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Structure, Process and Performance: A new paradigm for Organizational
Learning

Case study of an Engineering, Procurement, and Construction project
management firm in the energy sector

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*If language is not correct,
then what is said is not what is meant;
if what is said is not what is meant,
then what must be done remains undone.*

Confucius

This thesis is the accomplishment of my studies. It reflects the pleasure and commitment I faced during those years of discovering, creating, traveling and above all, learning.

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Abstract

The literature is relatively poor in terms of empirical studies about Organizational Learning impact on performance. This is why this thesis paper considers the relationship between Organizational Learning and Business Performance. The research supports the premises that there is a positive relationship between a Learning Organization's structure and Organizational Learning process but also between this same process and business performance. The literature review offers a new conceptual framework that is then applied to a case study on Biotec International, a small-size Engineering, Procurement and Construction (EPC) company offering environmental and renewable energy solutions. The analysis adopts the perspective of a facility management office (FMO) integration into an EPC contractor business model. A survey based on Organizational Learning was administered to the entirety of the organization's members and several individual interviews were lead with middle management. The results show that FMO is performing better than the rest of the organization although it still lies under the score of the benchmark in terms of Learning Organization structure. However, the department appears to contribute greatly to Business Performance through an informal Organizational Learning process. As a consequence, the existence of a FMO within the business model appears to be a competitive advantage. In order to sustain this advantage, the study analyses the results in details and provides concrete recommendations for management supported by a profitability analysis. Although the findings of the case study are relatively specific to a certain industry, the conceptual framework can be expanded to other industries.

Keywords: Organizational Learning, Learning Organization, Business Performances, Knowledge Management, Facility Management Office

Resumen

La literatura es relativamente pobre en términos de estudios empíricos con respecto al impacto del Aprendizaje Organizacional sobre el desempeño. Por esta razón, esta tesis considera la relación entre el Aprendizaje Organizacional y el Desempeño Empresarial. Este estudio soporta la premisa de que existe una relación positiva entre la estructura de una organización de aprendizaje y el proceso de aprendizaje organizacional de un lado y entre este mismo proceso y el desempeño empresarial de otro lado. La revisión de literatura ofrece un nuevo marco conceptual que luego fue aplicado a un estudio de caso de Biotec International, una PYME de *Engineering, Procurement and Construction* (EPC) que ofrece soluciones ambientales y de energías renovables. Este análisis adopta la perspectiva de la integración de un *Facility Management Office* (FMO) en el modelo de negocio de una firma EPC. Se entregó un cuestionario a la totalidad de los miembros de la organización y múltiples entrevistas individuales fueron conducidas con la gerencia intermedia. Los resultados mostraron que FMO tenía un mejor desempeño que el resto de la empresa aunque se encuentra por debajo del promedio global en términos de estructura de organización de aprendizaje. Sin embargo, el departamento parece contribuir ampliamente al desempeño empresarial por un proceso informal de aprendizaje organizacional. En consecuencia, la existencia de FMO dentro del modelo de negocio aparece como una ventaja competitiva. Para sostener esta ventaja, el estudio analizó los resultados en detalle y entregó recomendaciones concretas para la gerencia soportadas por un análisis de rentabilidad. Aunque los resultados del estudio de caso son relativamente específicos a una cierta industria, el marco conceptual se puede aplicar a cualquier organización.

Palabras clave: Aprendizaje Organizacional, Organización de Aprendizaje, Desempeño Empresarial, Gestión de Conocimiento, Oficina de Gestión de las Instalaciones

Abstrak

Dari sudut pandangan umum tentang kajian organisasi menunjukkan kadar yang kurang memuaskan. Oleh yang demikian, kertas tesis ini mengandungi hubungan antara pembelajaran organisasi dan prestasi perniagaan. Kajian ini menyokong premis bahawa terdapat hubungan yang berkait antara struktur pembelajaran organisasi dan proses pembelajaran organisasi di satu pihak antara proses yang sama dan prestasi perniagaan di sisi lain. Kajian literatur menawarkan kerangka konsep baru yang kemudiannya digunakan untuk satu kajian kes di Biotec International, sebuah Kejuruteraan bersaiz kecil, Pemerolehan dan Pembinaan (EPC) syarikat yang menawarkan penyelesaian tentang alam sekitar dan sumber boleh diperbaharui. Analisis ini menggunakan perspektif integrasi pejabat pengurusan kemudahan (FMO) ke dalam model perniagaan kontraktor EPC. Tinjauan berdasarkan pembelajaran organisasi telah dilaksanakan terhadap seluruh ahli organisasi dan beberapa temu bual indovidu telah dijalankan terhadap pihak pengurusan pertengahan. Hasil kajian menunjukkan bahawa FMO telah menunjukkan prestasi yang lebih baik daripada organisasi yang lain walaupun berada di bawah skor penanda aras dari sudut struktur pembelajaran organisasi. Walau bagaimanapun, jabatan ini telah menyumbang besar kepada prestasi perniagaan menerusi proses pembelajaran organisasi yang tidak rasmi. Hasilnya, kewujudan FMO dalam model perniagaan ini memberikan suatu kelebihan dalam berdaya saing. Dalam mengekalkan kelebihan daya saing ini, kajian menganalisa keputusan secara terperinci dan memberikan cadangan yang kukuh untuk pengurusan yang disokong oleh analisa keuntungan. Walaupun penemuan kajian kes ini adalah agak khusus bagi industri tertentu, kerangka konseptual ini boleh digunakan untuk mana-mana organisasi.

Kata kunci: Pembelajaran Organisasi, Organisasi Pembelajaran, Pencapaian Perniagaan, Pengurusan Pengetahuan, Pengurusan Fasilitas Pejabat

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Glossary

- BIA: Biotech International Asia
- BIB: Biotech International Belgium
- BIC: Biotech International Corporate
- BOD: Biological Organic Demand
- CAPEX: Capital Expenditure
- CEN: European Committee for Standardization
- CH₄: Methane
- COD: Chemical Organic Demand
- DTV: Design-To-Value
- EPC: Engineering Procurement and Construction
- FMO: Facility Management Office
- FTE: Full Time Equivalent
- H₂S: Hydrogen Sulphide
- IC: Intellectual Capital
- IFMA: International Facility Management Association
- KM: Knowledge Management
- LO: Learning Organization
- OL: Organizational Learning
- OPEX: Operational Expenditures
- PMO: Project Management Office
- ROI: Return On Investment
- QA: Quality Assurance
- SME: Small and Medium Enterprise
- SOP: Standard Operating Procedures
- TQM: Total Quality Management
- TS: Technical Service
- TSS: Total Suspended Solids

Definition of Concepts

First and foremost, it might be useful to define a few concepts related to this specific topic. Note that these definitions are not provided by scientific sources but come rather from industrial or institutional actors.

- Engineering, Procurement and Construction (EPC)

The Engineering, Procurement and Construction Portal defines EPC as: “a prominent form of contracting agreement in the construction industry. The engineering and construction contractor will carry out the detailed engineering design of the project, procure all the equipment and materials necessary, and then construct to deliver a functioning facility or asset to their clients. Companies that deliver EPC Projects are commonly referred to as EPC Contractors.”

- Facility Management Office (FMO)

The European Committee for Standardization (CEN) offers the following definition for facility management: "the integration of processes within an organization to maintain and develop the agreed services which support and improve the effectiveness of its primary activities." According to the International Facility Management Association (IFMA), it includes eleven core competences but only operations and maintenance are relevant for the case of Biotec International proposition.

1. Introduction

Only the wastewater from existing palm oil mills in Malaysia and Indonesia could provide electricity for 40 million of inhabitants

Philippe Conil, CEO of Biotec International

Biotec International is an international group of Engineering, Procurement and Construction (EPC) companies providing energy and environmental solutions through organic matter treatment, generation of biogas and natural fertilizers in tropical and subtropical regions. The industry of biogas in those regions is developing fast and competition is increasing. Such a phenomenon is due to three main factors. Firstly the most-advanced technology leaders try to diversify their market because of the drop of subsidies for renewable energies due to austerity policies in Europe. Secondly, environmental norms are getting more severe around the globe due to international pressure. Thirdly, the energy demand is particularly increasing in emerging countries. Biotec International benefits from its long experience in those markets but expresses today the need of anticipating this competitive pressure by improving Business Performances.

After having worked for *Biotec International* as a business developer redefining the corporate strategies of the company and expanding its market to new regions, I decided to assess Organizational Learning techniques. Dealing with the strategic vision and then confronted to the market, I considered the potential sources of a sustainable competitive advantage. The present study has for objective to analyze a potential source of sustainable competitive advantage. It concerns the integration within the business model of a *Facility Management Office* (FMO) in charge of operation and maintenance of the projects with a view to benefit from Organizational Learning and improve overall performances.

Peter Drucker (1969) popularized the expression of *knowledge economy* as it became the dominant basis of wealth creation substituting material goods. This trend was largely observed with the increasing amount of Knowledge-Intensive Firms worldwide calling for new management practices in business organizations. Hence the appearance of *Organizational Learning* in the work of Argyris and Schon (1978) that later inspired Peter Senge (1990) to develop the *Learning Organization* concept. This model encourages organizations to facilitate

the learning of its members and continuously transforms themselves (Peddler et al., 1997). Such a discipline was developed in order to face external pressures and remain competitive in the business environment (O’Keeffe, 2002).

As part of this thesis, I am interested in assessing the benefits of Organizational Learning through the integration of a FMO in the business model of an EPC contractor. In other words, I analyse, through a case study, the impact of such a contractual proposition on Organizational Learning and thus on both value creation and cost efficiency. As a consequence, I chose to focus my study on an experience-based hypothetico-inductive method to formulate the following research question:

To what extent does Organizational Learning influence Business Performances and more particularly in the case of a Facility Management Office?

First of all, I conduct a literature review on the premises concept of Organizational Learning. The different theories developed around the topic lead us to firstly examine the structural approach, known as Learning Organization (Senge, 1990). Then the Organizational Learning is analyzed from a process perspective. Afterwards, Business Performances as an outcome of those previous disciplines is considered. The literature review ends with the proposition of a conceptual framework.

Secondly, the Learning Organization’s antecedents but also the process and flow of knowledge between the operation on the field in South-East Asia and the engineering in the headquarters based in Colombia is assessed through various surveys, individual and collective interviews. The analysis starts with an assessment of Organization Learning ability of FMO and then focuses more on the capacity of the department to optimize both product and cost efficiency thanks to Organizational Learning. This study is mainly conducted inside a subsidiary’s office based in Kuala Lumpur, Malaysia.

Thirdly I propose a discussion of the findings in order to develop actionable recommendation for the management. Nevertheless, those solutions require a deeper profitability analysis and risk analysis before further implementation. The proposed methodological approach can be observed in the figure 1.

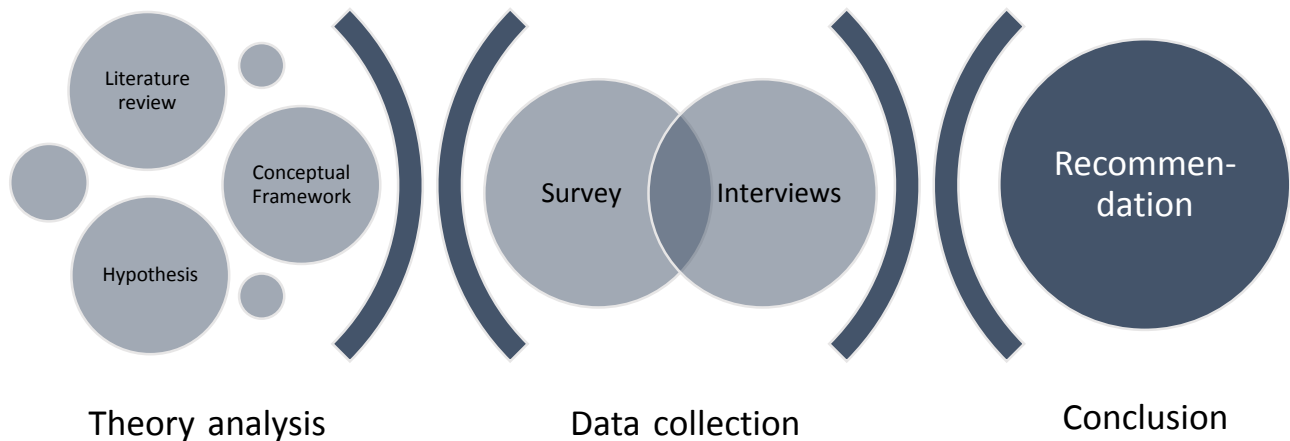


Figure 1 Methodological Approach

I would like to state clearly that this thesis doesn't have the pretention of covering integrally the fundamentals of Organizational Learning but only the theories that were judged most relevant for this study field. Moreover, it will open the debate and generate new ideas about future actions but it will not address an integral solution for Organizational Learning in the Biotec International group.

