. It focuses on thorough training to prepare and develop the capabilities of the employees when the production of B3 expansion will ramp-up. Others also recognized the importance of involving business users in the change cycle and decision making to create sense of ownership; for instance, involving business users in user acceptance test (UAT) phase to allow them to get clarifications on the type of changes and get answers to their questions to make them ready for the change.

The business process development department in SCM consists of business process leaders (BPL) and business process specialists (BPS), who are trained by IT system analysts on how to use SAP and how to analyze Borouge's business processes when issues occurred. Later, it is the responsibility of the BPL and BPS to train the other users. IT system analysts also prepare all user manuals and training materials for only new changes or new functionalities in SAP. The business process development department actively is playing a role in training business users on executing business processes as kind of refreshment sessions. These sessions are part of the training calendars which scheduled for different business areas within supply chain department throughout the year. It is highly believed that these sessions can assist employees in following up with the changes in business processes and to ensure that the new business processes are adapted by the users; however, it may not be effective if people are not trained on how to think systematically and adapt the new way of doing the business. Obtaining the analytical and

systematic thinking skills will help them to handle system errors and analyze the business processes to investigate what was entered wrongly in the systems when performing business process activities. In addition, it can be seen that these sessions will create an awareness of the business users on looking at the big picture of business processes, but it seems the concept of the importance of understanding business process logic is not yet developed completely in Borouge environment.

5.2 Driving Forces for Business Processes Changes

Organizations are being driven by external forces that drive reshaping of business processes. The driving reasons of changing business processes in Borouge for B3 program were clear to business employees who were interviewed, because it was resulted from the study the external consultant conducted on market study research, AS-IS business processes models of Borouge Pte and TO-BE business processes models.

5.2.1 External Forces Factors

Most business respondents emphasized the challenges the organization are facing from competitors and agreed that business processes need to be changed to be flexible enough to respond to the fast demand and changing conditions of the market. The vice president of B3 program expressed the market challenges Borouge is going to face in the new market – Europe - by saying *“if we are reaching customer outside our region, they already have a local producer who can deliver with less time and with lower cost”*.

The respondents recognized the importance of changing or redesigning business processes with two criteria which are as stated by the vice president of B3 program *“what we are designing fit the future, which can’t be 100% guaranteed due to the dynamic market, and the process is flexible to be fine tuned in case it didn’t fit the future”*. Another factor was the government regulations of foreign countries like China market which stated by the business process development department manager of SCM as *“.... very dynamic market and unanticipated”*. Most respondents from SCM department recognized the impact of such factors to business processes which requires immediate responses to change business processes designs in IT systems. This raises the issue of quick fixes, suggested by the consultant who conducted the

Borouge's strategy study, to redesign business processes in IT systems. This point will further discussed in section 5.4.3.

5.2.2 Business Processes Efficiencies

Both SCM and IT departments agreed that automation of business processes and creating more efficient business processes are the most requirements needed and have been requested in IT FEED study requirement gathering. Business participants believed that there are lots of manual work and processes that can be automated using IT, which will increase the efficiencies of the processes and will free employees to concentrate on other important tasks. For example, senior customer service manager proposed the automation of sales order creation by customers via websites. As the sales order is created it will be converted and entered into Borouge's system and will be processed accordingly and notified to customers via internet on the delivery date of the goods. The respondent stated that it takes 12 hours executing the process manually, while if it is automated, it will take around five minutes. One of the interesting responses highlighted by supply planning manager and team leader – shipping specialist - was the transparency of the data and information from SAP system. They stated that they download the data from SAP in excel format and perform their analysis, which takes a lot of time to generate the required information. This indicates two points. First is the fact that Borouge's employees do not trust the result generated from SAP system which is caused by wrong entering of data. Second is the comfortable level of Borouge's employees using manual work though SAP is a very powerful integrated system where a lot of data and information can be generated through standard reports or customized reports based business user request.

5.3 Realization of Business Process Redesign Concept

On daily basis, Borouge's business processes is on continuous changes due to system errors and problems carried forward from B2 project, some changes in Borouge's business models happened due to government regulations of local or foreign market as referred earlier in point 5.1, requests from business process owners to improve a particular business process or activity and/ or new requirements to automate some activities in business processes. Continuous changes in business processes and silo thinking indicates nonalignment of business processes in Borouge. This advocates the need to perform business processes reengineering project in Borouge.

5.3.1 Business Processes Reviews

Given the fact that supply chain business process development department is a good initiative to manage business processes changes, there are no workshops conducted to review Borouge's business processes in a regular basis to identify bottlenecks and create value to business processes. However, SCM has one monthly leadership meeting where business owners and department managers discuss critical issues in business processes. Some respondents stated that if they noticed a problem in any business process they raise their concerns to the top management to take action to discuss further and resolve the issues. Majority of respondents agreed that they do not have sufficient time to conduct a review on business processes with involvement of all business functions to solve bottlenecks and/or enhance business processes. However, respondents pertained to B3 program which will be in charge of analyzing the current AS-IS situation and provide recommendations on how business processes can be improved.

Borouge finalized B2 transformation in 2010 and started working on B3 transformation in 2011, which indicates continuous transformation manner without an adequate stability period to workout business processes issues and to ensure people are not retaining to the old way of running business process activities. Small number of respondents agreed on the criticality of redesigning Borouge's business processes to solve bottlenecks, which should be conducted by internal resources rather than external consultants. The supply planning manager stated that in nine months average of 2500 change requests - small to medium level – have been raised to IT per month for the demand planning module in SAP. The demand planning module in SAP is not well integrated with other modules and creates obstacles when processing other business processes creating sales. In demand planning module customers are allocated with xxx tons of material A, which if the customer order more than that the sales order cannot be created in the system for that customer. From the discussion, it was obvious the good understanding level of SCM respondents on their respective business processes issues and the related impact within the SCM.

