Continuous Improvement of Production system in Algerian Industry

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Abstract

This paper presents the methodology for process improvement of Algerian Company, which implements a new process by the following of business process reengineering approach. For this, we conducted a comprehensive study of the company activity through a study of the current manufacturing process followed by an evaluation of various performance indicators, this has allowed us to propose a new model production process and identify weaknesses of the activities and services that interact with the company machining process

Keywords: Improvement continouus, Kaizen, performance, Réingeneering, Six sigma.

1. Introduction

Today, companies are obliged to adapt to a disruption: market developments, changing technology and customer requirements, which orients companies to make a change and it is more difficult to carry and control. And despite all, the company remains a requirement for continuous improvement which consists of implement actions to achieve the best levels of quality and productivity. In this work we will propose a new production process model based on the principles and tools of continuous improvement.

2. What is a process

The process is a sequence of activities from one or more inputs produces a result (output) representing a value for a customer.

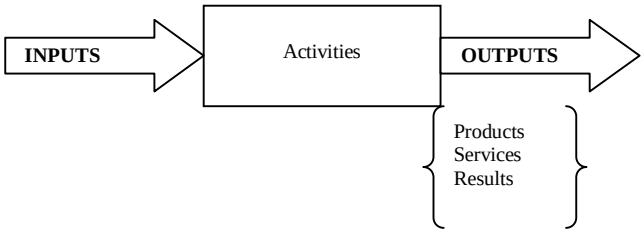

Fig. 1. Process Définition

3. What is a Performance

A performance in the company is all that and only that which helps to improve the pair value- cost, ie to improve the net creation of value

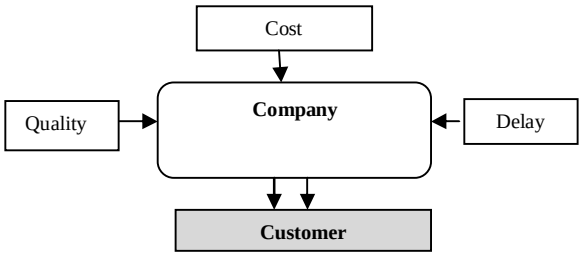

Fig. 2. Performance by the trilogy: quality- cost-delay

4. Type of process

There is no single type of business processes, however, we can facilitate the identification with two selections [3]:

4.1 According to the importance and value of a process: As shown in the table below:

Table 1. Type of process

Process	Type
active	One that provides a distinct value to the company in terms of capacity, reputation, competitive differentiation, cost, efficiency.
passive	One that turns the company capital without providing benefit.
identity	Central object of the company.
priority	Important element of the company (logistics, quality)
Background	That the company should do, but without spending too much effort or resources
obligatory	Laws and regulations.

4.2 According to according priority to three main families: The following figure shows this typology

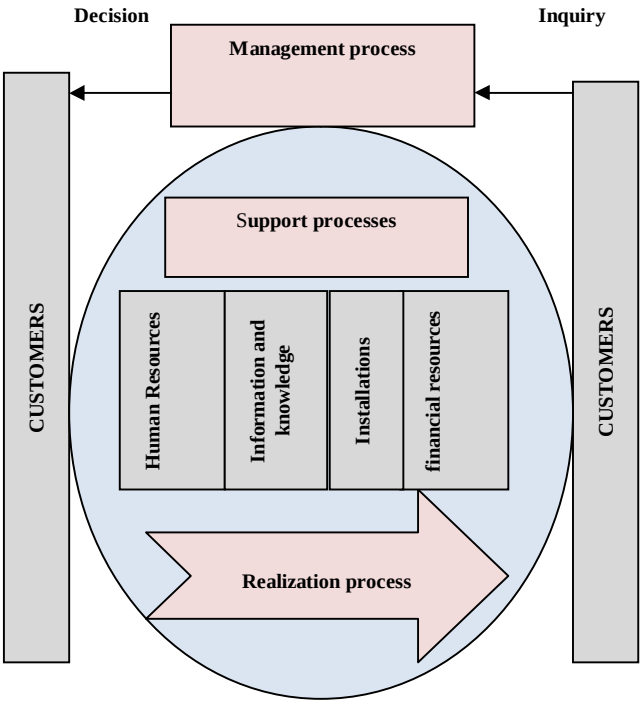

Fig. 3. Process Typologie [12]

5. Pprinciples for improving industrial systems

It's possible to distinguish four main types of approaches to business. Those are[12]:

5.1 Approach oriented to eliminating waste

These are the steps of Lean Production and Kaizen seeking to eliminate waste. We can see these two approaches more akin to a system management. The objectives are to reduce and eliminate waste in the industrial world .

