INFORMATION TECHNOLOGY (IT) STRATEGIC ALIGNMENT: THE CASE OF ARCELORMITTAL TUBARÃO

ALINHAMENTO ESTRATÉGICO DE TECNOLOGIA DA INFORMAÇÃO (TI): O CASO DA ARCELORMITTAL TUBARÃO

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ABSTRACT

This paper aims to understand the process of strategic alignment of Information Technology (IT) in a Brazilian steel industry, ArcelorMittal Tubarão Company, analyzing how it is practiced in the mentioned company *vis a vis* the theoretical concepts. Based on Souza and Joia (2009) model, we sought evidences about the elements that support the IT strategic alignment with business strategy. The research was conducted between October 2009 and February 2011, the data was collected through semi-structured interviews with IT managers as well as operational managers, IT users in the organization, and they were treated by means of content analysis. The main findings indicate a trend of align the organization's practice with the elements of theoretical model chosen, particularly regards the fundamental aspect of change organizational mindset about the role of IT in Business.

Keywords: Strategic alignment; Business Strategy; IT-business alignment; Steel Industry; Information System.

RESUMO

O objetivo deste artigo é compreender o processo de alinhamento estratégico de Tecnologia da Informação (TI) de uma empresa do setor siderúrgico brasileiro, a ArcelorMittal Tubarão, analisando como o mesmo é praticado na referida empresa *vis a vis* à teoria. Fundamentado no modelo proposto por Souza e Joia (2009), buscou-se evidências acerca dos elementos que dão suporte para o alinhamento estratégico da TI com a estratégia do negócio. A pesquisa foi realizada entre outubro de 2009 e fevereiro de 2011 e os dados coletados por meio de entrevistas semiestruturadas com gestores de áreas de negócios e de TI. Os dados foram tratados por meio da análise de conteúdo. Os resultados apontaram para uma tendência de alinhamento da práxis da organização com os elementos do modelo teórico escolhido, particularmente no que diz respeito ao aspecto fundamental de mudança do pensamento organizacional sobre o papel da TI no negócio.

Palavras-chave: Alinhamento Estratégico; Estratégia de Negócio; Alinhamento da TI com Negócios; Indústria siderúrgica; Sistema de Informações.

1 INTRODUCTION

Information Technology (IT) has become more and more an indispensable element for the organizations. The great diversity of technological resources and their constant evolution have demanded enormous attention by managers who search to establish a great relationship between costs of implementation and their expected returns (LAURINDO et al., 2001). However, verifying how the IT practices impact the organizations' performance is a complex task (OH; PINSONNEAULT, 2007), because IT resources generally act in a complementary relationship with other resources present in the organizations' portfolio,

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becoming difficult the managers' perception related to the role and the weight of IT in the conduction of business.

Nowadays, one of the approaches adopted for this problem consists in the IT strategic alignment with the organization's strategy. Strategic alignment in the context of this work consists in the coordinated execution of activities by the organization in order to achieve cohesive goals among the several functional business areas, such manufacture, finances, marketing, human resources and IT (HENDERSON; VENKATRAMAN, 1993). According to Luftman (2000), it may be also described as the application of IT resources in appropriate time and mode with business strategies, goals and needs. Hence, by this vision we start from the assumption that IT is able to support the organization strategies when properly planned and executed for this purpose.

Meanwhile, the literature points that the alignment absence among business strategies and IT is one of the causes for adverse results in IT investments (LAURINDO et al., 2001). In this sense, it is important identify and evaluate whether the organizations is able to notice the real causes both for success and adverse results, which permeate the process from the definition of strategy to the implementation of necessary IT resources to ensure a correct IT strategic alignment within business goals.

In this context, several models has been proposed in the literature (HENDERSON; VENKATRAMAN, 1993; REICH; BENBASAT, 1996; CHAN et al., 1997; TÉO; KING, 1997; LUFTMAN, 2000; HIRSCHHEIM; SABHERWAL, 2001; KEARNS; SABHERWAL, 2006; BRODBECK; HOPPEN, 2003; SOUZA; JOIA, 2009) in order to verify and evaluate the strategic alignment and the IT practices inside the organizations.

In the international context, Yayla and Hu (2009) searched empirical validation for theoretical models of strategic alignment and they identified that aspects of centralization, formalization, and common domain knowledge, IT history of success and relationship of managers have been the main drivers for the success of this alignment. Jorfi et al. (2011), based on an extensive literature review about the theme propose that in dynamic environments, and those of great uncertainty, should be an IT flexibility to adjust itself with the strategic business alignment. About the IT impact on the business, Tallon (2007) argues that, for better comprehension of the business IT strategic alignment, a guiding perspective to processes allows a more significant comprehension of how this alignment affects the business performance.

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About the evaluation of IT financial impact, Oh and Pinsonneault (2007) compared two conceptual approaches (one of them centered-resources and another contingency-based) and two analytics (one linear and another nonlinear) in order to measure the IT strategic value in the business. Their results showed that contingency-based approach is more adequate to explain the impact of IT cost in business performance; while the centered-resources vision may perform a better IT forecast in its income and profitability.