2. Contextualization

Turning organic waste into profit

Biotech International

In order to fully understand the problematic, a brief introduction of Biotech International is presented. This one mainly focuses on the structure of the group, the business model and strategic planning. Note that for confidential reason, the information has been synthetized in order to only provide the big picture.

2.1. Organizational structure

Biotech International group is a corporation made of several entities, namely Biotech International Corporate (BIC), Biotech International Belgium (BIB) and Biotech International Asia (BIA). So far, BIA covers South-East Asia while BIB is responsible for Latin American and West-Central African markets.

As we can see in the figure 5, there is on the one hand a corporate unit responsible for providing the designs and the global strategic development and, on the other hand, two regional units focusing on the sales and execution of the projects. Another particularity is that BIC is actually decentralized between competence centers located in the different regional business units (respectively in Cali, Colombia and Kuala Lumpur, Malaysia). The figure 5 represents the formal structure of the different entities by departments.

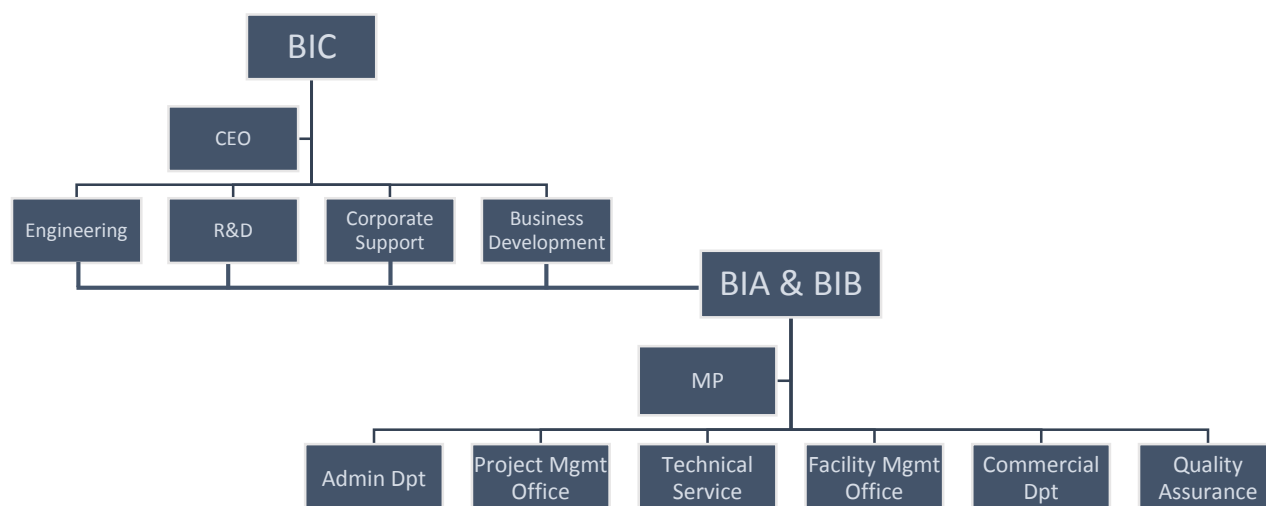


Figure 5 Organogram of Biotech International per department

2.2. Business model

In order to provide the big picture of Biotec International's business model, it is summarized in the figure 6 according to *The Business Model Canvas* developed by Osterwalder (2004). It describes the rationale of how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2009).

The Business Model Canvas: BIOTEC INTERNATIONAL

<u>Key Partners</u>	<u>Key Activities</u>	<u>Proposition Value</u>	<u>Customer Relationship</u>	<u>Customer Segments</u>
Subcontractor	R&D	Environmental compliance	Operation and maintenance (FMO)	Agro-industrial mills in (sub)tropical regions
Engineering consultant	Design	Energy self-sufficiency	Continuous training	
	Construction		<u>Channels</u>	
Sectorial organizations	Operation	Chemical fertilization substitution	Reference Events	
	<u>Key Resources</u>			
	Intellectual capital			
<u>Cost Structure</u>			<u>Revenue Streams</u>	
Purchase & subcontractors 50%			EPC project sales 95%	
Overhead payroll 40%			Operation & maintenance 5%	
Engineering 10%				

Figure 6 Business Model Canvas of Biotec International

2.3. Strategic planning

Previously in charge of the business development of Biotec International Corporate, I faced the specific issue of acquiring competitive advantage in a Knowledge-Intensive Firm (KIF) on a market in expansion. I notably contributed to the five year corporate business plan and the forecasted sales announced an average of 30% growth per months. In order to face this important growth and cope with such an amount of new projects, some innovations were required.

First of all, the engineering team in charge of the conception of the plants recently implemented a standardization procedure of the designs. This method known as *biopalma* is

already in application inside the company's offer and it actually allowed to reduce the design period from between 4 and 6 months to only 2 months. As a consequence, a huge gain of productivity was gained as the engineering team is now able to produce two to three times more projects per year with the same workforce.

Then, the R&D team is currently developing, in collaboration with a strategic partner, a new technology consisting in building large metallic tanks instead of digging lagoons for implementing biodigestors. This option would save a lot of time in terms of construction as it wouldn't require earth moving anymore. As a consequence, this improvement would enable a reduction of the construction period from 12 to 6 months. In this case, the productivity gain allows to increase by 200% the number of projects per year.

Finally, the last key component to succeed that still has to be optimized is the operation and maintenance directed by FMO. As every new project systematically needs the supervision of a chief of plant and a facility engineer, the headcount projected for FMO is estimated at 33 FTE for 2020. But is such an extra service actually profitable to Biotec International? Operation and maintenance fees only represent less than 5% of the total sales price of the projects. Nevertheless, the retrospective feedback provided by FMO allows to improve the conception of the design and as a consequence the value creation and cost efficiency. This is why this thesis aims to make a diagnosis of the situation and propose recommendations in order to tend to be a Learning Organization to improve the process of Organizational Learning and positively influence Business Performances.

3. Literature review

Both Learning Organizations and Organizational Learning are disciplines that have been widely discussed in the literature. Although they are similar concepts that are often confused, Ang & Joseph (1996) contrast both in terms of structure versus process. Moreover, multiple authors investigated the effect of such disciplines on overall Business Performances. The following literature review aims at providing a theoretical framework in order to answer to the research question. To do so, the Learning Organization structure will be analyzed according to several authors. Then a strong focus will be made on the Organizational Learning as a dynamic process. Finally, the concept of Business Performances is presented according to the literature.

3.1. Learning Organization as a structure

An organization learn only through individuals but the individual learning does not guarantee organizational learning

Senge, 1990

The concept of Learning Organization emerged through the work and research of Peter Senge (1990). According to him: “Learning Organizations are organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspirators are set free and where people are continually learning how to learn together”. Garvin (1993) proposes another definition: “a learning organization is an organization skilled in creating, acquiring and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights”. According to Marquardt (1996), it refers more to “an organization which learns powerfully and collectively and is continually transforming itself to better collect, manage, and use knowledge for success”.

Garvin’s work later provided a tool to assess the performance of Organizational Learning and assess to what extent a unit is functioning as a Learning Organization (Garvin, Edmondson and Gino, 2008). This one has been published in the Harvard Business Review. Based on the previous works of Garvin (1993 & 2003) and Darling, Parry and Moore (2005), the authors

developed a survey including three main building blocks, namely a supportive learning environment, concrete learning processes and a leadership that reinforces learning. They support that an analysis of those building blocks enables to improve knowledge sharing, idea development, learning from mistakes, and holistic thinking.

3.1.1. The environment or the origin of Learning Organizations

Lave (1993) focuses in his study on the importance of situating learning activities in a cultural and historical context. Several studies (Orr, 1990; Barley, 1996) demonstrate that the access to workplace knowledge and the ability to interpret it was critical for work performance. The correlation between organizational culture and performance has been defined by several authors (Denison, 1990; Gordon & DiTomaso, 1992). Effectively this context is also conditioned by specific behavioral dispositions (Bourdieu, 1979) that allows a sense of unity and belonging to the organization (Weick & Westley, 1996). Senge (1990) popularized the concept of Learning Organization through his book *The Fifth Discipline*, where he argues that such a context relies on five main characteristics, namely Systems Thinking, Personal Mastery, Mental Models, Shared Vision and Team Learning.

System Thinking originates from Bertalanffy (1968)'s general system theory and represents an approach to problem solving by integrating it in an overall system. Although there is no single discipline for system thinking but a linkage of various disciplines (Leischow & Milstein, 2006), in Learning Organization, it expresses the need of adopting a holistic perspective of an organization. Senge describes this discipline with the following metaphor: "When you split an elephant in two, you do not have two small elephants which you can take care of. You can only take care of the one complete elephant." In other words, an organization has to be considered as a living organism. Only this perspective enables to see the big picture instead of reacting to specific parts separately.

Personal Mastery relies on continuous learning at an individual point of view. In other words, the individuals need to clarify and deepen their personal vision. It goes beyond competence and skills and requires a creative instead of a reactive approach. This discipline can be encouraged but there is no way to force people into personal mastery.

Mental Models are the basis for all reasoning process (Holland et al., 1986). According to Senge (1990), they are deeply embedded assumptions, generalizations, or even images that influence how we understand the world and how we take action. To change those mental models, it is crucial for individuals to reflect on their own behavior and beliefs. Garvin (1993) also joins Senge (1990) by stating that openness is essential to quit playing “power games” and define honest personal needs.

According to Chiu, et al. (2006), “a Shared Vision embodies the collective goals and aspirations of the members of an organization”. In other words, it means all the members of an organization share and agree on where they should go. This is fundamental for providing something everyone is passionate about. Once an authentic and shared vision is implemented, members naturally participate in the improvement processes. According to Senge (1990), “people are not playing according to the rules of the game, but feel responsible for the game”. Lord (2015) also highlights in his study the importance of shared vision on group learning capacity.

Team learning has received increasing attention from researchers (Edmondson, Dillon, & Roloff, 2007; Van den Bossche et al., 2006; Wilson, Goodman, & Cronin, 2007) and several definitions exist. However, from Senge point of view, it can be achieved through the capacity of members of a team to suspend assumptions and enter into a genuine collective thinking. Here the dialogue as defined by David Bohm - opposed to discussion - is essential to build an organization with more intelligence than its members (Senge, 1990).

In a nutshell, organizational culture is key for Learning Organizations (Leonard-Barton, 1992; Barrett, 1995). However, Hong and Easterby-Smith (na) also discern multiple subcultures that coexist inside a same organization. They might be determined by different occupational communities (Van Maanen & Barley, 1984; Schein, 1996), hierarchical groups (Carroll, 1998), or national cultures (Easterby-Smith, 1998; Taylor & Easterby-Smith, 1999). Although the notion of supportive environment in this study is related mostly to the cultural context embedded in individuals, other studies (Tyre & von Hippel, 1997) indicate that physical context is also critical to the learning process.

3.1.2. The need of concrete learning practices

Although multiple authors studied the importance of cultural environment for Organizational Learning, research on learning methodology and processes is limited (Bapuji & Crossan, 2004; Easterby-Smith & Araujo, 1999).

A Social Phenomenon

According to Cook and Brown (1999), practices represent “the coordinated activities of individuals and groups in doing their work as it is informed by a particular organizational or group context”. In other words, learning is first and foremost an integral and inseparable aspect of social practice (Lave and Wenger, 1991). Indeed, Easterby-Smith et al. (2000) demonstrate that “social practice has emerged as a new conceptual tool to analyze the knowing and knowledge processes in organizations”. Wenger (2000) adds that the origin of a Learning Organization lies in the sharing of experiences and dialogues among different individuals. Furthermore, Fiol (1994) highlights the interdependency between each member’s expertise, knowledge and know-how as a fundamental requirement for the decision making process. The collective nature of learning process can be explained by the need to distribute knowledge among the different members of the organization (Hutchins, 1991).

Concrete practices

Dasgupta (2012) summarized in his study the main practices proposed in the literature: “staff training and development, enhancement of information processing and problem-solving capability, conservation and retrieval of experience through routine procedure and computer-aided information system, facilitation of triple-loop learning and knowledge creation, focus on creative and value creation, and adoption of Total Quality Management practices”. The latter appeared to be an antecedent to Organizational Learning as Barrow (1993) showed that there was a correlation between process improvement and Organizational Learning. Indeed it helps organizations to improve processes, implement organization-wide training and development, and concentrate on improvement of cost, quality, and customer satisfaction (Evans & Lindsay, 1999; Flood, 1993; Luthans, 1998). Garratt (1999) focuses more on processes that imply small groups, rigorous collection of statistical data, and the tapping of the group’s positive emotional energies. Moreover, the experience recording aspect lies in the form of documents, accounting files, standard operating procedures, and computer-generated spreadsheets and databases (Dasgupta,

2012). Garvin, Edmondson & Gino (2008) assimilate concrete learning processes and practices to experimentation, information collection, analysis, education and training and information transfer. The authors maintain that knowledge has to be systematically and clearly shared among the different individuals, groups and organizations. They precise that the knowledge can actually move both laterally and vertically. For example, post-audits and reviews can be shared internally after a project completion or forums with customers and suppliers can be organized so that the essential information can move quickly and efficiently (Lambe & Tan, 2008).