The business process development department manager in corporate support, who specialized in business process reengineering, strongly emphasize reengineering of Borouge's business processes. He observed silo thinking among different functions and what make it worst is the silo thinking within the function itself. In addition, the rapid growth of Borouge does not give

sufficient time to think about businesses processes issues and review them. Though B3 program taking into consideration changing people's mindset, it may not solve the current problems in business processes, unless people developed the understanding of the importance reviewing business processes to align them.

5.3.2 IT Involvement in Business Process Review

From observing the work nature between IT system analysts and business process specialists, most IT system analysts do not participate in any business processes reviews with business owners except for complex requirements at the initial stage of designing or redesigning business processes. However, from the discussion with SCM business process development manager, business process leader, business process specialist and IT system analysts, they agreed on the importance of engaging IT in the initial design especially the complex business processes to build a common understanding of business process change objectives, to provide advices on SAP capabilities to support the change concept and what options SAP can offer to enable the needed business process changes.

Business process change requests submitted to IT to some extent do not have clear requirements and objectives, as one system analyst said *"it does not sound logical from business point of view"*. It has been observed that Borouge's employees think about what the system offer to design business processes rather than thinking of creating business process logic that enabled by IT. One reason for the system driven way of thinking is the different business processes practices SAP offers to business users, which makes it easier to adopt the way system works rather than on how best business processes should be. It indicates a lack of understanding business processes logic, which is obvious by depending on external consultant to redesign Borouge's business processes instead of utilizing employees with long experience in the company. Although using consultant's expertise to direct Borouge's employees to develop a new way of doing things is one approach when looking for updated expertise, it may not reflect the sense of ownership within employees if they depend totally on them. Diverting to the old way of working can be easily occurred from the first problem that may rise in business processes. This is why stabilizing the organization after business transformation is essential to obtain control and ensure employees follow the new way of working.

5.4 IT Role in Enabling the Business Process Redesign (BPR)

From observation, IT role has a significant impact on controlling the continuous increasing number of business processes change requests. IT is an enabler tool to business processes; nonetheless, Borouge's IT is acting more than enabler mechanism to business processes changes. It takes the responsibilities of ensuring the alignment of business functions when receiving business process changes that might have integration impact. This theme discusses further the aspects of business processes changes and IT. It is divided into five sections: how does IT manage business process change requests, communication of business process change objectives, IT assessment on business process change requests, IT system influence on business processes designs and measuring IT-business added value from the implemented IT solutions.

5.4.1 How does IT Manage Business Process Change Requests

IT department receives business process changes through four methods as explained in chapter four, section 4.3.1. The first method is receiving requests as planned projects submitted in the annual business and investment plan. The second method is for unplanned projects called (ad hoc projects). The third method is service requests and change requests which are designed based on ITIL – Infrastructure technology information library-. The fourth method is incident requests that disturb the continuity of the business. Changes in business processes follow either service requests if the change impact is minor or request for change (RFC) if the impact is major or signification.

IT department has established procedures to handle change requests as mentioned above through RFCs based on ITIL standard, which was instituted to unauthorized unrestricting changes, to provide impact analysis prior incorporating the change and ensure the changes requested will not interrupt the availability of the live systems. This way of working was only within IT department. IT respondents agreed to some extent the benefits of these procedures in pushing business process leader/ specialist to get the requirements in structured documents with approval from business owners. However, this did not eliminate the problem of not having clear requirements especially when it comes to integration areas. One problem noticed is due to the fact that these procedures were not published officially to business departments as the standardized way of requesting changes in business process, it makes IT team role rather difficult to fight to get business requirements clearer through the documentation provided. In fact, IT

analysts enforced business process specialists to provide requirements via the template created by IT in order to incorporate the required changes. IT vice president believed that it is better to ensure that IT employees get to use to the habit of working in a controlling manner, before routing the procedures to all organization to follow when requesting any IT service. This might be true, however, SAP team do not work only within IT. All their interaction is with business users. Perhaps IT needs to be a bit open on their role in the organization and to standardize the way of working with IT to reduce IT personnel pressure. It will definitely change totally Borouge's culture and it will facilitate the work of IT system analysts to control and manage business processes change requests more effectively.

5.4.2 Communication of Business Process Change Objectives

Business respondents, who work on operation side, seem to have clear objectives on their business process change requirements. However, comparing these responses to the responses of business process leader, business process specialist and IT analyst teams, it showed the opposite. They strongly emphasized the ambiguity of business process change requests or new business process design/ redesign. One of the business process specialist stated that business users/ owners send a request with what they want without any clear specifications of the requests for example, business process change of demand planning, not considering an impact in the integrated areas for example order to cash, finance ...etc, whether number of users will change, who will execute the processes, any authorization access in the system is required ...etc. The business process leader expressed it by saying *"business requests are like saying I want a house on a beach!! What beach! how big the size of the house, how many rooms, how many floors ...etc no clear specifications"*.

The silo thinking of business employees' makes business processes changes rather difficult to handle and manage within such rapidly growing organization. It creates conflict between business and IT when changes are rejected for missing clear requirements and objectives. Business respondents stated that a pre-study of the request is done before it is addressed to IT as a change request, nevertheless, this may not be true to all business process specialists. Supply chain business process development department manager agreed that some change requests to create new business process or change existing one are submitted with no clarities on what is the

design or how the design should be. He stated “..... we receive IT comment saying “do you know what you want?””.

Supply chain business process development department is responsible to look after business processes and support any changes in the organization. However, the problem may be seen for three reasons. The first reason is possibly that business process specialists are not clear on the responsibilities of their job. The second reason is may be due to lack of motivation of the business process specialist as it is not rewarded enough to reflect the importance of such roles in aligning all business processes and activate business processes changes in a professional manner to make Borouge operate and compete strongly in the market. The third reason is the high dependency on the different business scenarios SAP offers that facilitate of redesigning business processes. One of the IT system analysts with a strong business knowledge background, being an accountant and auditor for 12 years, stated that “*I am very much involved in the redesigning of business processes, because I used to reject any changes if it does not sound logic from business process point of view*”. It pulls another problem which is the competent level of the business process specialists in understanding business processes as an interlinked chain of activities regardless of IT system.

