Improvement of Receiving Department by a Digitalization Project in a Medical Devices Company

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Abstract — *Years ago the word started to be more aware with the environment. The companies include in their planning be greener in order to support this campaign. Parallel to this started what many consider the third industrial revolution, digitization. The companies that integrate the digitization in their current or future plans can have great benefits. The digitization offers great benefits in terms of maximize space, have a backup for the important documents, accessibility, produce savings and at the same time helps the company to maintain a green program that can help the environment. The main purpose of this project is use DMAIC for digitalize the receiving department, because it helps to have a better track of the raw material and different things that enter in the company. This is going to help to avoid invoices issues, to find material that is lost and to have everything in order for an auditory.*

Key Terms — *Digitalization, DMAIC, Efficiency, Green Manufacturing.*

PROJECT STATEMENT

The world is moving to think more in the environment, for these reason the digitalization process has a boom in the government and private companies. The digitalization process is a safest way to keep the confidential and important documents in the companies. After the documents were storage in a server, the printed documents can be recycled. Additionally, the importance to have this in a server, is the fact that the fact that everyone needing to access the files can do it no matter where they are.

In the receiving department, for the Manufacturing Plant, experience the loss of many printed documents (printed documents) frequently. This cause many problems in the materials department. Some of them are: invoice delays, discrepancies in the system versus physical, and pieces lost within the factory boundaries.

Research Description

Research is going to be focus in what is digitalization of documents and why is this important to the companies in the era. This is essential to understand what about this project is and the benefits can have the company implementing it.

Research Objectives

Implement the digitalization process to:
- Avoid lost papers;
- Improve the quality of the receiving department;
- Improve the accessibility of the documents in the material department.

Research Contributions

How the digitalization is gaining acceptance worldwide. The digitalization helps the companies to be green and also to have the documentation in a server for easy access to all the employees on the company. If the companies implement this, can have savings and also improve the quality of the process. The digitization of the receiving documents can improve the process in the warehouse, because can be faster look into a specific document. Also, the company can have a backup for its files. Another important thing is that you can avoid lost documents, and that is going to help to prevent invoices issues with the supplier.

This specific point helps the company to have a better credibility with all the suppliers.

LITERATURE REVIEW

Worldwide the digitization is growing fast, but not to everyone knows what means. Also, many people think that digitization an industry or government doesn't have anything in common, but they are so wrong. The industry is moving to have the relevant documents in servers and computers for easy access to their personnel. This has named this "the third industrial revolution in the industrial manufacturing. The revolution will affect not only how things are made, but also where" [1].

Let's start to define, what is digitization? The digitization is the mass adoption of connected digital services by companies, customers, consumers and governments. Digitization offers many benefits for the companies and the government. After that, the most important thing to know is the answer for some questions: what is digitizing? What is the purpose? What are the benefits? What is the economy impact? Taking a look over these questions and what are the correct answers for them. Digitizing is the process to convert a document or an image to a digital form. This means to have these documents and image in computers and servers. The main purpose is being greener. This process is one that helps the companies to be green and help our environment. [1]. Also, have the documents in a server helps the way that the companies share the information. Many companies have several buildings, or are locates in different countries but need and share some files, with the digitization all the personnel can have access to the files no matter where in the world are them locate.

Digitalizing has benefits in different areas; some of them are cost, production, employments, market and operations. Another areas can be affected directly are the layout and the personnel. If the companies have less documents to archived, them are going to need less space. Less space means that the companies can optimize the layout

and use that space for other functions of the process. Also, less space has an effect in the companies' economy, because with better layouts and optimizing the space they can have savings in space and also in the company utilities [2].

In production the digitization has enable the companies to mover labor-intensive task to emerging economies while competing to develop new designs using the interface. In this era that is ruled by information and communications technology the manufacturers are moving to develop complex products, and in order to have successful they need the expertise in the digitization.

