

# ***Standardization of Cable Service Installation Orders Assignment Process in Rural and Suburban Areas***

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**Abstract** — *One of the great benefits of Lean Manufacturing is its diversity of applications beyond the size and type of industry. In this article lean concept alternatives are used under the DMAIC methodology as a systematic approach to improve the quality service in a cable company. The hurdle was represented by the installation orders assignment process in Rural and Suburban areas. The process was followed in detail to collect process information and create the current process flow. Next, the non value added activities were identified. The 5 whys method was employed to detect and recognize the root causes. Five top major offenders were indentified and improvements were recommended in order to counteract them. To sustain the improvement, the development of Standard Operating Procedures was proposed. In addition, the use of checklists and templates is necessary to monitor the process status. In the future, data will be available for an action review process.*

**Key Terms** — *Improve, Lean, Service, Standard Operating Procedures.*

## **INTRODUCTION**

Different methodologies have demonstrated that having a standard process is an effective approach to achieve a consistent output from the process. The standardization of processes clearly defines how a service is to be provided, which minimizes errors [1]. Errors are reflected in the quality of the service resulting in unsatisfied customers. It is important before standardize a process to make sure the process flows. To achieve an ongoing and continuous flow it is necessary to eliminate wasteful activities and free up time and resources to be devoted to additional value add activities [2].

This project focuses on evaluating the process of orders assignment for installation in a retailer of a cable company. This includes all activities that go from the service appointment opening to the service appointment closing. The evaluation consists of identifying and eliminating those non value add activities and to make a process lean. Once a lean process is accomplished, it would be standardized.

The Installation process is a key component to close the sale. At this point, the technician obtains the contract signed by the customer to release it at the office, where the person responsible gives it completed to sales.

The faster the order is completed, the faster the payment is released to the retailer and the higher the customer satisfaction. Consequently, it is really important to have a process that minimizes errors (causes of loss of time), guarantees a quick installation and provides consistency and reliability in the service.

Indeed, having an order allocation process standardized will reach these benefits and it will allow the organization attains a solid base on which to make some improvements. If the procedure is followed, an increment on customer satisfaction, an increment on productivity and a reduction of costs can be expected [3].

## **COMPANY BACKGROUND**

Service companies require focusing their efforts on developing and improving service quality in order to satisfy the customers. In fact, the customer satisfaction has a direct influence on company profitability. In order to improve its service, a Cable Retailer in San Juan desires to assure an installation in 24 hours to their customers located in the Rural and Suburban area. It is considered Rural and Suburban area all those areas

outside the Metropolitan area of Puerto Rico. Currently, it could take up to 5 days whereas in the Metropolitan area the Installation service is made in 24 hours.

For purposes of this project it will be considered a Metropolitan area the extension that includes the following zones: San Juan, Trujillo Alto, Carolina, Toa Baja, Toa Alta, Bayamon, Guaynabo, Dorado, Cataño, Vega Baja, Vega Alta, Caguas and Cayey. All those cities that are not included in the Metropolitan area are considered Rural and Suburban area.

The delay in the installation of cable service for people living outside of Metropolitan Area is causing: a) Discomfort in the customers, sometimes reaching the Retailer loses the customer, and b) Retailer resources are not maximized.

Once an order is assigned to install, it can be installed the same day. This situation suggests that the reason of the delay is the process of orders allocation. There is not a documented procedure which indicates an effective and consistent way to assign the order service and it results in a slow and inefficient process that lacks of transparence and reliability.

Hence, to develop a documented and standardized the procedure to assign the service orders must be considered if improving the quality service and cutting down the time of installation is the target.

## **OBJECTIVES AND CONTRIBUTIONS**

The main objectives of this project are:

- To develop a standardized and documented procedure to assign orders.
- To assure an Installation in 24 hours to all Island customers, regarding the classification of theirs location (metropolitan, suburban/rural areas).
- To reach a process free of waste and activities that not adds value.