5.4.3 IT Assessment on Business Process Change Requests

IT system analysts perform an impact analysis on businesses process change requests. The impact analysis will include the impact of the system’s behavior upon incorporating the changes in other integrated areas. One recent example of a proposed new business process being observed, part of the quick fixes of business processes decided in B3 program. The request submitted to IT through project charter, prepared by supply chain business process development department, to be handled using in-house resources to start exporting Borouge’s products to Europe warehouses and to be sold by Borouge partner company Borealis. The project charter developed as a high level design of business process model from logistics point of view. No finance requirements were included for instance what sort of financial data should be captured, visibility of the charges being added in the material price in the partner’s system, what general ledger should be used, how the cost will be incorporated in Borouge financial books ...etc. This example shows the rigid and narrow view and the silo thinking between business departments when prepared the project charter. The more interesting observation was the silo thinking noticed

not only between business departments, but also within the department themselves. The business model of export to Europe was discussed and approved by the business owners of Borouge and Borealis involving logistics, finance, supply chain and legal functions. However, when IT team from all SAP modules initiated a meeting to ask clarification on some ambiguity on the integration requirements, by inviting business process specialists of each area, finance BPSs were not familiar with this new business process model, though their two business owners from finance in Abu Dhabi and Singapore office participated and approved the model.

Another point the above example indicates given the context of supply chain business process development department is the way SCM business process development department addressed the request without in-depth analysis on the integrated functions impact and requirements. From the discussion with the SCM business process development department about this project, it seems they did not involve in the discussion of the quick fixes of business processes. Doing quick fixes does not really facilitate or enhance the situation of Borouge challenges covered in the strategy if it did not studied carefully and dealt in a proper way. Although B3 strategy study gave a strong emphasis on people and process alignment, the example above showed the difficulties Borouge is going to face by addressing changes in business processes with the same mindsets of people.

It was interesting to hear one of the respondent's comments during the discussion that it is the responsibilities of IT system analysts to bring all respective functions to discuss business process requirement changes. It does not reflect only IT role in enabling business processes changes, but also it pushes IT to take the lead on driving the changes in business processes. Consequently, it manipulates people's mind to rely on IT to design business processes as explained in the above section 5.4.2.

It has been noticed that SCM department does not have a change management procedure to manage changes in business processes. One of the respondents stated that if they have an idea for improvement or observation of an issue in business processes, it will be escalated to their own management within SCM department and it will be discussed internally during their monthly meetings. In addition, they depend on the change management procedure that was enforced by IT department for medium and major RFCs.

5.4.4 IT System Influence on Business Processes Designs

SAP as explained in chapter four – section 4.2.2 – is developed as per the standard best practices in the world to suite different business scenarios in different geographical locations. SAP has an influence on driving changes in business processes, which makes business personnel complains saying *“Borouge is IT driven rather than business process driven”* as stated by one of the system analyst. This is due to the fact that business requirements submitted to IT do not have a clear picture of the detailed design. Additionally, the dependence of business users on what SAP offers to modify business processes as shown in section 5.4.2 facilitate addressing their requirements from system point of view. This cause IT system drives business process changes.

In the case where business process change requests in IT system require redesign of business processes, IT system analysts confirmed that upon explaining in details and justified the value added to business processes, business owners most likely to accept the redesign solution proposed by IT, while some will not accept easily though all information is clear as stated by IT participants. This indicates that people are afraid of changing and getting out from their comfort zone. Some maturity level was shown in few interviewees from SCM department when it comes to systemizing business processes. The senior customer services manager stated *“some compromise can be made to fit the system requirements, but the main process will stay the same”*. Two of the interviewees realized it is about the way of working and the willingness of the people to change the old way of working.

The current SAP version is an old version (ECC 5.0) which has some restrictions to some extent do not accommodate some of business process changes requirements for example, the inability to generate the required legal and government documents in Chinese and Arabic languages. However, business respondents believed that IT has to enable business requirements; though it may not be supported by the ERP system deployed. Vice president of B3 program said *“IT system should not restrict the business from performing the business task”*. IT department has realized the system limitation to support business process changes with the old version, therefore, IT department is currently running SAP technical upgrade project to upgrade SAP platform from ECC 5.0 to ERP 6.0 in order to support business processes changes in B3 program by mid of 2012.

The system will not impact the structure of the business organization; however, it requires a clear identification of the roles and responsibilities of the tasks at the different level. This has been noticed as a problem by the business process leader and specialist, because as changes being incorporated in system, people who suppose to execute the process are not familiar on their roles and responsibilities because they were not involved in the changing process. It induces a resistance to change when people are defined after implementing the change, without being part of the change.

5.4.5 Measurement of IT-Business Added Value

Borouge does not have a technique used to measure neither IT-business added value nor shared key performance indicators (KPIs) to motivate employees to work for one goal. It is because Borouge are function driven rather than process driven. It is a common thought that IT-business added value cannot be measured because IT results are not measurable and intangible. However, the added value of IT is by creating an efficient business processes. Team leader –shipping specialist stated *“we do not have time to do the measurement, but they can feel the differences of the added value after the automation of the business processes”*.