Companies are moving to have more personnel working from home or far away of the office; the digitization makes this option a good one for the companies. For a company, have all the documents in digital and also stored in a server, provide the benefit that any of their employees can access those files no matter the location in which the employee is. Also, this is a backup for the documents, if for some reason anyone lost some important documents; can have the back-up in your server. Additional, the productivity of the employees can be maximizing, because they aren't going to spend too much time looking for documents in the archives.

In the market the digitization is changing how the companies build the products and how manage their brands. As they have all the information in digital form helps them to expand their advertisement faster. Also makes them more attractive to the costumer, because of their accessibility [3].

The digitization has the greater effect in the operations too. This effect can be seen on the way the companies organize and operate their competitive strategies. Digitization has created more global entities, and makes them in touch across continents. Also, has redefined the concept of office space that helps the company to organize and manage better the company's resources. Additionally, this allow companies to outsource or

completely automate a number of their back end functions, this helps them to become more efficient.

Digitization has the potential to boost productivity, create new jobs, and enhance the quality of life for society at large; and to decrease the cost and increase efficiency [3].

METHODOLOGY

The methodology use for achieve the objective of this project is: Phases. The project must be developing in phases. This project will be developed in phases. The main reason is the process outcome is a service not a product.

Phase I: Identify the area assigned to the digitize process and the equipment required to complete the process. In this phase the main purpose is to establish the layout and the equipment for make the process and meet the objectives. The area need to be clean and organize. This is because the equipment are sensitive and the clips or others things can be dangerous to it. Also, the server needs to be identified and prepare to achieve all the expectations.

Phase II: Identify what types of documents are going to be digitized. The documents that are important to have in a server are the following: manifests, packing lists, daily logs of the material received. These are the documents that are necessary to digitized in order to avoid future problems or documents lost.

Phase III: Cleaning documents. In this phase need to assure that the documents are clean to avoid damage in the equipment. In this phase all the clips, paper clips and everything can damage the equipment need to be remove. After all the documents are clean, the team can process to the other phase.

Phase IV: This is the implementation phase. Here the team are going to implement the digitalize process. The documents should have to be process daily at the end of the day. The purpose to make this daily is to ensure that the documents that are important ant relevant are processed and archive up to date. This process need to be follow as establish to avoid delay in the next phase.

Phase V: Process the documents into the server. After all the documents are scanned, the next step is process them to the server. This is to guarantee close the loop of the digitize process.

Phase VI: Improve and control. This phase should be monitored constantly to assure the success of the project.

RESULTS AND DISCUSSION

The findings of this project are presented and explained in this section.

Phase I and II

The problem of lost documents increased at the same time that receiving department received a considerably high volume and quantities of material. The material that the company received arrived in containers from United States of America (USA), by air and the minority arrived by local carriers. The demand of the product has increase, resulting in add two more warehouse building in the company. As a result of this situation the need of have access to the important documents is essential to the business. Saying that, the area assigned for this project need to be establish in the warehouse building one. This is the main building of the three warehouses that the company have right now. In this building the company made a space for do this project. The layout is show in the Figure 1, and the equipment is show in the Figure 2.

The servers are identified and also the localization of the folders of the documents digitized. The persons who can view and manage the changes on these folders are assigned by the Materials Manager. Only the person who is digitizing the documents can make a change on the folders. The employees that have access to the folder only can view the documents, make search and print them, but cannot make any change to the document in the server.
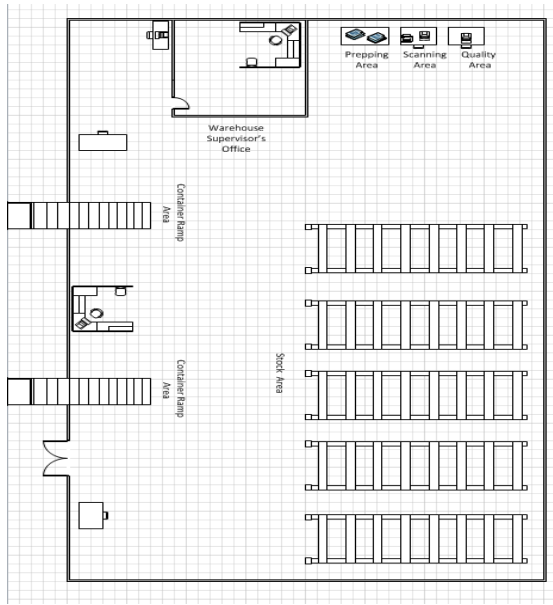
Figure 1
Layout of the Area