After the completion of this project design the following contribution can be fulfilled:

- Improve quality service. Customers will perceive a quicker response from the Retailer to install their service. Thus, they will enjoy the service faster.
- Process flow will improve making the process moves faster; therefore the time of the service delivery will reduce.
- The Retailer will receive its payment faster, because the release of the payment is given once the appointment is completed and the last one is achieved when the service is installed.
- Reduced learning curve/training time for new employees. Standard Operating Procedures (SOP) are living documents. When someone is new on the job, a well written SOP can be a lifeline to them to be able to know how things work [4].
- The Retailer will have a solid base on which to measure the process and to make some improvements.

## **LITERATURE REVIEW**

Lean manufacturing is a management philosophy. Its major pioneer was Taiichi Ohno who as a Manager and Executive of Toyota, from 1950 installed the concepts of lean throughout the company and into the supply base. Mr. Ohno created the Toyota Production System (TPS) and he had the vision and focus to eliminated waste.

Lean is a culture, a way of thinking where the value is defined from the point of view of the customer. From this perspective there are two key analytical terms of lean, value added and non value added. The term value added refers to activity that transforms the product or deliverable, in the view of the customer, to a more complete state. Conversely, the term non-value-added refers to activity that consumes time (people expense), material, and/or space (facilities expense), yet does not physically advance the product or increase its value [2].

### **Lean Thinking**

Specifying value accurately is the critical first step in lean thinking. Providing the wrong good or

service the right way is muda (muda means waste, activity which absorbs resources but creates no value).

The second step in Lean thinking is identifying the value stream map. The value stream map is the total cycle of activity, from initial customer contact through receiving payment for a product that has been delivered [2]. Analyzing the value stream map allows to see the process from a different view and identify the opportunities and the focus areas.

After analyzing the value stream and eliminating wasteful steps the third principle of lean is to make the remaining activities flow. The process should flow without hurdles or backtrack loops. Once flow is reached the next step of lean thinking involve the concept of pull, which means that things are done when they are required to be done, not before.

The fifth and final principle of lean thinking is given by perfection. Womack expresses perfection as a state which is reached after the four initial principles of lean are implemented and they interact with each other. What follows is continuous improvement by means of kaizen in route of perfection. By using Kaizen, companies are able to reshape the composition of work [5]. Kaizen usually refers to as incremental improvement, but on a continuous basis and involving everyone.

Once known the lean principles, it is possible to state that lean techniques are the systematic identification and elimination of waste, the implementation of the concept of continuous flow and customer pull [6].

### **Applying the Lean Technique**

Lean techniques can be applicable in a service oriented industry or office environment because every system contains elements which are considered waste. The techniques for analyzing systems, identifying and reducing waste and focusing on the customer are applicable in any system and in any industry. Any implementation of lean techniques will be different, depending on various factors such as industry, internal culture and internal business considerations. The tools

used to implement lean operations, and the order in which one combines them, are highly dependent on whether a company is a manufacturer or provider of a service.

The Retailer is a provider of service, which is pursuing to improve one of their processes in order to give a better service and increase customer satisfaction. Applying lean techniques to the cable service installation orders assignment process will improve the process flow resulting in a faster service. Different lean techniques could be used to reach this purpose, such as is the minimization of non value added activities (muda), the kaizen method, the value stream mapping and the documentation and use of standard operating procedures.

Standard work is regarded to be one of the most important techniques of achieving a perfect process. This approach provides discipline for attaining perfect flow in a process. Standard work is the documentation of each action required to complete a specified activity [6].

As mentioned before, the lean technique applicable and methodology will depend on the company. Manotas and Rivera in their paper "Lean Manufacturing Measurement: The Relationship between Lean Activities and Lean Metrics" [7] describe the activities that are normally considered part of Lean implementation regardless the type of industry. In contrast, Chen, Li and Shady in their paper "From Value Stream Mapping toward a lean/sigma continuous improvement process: An Industrial Case Study" [5] present a real Lean implementation in a small manufacturer in the United States. Chen, Li and Shady use the following tools to implement the lean system: Process at a glance, value stream mapping, the 5 whys, Kaizen events and standard operation sheets. On the other hand, Menechote and Luangpaiboon in their paper "Implementation of Lean System on Erbium Doped Fibre Amplifier Manufacturing Process to Reduce Production Time" [8] apply other techniques to the implementation of Lean on Erbium Doped Fibre Amplifier manufacturing process such as: Cellular layouts, single minute

exchange of die (SMED), Andon Boards, Jidoka, flow process and Kanban systems and Poka Yoke (mistake proofing systems). The intention for both cases of study was the same: eliminate the waste in the process, improve the production rate, improve process flow and improve the quality of their product. In spite of the tools used the outcome was achieved.