IT strategy and planning department manager and IT projects department manager pointed out one of the ways to measure IT-business added value which is time writing to measure the efforts of running business process before and after business process redesign. Some SCM interviewees are aware of the importance of measuring the improvements of their business processes. Within their own department, they perform some measurements before they make the proposed changes in business process and after. For example, cash in advance orders; where cash should be received in the bank in order the customer service representative can start processing customers' orders. The customer service representative checks with credit management team whether the cash is received to Borouge bank account, from which customer and how much the customer paid. The process measured to take 2-4 weeks. After automating the notification process by the bank to five department; sales, accounting, supply, demand and customer services, the process time reduced by seven days. The senior customer service manager shared the figured with his management in order to encourage the rest of the department to measure the value added when enhancing their business processes. Measuring the added value of the business processes encourage and motive people to bring ideas.

The KPIs of whole Borouge are not aligned and missed incentives which keeping people encapsulated with their shells. People work for several needs as described in Maslow's hierarchy of needs, the need of self actualization. Lack an incentives KPIs and misalignment of the KPIs among different function, misguide people as each one will focus on their own target.

5.5 IT role in Supporting SCM objectives

IT role is not embedded only in implementing business process changes, but also it should facilitate optimization of SAP to serve and enhance business processes. This part will discuss optimization of SAP functionalities in Borouge, the level of SAP knowledge versus business knowledge to assist both IT and business personnel in utilizing SAP functionalities and how effective IT department supports SCM department.

5.5.1 Optimizing SAP Functionalities

SAP functionalities are not fully optimized by business department. This can be referred to the rigid thinking of sticking to the old way of doing things and the lack of SAP knowledge and its capabilities to improve business processes. For example, SAP can assist finance in budget monitoring for any purchases occurred in small projects using project system module in SAP as it will give finance a cost control monitoring tool. Though IT system analyst informed the business owner of finance and users on the new functionalities the system can offer to improve their business processes, business users prefer to follow the manual work on monitoring the budgeting. The senior customer service manager noticed in B2 SAP project, a lot of functionalities were introduced by the consultant which added bigger responsibilities on Borouge's people rather than automating a lot of manual activities to create an efficient business processes. Thus, in B3 SAP project, SCM department asked a lot of business processes automation to speed up activities execution and to increase its efficiencies to serve customer better.

5.5.2 SAP Knowledge

From the discussion with SCM department, lack of SAP knowledge on the way it functions makes it difficult to use SAP effectively and to think on how SAP can enhance their business processes. This can be seen as one of the reasons why business employees depend on IT and involve them in business process redesign/ new design discussion when only a high level design is provided from the management. Supply planning manager and team leader – shipping

specialist - believed SAP knowledge is always a learning area and they sometimes depend on few people from SCM department who are familiar with SAP to ask them on how to use SAP effectively. SCM respondents highly believed that having an SAP expert working as business process specialist is very essential to assist business to solve a lot of business process issues in SAP and to enhance some SAP modules which are not performing according to business requirements. The business process specialist informed that the demand planning function hired a consulting company to evaluate demand planning business processes in SAP and to advice on how to redesign the business process and to solve SAP errors.

It was noticed also the importance of having business knowledge to facilitate fulfilling business process changes in the system. IT system analysts believed that understanding business assist them to map business processes requirements and provide gap analysis on current business processes whenever a redesign on business process is required. All IT system analysts proactively assist business owners and business process specialists to show them new functionalities in SAP to enhance their business processes by configuring the new changes in development environment and test it and analyze its outcome with business users before actually getting the approval to deliver the new setup to the live system. One of the IT system analysts stated *“I imagine myself as a consultant, I study the new functionality and assess the benefits on our business processes, create a prototype, perform the risk assessment and present it in a power point slides”*.

As highlighted in section 5.1, IT management depends on external consultant to gain benefit from their expertise to serve business and to train IT system analysts on the new functionalities in order to support business departments after finalizing the project. Though there are some restrictions for sending IT resource to SAP training due to budget limitations, IT department provides different mediums for SAP team to get knowledge on new functionalities or get help to solve system problems for example, accessing to internet, SAP publications, knowledge transfer from consultant which is one of the requirement on the external consultant needs, providing different environments for exploring new functionalities or any changes and SAP forum access.

5.5.3 IT Department Support SCM

From the discussion with SCM department, it was noticed that due to the increased number of changes in business processes, IT reaction and response time is too long. Some referred it as a shortage in manpower, as there is SAP modules supported by one resource for example SAP modules production planning and detailed scheduling (PPDS), material management (MM) and production planning (PP) are supported by one personnel. Some respondents however showed their understanding of IT resources being engaged in a lot of activities and cannot support the tremendous changes in the business processes.

This explained why IT management hired external consultant to conduct the IT FEED study as the internal resources are busy with daily operation and support. Despite this fact, using in-house resources to enable business processes changes can be seen as a better alternative to the external consultant, if they are provided with the required training on the new functionalities. This is because the internal resources are more familiar with nature of Borouge environment and the business IT requirements.

One of the negative aspects of using external consultant is no proper knowledge transfer to the IT systems analysts which disable them to support the system when errors are generated. It was clearly recognized by SCM participants that issues within B2 SAP project was due to the dependence upon the SAP consultant, while the knowledge transfer did not happened properly. In addition, the fact that the business owner who signed-off on the deliverables of the milestones are not involved in the system operation, which ended up agreeing on suggestions implemented by consultant that are not discussed with the operation experts to check if it fit Borouge's environment. When the consultant finalized the project and left the project, IT system analysts and SCM business process specialist did not understand how the system works. From the first errors generated, IT system analyst could not support the system and employees returned back to the old way of working, for example, the implementation of the supply network planning (SNP) module, which is not utilized by Borouge SCM.

For daily IT support, IT system analysts train business process leader and specialist on how to use SAP for the new functionalities or new changes. Later, it is the responsibility of the business process leader and specialist to train the other business users. IT system analysts also prepare all

user manuals and training materials for only new changes or new functionalities in the SAP. This shows the effective role of IT in providing the required support to business functions.

5.6 Challenges and difficulties of the organizational change

This theme aims at investigating the challenges both IT and business personnel confront during the organizational change and in particular when redesigning business processes. This section is divided into two; critical success factors and difficulties and challenges.