Unlearn to learn?

However, Kuhn (1962) argues that people do not tend to discard their current processes and practices as long as they produce satisfactory results. The trigger for accepting new paradigms is most of the time bounded to failure (Petroski, 1992). This resistance to change hold back learning process. As a consequence, Organizational Learning includes a certain degree of organizational unlearning according to Dasgupta (2012). Hence the need to continuously question the existing plans (Drucker, 1993). According to Hale (1996), some organizations even implemented incentives system based on improvement in order to stimulate employees to risk taking and collective problem solving.

3.1.3. The leadership that reinforces Learning Organizations

According to Caldwell (2012), the literature about Learning Organizations emerged in parallel with alternative models of leadership (Bass, 1990, 2000; Berson et al., 2006; Senge, 1990, 1996). These new models were more inclusive and participative (Gronn, 2002; Harris et al., 2007).

The leader skills

Rijal (2010) argues that leadership takes on a different role in a Learning Organization. To achieve the vision of Learning Organization leadership capabilities must be developed (Rijal, 2010). Marquardt (1996) focuses on coaching, mentoring and modelling roles for leaders. He states that the leader has the responsibility of generating and enhancing learning

opportunities for the members of the organization. Besides, Johnson (2002) considers rather visioning and empowerment as crucial skills for leaders of Learning Organization.

Transformational leadership

Transformational leadership, according to Burns (1978)'s definition, have to achieve technological innovation (Howell & Higgins, 1990), align the organizational vision, design and management practices (Appelbaum et al, 1998) but also encourage employees to learn new behaviors (LeBrasseur et al, 2002). In other words, they are change agents who have the responsibility for transforming an organization to a Learning Organization.

The role of the leader

According to Senge (1990), leaders in Learning Organizations are responsible for building organizations where people are continually expanding their capabilities to shape the future – that is, leaders are responsible for learning. Senge (1990) emphasizes the role of the leader in a Learning Organization. He defines three different leadership role, namely designer, teacher and steward.

The role of designer is hardly observable as the effects are seen only on the long term. It concerns firstly the design of the main purpose, vision, and cores value of the organization. Then the design policies, strategies, and structures that translate guiding ideas into business decisions on the other hand. As stated by Mitroff and Emshoff (1979): “the key is not getting the right strategy but fostering strategic thinking”. The third key design responsibility for such a leader is to design appropriate policies, strategies and structures.

The role of teacher is to sustain the members of the organization to take advantage of the current reality by restructuring their mental models to see new possibilities for shaping the future, make decision, and identify problem and opportunities. Senge (1990) distinguish three levels of area of influence for leaders, namely events, patterns of behavior and systemic structure. However this function doesn't report to leaders as authoritarian experts teaching their view of reality. The leader here is rather considered as a coach, a guide or a facilitator.

The steward function is the most critical for a Learning Organization as it directly relies on the attitude of the leader. Senge (1990) discerns two levels of stewardship. The first one targets the people they lead while the second one focuses on the organization's larger

mission. In the latter level, the leader's desire is to build a better organization as he feels to be part of a greater purpose than the one of simply leading.

3.2. Organizational Learning as a Process

*Learn from mistakes of others;
you can't live long enough to make them all yourself*

Anonymous

Technology change, advances of globalization and intense global competition resulted in an increasingly complex and unpredictable business environment (Bontis, et al., 2002). Wick and Leon (1993) even stated that organizations now had to “learn or die”. As a consequence, many authors agree on the fact that organizations need to learn and interpret new information and technology changes (Birdthistle & Flemming, 2005; Casey, 2005). This rising interest in Organizational Learning has attracted scholars but also managers and consultants (Chiva & Alegre, 2005). The construct of Organizational Learning has been articulated for decades, and scholars have acknowledged that the concept was first mentioned by March and Simons in 1958 (Casey, 2005). However, there is little consensus about the concept of OL (Stewart, 2001) as many definitions and models were developed creating different perspectives (Lundberg, 1995). Some of the main definitions of Organizational Learning in the literature can be observed below:

- Argyris and Schon (1978): *Organizational learning is a process of detecting and correcting errors.*
- Fiol and Lyles (1985): *Organizational Learning means the process of improving actions through better knowledge and understanding.*
- Cavaleri and Fearon (1996): *Organizational Learning is the purposeful creation of shared meanings derived from the common experiences of people in organizations.*
- Schulz (2001): *Organizational Learning is an attempt to understand the processes which lead to changes in organizational knowledge, as well as the effects of learning and knowledge on behaviours and organizational outcomes.*

3.2.1. An eternal debate

There is indeed a large amount of different definitions as the fundamental notion of learning itself is largely debatable (Fiol & Lyles, 1985; Huber, 1991).

The primary debate in OL literature focuses on the definition of learning. The two main perspectives have been whether learning was mostly a cognitive process focusing on the capability of revising mental models or a behavioral process focusing on the application of new insights. In other words, scholars have distinguished *know-what* to *know-how* (Scott, 2011).

In order to fully understand the literature of Organizational Learning, it is necessary to adopt a multi-disciplinary approach. Easterby-Smith (1997) identified several key disciplines that contributed to Organizational Learning, namely psychology, strategy, cultural anthropology, production management, sociology, management science, organization theory, among others. Lipshitz, Popper and Friedman (2002) focused their conceptual framework on five main dimensions: structural, cultural, psychological, policy, and contextual. In addition, Cohen and Sproull (1996) collected different articles illustrating the several perspectives of Organizational Learning. This list was provided by Bontis and Hulland (2002): “learning from history (March, Sproull and Tamuz, 1996), organization and 3 local adaptation (Hutchins, 1996), communities-of-practice (Seely-Brown and Duguid, 1991), learning curves (Epple, Argote and Devadas, 1996), stimulus-response (Weick, 1996), bounded rationality (Simon, 1991), technology diffusion (Attewell, 1996), personnel turnover (Carley, 1996), patterns of change (Lant and Mezias, 1992), executive succession (Virany, Tushman and Romanelli, 1996), collective mind (Weick and Roberts, 1993), technological change (Henderson, 1996), social ecology of jobs (Miner, 1991), organizational routines (Cohen and Bacdayan, 1996), culture (Cook and Yanow, 1996), continuous improvement (Winter, 1996), knowledge intensive firms (Starbuck, 1996), and learning through failure (Sitkin, 1996)”.

3.2.2. The 4I model: A dynamic process

Crossan et al. (1999) present Organizational Learning as a dynamic process of strategy renewal. Their 4I's model is related to feed-forward and feedback processes across the company's levels. They developed this process based on four main premises and assumptions.

Firstly, Organizational Learning involves a tension between assimilating new learning (exploration) and using what has been learned (exploitation). Secondly, Organizational Learning is an integrative concept that includes various levels of analysis (Dodgson, 1993): individual, group and organization. According to the terminology, this multilevel perspective is also categorized in individual, team, and system (Dixon, 1994; Marquardt, 2001). Thirdly, the three levels are linked by social and psychological processes, namely intuiting, interpreting, integrating and institutionalizing (4I's). Finally, cognition affects action and vice versa.

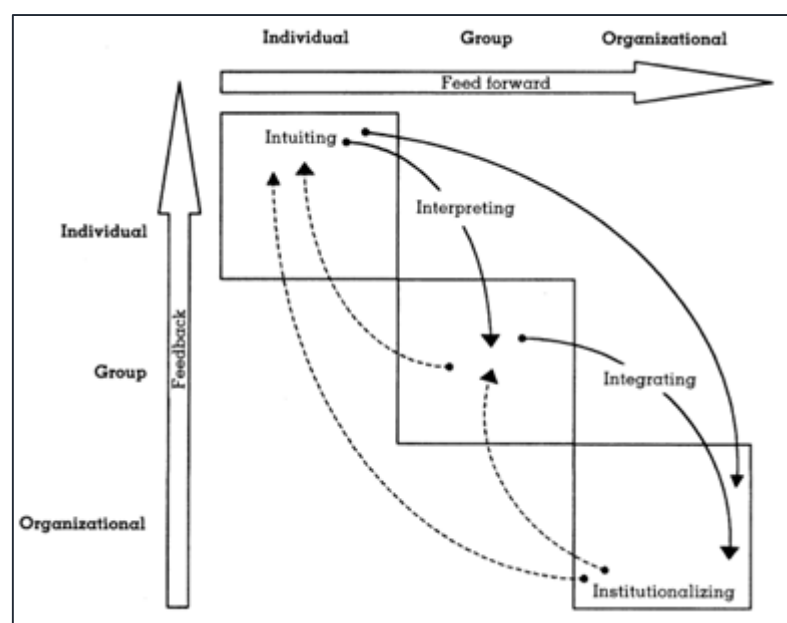


Figure 2 4I Model of an Organizational Learning (Crossan et al., 1999)

Individual level learning

New insights are developed at the individual level through the process of *intuiting* based on the concept of tacit knowledge (Polanyi, 1967). The conversion from tacit into explicit knowledge developed broadly in the SECI model also highlights the role of intuition as the basis of knowledge creation (Nonaka & Takeuchi, 1995). Boisot (1998) provided later a framework in an attempt to describe the social learning cycle focusing on the codification and the diffusion of the knowledge. However, this conversion is highly debated in the literature as the thesis of conscious under-articulation, the Gestalt thesis of tacit knowledge and the thesis of epistemic regionalism (Grimen, 1991) all describe the tacit knowledge as an

inarticulable intuition. Besides, another debate confronts the intuition theory proposed by Gobet and Chassy (2008) to Dreyfus (1986) phenomenology of skills acquisition.

The development of new insights is also very much supported by the several innovation theories. The novelty of an idea was initially introduced and debated by Barnett (1953), Becker and Whisler (1967) and Aregger (1976) while another focus argues on the subjective recognition of novelty (Schmookler, 1966; Knight, 1967; Kieser, 1969; Vedin, 1980). Furthermore, various techniques such as brainstorming sessions are recommended in order to capitalize on intuitions, stimulating creativity and having a positive impact on Business Performances (Sutton & Hargadon, 1996; Rudiger & Vanini, 1998).

The following process consists in crystalizing those new insights by *interpreting*. This phase requires the individuals to develop cognitive maps (Huff, 1990). According to Stacey (1992), “the key to success lies in the creative activity of making new maps, not in the imitative following and refining of existing ones.” He was later supported by Kikoski and Kikoski (2004) who maintain that it is not sufficient to adapt their old maps to face new challenges from a fast changing environment but that managers should constantly update the maps that guide them.

The cognitive maps are conceptually similar to the stocks of individual learning presented by Bontis and Hurland (2002). Bertini and Tomassini (1996) argue that these stocks actually represent individual knowledge and competencies. Those competencies can be whether specific or generic. Some generic competencies are particularly important for individual learning. Bontis and Hurland (2002) summed the major ones: accepting negative feedback without reacting defensively (Argyris & Schon, 1978), being self-development oriented (Pedler, Burgoyne & Boydell, 1991), acquiring external knowledge (Betini & Tomassini, 1996) and having a scanning imperative (Nevis et al., 1995). Above all, individual learning is requiring motivation and focus (Watkins & Marsick, 1993).

Team Level Learning

The learning at a team level is built on the socialization of individuals interpretations in order to develop a common knowledge. This process is referred as integrating in the 4I framework. Although Crossan et al. (1999) use the term group, the concept of team is more common in the literature (Senge, 1990; Mayo & Lank, 1996; Watkins & Marsick, 1993). A team

is more explicit in a working environment and is more contrasting with an entire organization as a group remains a vague concept.

Several authors agree to state the communication as the most crucial element for this process. Watkins and Marsick (1993) identified the dialogue as a key factor in the integrating process. The shared understanding or collective mind (Weick & Roberts, 1993) can only be achieved through continuing conversation among the members of a team. However, other elements are also necessary to capture this process of integrating, namely “effectively working in group, having productive meetings, having the right people to address the issues, [...] being prepared to share both success and failures, encouraging diversity and effective conflict resolution” (Bontis and Hulland, 2002).

