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Strengthening Competitiveness through Process Reengineering

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ABSTRACT

Can the competitiveness of a company be strengthened through the reengineering of internal processes? This research study is analyzed according to the methodology "Balanced Scorecard". The case study is a company that designs power plants. In order to know and measure the state of the efficiency of the process, the data collection technique was applied through a Likert scale questionnaire, interviews and documentary analysis. The theory and research showed that there is a significant relationship between process efficiency and an organization's competitiveness, which can be strengthened by process reengineering using technological tools to adapt to change and maintain sustained organizational success.

Keywords: *Competitiveness, Balanced Scorecard, Organizational development*

INTRODUCTION

The company that is the object of this research is dedicated to the design, manufacture and commissioning of electric power generating plants for marine or terrestrial applications, each power station being specially designed according to the needs of each customer, and each site where they will be installed for its operation. The power plant is adapted according to various factors such as geographic conditions, climatological conditions, type of fuel available and demand of electric energy in each specific site, quantity of water available, among other factors, to be able design in order to maximize the resources of each site.

Recently, the competitors of this company can offer the design and start-up of power plants in less time. This time of delivery is the key and the guideline to win or lose contracts since the potential clients require the implementation of these systems in the shortest possible time. Thus, design and manufacturing execution time is one of the keys to keeping the company competitive in this market, as any company that wants to survive in the long term must adapt to change, new situations and costumer's needs.

In this company, the requisition process is one of the key processes, since it starts when a customer has a need to cover and thus has contact with the sales department to initiate the requisition. They go through each stage until reaching the manufacturing and the delivery of the final product. Thus, the requisition process, which begins and ends with a customer, is a key internal process for the company's operations.

This company has been presenting the increasingly common situation where contracts are lost because of the delivery time of the final product, since customers prefer to hire competitors in order to have power plants delivered as soon as possible, as they work 100% in their destinations and meet their electricity consumption needs.

The company should not remain running its processes as it currently does and must be intervened, otherwise the threat of competitors in this industry will continue to present the risk of permanence of the company. With this

research, the current state is presented and how it should be changed according to the needs of the environment is proposed, making management strategies tangible and truly executable. A scheme of administrative and technical improvement in the requisition process is proposed as one of the key processes in the area of "design and development engineering" for the optimization of production and service times, and thus be more competitive in the category. To keep the company competitive in this market, it is necessary to reduce the engineering design cycle time by making the internal processes more efficient, aligning the efforts to the mission and vision of the organization and ensuring sustained success.

THEORETICAL ASPECTS

Balanced Scorecard

According to the authors and creators of this methodology, Kaplan and Norton (1996), companies are in the midst of a revolutionary transformation: the era of industrial competition is being displaced by the age of information competition. During the industrial era, financial control systems were developed in companies such as General Motors, DuPont, Matsushita, and General Electric to efficiently facilitate and monitor the allocation of physical and financial capital, and to the extent that it was efficient, it created value for the shareholders of the companies. However, in the emerging information age, many of the fundamental assumptions of the era of industrial competition are already obsolete. Not for long, companies would gain a sustainable competitive advantage by merely developing new technology in physical assets quickly and not by an excellent management in financial assets and liabilities.

In the information age, both manufacturing and service organizations require new capabilities for successful competitiveness. The ability of a company to mobilize and exploit its intangible or invisible assets has become far more decisive than investing in managing physical, tangible assets.

Intangible assets give an organization the power to:

- Develop relationships with customers that retain loyalty (existing customers) and effectively and efficiently serve a market segment of new customers;
- Introduce innovative products and services
- Produce high-quality customized products and services at low cost and with short delivery times;
- Motivate the skills of employees for continuous improvement in process capacity, quality and response times;
- Deploy information technology, databases and systems.

So now all employees must add value by what they know and by the information they can provide. Investing in managing and exploiting each employee's knowledge has become critical to the success of companies in the information age. This is how organizations try to transform themselves to compete successfully in the future, turning to a variety of improvement initiatives.

The Balanced Scorecard retains the parameters of financial measures, but financial measures tell the history of past events and suit stories for companies in the industrial era, during which long-term investments and customer relationships were not critical for success. These parameters of financial measures are inadequate, however, to guide and evaluate the path that companies need to take in the information age to create value in the future by investing in customers, suppliers, employees, processes, technology and innovation. The objectives and measures of the Balanced Scorecard framework visualize organizational performance from four perspectives: Financial, Clients, Internal Business Processes, and Learning and Development.