5.2 Approach oriented to fault rectification

The two approaches presented here are fairly considered as working methodologies directly applicable only as most general principles of management.

5.3 Approach oriented resource efficiency

In contrast to previous approaches that are process-oriented (reduction of defects and waste), we will now discuss an approach that focuses on the performance of the resources used by these processes, and these resources can be equipment or Human resources

5.4 Approach focused on change, improvement and development

The Business Process Reengineering (BPR) comes from the United States. It has become the leading approach in the 1990. Addition to his intrinsic qualities, the success of BPR is also because it was breaking with the existing, come mainly from Japan (JIT, Kaizen, 5S, TPM, Kanban, Poka-yoke) and allowed to run a new dynamic among business consultants

6. BPR approach

Most companies which had succeeded in changing radically had applied the same series of rules and techniques. In contrast, the failures were usually due to one or more identical reasons companies that sought more than a modest improvement and successful does not pose the same questions: "How does better, faster and less expensive things?" Why we do what do we make?"

7. Reengineering

Reengineering is a fundamental questioning and a radical redefinition of business processes to achieve spectacular gains in the critical performance which constitute today: the cost, quality, service and rapidity

7.1 The Process Reengineering

The reengineering does not see the company as a set of functions but as a set of processes to satisfy the customer, these processes are often cut across the company. Each process is defined by a class of customer (internal or external to the organization) and must offer added value to the client.

7.2 The elements of reengineering

Reengineering approach is based on four essential elements:

7.2.1 The critical process of the company

- The strategic process: medium and long term
- business processes: daily
- activities supporting the strategic and operational processes (process supports)

7.2.2 The process towards the client (business processes)

These are the processes for product realization. They include the activities of the identification of customer requirements to customer satisfaction. These processes can be found in the activities related to production, design, procurement, commercial approach

7.2.3 Focus on the company's business

Consultation on the objectives set by the company.

7.2.4 Use of modern information technology

Use other forms of management.

7.3 The principles

The reengineering is based on seven principles of reorganization:

- Have a person responsible for the process
- Facilitate access to information
- Make available the data processing for the process actors
- Centralize up similar activities
- To compare the activities
- Develop the autonomy of the process actors
- Eliminate the redundancies of information

7.4 The stages of Business Process Reengineering

BPR can be described as a sequence of six steps.

7.4.1 To adopt goals

From an inventory management to set goals and get the message to all employees. The message should be structured in two points: the need to change, and the status of processes and organization of the company after the change effected. Communication is a key element in the application of the method.

7.4.2 Identify the process to reconfigure

The BPR, even if it is "radical" should remain modest: we can revolutionize the entire company at one time it is necessary to locate the process changed.

7.4.3 Assess the factors favoring the reconfiguration

We need to know if the Human Resources, Information Technology, organization, corporate culture helps to change. A good evaluation of these factors have a significant impact on the success of the proposed reconfiguration

7.4.4 Understand the current process

The current process must be understood and diagnosed (advantages, disadvantages, outputs, performance), especially if one is a technological improvement of the process and not an outright change.

7.4.5 Establish the presentation of the new process

This step is the most creative
We start from scratch and it suspends all rules, procedures and methods. It uses only the basic principles of the method, and perhaps the feedback from other cases of BPR.

7.4.6 Install the new process

In this step, leaders hold a key role, since they must make an effort to communicate to everyone involved and feel involved in the project implementation process. Moreover, we must ensure that the BPR project has achieved its objectives, comparing with the original objectives achievement.
The reorganization is based in the processes and the reengineering and structure based on certain number of principles, we will mention later

8. Six Sigma approach:

Six sigma is a disciplined, data-driven methodology for eliminating defects in any process. To achieve six sigma quality, a process must produce no more than 3.4 defects per million opportunities. Six sigma's basic value proposition is that principles for process improvement, statistical methods, a customer focus, attention to processes, and a management system focusing on high-return

improvement projects result in continuous improvement and significant financial gains.