The concept of knowledge transfer is also crucial in this process of *integration* as a good implementation allows to successfully share both explicit and tacit knowledge (Bukowitz & Williams, 1999; Davenport & Prusak, 2000). This sharing capability depends mostly on emotional, cultural and physical factors. Cook and Cook (2004) insist mostly on emotional factors such as power, trust and appreciation in the transfer of tacit knowledge. Furthermore, it has been observed that teams with great collaborative experience were benefiting more than others according to Cavusgil et al. (2003). The role of the social culture is essential to ensure a climate of openness and trust. The organization structure is also supporting transfer knowledge opportunities through decision making process, HR policies and performance measurement (Cook and Cook, 2004). Finally, an appropriate physical layout of the offices can support and foster communication among team members (Hall and Sapsed, 2005; Lehner and Lehmann, 2004; von Krogh and Kohne, 1998).

Organizational Level Learning

Although multiple authors developed theories on the organizational level (Cangelosi & Dill, 1965; Duncan & Weiss, 1979; Hedberg, 1981; Shrivastava, 1983; Fiol & Lyles, 1985; Levitt & March, 1988; Stata, 1989; Huber, 1991) this concept seems to generate the most vigorous debate in the literature. The main controversy is whether an organization as a system can learn or not. Some scholars argue that Organizational Learning is simply the sum of individual learning (Kim, 1993; Simon, 1991) while others maintain that it reflects the collective initiatives as a systemic model (Levitt & March, 1988; March 1991). Although both views can be adopted, scholars agree that learning occurs through and amongst people, that

organizational context plays a significant role in the Organizational Learning process and finally that if the knowledge doesn't actually flow into the organization when acquired individually, then there is no Organizational Learning (Scott, 2011). According to Hedberg (1981), individual knowledge is captured and spread amongst other members to become group or community knowledge. He evokes an organization's cognitive system and memory. Moreover, Nonaka's (1991) SECI method describes organizations as living organisms that codifies its learning in order to later influence members learning.

Institutionalizing is the process required for informing the organizational level which then translate shared understanding into non-human artifacts such as new products, processes, procedures, structures and strategies (Crossan et al. 1999). Those outcomes of Organizational Learning enables to establish a strategic orientation to position better an organization within its competitive environment (Andrews, 1971). Those artifacts also refer to organizational memory (Walsh & Ungson, 1991) which provides sustainable competitive advantage (De Geus, 1988).

Flows of learning

The flows of learning can be observed in the Strategic Learning Assessment Map (SLAM) framework in table 2. The upper right cells represent the flow from the individual to group¹ and organization while the flow from the organization to the group and the individual is represented in the lower left cells.

Crossan and Hlland (1997) proposed a model simplifying the 4I's by combining the intuiting and interpreting processes under the individual level. This model is known as the Strategic Learning Assessment Map (SLAM) and is composed of five theoretical components: three learning stocks (individual, group and organization) and two learning flows (feed-forward and feedback).

¹ Note that the term *group* has been replaced by *team* in this study (see infra)

		Output		
		Individual	Group	Organization
Input	Individual	Individual-level learning stocks (II)	FF _{IG}	FF _{IO}
	Group	FB _{GI}	Group-level learning stocks (GG)	FF _{GO}
	Organization	FB _{OI}	FB _{OG}	Organization-level learning stocks (OO)

Figure 3 Strategic Learning Assessment Map (SLAM) (Crossan & Hulland, 1997)

Bontis and Hulland (2002) describe the feed-forward and feed-back learning as follows:

- Feed-forward learning: Whether and how individual learning feeds forward into group learning and learning at the organizational level (e.g. changes to structure, systems, strategy, procedures, culture)
- Feed-back learning: Whether and how the learning that is embedded in the organization (e.g. systems, structure, and strategy) affects individual and group learning.

The flows of feed-back and feed-forward are key for improving Business Performances and establishing competitive advantages (Dasgupta, 2012; Garratt, 1987; Porter, 1985). According to March (1991) and Miller (1990), organizations have to explore and learn new perspectives while also exploit their acquired knowledge. Managing the tensions between both exploration and exploitation is key for strategic renewal (Crossan et al., 1999). Spender (1994) defines the flow of learning as the conversion of automatic knowledge to collective knowledge and then to objectified knowledge.

Roos et al. (1997) proposed another perspective introducing the concept of internal flows in the intellectual capital literature as the transformation of intellectual capital into financial capital and vice versa. From an intellectual capital perspective, human capital can be turned into structural capital. This one is later expected to lead to relationship capital and finally to financial capital (Vera & Crossan, na). This view sustain the improvement of Business Performances integrating an initial learning flow. Edvinsson (1997) add that the flow of intellectual capital from human capital to intellectual property allows value creation.

Crossan et al. (1999) make an interesting parallel between production flow and learning flow. Just as manufacturing managers, organizational managers have the task of regulating the stocks and flows to operate efficiently and effectively. As production flows require the work-in-process inventories not to exceed the system's capacity, learning flow might face similar bottlenecks to absorb the feed-forward flow from the individual to the group and the organization (Cohen & Levinthal, 1990). This comparison makes perfect sense in a dynamic theory of Organizational Learning. However, a slight difference has to be taken into account as a work-in-process inventory might be stockpiled but in the case of individual's knowledge, it might become frustrating and have negative impacts on Business Performances (Crossan et al., 1990). As a consequence Bontis and Hulland (2002) concluded their study by affirming that an organization that reduces the misalignment between the stocks and the flows of knowledge can achieve better performance.

3.3. Business Performances as an outcome

The ability to learn faster than your competitors may be the only sustainable competitive advantage

De Geus, 1988

Organizations face the need of strategically renewing themselves as the competitive landscape is highly variable (Quinn, 1992). Some empirical researches tempted to use Organizational Learning as an explicative variable for organizational performance (Bapuji & Crossan, 2004). Bontis, Crossan, and Hulland (2002) concluded from their empirical study that Organizational Learning had a positive impact on Business Performances at all levels. According to Hult et al. (2000) Organizational Learning affects positively purchasing

information processing and cycle time of purchasing process. Besides, Organizational Learning positively contributes to business financial performance and innovation (Lopez, Peon & Ordas, 2005). Although there are several conceptual studies that demonstrate the relationship between Organizational Learning and performance, there is a need of developing further the empirical researches to include crucial outcomes such as product performance and cost efficiency.

Nevis, DiBella & Gould (1995) argue that Organizational Learning is the capacity to maintain or improve organizational performance based on experience. Organizational Learning enables to develop people understanding of the organization and its environment in order to increase organizational performance on a continuous basis (Jones, 2000). Several authors linked learning and organizational performance. Although there is little empirical evidence to support such a correlation, they all demonstrate that higher level of Organizational Learning impacts both financial and non-financial performances (Dimovski, 1994; Figueiredo, 2003; Lam, 1998; Sloan et al., 2002).

3.3.1. A systemic view

From an Organization Learning perspective, success cannot be motivated in the short-term only by the traditional financial measures (Kaplan and Norton, 1996). Although both the literature and the industry traditions consider financial results as the main Business Performances (Lei et al, 1999), profit theory (Cyert and March, 1963) can no longer represents a valid indicator. The most representative framework for non-financial metrics selection is the *Balanced Scorecard* (Kaplan & Norton, 1992). Moreover, Rejc (2002) argues that it is crucial to include organizational goals. From a holistic point of view, every stakeholders need to be taken into account as they all have particular goals and expectations related to the organization (Rejc, 2002). This phenomenon is even truer for Organizational Learning as the outcomes often include changes in values and assumptions (Argyris and Schön, 1978), skills (Fiol and Lyles, 1985), systems and structures (Levitt and March, 1988), core competencies (Prahalad and Hamel, 1990), organizational innovativeness and competitiveness (Nason, 1994), and employee satisfaction (Bontis et al, 2002).

3.3.2. Measuring performances in project management

While this systemic view is necessary to assess Business Performances, the specificity of the industry also has to be taken into account. Whittington et al. (1999) declare that project intensive organizations is a more and more common organizational form. As a consequence, there is a strong requirement for studies about learning from project management firms (Prencipe & Tell, 2001; Newell et al., 2006). Although learning from a project perspective might be challenging and difficult (Hobday, 2000), it applies mostly to very specific projects. The large CAPEX projects can include a certain degree of standardization and support a relative structure and routines that facilitate organizational memory (Anand, Manz & Glick, 1998). As a consequence, in the case of large CAPEX project management, the performance focuses mostly on whether the projects are completed on time, on budget, and within expected quality parameters (BCG, 2012). In order to analyses more effectively those quality parameters, the Boston Consulting Group (2012) developed a tool – the BCG LPM Octagon - which includes eight key levers, namely expenditure optimization, design to value, rigorous risk management, procurement excellence, contracting optimization, access to scarce resources and local content, excellence in construction, and project management office. Each of those levers can be pulled by applying key principles and improve overall Business Performances.

3.3.3. A source of competitive advantage?

The first research on Organizational Learning already showed that “the ability to learn faster than your competitors may be the only sustainable competitive advantage” (De Geus, 1988). Stata (1989) repeated in nearly the same words that “the rate at which individuals and organizations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries”. Garvin (2008) added in an interview: “Products can be copied. Services can be copied. Even processes can be copied. [...] But if you’re learning more rapidly than the competition, you can get ahead and stay ahead.” This has been demonstrated empirically through the study of Dimovski (na) where he concludes that better Organizational Learning leads to higher profits and value added per employee than the competitors.

To sum up, the literature is abundant on both Learning Organization and Organizational Learning although the empirical evidences of its impact on Business Performances remain limited. The theory about Learning Organizations provides structural antecedents that can be categorized into three main concepts, namely environment, practices and leadership. Then the 4I model serves as a reference in the literature for illustrating the dynamic process of Organizational Learning. Conceptually, the flow of learning stocks within an organization can rely whether on a feed-back or feed-forward process. Finally, the Business Performances are seen as an outcome of this process. Those performances might change from an industry to another but the two main perspectives remain cost efficiency and value creation.

4. Methodology

4.1. Conceptual framework

Based on the above literature review, I developed the following hypothesis:

Hypothesis 1 (H1)	A Learning Organization structure has a positive influence on Organizational Learning process.
Hypothesis 2 (H2)	Organizational Learning process has a positive influence on Business Performances

These hypothesis allow to build a conceptual process framework that set out the main stages from initiation to conclusion (Smyth, 2004). It “explains either graphically or in narrative form, the main things to be studied – the key factors, concepts or variables – and the presumed relationship among them” (Miles & Huberman, 1994). This framework is inspired from the *Structure, Conduct, and Performance* (SCP) paradigm developed by Joe S. Bain (1959) in his book *Industrial Organization* but also from the later *Donabedian model* which focused on structure, processes and outcomes in a health care system (Donabedian, 1966). Another parallel can be established with the similar work of Gută (2013) as she proposed a conceptual model relying on Organizational Learning Capability, the process of Organizational Learning and Organizational Performance.

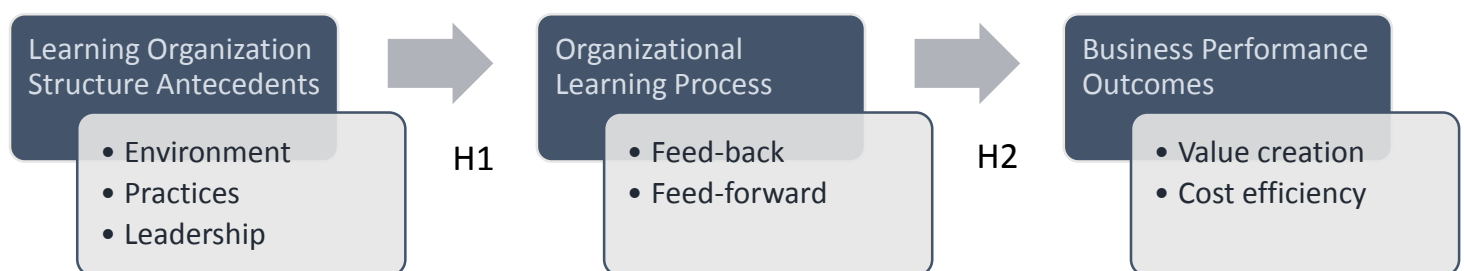


Figure 4 Conceptual Framework

As it has been mentioned above, in spite of the increasing popularity of Organizational Learning, most of the authors focused on conceptual development and relatively little attention was paid to empirical researches (Wang & Ellinger, 2008). This phenomenon might

be due to the difficulty to develop quantitative measurement for organizational learning (Santos-Vijande, Sanzo-Pérez, Álvarez-González, & Vázquez-Casielles, 2005).