By that it is mean that what really is important is to define the needs and the actual status of the company where the system is going to be deployment in order to identify the most appropriate techniques. In relation to the previous cases, none was better than other because the tools applied; the two were successfully for their respective purposes. In fact, one of the great benefits of Lean Manufacturing is its diversity of applications beyond the size and type of industry.

The topics discussed before collect the necessary information to understand the development of this project “Standardization of Cable Service Installation Orders Assignment Process in Rural and Suburban Areas”, which is intended to apply an everyday approach.

## **METHODOLOGY**

The methodology that will be used in the development of this research work is DMAIC.

### **Define**

The first thing to do will be to establish a clear Business Case and a Project Sponsor who will be willing to commit to the results. For this purpose a Project Charter will be the tool used. It will contain a description of the project, the scope, goal and measures, business results, team members, customer benefits and a timeline.

### **Measure**

It will be established the base line of the process (what company is doing now) and it will be represented in a flow chart (VSM). With the support of key personnel and the appropriate tools (Brainstorming) the non value added activities and the value add activities will be identified. In this

step, it will be determined the cycle time and it will look for errors or inefficient that contributes to defects. The flowchart will reveal the sequential order of operations, its descriptions and the number of workers required for each operation.

### **Analyze**

After identifying where the muda is, it is important to identify the root cause of that muda and eliminate it. The 5 why’s technique could be helpful; it is a root-cause analysis that consists of keep asking why until the cause is found. Another tool that could be helpful will be the Cause and Effect Analysis. Once potential root causes are identified the next step would be prioritize them and identify the Process Owner.

### **Improve**

This phase will be focus in evaluate, select and optimize best solutions to reduce or eliminate muda. With the use of a Blitz Kaizen event a Process Flow Improvement will be reached. A new flowchart will be defined.

### **Control**

Standard Operating Procedures will be developed to keep consistency in the process. The Process Owner will be trained in how use it and he/she will be analyze on the use of the SOP. The Supervisor will review periodically the Process Owner fulfill the procedures.

## **RESULTS AND DISCUSSION**

During this section, results will be discussed using the DMAIC methodology in order to obtain the needed information to establish conclusions at the end of the project

### **Define**

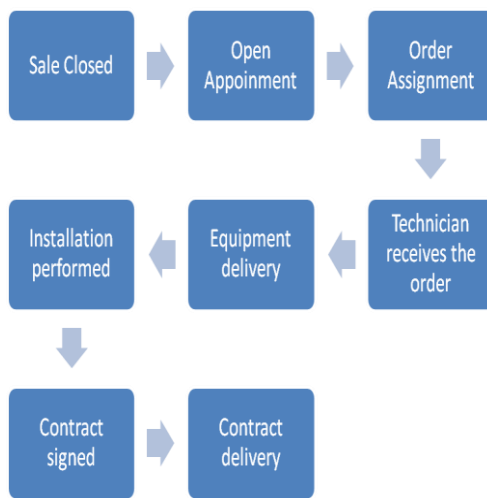
A project charter was developed on this phase. This tool is a critical factor in giving the team the direction and support it needs to success. The project charter is presented in Figure 1. It lists the reasons underlying the need for this project,

including but not limited the team’s mission, scope of operation, goals, benefits and time frames.