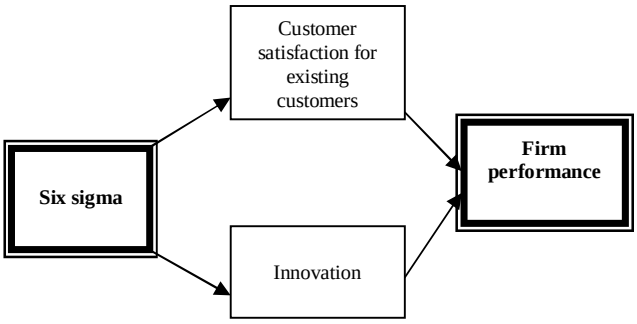

Fig.4 The effect of six sigma projects on firm performance [9]

9. Presentation of company CABAM (Algeria)

Is a national economic belongs to the industrial complex holding wood, with a capital of 500.000.000,00 Algerian Dinar (5 000 000 euro), it was established in March 1998 from the national unity of the joinery and construction precast, and it was created after the restructuring of the institution of cork and wood SNLB in 1988, which obtained ISO9001 certification

10. The product CABAM

It consists of manufacturing prefabricated cabins with different types or it can be changed in terms of length, width, nature of the cabin, and the characteristics of interior finishing and all this according to the desire of the customer.

Fig. 5. The product CABAM

11. Implementation of the reengineering approach

10.1 The objective

Our goal is to try to make reengineering in a process of realization chosen after a follow-up steps in our approach to obtain a new process model

10.2 Identify the process to reconfigure

To manage the process, it is necessary to have a global view of business operations. It is therefore important to develop a schematic representation, systematic process validated by all stakeholders: mapping process in the following figure, this representation is used to align the organization on customer needs. It must also define the functional relationships and interfaces of these processes by providing a real system of process

10.3 Implementation of the balanced approach

We take a score of 1 to 5 from the selected criteria, and then the value 1 will say that there is little impact of a thing of our process on the test, and the contrary for the other.

The criteria chosen for the new process

1.Tthe impact on customers:

We take some criteria:

PT : production time
NQ: no quality
QS: quality standards
CP: Production cost

Table 2. The impact on customers criteria

diagnosis / processus		PT	NQ	QS	CP	**Total score**
Machining	1					**14**
	2					
	3		x	x		
	4	x			x	
	5					
Primary assembly	1					**13**
	2		x			
	3	x				
	4			x	x	
	5					
Assembly of the cabin	1		x			**11**
	2	x				
	3					
	4			x	x	
	5					
Finishing	1					**15**
	2					
	3		x			
	4	x		x	x	
	5					

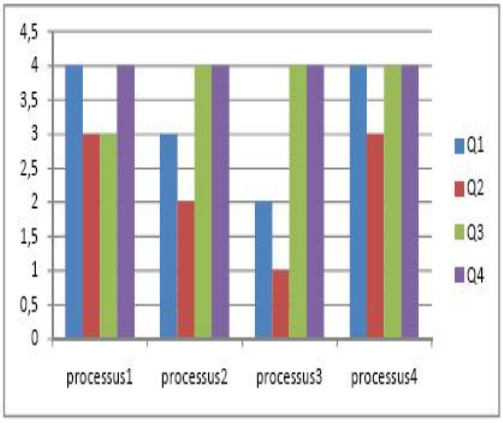

Fig .6 Impact on customer graphic

Interpretation: we can note that the finition process has the most impact on the customer (total score = 15) because works of this process are extremely clear for the customer. On the second level we have the note 14 which relates to the machining process due to the importance of production time and the relative costs

2.Possibility of process improving

We take some criteria:
AW: Accidents at work
DPA: differences between planned and actual production quantities
DPT: differences between planned and actual time
M: the maintenance

Table 3. Possibility of improving criteria

diagnosis / proces		AW	DPA	DPT	M	Total score
Machining	1					**17**
	2					
	3					
	4	x	x	x		
	5				x	
Primary assembly	1					**9**
	2	x	x	x		
	3				x	
	4					
	5					
Assembly of the cabin	1					**9**
	2	x	x	x		
	3				x	
	4					
	5					
Finishing	1	x			x	**6**
	2		x	x		
	3					
	4					
	5					