Within national context, Junior et al. (2012) investigated the relation of strategic alignment and IT in the product development process, and found evidences of elements of strategic alignment along the process mentioned before. Finally, Galas and Ponte (2006) analyzed, under manager perspectives, the impacts of *Balanced Scorecard* (BSC) implementation in the IT strategic alignment factors with the business. Their results showed that BSC implantation cause manager changes which influence in the IT alignment factors in the four BSC dimensions, transforming them in facilitator factors of alignment and contributing positively to the IT alignment with the business.

Based on this theoretical outline and before the importance of comprehend how this phenomenon occurs in the national context, the motivation of this study is deepen the understanding of strategic alignment in an important sector for the national economy. Therefore, this article aims to verify, based on the actors involved, how the IT strategic alignment occurs (or not) in an enterprise. Thereunto, we performed a description and analysis of the strategic alignment process particularly based on the literature about IT strategic alignment under the model proposed by Souza and Joia (2009). The justification to choose the model by Souza and Joia (2009) is because it searches synthetize several models proposed before (HENDERSON; VENKATRAMAN, 1993; CHAN et al., 1997; TEO; KING, 1997; BRODBECK; HOPPEN, 2003; KEARNS; SABHERWAL, 2006) in a single and useful model to apply in the national context.

The empirical support evaluated an enterprise from the Brazilian steel industry called ArcelorMittal, recognized also in the international scenery as one of the most updated and competitive in the world (CROSSETTI; FERNANDES, 2005). This enterprise exports about 30% of this production to the North America, Asia and Europe, among other countries. It has several affiliates in Brazil and is part of a great multinational group with which change information constantly and in real time. This scenery allowed a discussion and analysis of several

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aspects presented in the strategic alignment models in three levels: local, global and the group. This theoretical-practical model used has base on the investigation proposed by Whittington (2004), which argues: "studying the practice may be practical" (WHITTINGTON, 2004, p. 45).
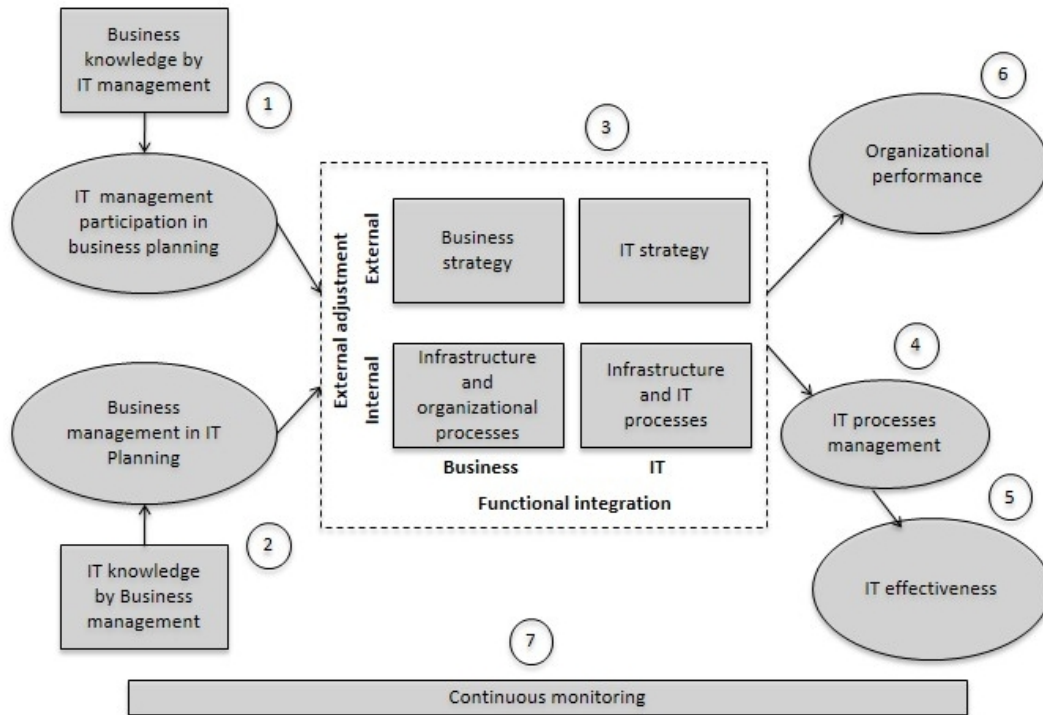
The article presents the following organization: the first section shows the introduction. Next, we exhibit a revision about the main strategic alignment models whose give support to the theoretical work. The section 3 describes the methodology used to analyze the enterprise selected based on the theoretical support adopted. Finally, we present the conclusion and final considerations.