4.2. Data collection

The methodology adopted for this case study is based on the conceptual framework developed previously from the literature review. In order to assess the extent of Organizational Learning in FMO and make a recommendation for Biotec International, I followed the conceptual analysis model suggested by Paquet, Bawin and Wattier (2011). This method consists in defining the main variables used in the hypotheses. Those variables composed of several key concepts are then divided into multiple dimensions which are themselves divided into measurable indicators. In this particular case, the data's only represent opinion and behavioral indicators. While the full table developed for this study can be seen in appendix 1, the figure 7 illustrates graphically the conceptual analysis table method. One table is produced for each variable, namely Learning Organization Structure (1), Organizational Learning Process (2) and Business Performances (3).

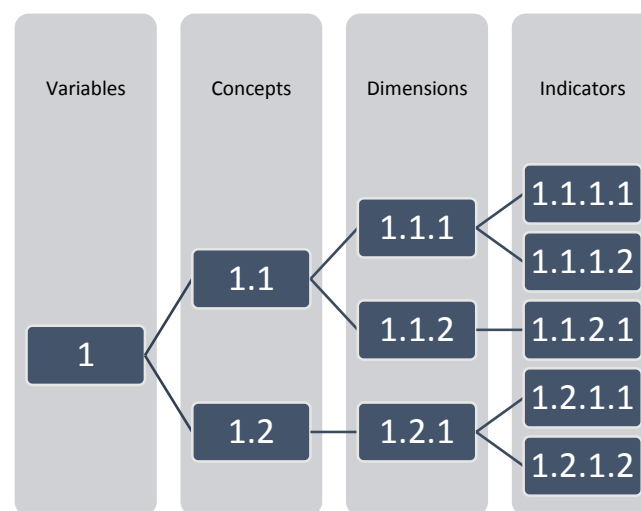


Figure 7 Conceptual Analysis Table (Paquet, Bawin and Wattier, 2011)

In order to make a diagnosis based on the conceptual framework, it is necessary to measure every variable with clear indicators. To do so, the data collection for this study includes a total of 10 concepts represented by 31 dimensions divided into 78 indicators. Their

assessment is conducted through an analysis model including questionnaire surveys, continuous passive observation, document analysis, and individual and group interviews.

Firstly, a hypothetico-inductive method has been utilized in order to define the issue of FMO as an agent fostering Business Performances. This first reflection was achieved thanks to my previous experience in BIC but also to observations that could be made on a daily basis during my stay in BIA for the data collection.

Then several exploratory individual interviews were lead to consider various perspectives for tackling this challenge. Those meetings were mostly informal and consisted of open discussion on the topic with the heads of departments and the senior management. They also allowed me to test both the survey and the interview guide before applying it to the whole sample.

Afterwards, an online questionnaire survey including 45 measuring indicators is submitted to the totality of the staff of BIA in order to assess both the company as a whole but also FMO in comparison to other departments to define to what extent they are Learning Organizations (see appendix 2). This sample represents 40 employees and a response rate of 60% was achieved with a return of 24 completed surveys. The survey lead within BIA, allowed to assess whether FMO and BIA were Learning Organizations. This assessment was driven through a *Harvard Business Review* survey developed by Garvin, Edmondson and Gino (2008) and the average score has been compared to a benchmark established by the same authors. Their baseline data was derived from surveys of senior executives in multiple industries completing a general management program at Harvard Business School in 2006. The questions are multiple choices and provide seven options to assess the accuracy of the statements illustrating the indicators. The scores from 1 to 7 are then converted into percentages. On the one hand, if the score falls below the median and more particularly if it lies in the bottom quartile, then some measures for improvement should be considered. On the other hand, if the scores fall above the median and particularly for the top quartile then some partnering with lower performers should be considered in order to share good practices and concrete strategies.

Finally, some individual and group interviews were conducted in an attempt to assess more deeply the role of the Facility Management Office. They are focusing on two variables,

namely the Organizational Learning Process in the Facility Management Office and the Business Performances specifically linked to this department. The former relies on qualitative observations built up from open questions while the latter is based on a more quantified analysis. The measurement indicators of cost efficiency used in the latter analysis are strongly based upon the *BCG LPM Octagon* (BCG, 2012), while the value creation is based on the usual KPI's provided by the industry. These interviews focus on FMO related actors inside the organization and consisted mainly of both open and closed questions. They are especially conclusive for understanding better the Feed-forward and Feed-back Processes of Organizational Learning, but also its impact on the Business Performances. The interview guide is located in the appendix 3.

5. Results and discussion

The data collection aimed at assessing the three main variables according to the conceptual framework, namely structure, process and performance. All the concepts are discussed based on the most relevant dimensions score. More information about overall data's can be found in the appendix.

5.1. Structural Antecedents of a Learning Organization

The Learning Organization variable can be summed up in three main concepts each of them divided by multiple dimensions and measured by a total of 45 indicators. The main concepts are supportive learning environment, concrete learning processes and practices, and leadership that reinforce learning. Note that the scope of the study includes both FMO as department, BIA as a company and a benchmark based on multiple companies from different industries (see appendix 4). The major results of the survey are represented in the figure 8 and the consolidated data's are located in appendix 5.

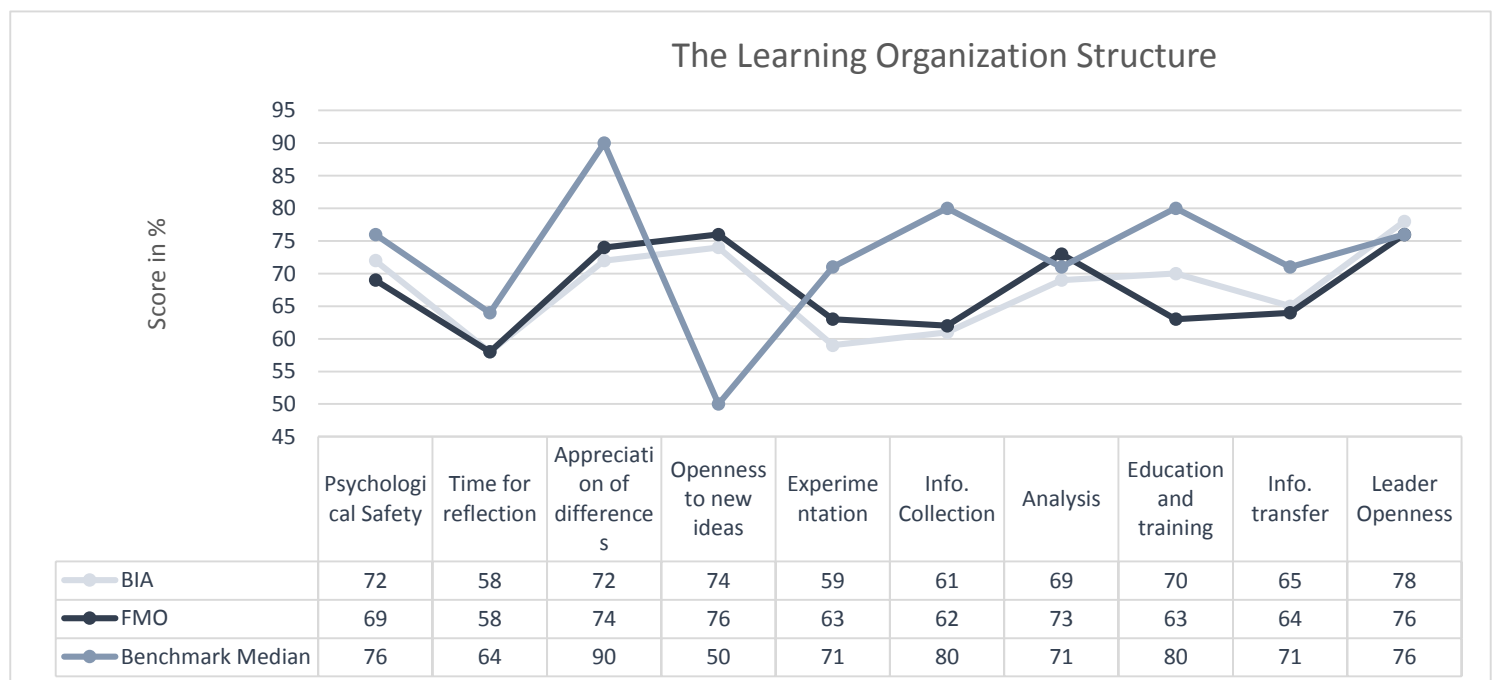


Figure 8 Results of the Learning Organization Survey

The three dimensions analyzed below are actually reinforcing each other. The leadership behavior defines the learning environment that facilitates the execution of concrete learning processes. Finally, those processes provide opportunities for leaders to adopt more openness and foster the virtual cycle characterizing a Learning Organization.

5.1.1. Supportive Learning Environment

The learning environment can be said as supportive if it provides psychological safety, time for reflection, appreciation of differences and openness to new ideas. This aspect is crucial as it represents the fundamentals of a Learning Organization. Such a concept focuses on the corporate culture and thus the people itself. While openness to new ideas was particularly positively qualified in comparison to the benchmark, a special focus should be made on psychological safety, appreciation of differences and time for reflection.

A lack of psychological safety implies that employees are not feeling comfortable expressing their thoughts when they disagree with their peers or manager and ask naïve questions. The low score here is due above all to a lack of owning up to mistakes. This dimension is hard to change because it mostly relies on personality patterns. However, applying specific methods to structure meetings and encourage informal talks can lead to such cultural changes. Note that the process of change can be relatively long as corporate culture is usually deeply embedded in people. However, BIA has the advantage of being a relatively young organization with 60% of its staff having less than one year of experience in the firm.

In terms of appreciation of differences, it can be observed that low interest is given to minority's opinions. Moreover, it has been noted that differences of opinion are handled mostly privately instead of being addressed to the team. Those attitudes strongly rely on cultural aspects and require deep changes in behavioral patterns. This dimension is scoring below the benchmark median in every single department. As a consequence, empowerment initiatives in each team should be strongly supported by managers.

Time for reflection is an important dimension in an organization as it allows to take distance, encourage creativity and make better decisions. It is an essential component to

foster a supportive learning environment. Both BIA and FMO have shown a particularly low score. The main issues requiring improvements are that schedule pressure gets in the way of doing a good job and people are too busy to invest time for improvement. Some improvements might come from practice sharing with the best performers in the organization such as the Executive Chairman, Project Management Office or Quality Assurance.

Concerning the openness to new ideas, it relates to approaches like encouraging employees to take risks and explore the unknown. More precisely, it can be observed that unless an idea has been around for a long time members in the team are reluctant to hear it. However, FMO results are slightly better than the average of BIA. This might involve that they should share their practices to other departments in terms of accepting novelty.

5.1.2. Concrete Learning Practices

The concrete learning practices are represented by the following indicators: experimentation, information collection, analysis, education and training and information transfer. It can be observed that FMO is falling low under the benchmark median, with the only exception of analysis. In other words, the department needs major improvements in terms of learning practices. The most priority dimensions requiring action are information collection, education and training, and information transfer.

Firstly, the formal process of gathering information on competitors, customers and technological trends relies on several approaches such as business intelligence (BI), analytics and big data collection. Based on my personal experience, those disciplines are pretty non-existent in the organization and most of the information acquired is often outdated and lack rigorous sources. The main lack concerns mostly the competition and market but also technological, economic and social trends to a lesser extent. Note that despite the low score of FMO compared to the benchmark, it is still slightly outperforming the organization as a whole. This can be explained by the fact that they are in constant contact with both customers for the operation of the plants and suppliers for the maintenance of equipment's.

Then, the lack of training and education for new and established employees has also been highlighted by the members of FMO. A net difference can be seen as FMO falls far behind BIA

and even more from the benchmark. The low score is due to the lack of periodic training and training updates and to the little time made available for such activities. Moreover, they complain there is no systematic training for experienced employees when they switch to a new position or when a new initiative is launched. This is partly explained by the fact that the chiefs of plant - who represent the majority of FMO members - are based on remote sites for long period, sometimes with difficulties to find a reliable internet connection and do not have frequent access to usual trainings in office. Moreover, although this lack of training might be partly due to the economic conjuncture of the organization, several techniques could be adopted using the LEAN methodology². In order to do so, employees can enjoy internal training, rely on a blog based after-action-reviews or simply be encouraged to participate in open online course. Note that focusing on this aspect also plays a crucial role for motivational management and staff retention. Informal interviews showed that there is a global demand coming from the members in order to access more training.

Furthermore, information transfer score is pretty similar between both FMO and BIA, but still fall below the benchmark. Such a low score is mainly due to the lack of regular exchange with network of experts from outside the organization, but also with customers and suppliers. According to Organizational Learning theories, knowledge must be clearly defined and shared systematically (Garvin, Edmondson & Gino, 2008). In order to achieve this, a strong and reliable taxonomy as part of a consistent document management system is required. Several cloud based solutions from different providers exist in the market but the most crucial is to have a single integrated system that include every member from each unit. This affects also the resulting analytics and security issues. Finally, practices such as systematic post-audits and after-action-review can also improve the transfer of information.