The Balanced Scorecard is more than a tactical and operational measurement system. Innovative companies are using this methodology as a strategic management system to manage their long-term strategies. These companies are using the Balanced Scorecard approach to meet critical management processes: Clarifying and translating vision and strategy; Communicating and connecting strategic objectives and measurements; Planning, setting goals and aligning strategic initiatives; improving strategic feedback and learning.

Regarding the Balanced Scorecard methodology, Niven (2006) defends the position that since the mid-1990s organizations have been changing their structures due to the changes in the markets and the environment. Now, more competitors and customers are demanding better services without increasing prices, which means that the strategies of the organizations are not implemented effectively or the desired objectives are not achieved. Hence, the "Balanced Scorecard" methodology is the correct tool in order to implement the organization's strategies effectively to achieve the desired objectives. With it, employees of the organizations can improve

their skills, develop new processes, create loyalty in clients and obtain the desired financial results. Thus, each organization can derive great successes from the Balanced Scorecard system.

Organizational Competitiveness

Hernandez & Rodriguez (2011) say that it is convenient to make a study of the competitiveness of the company (quality and productivity among companies of the same industry), as well as an evaluation of satisfaction with respect to users of products or services being important and not with respect to the internal staff of the organization.

It is proposed to use a tool to measure effectiveness and competitiveness in the company like the one below. There are several tools that can be used and adapted according to the needs of each organization showing how to measure effectiveness and competitiveness in a company. The information is important despite the subjective content that may be had. Finally, the information will be objective as well as profound and pertinent.

Organizations must adapt to the change that is presented in their environment to remain competitive. The tool of Organizational Development is designed specifically for this purpose. In these changing times when values evolve rapidly and resources become scarce, it is increasingly necessary to understand what influences the performance of the organization's assets.

Hernandez, Gallarzo & Espinoza (2011) emphasize that modern organizations are changing at a rapid pace due to the nature zzof work. Corporate activities are now more global, so there is a drastic change in the nature of the competencies being of an international, national or local nature according to the markets covered by the organization. Traditional structures are being transformed by factors such as globalization, pressures for competitiveness and the unstoppable increase in knowledge-based work. This poses challenges for the managers of the organizations, making it necessary to have strategic tools to face these new demands and situations in an effective and planned manner. Organizational development is one of the tools that help these processes of change favoring the competitiveness and permanence of organizations. This is how organizational development is recognized as the instrument for an excellence planned change.

Rojas (2001) handles the concept of "first-age companies" vs. "second-age companies". He calls first-age companies those whose focus is product quality, regardless of human talent, services or customer relationships. Second-age companies are the ones where customers claim importance and, because of this, organizations change or adapt their structures and focus efforts on adapting policies and even changing their administrative paradigms. These second-age companies are interested in human talent, customer service and effectiveness in order to be effective and leaders in their field.

Thus, companies are facing the need to move from the first era to the second era in order to be competitive.

The same author, Rojas (2001, p. 51), gives the following definition of competitiveness: "Competitiveness is going beyond technology and productivity; you have to have low costs, better quality and more complementary services than what others offer". So, competitiveness is the result of the construction of conditions to acquire markets or an important participation in them, either locally or globally. Organizations are observed and evaluated (qualitatively and quantitatively) to know the level of competitiveness. These observations and measurements are made by customers, influence society, suppliers, and regulators. Thus, competitiveness is a consequence; it must be built and sometimes has high cultural costs for the organization. For the last 100 years, a clear orientation has been observed towards efficiency, as well as the transformation of processes and the optimization of resources, to finally have a substantial improvement in the use and exploitation of the resources of the organization. However, the interests of customers and the quality of the product or service were not taken into account.

The following are the six viable principles for organizational competitiveness: Sustainable strategic positioning; The Company in function of the client; Effective organizational practices; Customer service as a differentiating factor; Integral human development; Organizational learning. The important thing is to integrate the principles with each other, otherwise there will be no differentiating strategy, it will not have sustainability and everything will be reduced to the task of supervising independent functions.

Fernández & Sanchez (1997) affirm that since the decades of the 70s, 80s and 90s something new has been happening, and it is not known if it is in the heart of the society in general or if it only happens within the organizations in which the general rules of the game are being transformed. These transformations are called

by some as acceleration of social change, uncertainty, turbulence, dynamic change, among others.