2 THEORETICAL FRAMEWORK

Strategic Alignment has been object of several studies along the two last decades (HENDERSON; VENKATRAMAN, 1993; REICH; BENBASAT, 1996; TEO; KING, 1997; CHAN et al., 1997; HIRSCHHEIM; SABHERWAL, 2001; BRODBECK; HOPPEN, 2003; KEARNS; SABHERWAL, 2006), and the work performed by Henderson and Venkatraman (1993) is the most important and influence the research of other authors.

Based on the most relevant elements from the studies described above, Souza and Joia (2009) proposed a new model for IT strategic alignment in which search describing how the role played by IT affects the organizational performance when correlated with the strategic planning. The model presented in the figure 1 is the first referential to analyze the strategic alignment and the IT practices in the enterprise studied in this article.

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Figure 1 – Conceptual Model Theory

Source: Souza and Joia (2009).

According to Souza and Joia (2009), one of the components of the strategic alignment model has its base on the contributions by Teo and King (1997). For these authors, the knowledge of IT managers about the business area has direct and positive relevance on the strategic alignment. In these sense, Souza and Joia (2009) point to the importance of this aspect when they describe that the IT management participation moderates directly the business-planning (element 1); in other words, the knowledge of business by IT management has straight influence in its participation in planning actions in the business.

On the other hand, Souza and Joia (2009) argue that, more relevant than the knowledge by IT managers about the organization's business area, the knowledge by business executives from other areas about IT is the most important aspect (element 2). However, this dichotomy may be considered beneficial because may cause a kind of knowledge competition among the business areas and the IT. Therefore, both elements are contemplated in the model and act in a complementary way to analyze the strategic alignment (SOUZA; JOIA, 2009).

Mutual knowledge among different areas influence directly their managers' action when they participate in the planning of other area: IT management participation in the

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business-planning (element 1), and the participation of business manager in the IT planning (element 2) facilitate the IT practices for the business strategic alignment. In this point, Luftman (2000) points that IT and business managers have different perceptions about IT strategic alignment with business area and, however, in order to provide a mature alignment, all the perceptions should be considered as a joint work, according to contemplated by Souza and Joia's model.

The central core from Souza and Joia's proposition has as main source Henderson and Venkatraman (1993) model (element 3). This element reflects four fundamental domains of strategic choice: (1) Business strategy; (2) IT strategy; (3) Infrastructure and Organizational Processes; (4) Infrastructure and IT Processes. By Henderson and Venkatraman's vision (1993), business strategy involves the formulation (choices on competitive approach, products and markets) and the implementation (decisions about structure and capacities that will help the choice of products and markets), laying emphasis on two fundamental characteristics of strategic management based on IT strategic alignment:

1. Strategic adjustment: correlations between internal and external components;

2. Functional Integration: integration between business and functional domains.

According to Henderson and Venkatraman (1993), the concept of strategic alignment is based on two suppositions. The first one is that the economic performance is directly related with managers' skills to create a strategic adjustment between the company's position in the Market of products, and the conception of an appropriate structure to support its execution. The second one means that this is a dynamic process. Therefore, strategic alignment is not an isolated event, but a continuous process of change and adaptation.

Henderson and Venkatraman (1993) also argue that, in this context, a sustainable competitive advantage only will be achieved by means of capacity to explore IT functionalities in a continuous way. According to these authors, it requires a substantial change in the manager thoughts about the IT role in the organization, as well as a comprehension on IT strategy and its importance, both in support and direction to strategic business decisions.

Another important element is the figure of the moderator IT projects management for the success of strategic alignment, as described by Kearns and Sabherwal (2006). Souza and Joia (2009) reinterpret this aspect in their IT management projects model (element 4) as

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mediator between the strategic alignment and effectiveness of IT (element 5). The better planning and implementation of IT, higher its impact on the organization.

Finally, Kearns and Sabherwal (2006) and Chan et al. (1997) point that all the effort to achieve a mature IT strategic alignment *versus* business strategy have as objective influence its performance (element 6) in a positive way, by direct mediation of IT effectiveness or by mediation of all components pointed in Henderson and Venkatraman's core (1993). In this way, both the internal and external faces of the central core with participation of managers from both areas in its planning, and influencing mutually the business and IT areas on dimensions of strategic adjustment and functional integration affect the business performance.

It is important subjoin the temporal and dynamic aspects (element 7) of follow up in the process of alignment (HENDERSON; VENKATRAMAN, 1993) represented by the element 7 which, according to Souza and Joia (2009), acts as support base. This aspect is also corroborated by the model proposed by Brodbeck and Hoppen (2003) as an incremental process of implementation and learning (HIRSCHHEIM; SABHERWAL, 2001).

Hence, based on the theoretical proposition by Souza and Joia (2009), the elements of the model whose will base the analysis of the process of IT strategic alignment to the business in a real case in Brazil were presented.

3. METHODOLOGY

3.1 APPROACH TO RESEARCH

To achieve the objectives of this study, the qualitative approach was chosen. The choice is justified because to evaluate the applicability of the model it is necessary comprehend how the managers understand the process of strategic alignment. Besides, this approach does not require randomness or high numbers of participants in the interviews (CRESWELL, 2007). Based on the interpretation of speaks of actors involved about their perceptions and experiences obtained by semi structured interviews, we searched comprehend how they understand the process of IT strategic alignment in the organization.