Figure 2
Equipment

Phase III

Cleaning station. After all the documents are cleaned and ready, the process of digitalization needs to start. See below in the Figure 3 and 4 the difference between a dirty document and a clean one. This phase need to be complete before start the next phase, to avoid scanner damages. If something makes damage to the scanner, the project is in serious problems

Phase IV and V

This phase can only be implementing after the first three are finished. This phase have three subdivisions, because of the documents volume.

All of the subdivisions are going to have the same SIPOC. The SIPOC is the following:

SIPOC				
Supplier	Input	Process	Output	Customer
Containers	Manifest		Files in Server	Buyers
Air shipments	Tracking numbers		Back up Log	Managers
Local Carriers	Receiving Documents			Accounting
Employees	Packing Slips			Receiving Employees
	Register Log			
Arrive documents with the material	Review Documents	Scan Documents	Process to the Server	Available to Employees

Figure 3
SIPOC Proposed

First subdivisions: Selected the January, February and March of the year 2013. This process had duration of five weeks of production. The inversion of this subdivision is one employee, at $7.25 per hour and eight hours per day. The total of the inversion is $1,450.00. The graphics 1 shows the comparison of images per day, while the graphic 2 shows the number of pages per day. The graphics show the estimated numbers of the project aren't real data. Both graphics showed that the number of images and pages increase with the time. Is important to remember that the images digitalized consist in; manifest of containers, tracking numbers, packing slip and local carriers documents.
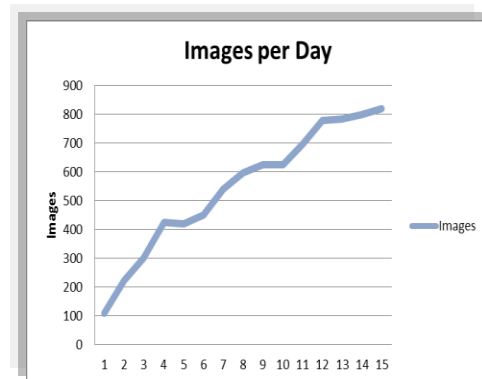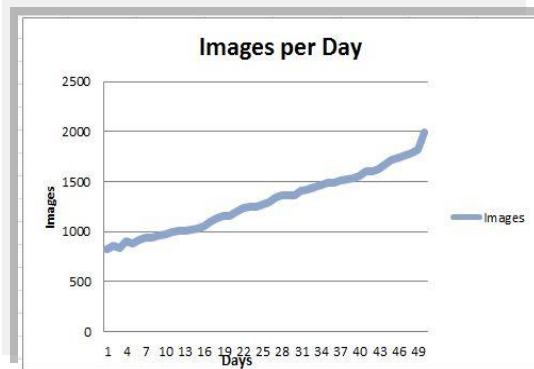

Graphic 1
Quantity of Images in the First Subdivision of the Project

Graphic 2
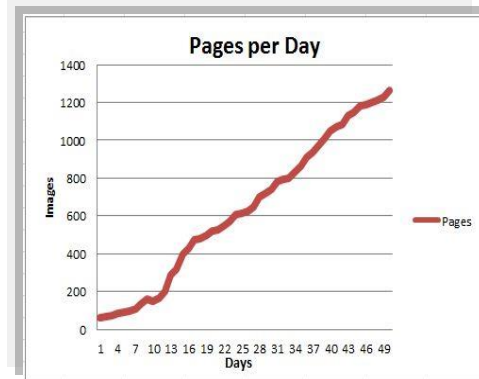**Quantity of Pages in the First Subdivision of the Project**