5.6.1 Critical Success Factors (CSFs)

Business respondents rank people as number one for being the most critical success factors. It is obvious throughout the case study analysis that people either business owners or business users are the drivers of business process changes. There are lots of factors that drive the success of business process changes mainly are; the involvement of the right people in redesigning business processes, acquiring the right knowledge and listening to other opinions and feedback, taking an ownership and work as a team to accomplish the ultimate objectives of the company and the effective communication to ensure affected areas are involved.

Besides what SCM respondents noted as CSFs, IT respondents highlighted a lot of CSFs. Clear requirements ranked number one among the responses. It has been highly recognized that business processes redesign or change requests sent to IT do not have clear understanding of business process as a complete chain, which makes the requirements focused only on one functional specifications regardless of the impact and requirements from other functions. Number two from the rank was clear ownership personnel who should approve business process changes after consulting other business owners to ensure that all business processes are aligned. Number three of the rank was resource availability. It is one of the problems associated with ownership, because if people showed uninterested and careless behaviors by not attending meetings and not taking any actions or follow up or making decision, it is a sign of lack of ownership and responsibilities on the resource assigned to the task and unmotivated employees. This increases the resistance to change. Other CSFs highlighted by IT respondents were right project management to ensure that all involved parties are aligned and milestones are delivered and signed-off by business owners. In addition, the cost benefits analysis which can determine the success results of business process redesign exercise when using IT.

5.6.2 Challenges and Difficulties

Functional driven organization is number one challenge for SCM department. Some respondents highlighted the difficulties to align all functions to take a role in any business processes discussion, which makes taking approval to implement IT system changes longer. It has been noticed that IT effectively working to align all business process owners and BPSs for big project, however, for small change with underestimated impact on other processes, aligning them before the change take place become rather difficult. This ends up blaming IT on implementing a change without aligning all stakeholders. One interesting opinion from SCM respondent was *“IT should drive to align all business processes, so IT does not end up doing a change that will impact other area”*. This indicates four observations; unclear business process redesign requirements, silo thinking, lack of ownership and system driven people. Business processes should be thought of as interconnected activities, not as system activities where IT is responsible to take ownership and responsibilities of business requirements. Last and important challenge for SCM is the data integrity of master data especially in the material master data where a lot of wrong setting has been stored, which has a big impact on our financial figures, for example, a wrong setting on the measurement unit can affect our material cost and price. Some respondents recognized that SAP has a lot of data that needs to be analyzed which unfortunately is done manually through Microsoft Excel format. The supply planning manager stated *“we do not trust the number in SAP, we depend on excel work”*. The data entered in SAP is generated from people entering data which is used by another function. A broken business processes and the silo thinking, created unrealizable data and thus information through SAP standard reports.

Lack of clear ownership and alignment between business stakeholders was on the top of the list that IT respondents considered it as a challenge. As stated a change requests created to amend business process in one area for example demand planning, while the major impact is on the other sales area. Business users request changes through IT and wait for IT to get the required approval from the sales area to move on with the change. Also, last minute change was one of the most challenges IT is facing whenever there is a big change in business processes, which delay the implementation. Such behavior requires all participants to start discussion again of the request of change with involved parties, conduct impact analysis, get approvals and redo the user acceptance tests prior to moving the new changes to the live system.

This chapter presented the data analysis obtained from the interviews with Borouge's employees. The finds were categorized based on themes to create a better understanding of the phenomenon in Borouge between business processes, IT and people. The results of this chapter will be used in the following chapter to discuss comprehensively findings and to draw a conclusions and recommendations.

6.0 Chapter Six: Discussion and Conclusion

Analyzing the case study based on the conceptual frame developed from the literature review builds up a bridge to connect the findings for further discussion to draw a conclusion for the studied topic and to provide recommendations. Therefore, this chapter is structured to discuss the research findings, summarize the results to assist in providing recommendations. It also highlights the research limitations and further research studies noticed from the studied topic.

6.1 Discussion

The objectives of the interviews were to get an understanding of Borouge's business transformation strategy that identifies the driving forces of this transformation and to understand challenges and difficulties IT asset and business stakeholders face during the transformation. It also aimed at investigating the realization concept of business process redesign and how this could leverage IT capabilities to accomplish SCM objectives.

6.1.1 Driving Forces of Business Transformation

Borouge is a fast growing organization and one of the strongest competitors in the market. Reaching the competitive edge and competing to keep the organization's position in the market is the most challenge Borouge is facing. The dynamic market demand and the strong competition urged Borouge to be closer to their customers and to increase their product ranges based on the different requirements received from the market. This puts pressure on Borouge to revise its strategy which led to a transformation to enable the company to handle the increased volume of production and to efficiently increase the sales of Borouge's products globally. The driving forces behind Borouge's business transformation seem to be more market driven to competitively enter a new market. These driving forces influenced changes in Borouge's business processes to create more efficient and flexible processes that could be easily modified depending on the changing conditions of external factors. Announcement of the driving forces of business transformation through Borouge 2015 strategy campaign and the participation of the employees in the strategy formulation was a good starting point that initiates the unfreezing phase that was discussed in Lewin's force fields theory (Grieves, 2010).