3.2 CASE STUDY

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This research is also characterized as a study case (YIN, 2005), and a company with strong participation in the national steel industry called ArcelorMittal, from Tubarão, was chosen. The choice is justified because it is a company recognized also in the international scenery as one of the most updated and competitive in the sector (CROSSETTI; FERNANDES, 2005), and this was the motivator factor for the choice. The company is part of the multinational group ArcelorMittal, present in 60 countries. The group is the largest steel producer in the world, with capacity to produce 110 million tons a year.

There are two plants in Brazil: one production unity in Espírito Santo (steel plate and hot rolled-coil) and another in Santa Catarina (cold rolled and galvanized coils), in addition to subsidiaries in several Brazilian states. They export 30% of their production to the Americas, Europe and Asia. There are about 4.600 employees in these two unities.

The plant in Tubarão, object of this study, is integrated (produces steel from basic raw material – iron ore, coal and other inputs), with productive capacity of 7.5 million tons of steel a year. It dedicates to the production of flat steel and hot-rolled coils, cold-rolled coils, pickled coils and galvanized coils (zinc coated to protect the surface against oxidation) and steel plates destined to rerolling, automobile industry, building and metal-mechanical industry. Its main indicators registered in 2011 a production of 5.4 million tons of steel, and departure of 5,168 tons of products, which generated 4.6 billion dollars income and 478 million dollars EBITDA[1].

3.3 DATA COLLECTION

The research was carried out between October 2009 and February 2011 and involved multiple evidence sources (YIN, 2005). The start was from the contact with the IT general manager. From this one, other managers who administrate the IT sector were interviewed: IT technical support manager, administrative development and maintenance systems and production development and maintenance system. In a second stage between December 2010 and February 2011, managers of other areas were interviewed: production manager, general techniques for production manager, operation manager, and work safety engineering manager.

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[1] EBITDA stands for "Earnings Before Interest, Taxes, Depreciation and Amortization".

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The definition of the subject group of research used as criteria the fact to be IT managers in the enterprise; wherefore, responsible by elaboration and implementation of IT strategies, and managers from different business areas inside the company. The four managers from the business area were chosen randomly in order to represent the areas of production, techniques for production and work safety engineering inside a company with 130 managers. Production manager and techniques for production manager are distinct because the first one answers by the area that produces intermediate, semi-finished or finished products, and the second one answers by an area that reprocesses semi-finished or finished products from other unities.   The work safety engineering manager is involved with all the areas in the company, what gives him a wide vision about the business.

The table 1 presents the profile of each interviewed showing position, age, time in the function and in the enterprise. The identification of managers occurred by the letter G, followed by the number 1 (first manager interviewed) until 8 (eighth manager interviewed). Along the text, in the section results, to associate the quotes to the interview, the numerical sequence from 1 to 30 was used to facilitate the data traceability process and to allow any kind of auditing to verify them, in order to ensure the internal validity and reliability (KERLIN, 1997; BANDEIRA-DE-MELLO, 2002).

Table 1 – Profile of interviewees

Interviewees	Position	Age	Time in the function (years)	Time in the enterprise (years)
G1	IT general manager	44	5	25
G2	IT technical support manager	47	9	27
G3	Administrative development and maintenance system manager	34	7	10
G4	Production development and maintenance system manager	46	6	25
G5	Production manager	49	5	25
G6	Techniques for production management manager	46	3	23

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| G7 | Operations manager | 52 | 3 | 12 |
| G8 | Work safety engineering manager | 40 | 6 | 20 |

Source: authors (2013).

The interviews had 60 minutes medium duration, and they were recorded after the interviewees' permission. Next, they were transcribed and consolidated in a data bank with the narratives obtained, organized by themes associated with this study and thus constituted the main data source.

Beyond the interviews, documents from the management sector *Balanced Scorecard* (BSC), reports and other that were used for data triangulation were accessed in order to better understand them (YIN, 2005). Finally, some non-participating observation in the company's organizational practices were also carried out about the theme under investigation. The use of this technique was possible by the access allowed to one of the authors of this work to the plant, in order to observe the organization's routines about the theme in study. The observations were written down, describing the interaction among the managers. These notes have helped in the process of analysis of the interviews.

3.4 DATA TREATMENT

The analysis of content (BARDIN, 1977) was the technique adopted for data analysis. This technique is based on the "theoretical propositions" (YIN, 2005) from the literature review. The codification process fragmented the interview in quotes (CORBIN; STRAUSS, 2008) which refers to the part of the text that express certain meanings obtained from criteria related with theoretical references that orients the analysis (BARDIN, 1977).