5.1.3. Leadership that Reinforce Learning

The FMO manager shows an average score in terms of leadership as this dimension is the only one that falls exactly in the median of the benchmark. However, we can notice a strong

² Lean methodology: "Lean enterprise is the practice of creating more value for consumers while using fewer resources and eliminating waste. The concept of Lean has become a feasible solution for organizations to transform themselves and become more competitive." (The University of Tennessee, na)

contrast between the answers of the people in office and the ones coming from the people on sites. The openness of the manager has been strongly acknowledged by his team members who work closely with him. Such a behavior of openness foster the creation of new ideas and options among employees. However, the chief of plants – who work in remote location - used to be more critical. Out of sight, out of mind? The distance and the resulting lack of communication might be responsible for such a difference. Such a factor could be misleading for the results in terms of leadership openness. As a consequence, strong improvements should rather focus on online coaching and mentoring that would empower people on sites. It is necessary for them to understand the mission of the organization and feel part of a greater purpose than just the operation and maintenance of a plant.

The global results of the survey showed that both FMO and BIA cannot be considered as Learning Organization as the scores are actually poor in comparison to the benchmark, with up to eight dimensions out of ten falling below the median. As a conclusion, there is definitively room for improvement concerning the Learning Organization Structure.

5.2. Organizational Learning Process

The Organizational Learning process variable has been assessed from a qualitative point of view according to an informal interview with the head of FMO. The observations were based on the concepts of feed-forward and feed-back flow of knowledge (Crossan & Hulland, 1997) (the indicators can be found in appendix 1).

5.2.1. Feed-forward flow

The feed-forward flow is also identified to the exploration process as the learning stocks originated in the individuals become organizational. The dimensions used are based on the 4I model³ (Crossan et al., 1999) and the indicators are simply whether Standard Operational Procedures (SOP) exist or not. Concerning the *intuition* step, although it might be done in an informal way, no actual measure has been taken to foster new idea generation nor

³ The 4I model is based on Intuition, Interpretation, Integration and Institutionalisation (see supra)

brainstorming session implementation. The *interpretation* is clearly the most absent dimension of the process as there is absolutely no incentive nor SOP for making explicit people's cognitive maps. In terms of *integration*, some regular meeting exist between the chief of plants, facility engineers and the head of FMO. Moreover, both daily and monthly reporting procedures have been implemented for monitoring purpose. But no specific SOP has been created to foster communication and knowledge transfer in a learning and improvement perspective. Finally, the institutionalizing process lacks of integral vision for the establishment of new products, procedures, structures and strategies as no clear SOP is existing for such purpose.

5.2.2. Feed-back flow

The feed-back of learning stocks traduces the exploitation of learning stocks from the collective level to individuals. This concept has been linked to departments organizational planning on different time scales, namely short, medium and long term. The short term (less than a year) relies on operational planning, while the medium term (between one year and five years) is based on tactical planning and long term (more than five years) on strategic planning. Although operational planning is documented via the annual budgetary exercise, no proper planning exists at departmental levels for tactical and strategic perspectives. Nevertheless, it doesn't mean that no feed-back flow exist. It can be supposed that the exploitation of learning stocks is still present but not in a documented and systematic way.

5.3. Business Performance Outcomes

The most relevant Business Performances directly linked to FMO were assessed, ranked and quantified. The data collection is based on a series of 12 interviews with people from FMO, Technical Service, Research & Development, Engineering and Commercial Department. The multiple indicators can be summed up into 14 main dimensions. The figure 9 represents the score of those dimensions that mostly affect Business Performances from a FMO origin (Crossan et al., 1999). The results of the indicators have been combined and exposed on a scale from 0 to 10 according to the extent of agreement to the role of the FMO contributing to Business Performances, 10 meaning the interviewee most strongly agreed. Note that the objective is not to measure the performance itself but the extent to which Organizational Learning impacts them through the existence of FMO (see appendix 6).

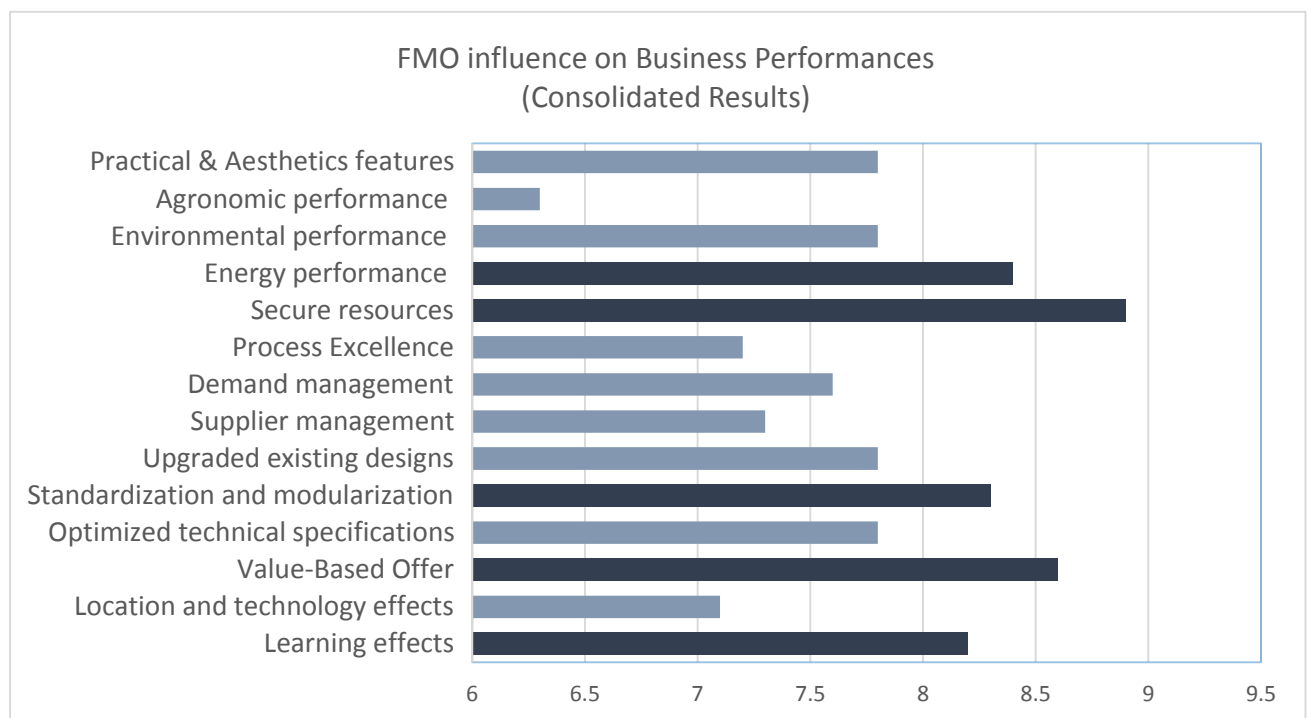


Figure 9 Influence of FMO on Business Performances

As we can see in the results, the most important dimensions contributing to Business Performances are: resources securement, experience effects, design to value, energy performance, and standardization and modularization. Other dimensions are contributing to a lesser extent, namely optimized technical specifications, upgraded existing designs, demand

management, environmental performance and practical and aesthetics features. In order to understand better those consolidated results, I will focus more deeply on the most important dimensions and their impacts on Business Performances.

5.3.1. Cost Efficiency

According to BCG (2012), “proactively securing access to scarce resources over the medium term in areas where there is a high concentration of projects is a key differentiator”. Securing the resources requires to follow the best practices in attracting and retaining talent. It can be observed that a special focus was made on the skill development of the existing staff, but also on encouraging workforce commitment and proactively recruiting. Indeed, most of the employees of Biotec International unanimously highlighted this major role of FMO. Thanks to O&M contract with the client, Biotec International staff can learn on the field and acquire practical experience. This experience allows them to understand better the nature of the business and feel more committed to their work. Last but not least, it has been demonstrated in the past that several highly trained operators had been recruited on the suggestion of the chief of plants. From the project’s budgetary perspective, the most impacting factors are price volatility and resource availability (BCG, 2012). A certain control of those factors is possible through the existence of FMO.

Experience Effects can be observed as FMO captures learning effects for systematic standardization (see *infra*). The repetition of processes and designs is a source of improvement at both component and project levels. It is even truer in case of large volume demand. The learning effect can be thus linked to the scale effect. Such a phenomenon can be represented by a falling exponential learning curve (Wozniak, 1999). As experience is acquired with the time, a productivity gain appears.

The design-to-value (DTV) approach based on the actual client needs at the lowest possible price is crucial for EPC contractors. According to Henrich J, Kothari A. & Makarova E. (2012), it can increase product margins by 3.5% to 9%. BCG (2012) made an even more optimistic statement as they argue that a DTV can reduce expenditures by 10 to 15% for existing products and up to 50% for new equipment. This has been achieved in Biotec

International mainly through understanding clients key purchasing criteria and design projects to meet client's needs. Those dimensions have been particularly valuable for the company since some of the clients are industrial groups representing several project opportunities. As a result, it also allows to shorten the negotiation period for future projects with this kind of client. FMO plays an essential role in understanding customer requirements and translate them into technical specifications.

Biotech International achieved scale effects with their design standardization known internally as *Biopalma*. Moreover, the ongoing R&D project of *biotanks* is of similar nature as it consists of modularizing the main components. This allows to use standardized components on multiple projects and as a consequence strongly reduce delivery times and overall complexity. Both developments were mainly due to FMO experience and learning. Finally, standardizing designs also lead to another ongoing initiative which is global sourcing in order to capture major costs savings. In the field of civil work, the most cited progresses were the elevation and adjustment of pipelines slopes and exit. The operators are the first ones competent for requiring adjustment. These features are strongly linked to experience effect and can be captured by having systematic after-action-review.

Several improvements in terms of equipment and materials also occurred due to FMO. They concern mostly engines maintenance, materials used for various components, and electricity and instrumentation scaling. Supplier management is directly involved as it allows to deepen relationships with top performers and also consolidate a supplier base by assessing and improving the quality of key suppliers.

5.3.2. Value creation

The main need coming from the client is either for environmental norm compliance or for energy generation. In order to improve client satisfaction, FMO has been playing a decisive role. Due to the complexity of the microbiological process of anaerobic digestion, the clients use to face difficulties when they are left on their own to deal with a biogas plant. Multiple interviewees made the comparison between a biogas plant and a car: “a racing car is useless if the driver doesn’t know how to drive the car”. FMO integration allows on the short term to guarantee the operational KPIs of the plant thanks to operation and maintenance. In order to guarantee similar results on the long term, continuous trainings are provided for the clients to ensure value creation.

Concerning the energy performance, the most important indicator provided by FMO has been the hydrogen sulphide (H₂S) removal in order to avoid erosion in the engines. Then come the total running hours of the biogas engine and the percentage of methane in biogas. Finally FMO also improves the biogas captured per month and the electricity generation but to a lesser extent as it relies mostly on external parties, namely the client and the engine supplier. According to the interviews, the anaerobic digestion process improvements include mainly the agitation, the effluent dissolution, the biogas suction point and the homogenization of effluent. Those criteria’s strongly influence the production of biogas and its quality. Regarding the biological filtration, most of the improvements were about the wet biological filter process, the biogas recirculation and the air injection. This factor is strongly associated to process engineering but as H₂S removal represents an important problematic for FMO, it constitutes a separate field.

FMO has less direct impact on the environmental performance as the KPI’s depend more on the initial designs but the operators can still have a relative influence on the results. The department is partly responsible for the removal of Total Suspended Solid (TSS) and to a lesser extent the Chemical and Biological Oxygen Demand (COD & BOD) representing the main characteristics of wastewater contamination. Furthermore, some agronomic performance indicators used to be taken into account for the ferti-irrigation and composting system as part of the Biotec International offer. However, the Asian branch is not providing those solutions yet. As a consequence, this dimension couldn’t actually be validated through

this study. Finally, some practical features improvement were mainly based on minor change such as the installation of a small path leading to the plant or valve draining system for instance.

Multiple specific improvements that have been made in the past through FMO were observed. The figure 10 considers five major types of improvement, namely anaerobic digestion process, equipment and materials, biological filters, civil work and to a lesser extent practical features. The following chart is representing the number of times major types of improvement were mentioned during the interviews.