There has been a growing process of instability in organizations. These transformations also coincide with changes in global markets, where social and economic progress, technological advances, the growth of markets and the arrival of markets in other countries are the result of the globalization of competition. In Viedma's words (1992, p. 201), we find that he defines competitiveness as: "the ability of a company or organization of any kind to systematically develop and maintain comparative advantages that allow it to enjoy and sustain a prominent position in the socioeconomic environment in which it acts, where it is understood by comparative advantage the skill, resource, knowledge, attribute, etc., which is available to a company that its competitors lack and which makes it possible to obtain higher yields than these".

In terms of engineering, productivity is expressed regarding the efficiency of a machine (Norman & Bahiri, 1972), which efficiency depends on converting inputs into outputs, taking into account the use of those inputs and the efficiency of the resulting outputs, that is, the ratio of "current outputs/potential outputs". Thus, it is stated in this approach that the ideal is to equate productivity with efficiency, which has an impact on competitiveness. This way, all this relationship between efficiency, productivity, profitability, quality, competitiveness, etc., are characteristics of business success or excellence.

Porter (2003) says that competitiveness is the supply of goods and services that have a high quality low prices with respect to the competitors, whether local or international, resulting in a series of benefits for the society in which it interacts and thus increase real income.

Fred (2003) says that competitiveness is based on better performance of productivity and the ability to modify the product to activities of higher performance, thus giving a nature of flexibility and productivity to the competitiveness.

Organizational Development

Hernandez, Gallarzo & Espinoza (2011) agree that modern organizations are changing at an accelerated rate, making corporations become more global and experience drastic changes in the nature of competitiveness. This results in variations in the structure of the organization, which in turn demands tools that can manage in a planned way the necessary adaptations and respond to those changes. Organizational development is the strategic tool that supports those planned changes to meet the demands of the environment, where, according to the course of history, any organization that is not able to develop its knowledge, creativity, or strengths to overcome challenges, could disappear due to lag and maladaptation. In this way, organizational development (OD) is the strategic tool that drives the competitiveness and permanence of the organization through actions derived from the analysis of the organization.

Hernandez, Gallarzo & Espinoza (2011, p. 10) define it as "The process through which the organization evaluates the behaviors, values, beliefs and attitudes of people to face resistance to change, with which it can apply modifications in the organizational culture to reach better levels of productivity and efficiency ".

According to Huffington, Cole & Brunning (1997), organizations are being transformed: there are global changes and mega trends, experiencing big changes where the only certainty is uncertainty itself. They say that organizations are in the middle of a cloud of transformations in different aspects where it is difficult to predict what is ahead.

From Garrett's words (1987): "For the organization to survive, its learning rate must be equal to or greater than the rate of change in the external environment."

From Morgan (1988, p. 187): "It is not enough to look at what excellent organizations and administrators are really doing, it is also necessary to be proactive in relation to the future to anticipate some of the changes that are possible to occur and position the organizations and their members to effectively address these new challenges. "

Methodological Aspects

Method to measure efficiency in the requisition process

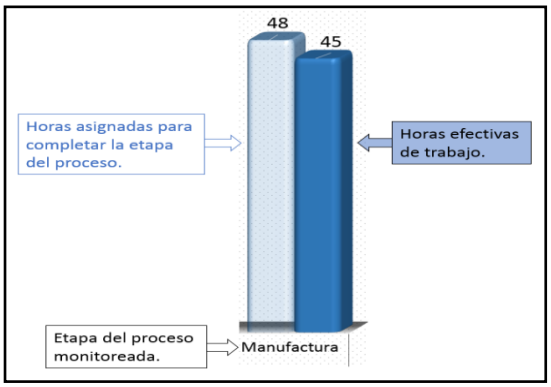
In order to know the actual and current situation of the organization with respect to the requisition process, an organizational diagnosis (focused on the process under study) was carried out, following an analytical process, in which the problem and the areas of opportunity were visualized to make an intervention and take advantage of the areas of opportunity detected.

The methodology used to obtain information for this diagnosis was through two instruments of data collection, first the "Questionnaire" was used and then the "Documentary information".

A questionnaire and a semi-structured interview guide were designed to measure the perception of the people who directly interact in the process of requisitions (with respect to the inefficiency in which each stage is executed). The goal was to identify the stages of the process in which people perceive that there is greater inefficiency or simply the stages where they believe it could be improved.