Second subdivision: in this subdivision the requirement is scan from April to December, 2013. After scanned all the documents, the images must be accessible in the server to those employees that management decide to have access to the folder. The data for this subdivision is estimated using basis previous simulation. The graphics 3 and 4 showed below are based using estimated data. The inversion for this is the following: two employees, working eight hours each one, at $7.25 per hour, for ten weeks. This is a total of inversion of $5,800. The next figure shows the improvement in the process.

Graphic 3
Quantity of Images in the Second Subdivision of the Project

Third subdivision: In this the phase all the documents for the beginning of the year until today. This means that from now to the future all the documents are going to be digitalized at the present, not after the problems started. For this subdivision the inversion is less than the other two. The company is going to have one employee working twenty hours per week at $7.25 per hour. The total cost of inversion here is approximately $145/weekly. The decision of have a person running the process in part time is because after the fifteen weeks of the first two subdivisions the employee is faster than in the beginning and the process is leaner. The process is prepared for be executed for any employee, is simple and straight to the point.

Graphic 3
Quantity of Pages in the Second Subdivision of the Project

Cost Analysis of the Project

The cost of the project contains but is not limited to; cost of production and equipment.

- Actual Annual Cost:

Table 1
Analysis of the Actual Annual Cost

Actual Annual Cost				
Employees	Hours/week	Weeks	Salary	Total
6	6	52	$26.00	$48,672.00

- First Year Inversion:

Table 2
Analysis of First Year Inversion

Cost of Production					
Subdivision	Employees	Hours/week	Weeks	Salary	Total
1	1	40	5	$ 7.25	$ 1,450.00
2	2	40	10	$ 7.25	$ 5,800.00
3	1	20	52	$ 7.25	$ 7,540.00
					$ 14,790.00

Cost of Equipment		
Scanner	Qty	Cost
X Brand	1	$6,800

Total Cost
$21,590.00

- Second Year Inversion:

Table 3
Analysis of Second Year Inversion

Cost of Production				
Employees	Hours/week	Weeks	Salary	Total
1	20	52	$ 7.25	$ 7,540.00

- Savings for the first year:

Table 4
Analysis of First Year Savings

Savings or the First Year
Actual Cost - Cost of inversion = Savings/ year
$48,672.00 - $21,590.00 = $27,082.00

- Savings for the second year

Table 5
Analysis of Second Year Savings

Savings or the Second Year
Actual Cost - Cost of inversion = Savings/ year
$48,672.00 - $7,7540.00 = $41,132.00

Phase VI

Improve and control: Comparison between the first 5 weeks of the process with the rest of it, it can be observed that the process now is faster. This improvement need to increase more and more with the time pass. After the improvement of the process is guarantee is needed to assure the control phase. The control must monitor the process one time per month in the first six months of the project. After that the control can be random in order to identify any possible failure in the process.

CONCLUSIONS

After make the entire project and analyze the results obtain in the chapter four, can conclude that implement the digitalization in receiving department have more benefits than inversions. The real benefits of the digitalization are the following:

- Decrease the frequency of documents lost in the receiving department;

- Decrease the time invert looking into documents;
- Have a backup for the documents;
  More accessibility for the employees that need the documents;
- Have better organization;
  More control of what is received in the warehouse;
- Savings of $27,082.00 in the first year;
- Savings approximately of $41,132.00 in the second year;
- Maximize the space in the warehouse building one.

Some recommendations for the company are the following:

- Make a monthly auditory. Check the scan versus the real document, to review if everything is correct and the digitize copy is complete.
- Implement preventive maintenance for the equipment.
- Give training to new employees.

The company needs to be sure to emphasize the importance of the phase VI. The control of the project must be executed for all the employees working on the digitalization area.

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