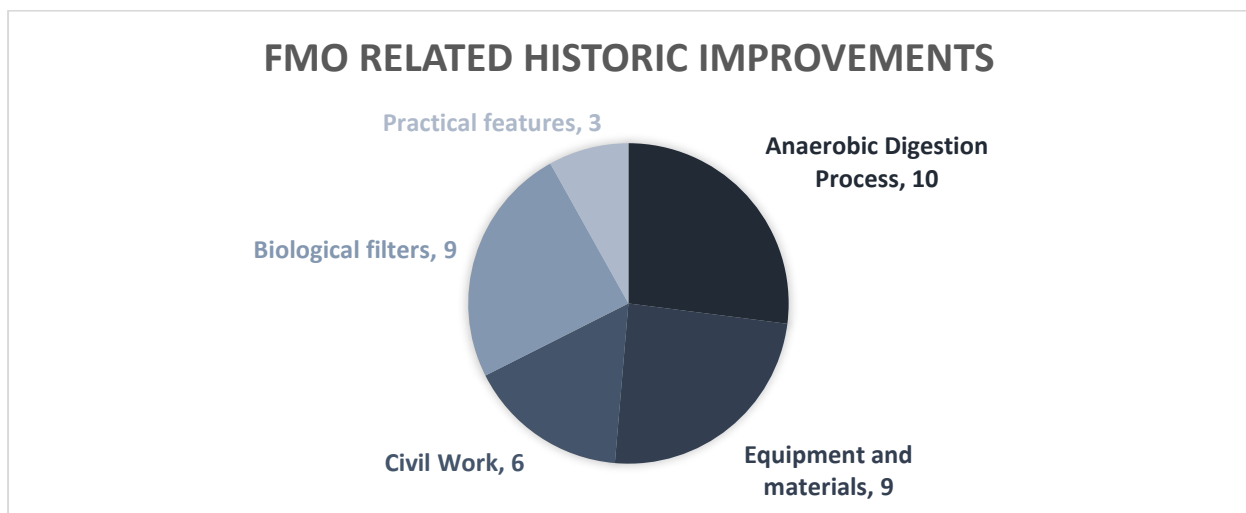


Figure 10 FMO related historic improvements

These improvements might suggest the existence of a link between the Facility Management Office and Business Performances, which supports the thesis statement.

6. Implications for Management

As it has been observed, the Learning Organization structure relies on three interdependent concepts, namely environment, practices and leadership. The results might suggest that there is an asymmetry between a fostering leadership behavior and the global pessimistic environment due to the physical distance between the people in office and the ones on sites. This can be explained by the fact that Biotec International is underinvesting in learning mechanisms. As a consequence, both the environment and the leadership could suffer from it. Hence the strong need of reinforcing learning practices.

Organizational Learning as a process exists a fortiori but there is no evidence of willingness to do so. The management has not implemented any formal standardized operational procedures to improve the feed-forward flow of learning stocks. However, some independent initiatives are taken on a case by case basis at integration and institutionalization steps. The strong lack of explicit procedures at individual level reflection does not support innovation and interpretation of mental models. Moreover, the feed-back flow distributing the knowledge to individuals also lack of a clear organizational planning. The exploitation of learning stocks should be framed by coaching and mentoring. The outcomes of this study lead to suggest that improvement efforts are required in terms of procedures in order to benefit of an optimal Organizational Learning.

FMO doesn't have the characteristics of a Learning Organization and spend little attention to the Organizational Learning process. However, this department still enables performance improvements at various levels. Both the cost efficiency and the value creation are enhanced despite the lack of investment in learning.

As most of the competitors are not including operation and maintenance services in their business model, we can conclude, *ceteris paribus*, that FMO represents a competitive advantage. However, according to the conceptual framework developed in the literature, this advantage could become sustainable if both the structure and the process were improved. Such a sustainable competitive advantage is crucial for Biotec International in order to achieve its vision, namely being the industry leader of organic matter management in tropical regions.

6.1. Redefinition of FMO value proposition

FMO is officially responsible for the operation and maintenance of the installed facilities. This department is a source of Business Performances but it only exploits a small part of its full potential. This being said, I recommend the value proposition of FMO to be redefined. This first implication for management doesn't represent massive investment neither in time nor monetary terms but relies on a change of internal awareness and vision. The potential value proposition should include constant Business Performances improvement, continuous training for both the client and Biotec International but also an aftersales additional service (see appendix 7).

The anaerobic digestion process continuous improvement represents the main competitive advantage of Biotec International and it is due to the presence of FMO. In order to go beyond this current advantage, the feed-forward process should be revised and some SOP should be developed within the quality system to always ensure better KPIs than the competition.

FMO is also a mentor providing continuous training for employees of Biotec International as these ones can go on sites and learn directly from the field. But it is also a mentor for the clients teaching them how to manage a biogas plant. This guide has to be supported by information technologies such as e-learning platform for instance.

The Chiefs of Plant and the Facility Engineers are facing the clients on a regular basis and they are the trouble shooters who have the mission of building a deep relationship with clients. Biotec International has the opportunity to respond to any claim of the client and ensure his satisfaction. FMO represents the opportunity to sell extra services or even new projects to current customers. In order to do so, all the members of FMO should have a minimum of commercial background. This can be achieved through training mainly.

6.2. Recommendations

These new value propositions have to be supported by new solutions for Organizational Learning. Based on the conceptual framework and the results of this research, I propose to make the distinction between two major building blocks, namely organizational culture on the one hand and the tools on the other hand. Such a categorization is based on the nature of the recommendations taking into account the entity responsible for it. I would suggest to handle them from a human resource and senior management perspective for the former, and quality assurance and information technology point of view for the latter. As a consequence, the global environment and the leadership are part of the culture while processes and technologies represent concrete tools to lever a Learning Organization. Note that the culture is an antecedent to the tools. Similarly, it can be observed that the following categories are presented in a specific order, from the most intangible to the most tangible. The following recommendations provides the minimum requirement in order to improve Organizational Learning. As it has been stated by the management, a LEAN methodology has been applied in order to become progressively a Learning Organization with the limited budget of a SME.

6.2.1. Leadership

As Organizational Learning requires a strong commitment from every member, it is necessary to consider new ways of recognizing contributions. Hence the necessity to have a champion who advocate and promote Organizational Learning. They can come from C-levels or operational level, but the most important is that they dedicate a part of their working time to actively support the multiple initiatives and promote appreciation of differences. Concerning the latter, a strong effort has to be made on the minority's opinions and collective problem solving. Champions can be appointed during performance review, and incentives such as awards or special mention should also be considered.

Furthermore, Organizational Learning also requires a certain availability of internal experts to share their knowledge. The subject-matter expert (SME) are authority in a particular area. They have the duty to engage in mentoring and coaching other members of

the organization about technical subject. Every member of an organization might be expert in a topic or another. As a consequence, they should all schedule a few hours of their working time per month in order to share their expertise with their colleagues.

6.2.2. Environment

Concerning the organizational culture, it is crucial to establish Organizational Learning awareness and an efficient communication plan. This initiative can be supported by change management and stakeholder management. Every member of the organization should be aware of the Organizational Learning vision. Some events such as an annual knowledge fair can be organized to promote Organizational Learning initiatives.

Then the question of knowledge and information literacy should be raised. Do people have the ability to fully leverage the information and knowledge resources and tools available? The required skills might include training session for improving searching and navigation in information systems, organizing information, supporting and mentoring peers, or simply using the collaboration tools.

6.2.3. Process

The processes are characterized by the principles of positive deviance (Pascale, Sternin & Sternin, 2010) which is based on the fact that within every social group, given the same resources and challenges, some people find better solutions to problems than their peers. As a consequence, solutions might already exist within the organization. Hence the necessity to promote best practice transfer. Positive deviance is a problem solving approach that enables every member to discover successful behaviours and adapt them into an action plan. In order to apply positive deviance, community of practice and community of interest are fundamental concepts to be understood. Both are informal group of people who share a common interest and meet and discuss regularly topics related to this area of interest. While the former is strictly related to professional work in order to spread specialist knowledge and expertise,

the latter isn't and focuses more on building informal social network to support future information and communication flows.

Another key aspect of Organizational Learning is the learning from mistakes. Psychological safety is a prerequisite for this process and can be facilitated by several procedures. The After Action Review (AAR) is the most frequent one. It is a short facilitated meeting conducted at key points during a project or a regular work cycle to find out the areas that can be improved for the future or simply for other teams. A similar method is the Retrospect with the slight difference that the latter is achieved at the end of a complete project or a complete activity cycle. It is usually much more time consuming as it summarises and captures what the team has learnt in the big picture. Once the AAR approach is well-developed, a Before Action Review (BAR) can be implemented as a process. It takes place before the beginning of a project or major activity cycle in order to deliberately consult the existing knowledge base that consists of Retrospect, AAR repositories, etc.

6.2.4. Technology

Finally, those approaches still need to rely on technological supports. The term Enterprise 2.0 refers to the adoption of Web 2.0 technologies for business purpose. The technology tools respond to three main dimensions, namely innovation and information collection on the one hand and information transfer on the other hand.

Richard Gregory (1970) strongly believed that the visual perception relies on top-down processing. In other words, human mind forms a perception from the big picture to the tiny details. This conceptual driven process is key for innovation. As a consequence, mapping techniques have to be strongly considered for novelty purpose. First and foremost, the wide use of graphic facilitation (Sibbet, 2001) and rich picture (Avison, Golder & Shah, 1992) methods have to be supported by the management. Then specific software's for concept mapping can be used. Multiple SAAS can be found in open source but some of them might be useful for specific tasks such as knowledge mapping or value network mapping. The collection of information is usually known in the industry as business intelligence. However, such a discipline requires large budget and wouldn't be justified for a small size firm. Some

alternatives exist in order to access information about competition, best-in class organization or customer. A simple way to start by subscribing to RSS feeds of websites from interesting parties. News aggregator or social bookmarking can also include synthesized information about a specific sector or industry. Then subscriptions to industry reviews could also provide key information about economic and technological trends.

An efficient information transfer requires information architecture, a resource database and good communication media. The information architecture is crucial for Organizational Learning as it is the design of information sharing environments that allows to stock and find knowledge. The first and foremost prerequisite is to have an efficient document management system (DMS). Such a system tracks, manages and stores the documents. Most of them include history tracking to record the various versions modified by different users. Moreover, the system has to be compatible with all type of devices and have a user-friendly interface. Once the system is chosen, the taxonomy has to be established in order to improve the findability of information. The next tool to implement is an internal wiki. This collaborative tool can outline procedures and best practices but also specific knowledge based on subject matter experts insights. The wiki has to be an integrative tools including social tagging and social bookmarking to refer to a particular member or document. Then comes the dashboard, a tool to track key performance indicators. The visualization of data allows a better understanding of historical trends and current performances and it also reveals the results of other business units. Although a dashboard has to be simple in its presentation, the analytics and the intelligence behind it might face more complexity.

Once a proper information architecture exists, it is necessary to establish a resource database. This one aims at centralizing all the skills of the members of an organization in one single place. This is based on two main tools, namely yellow pages and a competency framework. The yellow pages are a directory listing the knowledge domains and contact details of the specialists. It can also include details of their experience and the kind of projects they have undertaken in the past. Such a tool requires the corporate culture to be collaborative as it might be difficult for the members to deviate from their day-to-day business in order to help their colleagues. Concerning the competency framework, it is a structure that aims at documenting the core competencies required for the main activities of a business unit. It describes the necessary skills for both normal and high performance situation.

The communication channels are crucial for efficient information flows. First of all, email detox has to be the core focus for implementing new media. It has to be done in a staged approach to allow the members of the organization to adopt the new channels progressively and to avoid confusing them with radical changes. The first channel to implement is integrated instant messaging to facilitate the communication between the field and office people. This channel provides users with instant feedbacks and offers video conferencing and VoIP⁴. A study of the Radicati Group (2004) concluded that companies could save an average of 40 minutes a day per user with IM. Moreover, it has been showed that it reduces workplace interruption (Garrett, 2006). The following channel to be implemented is an internal blog. This one should be based on multi-author blogging (MAB) and microblogging so that any member can share information to the rest of the organization in an easy way. Besides disseminating knowledge and expertise, it also promotes discussion and collaboration across business units. The third channel to implement is a podcast (Hammersley, 2004). This one is a digital media providing episodic series of content. Although it can be used for inbound marketing purposes, it is also an efficient way of sharing knowledge to other members of the organization. It can take multiple forms such as *vodcast* for videos content or even screencast for video screen capture. It can also support subject matter experts using storytelling, critical decision method or presenting case studies from past experience.

In a nutshell, conceptual mapping, subscriptions, information architecture, resource database and communication channels can be very efficient if well implemented but those technological tools still have to be strongly supported by standard operational procedures and the overall corporate culture.

6.3. Profitability analysis

The approach for the above recommendations is based on a LEAN methodology to avoid large expenses and considering the limited budgets of a SME. As every organizations, Biotec International also has informal and perhaps unconscious Organizational Learning

⁴ VoIP is a technology that delivers voice communications and multimedia over Internet Protocol (IP) networks. It's also often referred as internet telephony.

processes embedded in routines. Those recommendations focus on the extra efforts required to tend to the status of a Learning Organization.