To understand how occurs (or not) the IT strategic alignment process in the company studied, the data were analyzed based on the theoretical outline adopted. Fragments/quotes from the interviews were classified and categorized to identify, under the interviewees' optical, how they construct their perceptions, distinct or shared in relation to the IT strategic alignment and evidences of the elements of the model. In the section of presenting results, fragments of interviewees' speaks are reproduced along the text in order to substantiate the applicability of the model on the data. The analysis of content considered

the semi-structured interviews guidelines, constituted by 11 questions that served as reference for the confection of the theme in analysis:

1. Importance of involving IT management in the company's business plan;

2. Need for company's business knowledge by the IT management;

3. Importance of involving business management in the IT plan;

4. Need for IT knowledge by business management;

5. Ways to measure the performance of organization considering the IT impacts;

6. Ways to measure the effectiveness of IT area in the company's businesses;

7. How the IT projects management is performed in the company;

8. How is considered the external environment in the formulation of IT strategy in the company;

9. IT infrastructure and processes *versus* external scope;

10. IT infrastructure and processes *versus* company's internal scope;

11. How the *follow up* is performed in the IT strategic implementation in the company (metrics used in the plan, implementation and routine stages).

In this way, the fragments were classified and categorized according to the pertinence in order to reflect the themes developed in the categorizations. It aimed to identify the perception of actors related with the elements of the theoretical model applied.

4 RESULTS

4.1 APPLICATION OF THE IT STRATEGIC ALIGNMENT MODEL WITH ORGANIZATION'S STRATEGY: THE ELEMENTS OF THE MODEL

Based on de model by Souza and Joia (2009), an analysis was carried out to describe whether the seven elements proposed in the model (figure 1) was present in the company investigated. By data analysis from the interview with help from internal documents[2], it is described how each element of the model manifests inside the organization.

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[2] For reasons of confidentiality, no fragment of internal documents could be reproduced, and they were used only in order to facilitate the analysis of data collected in the interviews by data triangulation (YIN, 2005).

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4.1.1 IT management involving in the company's business plan (element 1[3])

The data analysis shows evidences of the practices that suggest a proactive participation by IT management in the company's business planning, which is the main element to measure the IT strategic alignment degree with the business:

> (1) IT is a way, but by itself does not maintain anywhere. If we, from the IT sector, were not understanding and knowing the course of business, to where the company is going, what the IT needs to support, it become hard you act. It is misaligned. [...] here in the company, the IT has a great value, it is not concerned a *posteriori*, but during the process. It is not a reactive IT [...] (G4).

> (2) The IT actions are together the board of directors. Our area attends the controllership and the Human Resources; we work with the client to unfold the Guidelines. There are also IT specific points, not only aligned to the business. For example, the need to upload the SAP in five years, ergo we have to plan it (G3).

This participation is noticed by other business managements, indicating that there is a composition of IT practices and the company's strategic plan:

> (3) In the company I evaluate that this participation is effective and facilitated by the use of the *Balanced Scorecard* in unfold of the company's business plan, what ensures alignment of actions in all the areas, which includes the IT. The *Balanced Scorecard* model gives the expression and the IT importance in the support to the business processes (G6).

> (4) The IT participation is fundamental. The use of IT tools aggregates value to the business in order to facilitate the achievement of the company's strategies, besides in the planning stage, the resources necessary are defined to priority projects hardware and software, making these actions be adequate to the information quality and safety, cost and term (G8).

The evidence above corroborates with Kearns and Sabherwal (2006), who emphasize the participation of business managers in IT strategic plan and vice versa, in order to provide a strategic alignment with IT. In this sense, it is possible assert there is an internal perception of IT area positioning in the company's organizational structure to involve it in the business strategic process:

> (5) How do you notice that it is aligned? The first thing: how is it positioned in the organizational structure? It is the first question, if it is heard and in what forum it is heard. How does it fit in the organizational structure? Whether it is linked to the

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[3] To facilitate the comprehension of the process, the elements from 1 to 7 presented in the model are not presented in their natural order.

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> Engineering, it will have a weight. My IT is linked to the Engineering department manager. It will have another weight. My IT is a department linked to the Industrial Director. It will have sometimes more operational vision. My IT is linked to the President Director to the CFO. Most companies link worldwide the IT to the CFO (*Chief Finance Officer*) or to the CEO (*Chief Executive Officer*), precisely when the organization itself notices that the IT should be inserted in the strategic formulation. Normally below the CFO, there is the controllership that, most of times, centralizes the course of investments; it normally carries together the IT and the HR, or the President Director (G1).

Hence, aligned with Henderson and Venkatraman (1993), who argue that to achieve the strategic alignment, a substantial change is necessary in the managing thoughts about the IT role in the organization. It is noticed that this aspect seems to be the fundamental element overall discussion about strategic alignment inside the company. In other words, there are evidences that IT area behaves itself as a sector to answer demands, but aligned with business strategies, which evidence business participation through the area.

In the company's case studied, the IT area is directly linked to the CFO and has held in the main meetings, like strategic plan, production plan, following quality results, projects for investments and another forums. It evidences the internal importance given to the IT, pointing to the existence of strategic alignment with IT practices inside the company.