RESULTS

Once the information was collected, the comparison of "assigned hours" against "effective hours" was done to execute each activity. In this way, the discrepancy between the time allotted and the effective time that is used for each activity can be seen and thus a measurement parameter is had (Figure 1)



Source: *Own elaboration*

Figure1. *Hours assigned Vs. Effective hours for each stage of the process.*

Ideally the time allotted to complete the tasks required for each stage of the process should be equal to the time actually spent, being at break-even point with no time remaining to complete each task (according to the hours previously assigned) since that would mean that more resources are needed to complete the required jobs. However, it is also undesirable to have overtime as this would mean that more resources than are actually required are being allocated.

Root cause of inefficiency in the selected stages of the process

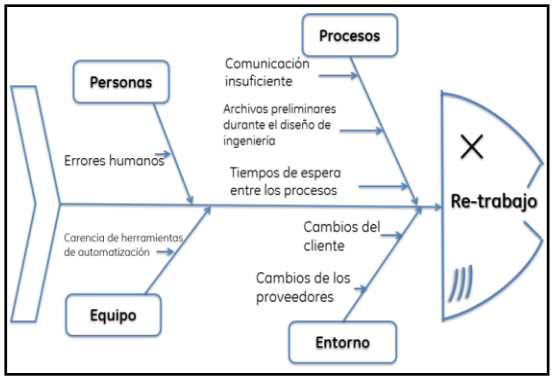
Actions or interventions were identified to correct the problems, but problems of inefficiency were first identified through the following methodology.

After analyzing this key process of the company through the questionnaire and documentary information, and identifying the stages where there is greater inefficiency (Stage of "Engineering Design" and "Creation of design documents"), prompt attention was paid to discover the root cause of inefficiency, or the cause of not having the potential yield expected.

To analyze these two stages, the tool "Ishikawa Diagram", also called "Fish diagram", was used. It is considered a pragmatic tool to discover and analyze the root causes of the problem studied.

A meeting was held with the team formed in the application of the questionnaire to provide their ideas on the causes of inefficiency in these two stages. We analyzed 4 categories (processes, people, equipment and environment) that are considered associated and appropriate to the problem and thus the factors involved in each category were found to reach the main problem of inefficiency.

The Figure2, shows the fish diagram with the 4 categories analyzed and the associated components.



Source: *Own elaboration*

Figure2. *Ishikawa diagram - Root cause of inefficiency in the process*

With the input of ideas from the team formed and the use of the Ishikawa Diagram, this tool helped identifying the factors that produce the problem. Giving a hierarchy to the problems encountered, the following is formed:

- Re-work
- Lack of automation tools
- Human errors
- Waiting times between processes
- Preliminary archives during engineering design
- Insufficient communication
- Customer changes
- Changes of the suppliers

General results

Analyzing the statistics obtained from the applied methodology, it is concluded that there is a problem of low performance or inefficiency in the following stages of the requisition process.

- Engineering design
- Creation of design documents

As a result of the diagnosis it was found that this organization suffers from the requisition process as a system and the re-work that must be done currently in the engineering design stages and the creation of the design documents, since it is a delayed and manual process. This causes a re-work due to the lack of tools that automate the manual and repetitive processes that are causing human errors in the creation of the final documents of engineering, and causing very long waiting times to review and to approve the correction of errors in the drawing design.

Figures and tables must be justified or centered according to the length of the caption. Large figures and table can be in one column in order to see them more clearly and avoid placing them in the middle of columns. Any table or figure that takes up more than 1 column width must be positioned either at the top or at the bottom of the page. “Figure. 1” should be used, even at the beginning of a sentence.

CONCLUSION

Vital Factors for Organizational Survival

Organizations must adapt to the change in their environment to remain competitive, and for this purpose tools and methodologies have been developed such as the Balanced Scorecard and Organizational Development, which are revolutionary tools that, when applied well, allow organizations to remain competitive in the marketplace by means of efficiency and effectiveness.

Companies must use their resources through the administrative process in an optimal way to have a competitive advantage with their competitors and, in this way, to elaborate a strategic plan including values, vision, objectives and goals to apply them in the activities to which the company is directed. Using all the resources of the company in harmony with the strategy can reduce costs, increase productivity, increase employee participation and encourage leadership in the company.

Processes Reengineering

Process reengineering is a vital administrative strategy to maintain the organization's competitiveness as confirmed by the balanced scorecard methodology, with a link between processes and customers. It is so critical that it can be both the cause of death of a company organization as well as the cause for their sustained success.

As time passes in the life cycle of a process, there is a downward trend due to several factors —for example, new technology inputs or the globalization of markets. In this way, the need arises to re-engineer the processes in order to remain competitive due to the "Cause-effect" relationship between the 4 perspectives of the balanced scorecard philosophy.