Quantitative measurement of the impact of Organizational Learning might be difficult due to its long term and holistic dimension (Santos-Vijande, Sanzo-Pérez, Álvarez-González, & Vázquez-Casielles, 2005). As a consequence, the required expenditures have been summed up in order to obtain the break-even point and determine the minimum productivity gain necessary for the investment to be profitable. The calculations are based on a four year period based on the projections of the business plan 2015-2019.

The total investment, including both CAPEX and OPEX covering the period from 2016 to 2019, amounts to a NPV of 574,890 USD with a discount rate of 14% (see appendix 8 and 9 for details). In order to be profitable, the recommendations should lead to a minimum productivity gain of 9.90%. According to professionals and experts in Knowledge Management such a productivity gain is widely feasible. In the figure 11, we can see that the Operational Expenditures are increasing through the years due to the forecasted growth of the company headcounts. However, the impact of Knowledge Management on Business Performance can be seen mostly on the long term. Although the context might be different, a study sponsored by PricewaterhouseCoopers shows that both BP Amoco PLC and Ford Motor Co. have each generated more than \$600 million in savings through Knowledge Management effort (Industryweek, 2005).

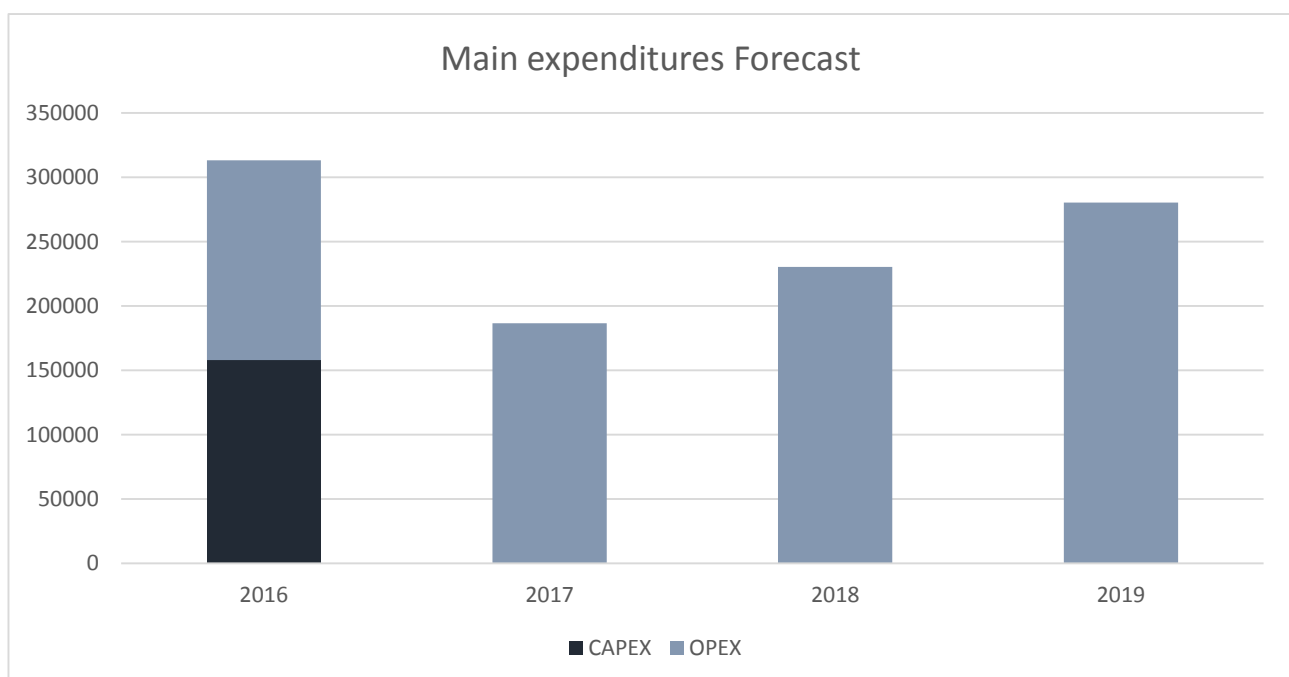


Figure 11 Expenditures forecast

The above profitability analysis is in no way sufficiently precise for supporting a business decision. The calculation have been elaborated with very limited resources and aims more at building a rough estimation of the expenditures than measuring the actual return on investment. As a consequence, a more detailed financial analysis is required to support further decision taking. The profitability analysis is based on recommendations for the Asian branch. However, some expenses such as the implementation costs of an information system for instance could be split or at least lowered due to economies of scale shared with the mother company. However, for precautionary reasons, such scale effects were not taken into account.

6.4. Need of a risk analysis

Before implementing such a recommendation, a risk analysis should be driven in order to analyses the identified risks and estimate their probability and occurrence impact. The risks are defined as the effect of uncertainty on objectives according to ISO 31000. As the study took place between the main offices of Biotec International located in both Malaysia and Colombia, the staff is very international and the study included people from more than seven nationalities with very different background. Therefore, the following risks are linked with cultural dimensions.

As described by Hofstede (1980)'s cultural dimensions (see appendix 10), we can see first and foremost that the power distance is at its highest in Malaysia, contrasting strongly with Colombia that is more in the average, with a score similar to Belgium. This high score in Malaysia is typical of Asian culture. As challenging the leadership is not well perceived, it has to be taken into account for cultural dimensions such as psychological safety and appreciation of differences.

Individual learning might not benefit to the organization if the quality and relevance are insufficient or if the learning is too much focusing on the individual's skills rather than its impact on the organization (Field, 1997). Both Colombia and Malaysia are collectivistic society, which means that the degree of interdependence among individuals is high compared

to European countries (Hofstede, 1980). As a consequence European expatriates might have to make special efforts for information sharing and team working.

Members of an organization may express a certain resistance to learn leading to the concept of *learning inaction* (Vince, 2007). According to Maaninen-Olsson & Vince (na) this phenomenon can be due to personal and inter-personal anxieties and defenses (Argyris, 1990, 2007; Schein, 2002); processes of 'unlearning' (Tsang, 2007); social and organizational defenses against learning (Bain, 1998); and unconscious processes of emotion and power that shape behavior and action (Vince, 2001; Gabriel and Griffiths, 2002). It can be observed that the uncertainty avoidance is pretty high in Belgium and to lesser extent in Colombia while especially low in Malaysia. This low preference for avoiding uncertainty builds a suitable environment for innovation and more flexibility for change.

Traditional Business Performances usually focus on short term whether the concept of Organizational Learning require a long term approach. Colombian culture is especially short-termist while Malaysians are close to the average of long term orientation, although they fall far behind Belgium (Hofstede, 1980). The focus on achieving quick results can be harmful for an Organizational Learning initiative as it normally requires a long term vision of the organization. The Organizational Learning strategy has to consider this eventual misalignment of each party's perspective and define integrative objectives based on a long term vision.

7. Critical perspective

Society is dependent upon a criticism of its own tradition.

Jürgen Habermas

Several limitations to this study have to be addressed. First of all, although, the literature review focuses on the main aspects of Organizational Learning in the broad sense, it is not intended to be an exhaustive review. It was designed rather to establish the fundamentals of Organizational Learning and elaborate a conceptual framework that could apply to a real business case study in order to make recommendations. The review was limited to the defined scope of analysis. The Organizational Learning in the broad sense is a vast and heterogeneous topic as it can be observed from multiple perspective. After reviewing much of the literature on Knowledge Management, a particular focus has been made on Organizational Learning from a structure, process and performance point of view.

Concerning the conceptual framework, it takes inspiration from the Structure Conduct Performance paradigm developed by the world-renown Harvard economist Edward Mason in the 1930's and later popularized by Michael Porter in 1980. Furthermore, it has been approved by several experts and professionals in the industry. As a consequence, it can be assumed that there were limited bias for the construction of the framework. However, it still faces some limitations as the relationship between Organizational Learning and Business Performances might require further investigation because the theory about this phenomena lacks support of empirical studies. Concerning Business Performances, some improvements might be dependent on other sources than Organizational Learning processes. The influence of external factors has not been taken into consideration because this research focuses on the Facility Management Office only. As a consequence, those external perturbation are classified as control variables that have no significant impact on Business Performances. Furthermore, as suggested by McKinsey in the 1980's, a more dynamic version of the framework could include a multidirectional component where the relationships between variables could flow in the opposite direction, breaking the linearity of the model. The impact of performance on the processes and then on the structure in terms of Organizational Learning is a subject that requires further research.

The methodology relies on opinion and behavioral indicators. As a results, no deep quantitative analysis has been driven. Even concerning the performances, the assessment indicators were purely qualitative. This is due to the fact that it was not possible to make any comparison whether in time or with the competition. Indeed, there were no previous study lead in this field within the organization conducting to a crucial lack of data. Also, information about competition is relatively poor because the number of competitors are limited but overall because it is an opaque industry. Moreover, this study is a project thesis focusing on a particular business case study and as a result the findings might not be generalizable for other industries as Business Performances variable relies on a particular activity, namely project management.

The data collection might be the part of the thesis facing the major limitations. First of all, although the sample for the online survey represents 60% of the population, it might not be representative as there were more responses from the people in office - who have frequent direct contacts with both the researcher and the management - than the ones on the field. Moreover, the study only focused on one branch of the group – reducing the population size - whereas it could have been done in the sister company based in Colombia. As a consequence, there is a relatively high margin of error. The lack of responsiveness to the survey shows an evidence of communication issues due to the particularly specific industry. Biotec International is active exclusively in rural sectors, working in remote location, geographically spread and often dealing with non-English speaking workers. As a consequence, there might be a bias in terms of the results compared to the benchmark. Furthermore, although the survey was anonymous, the fear of authority due to high power distance in Malaysia (see supra) might constitute another bias for respondents. They might not give honest answers when they are required to assess their manager and colleagues.

The scope of this thesis is rather to propose new avenues for future work than to provide a complete strategic implementation plan. The profitability analysis that follows is only a proposed framework in order to assess briefly the cost of recommendations. It highlights the main investments and operational expenditures required but a more developed financial analysis should be lead based on a wide supplier base comparison, precise cost of labor based on the headcounts projection of the business plan, and including the overall business development strategy.

8. Conclusion

Biotech International requires to improve its Business Performances and looks for a source of sustainable competitive advantage. In order to assess potential opportunities within Biotech International, this thesis relies on the following research question:

To what extend does Organizational Learning influence Business Performances and more particularly in the case of a Facility Management Office?

The notion of learning has been decomposed, according to the literature, in both Learning Organization and Organizational Learning while Business Performances rather find its origin in the industry standards. The structural antecedents to build a Learning Organization rely mainly on environment, practices and leadership. Although the leadership shows particular openness, there is a strong lack of concrete practices and the environment doesn't show sufficient support. As a consequence, neither Biotech International Asia nor the Facility Management Office can be qualified as a Learning Organization. Moreover, the Organizational Learning Process is decomposed, according to the 4I model, into both the feed-back and the feed-forward flow between distinctive learning stocks at individual, team and organizational level. Such a process is not formally recognized within the organization and there is still room for improvement in terms of Organizational Learning. Concerning Business Performances, the cost efficiency is based on project management in the energy sector while the value creation is specific to Biotech International's key performance indicators. The Facility Management Office is a source of continuous improvement in terms of Business Performances due to the operator's vision of the field.

Based on the findings, we can assume that although a unit might not be considered as a Learning Organization from a structural point of view, it can still be a source of Organizational Learning and positively influence Business Performances. This argument is even truer for the case of a Facility Management Office that is dealing with the daily operation and maintenance of the projects. However, the conceptual framework demonstrates that being a Learning Organization might reinforce the process of Organizational Learning and contribute even more to Business Performances. As a consequence, I strongly recommend to Biotech International to become a Learning Organization. In order to do so, the organization should focus its efforts in four main areas, namely leadership, environment, processes and

technologies. The senior management, human resource, quality assurance, and information technology departments have to be strongly engaged. A special dedication and initial investments are required during the first 12 months of implementation phase. Then the continuous Organizational Learning process will necessitate less resources thanks to standardization effects. If Biotec International becomes a Learning Organization, it will enjoy better Business Performances due to better innovation, intelligence, communication, productivity and staff retention.

This being said, the structure of a Learning Organization can be regarded as an optimum situation. However, the risks and efforts required to build such an organization require a deep analyze before any decision taking. Moreover, the difficulty to measure the impacts of Organizational Learning is typical of a systemic phenomenon but it is essential to develop a model for measuring the long term effects. As a consequence, further research should assess more deeply the potential risks and costs of establishing a Learning Organization on the one hand and the possible beneficial outcomes on the other hand.

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