4.1.2 Business knowledge by IT management (element 1)

How much the IT professionals need to know the business company? Moreover, about their internal clients business? How deep should be this knowing? Consider the IT people training about systemic thoughts of process as a sum of causes to generate an expected effect; it is possible suppose that may be easy for these professionals have a whole vision about the business. In this aspect, the data analysis suggests there is an internal perception on the importance of IT management knowing the company's business and of their internal clients, at least in the macro level, demarcated by main transactions. Some of them may be mentioned, like entrances, internal processing and outputs, according to the IT technical support manager and the development and maintenance of administrative systems have pointed to, respectively:

> (6) I understand that the much I know the better. You can give the better solution. Elementary, you are not going to develop mathematic models every day, or operating a machine, or a process line, but as much you know about the process,

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where there is an opportunity to improve the process, how can you use each thing, you can support and take more adequate solutions to the business. (G2).

(7) It is very important. About four years ago, we have done a realignment of our teamwork to replace us near to the business, to know more details about the clients' process and know where to act. Nowadays, I have a team member who attends only the HR, another who attends only the controllership. These people's focuses is a very good knowing about the process from the area to see where we can attend them. When the manager of the area has a need of controllership, he goes first to the IT expert [...]. For example, I can cite right now, we are performing an analysis of a tool that SAP is going to launch next year to check whether it attends a controllership's demand. If I have not an expert, we will be limited to the supplier controllership's person knowledge, what is not interesting. Then, my expert team member who attends the controllership, who knows the process, goes there and carry out an analysis to see what can be attended. Then, we are together the controllership (G3).

Actors from other sectors inside the enterprise share this concern about the importance on the business knowledge by the IT management:

(8) IT area needs to know the company's business to work in a proactive way in development of tools and systems to support the organization (G5).

(9) [...] it is important a basic knowing and a further deepening in specific cases linked to the IT projects (G7).

Teo and King (1997) argue about how the IT executive knowledge on the company's business is important to the IT strategic alignment and practices. Thus, data showed that there are evidences of internal concern to involve the IT in the company's business. Triangulation of data among interviewees' speaks and internal documents evidenced that the company really seeks to involve the IT in the strategic alignment process.

4.1.3 Participation and knowledge about IT by business management and its importance on the IT planning (element 2)

On the other hand, the participation by business management on the IT planning, as well as the knowing about the IT practices are also important to the strategic alignment, according to the Kearns and Sabherwal's viewpoint (2006). In this aspect, even knowing the IT particularities, data points, in a general way, to there are knowledge about IT practices by external IT users. For the IT professionals, there is an effective participation of business management on the formulation of IT strategies:

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> (10) I think it is important and we do it like that. When we are going to do our annual planning, I go first in the areas to watch jointly what these areas need for the next year. We do a survey and after we back to show them and we ask: Is exactly it? (G3).

On the one hand, the cheapening of the access to the computers by people in a general way facilitates this interaction among the areas:

> (11) According as the IT was getting the schools, inside each house, naturally the new employees are familiarized with what IT can offer. The user knows a lot about IT, even outside the company. The IT has the function to organize this knowing in systems. The IT area is more required because the user knows more. In compensation, the solutions are more adequate to the users' requirements (G2).

According to Kearns and Sabherwal (2006), the knowledge by IT about the business area, even not deep – and there is no need to be – may contribute to the company's businesses. More important than the knowledge of IT is the knowledge by the business areas about the potentialities of IT tools, available as a facilitator element for strategic alignment, and the IT and other areas share this vision:

> (12) The knowledge of tool and of the way of implementation is not important, but the potential of tool is important. Look at the SAP's example. The user can evaluate the potentiality, what the potentiality of a specialist system, of collaborative system. If there is no interest about the business area, it does not work. There are experts who knows well, others make their business by heart. The user could gain, but he does not do it because he does not know the potentialities [...] (G2).

> (13) The key-user should know the potentialities of the tool, know deeply its processes and interfaces and the potentiality of the *software* that he has in his hands. Sometimes the user has functions that he does not use and does not know that he has. The user's role is involve himself with the tool, and involve himself in the user groups who use the tool to share ideas. It would be the great role for him (G1).

> (14) It does not need a deep knowledge, but it is important know the potential of available resources (G5).

> (15) Basically, knowing what is possible carry out through IT to support operationally the processes and to optimize and minimize the results of the business area (G6).

The company's managers share this perception about the IT knowledge by the business management and its importance in the IT planning. In this aspect, to facilitate the link between the IT and the business area, the company uses the concept "key-user". They are people from the business area, experts, technics or operators who are deeply trained with the tools, in order to know them better to act as multipliers of these knowledge inside the area

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and, more important than it, they can play the role as facilitators in discussions between the IT and the business areas. Hence, it is possible infer that there is a concern in integrate the IT with the company's strategic goals, contributing provide a better IT strategic alignment within the company.