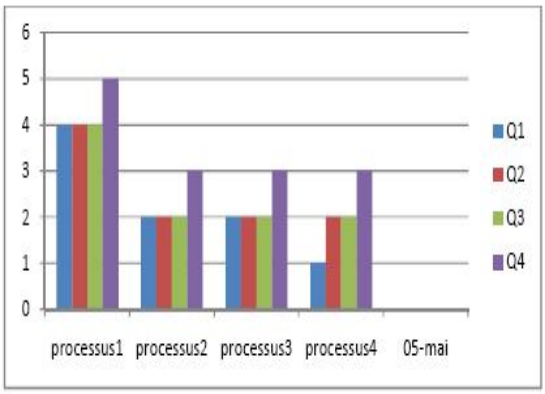

Fig.7 process improving graphic

Interpretation: It is clear that the first process is very important because the note is almost stationed into 4. All accident work saw in machining process because it's the only sector which contain machines

3. Adaptability Process

We take some criteria:
TA: The technical assistant in case of use problems
UCT: Using computer technology
EAT: Estimated average time to order processing

SE: social environment

Table 3. Possibility of improving criteria

diagnosis / proces		TA	UCT	EAT	SE	Total score
Machining	1					**19**
	2					
	3					
	4				x	
	5	x	x	x		
Primary assembly	1					**16**
	2					
	3			x		
	4	x			x	
	5		x			
Assembly of the cabin	1					**16**
	2					
	3			x		
	4	x			x	
	5		x			
Finishing	2					**14**
	3	x				
	4			x		
	5				x	
	1		x			

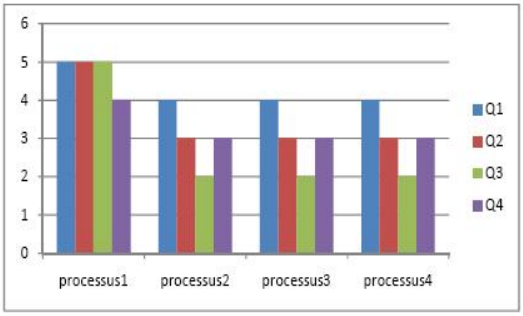

Fig.8 process Adaptability graphic

Interpretation: The impact on the adaptability for the first three diagnoses is maximum for the machining process
It is very important to think here of the action in order to face the new changes

4.The Business impact:

We take some criteria:
L : Labor
CM: The cost of maintenance
QD: Quantities deterred
AE:The aging of equipment

Table 5. The business impact criteria

Diagnostic processus		L	CM	QD	AE	Total Score
Machining	1					**19**
	2					
	3					
	4				x	
	5	x	x	x		
Primary assembly	1					**12**
	2			x		
	3		x		x	
	4	x				
	5					
Assembly of the cabin	1					**12**
	2			x		
	3		x		x	
	4	x				
	5					
Finishing	1					**12**
	2			x		
	3		x		x	
	4	x				
	5					

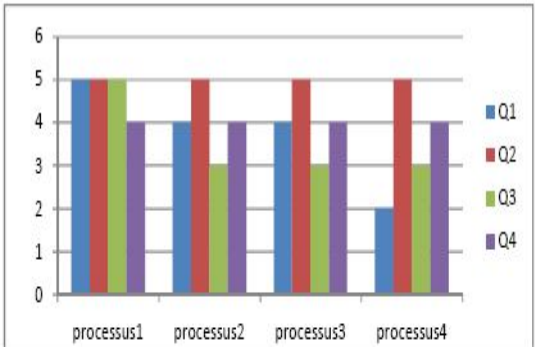

Fig.9 Business impact graphic

Interpretation: it is almost perfect that this process is characterized by a great effect on the investment of change of the machines, the three processes which remains have the same effect but the machining process will be always the choice.

General interpretation

We can see that the machining process has a great importance in the workshop and it will be selected for analysis in order to be improved

12. Diagnosis of the state of processes

Competitiveness and the company growth in a very competitive sector depends largely on the technology option, the mechanization and automation that are essential to the company.
Our analysis of the weighted approach was chosen as the machining axis change, then we will analyze the situation of that to obtain improvements in the performance of workshop production.