6.1.2 Challenges and Difficulties IT Asset and Business Stakeholders Confronted During Business Transformation

Given the challenges and difficulties Borouge's employees confronted and the current problems in business processes of inefficient and misaligned business processes, as resulted from the case study analysis, indicated the importance of solving and managing the current issues before moving to another transformation. The first major challenge in Borouge is people's resistance to change. The issue was clear in the first business transformation of B2, which consequently caused lots of problems in business processes being designed in a way that did not achieve its desired outcome. Adding to that people's ability to adapt new ways of working, which linked to psychological factors as referred in Lewin's theory of managing change (Grieves, 2010). People establish their own comfort zone and operate their work routine within it; for job security and fear of losing self-esteem as discussed in section 2.1.1.1. This problem formulated Borouge's organizational culture, which pursued a silo thinking way of working that negatively influence company's business processes. Silo thinking or the functional driven perspective keeps people's minds locked in a closed box. This caused people to operate within their related business processes neglecting understanding of other business processes whether it is directly or indirectly linked to their particular business processes. Another challenge found in Borouge is the silo thinking not only among the different functions, but also within the same function itself. This shows the nonalignment between Borouge's business departments' objectives and Borouge's objectives. Most important was the lack of understanding the business processes as an interconnected chain of activities that operate to achieve an outcome. This creates obstacles that may impede the success of the transformation.

6.1.3 Realization, Formalization and Establishment of Business Process Redesign Concept

Borouge's case study shows that the organization is in a state of continuous change, either incrementally or radically. Although Borouge has a continuous change atmosphere, the company did not alter its culture to adapt to new ways of working. The analysis of the case study found that Borouge's business processes are either not aligned with other processes, employees do not understand how the system performs the business transactions, or business process does not meet stakeholders' business requirements. The evidence from the case study shows that Borouge employees try to solve business processes issues within one circle which keeps the problem rotating around, and consequently, it increases the number of business processes change

requests. It proves the immaturity of Borouge's employees on embracing business process perspective. It also shows that the continuous critical problems that occurred in Borouge's business processes pushed people to do quick fixes, which were part of B3 strategy. These quick fixes are considered as projects and the efforts were put into implementing the quick fixes was enormous, which does not really reflect the meaning of the term used to describe it. The problem is the way employees interpret the word quick fixes which might underestimate the efforts that should be put forward and use the workaround approach to make it successful as shown in section 5.4.3.

The quick fixes endorsed in B3 program led to another finding of unstable period in Borouge between the two business transformations – B2 and B3. In addition, there was no control mechanism formulated after the first transformation – B2 - to look after the issues generated from the business transformation. Furthermore, Borouge's business processes quick fixes and the continuous increased number of business process changes as shown in section 5.3.1, indicates lack of change management procedures in place to ensure that changes are revised, analyzed and aligned with other integrated business processes. The dependence of business personnel on IT change management procedures does not solve the problems totally, because the root cause of misalignment and inefficient business processes is old mindset of employees that cause lack of being a business process driven organization.

The research detects a deficiency in the effective measurement approach or shared KPIs used to measure and evaluate the performance of the business processes, where all business functions are responsible for accomplishing the desired status quo. Engaging in huge transformation one after another creates significant challenges and pressures on Borouge's employees. Furthermore, the absence of an effective rewarding system in fact constructs obstacles in managing people and transformation results which influence the organization's culture negatively. Nevertheless, a good maturity level was found within few respondents who are measuring the effectiveness of business processes after the enhancement of the processes using IT.

The above discussion on the approach used to induce changes in Borouge's business processes indicates that the concept of business process redesign/ reengineering is not realized, formalized or established in Borouge's environment; which was against what assumed earlier before

conducting the case study analysis. Although B3 strategy identified Borouge's vision and objectives of business processes changes, it aimed at expanding Borouge's businesses and to change business processes to suite the new market rather than focusing on solving bottlenecks in current business processes by redesigning Borouge's business processes as proposed by Hammer and Champy's (1990) model of business process reengineering.

It is worth highlighting that, nonetheless the business process redesign is not formalized and established in Borouge, forming a corporate support function in Borouge may be seen as the first step in introducing the business process redesign concept which will change Borouge's organization culture. Borouge's corporate support function formed in 2010 to support Borouge at a high level and to educate them on how to run their organization more efficiently through analyzing company's performance and reengineering business processes. This is a stepping stone on the right path that Borouge is going through to cultivate its organizational culture to adapt to the dynamic changes and strong rivalry from its competitors.

6.1.4 Leveraging IT Capabilities through Business Process Redesign in SCM

The case study shows an effective role of IT in enabling and supporting business processes changes. However, the strong pressure on IT resources to make the changes in Borouge's business processes without holistic insight on the business process cycle does not facilitate IT role. Another problem that found was that Borouge's business personnel are being dependent on SAP to provide different possibilities to design the business process and on IT personnel to get the overall picture of business processes and manage the interaction between the different functions when incorporating business process change. However, the discussions with business employees revealed a strong belief in the role of IT as an enabler not a driver of the business change. This might disagree with Venkatraman (1994) and Davenport and Short (1990) on identifying IT as a powerful force in enabling and/ or driving redesigning business processes.

Having the fact that SAP is developed based on best business process practices in the world; the study found out the problem with not being fully happy with using SAP systems is due to the rigid thinking of the way business processes should be executed. This led to not optimizing SAP functionalities to enhance Borouge's business processes and raised complains that IT did not support business process changes effectively. Other interesting findings from the case study were

the data integrity problem in SAP, which makes business employees distrust SAP in generating the correct reporting figures. This can be interpreted by lack of systematic way of thinking and lack of data ownership in business employees.

The study found that running in parallel Borouge Pte strategy plan/ implementation and IT FEED study facilitates the collection of Borouge's business process requirements, which as a result will create some level of alignment between B3 supply chain strategy formulation/ implementation and IT B3 strategy implementation. The evidence of dedicating Borouge's employees in the marketing and sales company to work full time in B3 project till finalizing the project is a good initiative to ensure people efforts are focused on one target. However, IT resources will be working on both support daily activities and project activities along with consultants, who will implement business processes changes. This is going to put a heavy pressure on Borouge's IT employees and may impact their performance in the B3 SAP expansion project, because they will be concentrating in dual heavy activities, which will divide their efforts and time among the operational support work and project activities work. This may cause some difficulties for IT assets to support SCM department.