4.1.4 IT organizational performance and effectiveness in the business area (elements 5 and 6)

As other business areas, the IT is administrated with its performance indicators and other management tools, particularly the *Balanced Scorecard* (BSC):

> (16) It is very important that IT could have indicators focused on the high direction of the company. In BSC we have our tactical and operational internal indicators. We have a range of other systems of use; in other words, the IT has to be administrated as any other area (G1).
>
> (17) [...] in the corporative level, presenting monthly the indicators that measure the strategic goals is a key-question. A way to measure it is to check whether the Project strategic goals are aligned with the business area goals: it facilitates the measurement (G4).
>
> (18) [...] we have indicators that measure weekly the performance of solutions supplied by the IT area (quality, term, cost and scope) and other that measure the performance of the projects implanted (expected return x achieved return) (G6).

The fragments above evidence a concern about following the process management and whether the goals proposed are being achieved, what may influence positively the IT performance in all the process and consequently evaluate the IT effectiveness in the organization, according to the propositions by Chan et al. (1997). In this way, through these indicators, the company ensures the effective use of IT in the business processes (element 5), which as consequence influence in the organizational performance (element 6), according to Galas and Ponte (2006) evidenced previously.

4.1.5 IT projects management (element 4)

Generally, several tools or computer applications may perform the projects management, what constitute a common activity. However, it is not least important in the organizations. The company uses the *Project Management Institute* (PMI) Methodology:

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> (19) We have here a process management technology developed on the PMI in which management practices and rules has been defined for all the projects that follow it; we also have implanted a tool from Microsoft that the office has developed the Project. We are working hard with our staff in PMP certification (G2).

> (20) There is the PMI, which focus in three pillars: scope adherence, time (schedule) and cost, in other words, in the quality of the Project. We have indicators to measure the project, a tool called Project office, Project schedule, cost, and internal auditors in which an area audits projects from other and vive-versa (G4).

Then, the practice described above corroborates with Kearns and Sabherwal's argument (2006) that emphasize the importance of IT management to mediate the relation between IT strategic alignment and the IT effects on the business, according to the proposal by Souza and Joia model (2009).

4.1.6 Developments in IT strategy and business area considering the external scope (element 3)

During the IT strategic formulation process, the company evaluates the external environment. This evaluation occurs by means of participation in forums and events for dissemination of technology information by *benchmarking* practices in the sector. The data show evidences that there is an internal perception on the decisive role played by the IT area as the balance about trends and opportunities for technological advances:

> (21) The great role played by IT is balance the evolution of the external environment in technology market with big companies like IBM, SAP and Oracle. They are the great world technology *players,* and the internal needs of company's business. We have to be in constant contact with suppliers, take part in seminars, developing global and local partnerships. The more important factor in the external environment is how to give continuity in the technology that you have implemented. Giving it follow up in an acceptable cost [...] (G1).

> (22) Related to the external aspects of the group, we have contact with other technology companies while solutions provider for the business. We seek solutions from the region, from Market and from world for IT area. We have touch, see if there is an update, and take it as options for the group and for Brazil. About the *Benchmarking,* we have done some of them regularly, and we measure the performance in some projects and see how we are updated or not [...] (G2).

> (23) Normally, while we have some external event that influence in the business area, automatically the business area comes to the IT and says 'Look, I need this or that revision of system, or determined processes'. In other wordsm where there is a

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> change outside that achieve a process inside the company, it generates a great demand for us, at least for revision [...]. (G3).

> (24) Considering the state of art, and aligning the business objectives of the company (G6).

The fragments above are in line with Henderson and Venkatraman (1993), Reich and Benbasat (1996) and Brodbeck and Hoppen (2003), who argue about the need of strategic adjust between the position of the organization and the IT in the market. Then, according to the model described by Souza and Joia, the company seeks adjust the IT strategy according to the changes that occurs in the external environment, keeping its update with new Technologies launched. It allows the company keeping updated its technological advances from environment, and creates conditions for its competitive edge in the Market.

4.1.7 IT infrastructure, organizational processes and IT strategy in internal scope (element 3)

Considering the elevate use of computers and of IT resources in everyday company, the data analysis evidences there is a perception that infrastructure and IT organizational processes are adequate and aligned internally:

> (25) I believe that infrastructure and IT processes are very generously dimensioned and balanced with broad access by all the employees (G8).

Although there are still opportunities for improvement:

> (26) Yes, I believe that they are well dimensioned. I see small *gaps*, mainly in the part of data support by mobile phone (G5).

> (27) [...] any decision of change in the internal environment [about IT use] needs to be aligned with the group as a whole, because the group is connected. For example, we cannot use the Explorer 8 because there is a rule in which we take part of a committee, and this committee defines the explorer 6 and we cannot update while the group do not decide what *software* use [...]. (G2).

The alignment described above may be identified with what preconize Henderson and Venkatraman (1993). These authors argue that IT strategic alignment is based on, among other things, the existence of an administrative infrastructure adequate to the support for the internal environment. It allows a functional integration among the business domains and IT.