By measuring and monitoring the efficiency of processes, it is possible to detect the moment of decline. This will serve to make the decision of an intervention by modifying the current process or re-introducing a new one that has as precedent the process that ceased to be efficient.

Based on the results of this research work, it is concluded that the reengineering of processes is necessary for the survival and growth of the organization.

The results of the diagnosis in the requisition process of this company show that it is no longer efficient and it is time to implement a re-engineering process and begin a new cycle through an intervention according to the philosophy of organizational development.

PROPOSAL

Proposal 1 of 2: Automation of the crosscheck

Based on the possible solutions obtained from the tool "impact matrix," it was opted for the approach to solutions with greater impact and less effort to implement. The following action plan is proposed.

Use the automatic verification tool that was created especially for this crosschecking of the three documents.

This is a tool based on Excel, where you have the possibility to verify any of the 3 models of power station offered by the company. The tool works as follows: the user must open the AutoCAD files to be verified and then run the Excel macro described below.

Basically, this tool concentrates the three design documents, processes the information by cross-checking each instrument, executing about 3000 iterations, and generates a report indicating the discrepancies found so that they are reviewed in a timely manner without having to review all the instruments of the system of the electric power plant.

With this automatic check or cross check, the manual work of verification is reduced, human errors are avoided and the cycle time is improved from 5 days to 1 day, the time allotted to the verification from 36 hours to 8 hours is reduced and reduces the workforce from three

people to one. In this way, it takes advantage of technology, in this case of computing, where manual work is replaced by computerized work, improving the efficiency of processes.

Proposal 2 of 2: Invert the order of execution of the process

Proposal 2 is consecutive of having implemented the first proposal. Once you have an automatic verification tool between the documents and having generated the report of the specific points to be reviewed, it is proposed to move the stage of "Creating design documents" to before "Engineering design".

The purpose of this arrangement is to initiate the process by generating the specific documents supported by the report generated with the automation tool, so that the meeting of the three disciplines (electrical, control and mechanical) will already have specific documentation and a manual cross-checking of previously encountered discrepancies will have to be done. This makes the meeting time of the three disciplines more efficient, since they do not have to review all the instruments of the whole system. The modification in this section of the requisition process is possible because a report of the specific instruments to be reviewed has been previously made. Thus, each engineer will begin the developments with some preliminary designs and with the special discrepancies in which they should focus. This can reduce the cycle time from 9 days to 5 days.

REFERENCES

[1] Fernández R. M. y Sánchez, J. C. (1997). Eficacia Organizacional, concepto, desarrollo y evaluación. Madrid. Editorial Diaz de Santos, S.A.

[2] Fred R. D. (2003), Conceptos de administración estratégica. Pearson Educación de México.

[3] Garrett, B. (1987), the learning organization and the Need for Directors Who Think. London. Fontana

[4] Hernandez, J., Gallarzo, M. y Espinoza, J. (2011). Desarrollo organizacional enfoque latinoamericano. 2011. México. Pearson Educación

[5] Hernandez, S. y Rodriguez. (2011). Fundamentos de gestión empresarial. México. McGraw-Hill/Interamericana Editores S.A de C.V

[6] Huffington, C., Cole. C. y Brunning, H. (1997). A Manual of Organizational Development the Psychology of Change. London. Karnac Books Ltd

[7] Kaplan, R. y Norton, D. (1996). Translating strategy into action the Balanced Scorecard. Boston. Massachusetts. Harvard Business Press.

[8] Mello, F. A. F. (2004). Desarrollo Organizacional enfoque integral. México. Limusa.

[9] Morgan, G. (1988). Riding the Waves of Change. Developing Managerial Competencies for a Turbulent World. Michigan. Wiley

[10] Niven, P. R. (2006). Balanced scorecard step-by-step. Second edition. Hoboken, New Jersey. John Wiley & Sons Inc.

[11] Norman R. G. y Bahiri, S. (1972). Productivity measurement and incentives. Londres. ButterWorth

[12] Porter E. M. (2003). Ventaja competitiva, Creacion y sostenimiento de un desempeño superior. Editorial CECSA.

[13] Rojas B. C. J. (2001). Empresas competitivas. Bogotá, Colombia. Editorial Géminis Ltda

[14] Viedma, M. J. M. (1992). La excelencia Empresarial. Madrid. McGraw Hill

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