Although business processes redesign/ change should not depend fully on IT when redesigning the business processes on paper, IT role is critical to enable business processes changes in Borouge based on business request initiation. Borouge IT department insisted to be an enabler to business process changes rather than driver of business process changes, which may not leverage IT system capabilities in supporting Borouge's business processes. However, given the situation described above, IT role is strategically important to the success of Borouge's business transformation for the fact the exploiting IT will create more efficient processes.

The problems within Borouge as mentioned above are known to Borouge's management after the engagement of the external consultant company to perform the strategic analysis of Borouge's internal situation, including people, business processes, organization structure, and external environment to advice how to redesign supply chain concept in Borouge to compete strongly in the market. The research study discovers a high dependency on external consultant in a lot of company's activities for example, the strategic analysis, strategic formulation and implementation, business processes analysis and redesigning.

6.2 Conclusion

Organizations are driven by market forces to transform to compete strongly in the global market. The supply chain ultimate objectives worldwide are producing the right product in the right condition to the right location and customer on the right time and at the right cost. This pushes organizations to serve customers all over the world. The globalization of supply chain puts pressures on business processes and enforces reshaping and redesigning it to efficiently handle the sales of Borouge's products with lower cost and higher speed. Transforming organizations enforce changes on people and on business processes. People are the key factor in driving the success of the business transformation. The literature review highlights the importance of preparing people for the transition period before moving to the desired status quo and stabilizing the desired situation to assure that people do not divert to the old way of running the business. Changes in people and business processes means changing the way business activities are operating to a new efficient way. However, a lot of issues appear to the surface when talking about this subject. The case study of Borouge revealed a lot of findings that formulate the current challenges the organization are facing which should be addressed and managed strategically in order to enable Borouge to enter the new market competitively.

Silo thinking of Borouge's employees and the functional driven organization are the major issues in Borouge. It developed other major problems in business processes which are ineffective and inefficient business processes that suffer lack of alignment. In addition, the effective role of IT and the dependence of Borouge's employees on IT to drive the changes in business processes during business transformation put a significant pressure on IT. It results on business processes being designed based on suggestion given by IT external consultants which did not serve Borouge's environment. The problems appeared to be of many reasons for example, obscurity of business process requirements of what, why, how and by whom, lack of motivation which result in lack of ownership, silo thinking which leads to lack of effective communication and most importantly lack of understanding the business processes as interlinked set of activities.

The data being fed into the system flows through business processes activities to generate information and data that continuously transfer along the chain of activities. Changing any part of the business process impacts the other activities directly or indirectly, which can be seen by employees responses of not trusting information generated from SAP. This indicates various

aspects. First is the importance of having a change management procedure in place to manage and control business processes changes and to create alignment among the business processes. Second is the importance of reengineering Borouge's business processes to create efficient processes and resolve bottlenecks. Third is the importance of aligning business and IT to join the efforts to revise Borouge's business processes and clean up and control the changes in the data stored in the system for example, the material master data which includes data of material code, name, measurement of unit, current price, future price, storage locations, production plantetc. Fourth is the importance of measuring the IT business added value to encourage Borouge's employees to work to accomplish shared goals of the organization.

The case study of Borouge shows the first step Borouge Pte is taking to face the current challenges by formulating Borouge 2015 vision which aims at creating a competitive image of Borouge globally. Overall, the research paper discovers that Borouge business transformation is driven by the demand market changes. The study reveals the challenges and difficulties Borouge is facing during business transformation as summarized above, which indicates that Borouge business employees do not realize the importance of business process redesigning. Despite the fact that IT role in Borouge is seen as critical to enable business processes changes, Borouge IT system is not leveraged to support SCM with the power of IT system being deployed in Borouge. Given these issues between business processes, technology and people will not show the effective role of IT in supporting Borouge's goals, unless business process redesign project is initiated exploiting IT to add value to create an efficient business processes.

6.3 Recommendations

The case study manifested a lot of issues in people and business processes as these are the elements that are forced to change to achieve the business transformation desired status quo. Some recommendations developed below to assist Borouge in overcoming their current challenges.

6.3.1 Stabilization Phase

Although the driving forces of Borouge transformation are clear in Borouge's 2015 vision and the strong rivalry in the market urged Borouge to transform rapidly, it may not be sufficient to motivate employees to work in the transformation. In fact, it does not give an adequate stability

period to ensure people are changed and business processes that are put in place are working efficiently as planned as highlighted in section 6.1.3. Lewin's theory emphasized on refreezing stage after business transformation due to the fact that people easily divert to the old way of doing things. Thus, it is recommended to give a sufficient stabilization period after business transformation to enable Borouge's employees to get to the new way of working to be part of the organization's norms and to settle the issues emerges during the previous business transformation.

6.3.2 Cross Functional Business Process Development Department

As the study revealed the challenge of silo thinking in different functions in Borouge, it is recommended to form a business process development department which consists of cross functional team. The team must be responsible for managing and controlling business processes changes and redesigning Borouge's business processes to solve the current bottlenecks, to create efficient processes and to ensure the information system support process flows. In addition, the team should be in charge of training people and creating an awareness campaign to develop the understanding of Borouge's business processes. This suggestion will assist Borouge to have better control in business process changes and will formalize and establish business process redesign project whenever a major change is required.

6.3.3 Change Management Procedures

It is also recommended to establish change management procedures for business processes changes to manage and control changes in business processes and to ensure that business processes are aligned with each other. It should also assure that business requirements have the main important answers of what are the objectives of the business process redesign/ change?, why does the change is required? How the business processes should be designed?, and by whom the business processes will be executed?. These procedures should be handled by the business process development department suggested above. The change management procedures will assist to reduce some of the challenges and difficulties discussed earlier, by creating sense of ownership and responsibilities among business employees to ensure alignment of business processes.