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The use of IT tools needs to be integrated in all the organization and should be validated by the IT management to keep the alignment with the business.

4.1.8 IT strategies follow up monitoring (element 7)

The function of monitoring and verification of results to enable adjusts or re-planning preconized in the most simple models of planning, as the classical cycle PDCA (*Plan, Do, Check, Action*), is present in the activities of IT strategy implementation in the company both in the level of IT projects (element 4) and in the maintenance of systems existent. During the visit the company, the BSC (*Balanced Scorecard*) map of IT area was accessed. Its indicators of monthly monitoring with graphs and comments inserted evidenced the company's concern in create mechanisms able for follow up monitoring of the process. This aspect is clear and seems internalized in the company:

> (28) It exists and is continuous both for projects and for routine. The stage of implementation is critical, because from that moment a new solution is going to enter, or a new technology, or a new system. In the stages of development, implementation, tests and operation until the acceptation by the user, we measure it as project. After implantation, starts the routine. There is also an indicator of answering calls called *helpdesk*, incidents and others (G4).

> (29) It exists and it is the BSC. We use this tool. Our IT BSC was already defined and implemented. We use a tool from SAP. We have several indicators defined and the measurements for these indicators, and monthly we measure how these indicators are, and there is a month meeting to evaluate these information. During the implementation, we have defined what the indicators we will use. First, the objectives. Next, the indicators that define how to measure these objectives. Then we define a rule, a formula to calculate each indicator. Finished this process, we put in use and monthly I check. The follow up comes from there. Ergo, every month I check the results. It also occurs during the plan. Then, during and after the implementation I continue measuring. I planned, construct and enter in the routine. Therefore, I measure every month. Each indicator controls the measurement. We have about twenty BSC indicators (G3).

> (30) [...] by the strong impact by IT in success of projects in my management I am very involved in unfold through BSC. The main forums for this are the planning meetings, report meetings and monitoring meetings, and *follow-up* of projects (G6).

According to observations by Henderson and Venkatraman (1993), who defended that IT strategic alignment is not an event, but a continuous process of adaptation and changes, it is possible notice that there is an internal concern about this inside the company. The use of measurements to check the evolution of control parameters suggested by Luftman (2000), Teo, and King (1997) were

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also identified, leading to the conclusion that the company appreciates to keep its routines, and particularly about the IT practices. The impact of this practice, especially about BSC had been verified by Galas and Ponte (2006), indicating that its use, inside the ArcellorMittal, contributes to the IT strategic alignment with the business.

5 FINAL CONSIDERATIONS

As proposed before, this study searched comprehend the Information Technology (IT) alignment process in a company from the Brazilian steel industry called ArcelorMittal, in Tubarão, based on theoretical framework summarized by Souza and joia's model (2009), in which was verified in a real case if the elements of the proposed model could be evidenced.

The analysis of the model, considering the theoretical foundation, pointed to evidences of the existence of the seven elements proposed in the model, indicating that there is a strategic alignment related to the IT, among IT direct managers and those who belong to other business field, but IT users.

In data analysis, the extensive use of IT tools and IT management practices were identified, corroborating propositions by Henderson and Venkatraman (1993), Reich and Benbasat (1996), Teo and King (1997), Chan et al. (1997), Luftman (2000), Hirschheim and Sabherwal (2001), Kearns and Sabherwal (2006) and by Brodbeck and Hopen (2003). These propositions were synthetized by Souza and Joia (2009), where they argue about the fact that **business** and **IT** have become inextricably linked: there is no business without IT resource and the IT does not make sense without the business that it can make happens and show its importance.

The fundamental aspect of IT strategic alignment with business is related with a substantial change in the organizational thoughts about the IT role in the business (HENDERSON; VENKATRAMAN, 1993). In the company analyzed, it was possible observe factors like the position of IT in the organizational structure and in what discussion and planning forums the IT is involved and participates effectively. It points to the presence of IT as an area in similar importance in the business, than acting proactively and not reactively to answer demands from other business area.

In the process to verify the IT integration inside the organization and the strategic alignment with the business strategy, several evidences were identified. Many tools and

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elements were found, such as *Balanced Scorecard*, *Project Management Institute*, Project Office, Key-user, Standard system, among others that contribute to the IT strategic alignment.

Finally, this article contributes to a better comprehension of the IT strategic alignment process when use a theoretical framework that contemplate several elements. The model proposed by Souza and Joia (2009) was not empirically tested, hence, its use to evaluate a real case, if it is not amenable to generalization, shows itself as a first step to understand the phenomenon. Carrying out the analysis in an organization situated inside the Brazilian steel industry recognized as one of the most updated in the world in IT (CROSSETTI; FERNANDES, 2005) allowed identify an IT strategic alignment practice tuned with the theory studied, and it makes possible a better comprehension about the theme. It enables the enlargement of perspectives and insights for IT alignment management. For a better comprehension of the model, we suggest similar evaluation in other business fields in order to identify possible differences in practices, especially in those in which the IT has a different position inside the organization.

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