13. Presentation of the new model for the machining process

Our model is a new process that is based on changes in the tools and technologies in the process, and no doubt it brings gains to the different senses, each idea of these changes is a proposal must have a special study committee by special order to be applied, however, we will simply present these ideas:

- Automation in a functional analysis
- Integration of industrial data for the workshops supervision
- Evolution of the process Vision
- Change the mode of transition pieces
- Integration of Robotics

14. Diagram of new machining process

The diagram (fig.10) presents the new procssus proposed by our approach:

- The implementation of a computer platform using the production management computer and maintenance management computer software
- Automatic transmissions using conveyors such as gravity rollers, powered roller
- Identification of each type of part by kanban (labels)
- Installation of a LAN to ensure excellent communication
- Proposal for Turntable for the movement of parts

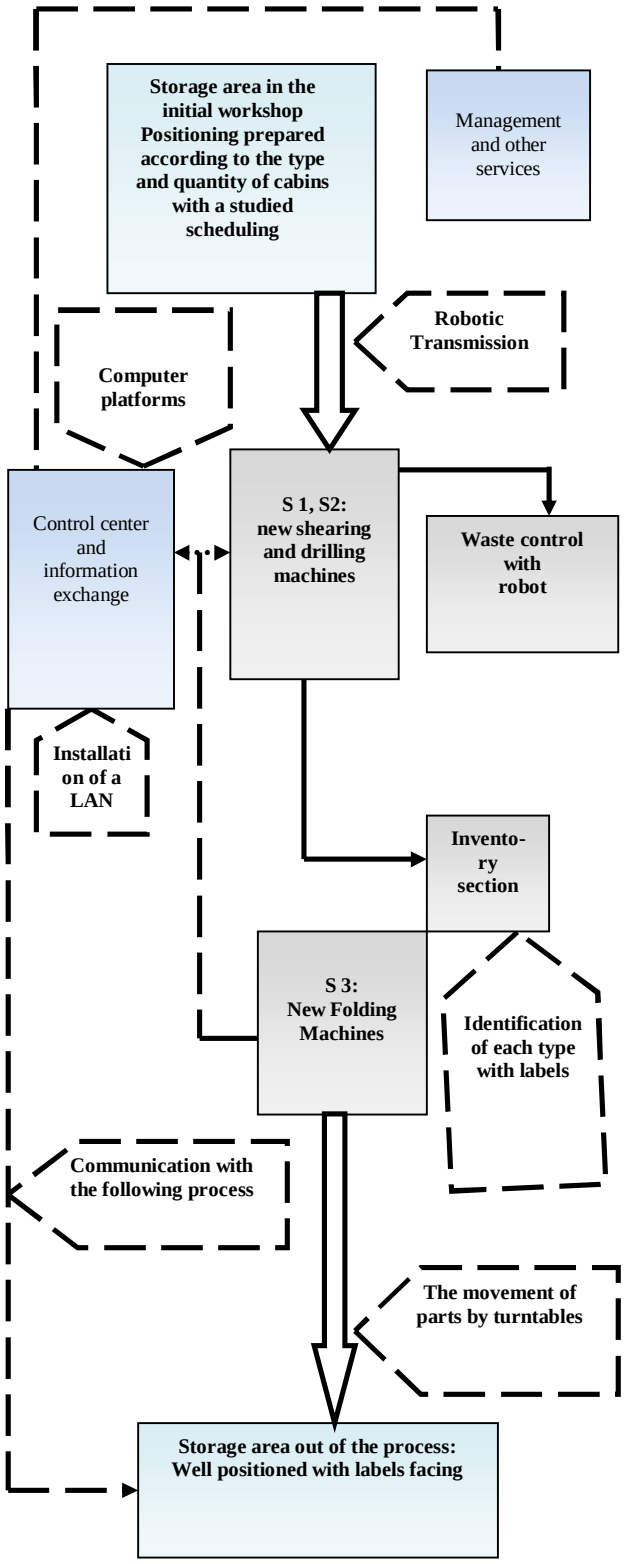

Fig..10. The new procssus proposed by BPR approach

15. Future research

The paper addressed the effect of reeingeering process on improvement and firm performance using ideas from process working
It is believed that the new model is needed to further validate the propositions.
It is recommended that the type of industry, the labor and the customer base taken into account. In addition, the size of the organization should be considered as a complexity criteria..
One of the challenges in conducting research in business process reengineering is to clearly integrated with Six Sigma approach.
With this integration and the exploitation of the Six sigma principles, organizations achieves the goal which is always the improvement of performance and competitiveness

16. CONCLUSIONS

This work has enabled us to both discover the company through one of its strategic functions, and discover one of the important aspects of continuous improvement that is contributing to the improved performance of the company CABAM a new process proposed by our approach.

But training remains the point of success of the BPR approach by the commitment of the company. Therefore, all staff must be integrated in the process decision to ensure continuous improvement of the company

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