6.3.4 Business Process Redesign to Leverage IT Capabilities

IT department should play advocacy role to persuade Borouge's management on the powerful IT system (SAP) can offer to solve bottlenecks in business processes. It is recommended that IT department can convince Borouge's management to initiate a business process redesign project that aim at removing bottlenecks and creating more efficient business processes. The five steps of business process redesign explained in figure 7 can be used as project methodology. Moreover, it is essential for the reengineering team to have executive management member to motivate and encourage people to achieve the ultimate objective, process owners to ensure of how the processes are performed, people from inside who perform the actual process activities to be the best judge on strengths and weaknesses of the redesigned processes and IT personnel to advise on the technological aspects and opportunities IT systems offers.

IT role as an enabler should be more effective to understand Borouge's' business processes requirements; therefore, IT team should develop more knowledge in SAP to enable IT personnel to play an effective role in explaining the capabilities in the current system. This will not be enough as it requires also more interpersonal skills for IT team to be more active in working with business employees. Additionally, it requires analytical skills for business employees to analyze the systematic way business processes are performed in information systems. This facilitates the collaboration between IT group and business process specialists to redesign Borouge's business processes by optimizing SAP's functionalities. The business process redesign project will leverage IT capabilities to accomplish supply chain objectives.

In addition, it is recommended creating shared business processes metrics to align company's objectives and department's objectives. Shared KPIs unites the efforts of people to a single goal rather than focusing on meeting individual's objectives. In addition, it will motivate employees on being part of creating difference in the organization.

The above recommendations will assist in leveraging IT capabilities in support business department in Borouge to achieve the desired business objectives.

6.3.5 Reduce the Dependency of Consultants

Furthermore, it is suggested to reduce the dependency of Borouge on using consultants and instead utilizing more of Borouge's' employees in the strategic analysis, formulation and

implementation. This develops the feelings of empowerment and allows employees to stress out their ideas and opinions. Although B3 program used Borouge employees to be part of developing B3 supply chain concept, still there is high dependence on consultants to perform the strategy formulation and implementation. This can be argued by the fact that Borouge's employees do not have the sufficient skills to conduct and implement the strategy outcomes. Thus, it is essential to develop the required analytical and leadership skills and the required knowledge in respective business area in Borouge's employees to allow them to involve in the change process actively. This will eliminate the scares of changing and hence will influence the organizational culture positively. These recommendations will assist Borouge to reduce the restraining forces of people resisting to change which is defined as the major challenge and critical success factor of business transformation.

6.3.6 New Skills Requirements

Since the role of management is known to be important to influence the changes in the organizational culture, it is essential to develop the required skills of management to be more of persuading and convening the change in people rather than instructing and dictating the change. Developing facilitation skills in Borouge's management is important in order to shape and direct the team work to accomplish the transformation objectives. It is also very important that Borouge management and employees develop the skills of critical thinking which advocates the thought of why things are done this way. This can be done through developing knowledge of employees in their functional areas and in other functional areas as well by conducting an awareness campaign on Borouge business processes. It will gradually develop the process perspectives in employees' minds. This recommendation will help in solving some of the challenges seen in business personnel for instance lack of ownership, silo thinking and resistance to change.

6.3.7 Effective Rewarding System

Lastly, it is recommended establishing an effective rewarding system that rewards the role of business process leaders and specialists and IT team. They are the mind which stores and embrace the tacit knowledge of Borouge's business processes. Similarly important is the motivation of Borouge's people by engaging and empowering them to take an effective role in the strategy implementation to create sense of ownership and to fulfill people's psychological needs. It will reduce the level of the major challenge in Borouge which is resistance to change.

6.4 Research Limitation

While the qualitative research findings and analysis enlighten very strong factors influencing the business transformation outcome and the IT role in enabling business processes changes effectively, there are some limitations that should be noted.

The first limitation is conducting the research study in one organization. Although studying a single case gives more in-depth insight on the phenomenon, it worth to extend the study to Borouge's partner – borealis – to identify which features of the studied topic are unique to a case and which are common across. In addition, it will assist in developing different patterns of actions to be used to build a test theory and use the single case to support it. However, this will reduce the in-depth investigation of certain aspects due to the fact the research duration and efforts will be divided between the multiple case studies.

The second limitation is studying an example of business process redesign in Borouge supply chain department with IT department. It should include discussion with the shared services departments; finance and procurement to investigate further their understanding of Borouge transformation and business processes nature in Borouge. Finance and procurement processes are part of the business processes. Given any changes in the supply chain business processes will impact directly or indirectly finance roles as same as changing any procurement business processes will have an impact on supply chain business processes. However, the observation of some discussion occurred for business process changes between supply chain and IT has included finance department and some observation was drawn on the nature of the business processes changes in Borouge. Furthermore, the fact that the research is IT system analyst who support SAP finance and controlling modules and interact with them.

The third limitation is case study did not focus on analyzing one specific example on business process with problems and how it was resolved using IT. Since the research intended to study the relationship between business processes, technology and people, the research did used various examples to better realize the interrelationship between these elements.

6.5 Further Research Studies

The findings of this research study point out several possible directions for further research on the business transformation and IT role in enabling business process changes. One area of

extended research can be a comparison between Borouge and its partner and including other functions than supply chain department. As the main aspect of business transformation is the business process redesign, the research can be extended to examine the influence of information technology and business processes changes on the productivity. Other area for future study can be conducted to investigate further the alignment between the strategy of marketing and sales company with the manufacturing company in Borouge and the formulation of IT strategy to support the business transformation. Since the research highlighted people resistance to change and the organizational culture, a further research can be directed to study in-depth the organizational culture influence on the success of the business transformation. A study on the relationship between data, information and business processes to improve the performance of the business processes can be further investigated, since the research on hand highlighted the importance of data integrity on the quality of the information and health of the business processes. In addition, influence of realizing the IT business added value in the organizations on the organizational culture.

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