<b>Project Name</b>	Standardization of Cable Service Installation Orders Assignment Process in Rural and Suburban Areas		
<b>Project Leader</b>	Veronica Villa	<b>Project Sponsor</b>	Cable Retailer
<b>Start Date</b>	Jan. 09, 2015	<b>Target Completion Date</b>	Apr. 24, 2015
<b>Project Description</b>	Evaluate the process of orders assignment for installation in a retailer of a cable company with the purpose to identify and eliminate the non value add activities and to make the process lean.		
<b>Scope</b>	Eliminate the activities that not add value in an orders assignment process of Rural and Suburban Areas at a Retailer of a cable company.		
<b>Project Goal &amp; Measure</b>	<b>Project Ys</b>	<b>Baseline</b>	<b>Goals</b>
	Process Waste (%)	20	10
	Lead Time (days)	5	2
	Process Variation (Cpk)	0.372	0.558
<b>Expected Business Results</b>	<ul style="list-style-type: none"> <li>Reduce cost by reducing waste and rework.</li> <li>Faster return of investment.</li> <li>Reduce learning curve/training time for new employees</li> <li>Increase predictability in the process.</li> </ul>		
<b>Expected Customer Benefits</b>	<ul style="list-style-type: none"> <li>Improve quality service.</li> </ul>		
<b>Team Members</b>	<ul style="list-style-type: none"> <li>Green Belt: Veronica Villa.</li> <li>Owner Process: Designate.</li> <li>Human Resources Coordinator: Designate.</li> <li>Three (3) Technicians: Designate</li> </ul>		
<b>Support Required</b>	Allow team for biweekly meetings.		
<b>Schedule</b>	<b>Milestone / Duration</b>	<b>Phase</b>	<b>Target Date</b>
	D-Define / 1 wk	D - Completion	Jan 16, 2015
	M-Measure / 4 wks	M - Completion	Feb 13, 2015
	A- Analyze / 3 wks	A - Completion	Mar 06, 2015
	I- Improve / 3 wks	I - Completion	Mar 27, 2015
	C- Control / 2 wks	C - Completion	Apr 10, 2015
		Safety Reviews	Apr 17, 2013
	Project Completion	Apr 24, 2015	

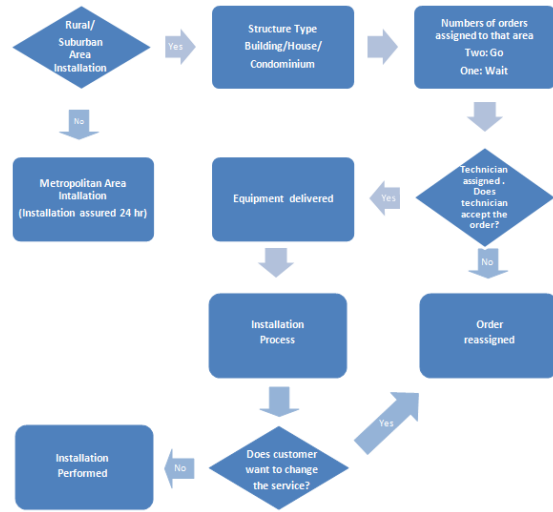
**Figure 1**  
**Project Charter**  
**Measure**

The current process flow was defined to measure the process and understand the current state. The process flowchart showed in Figure 2, is a high level mapping of the process.



**Figure 2**  
**Process Flowchart of Current Order Assignment Process**

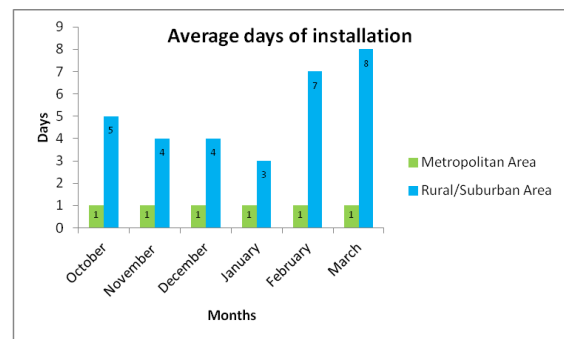
Because the scope of this project is to improve the order assignment process; Figure 3 presents a detail flowchart of the order assignment process.



**Figure 3**  
**Detailed Flowchart of Order Assignment Process**

A brainstorming session was developed in order to identify the non value activities. Then, with data retrieved from the system (6 months), it was possible to define the average days of installation for the last 6 months for Rural/Suburban orders (Refer to Figure 4).

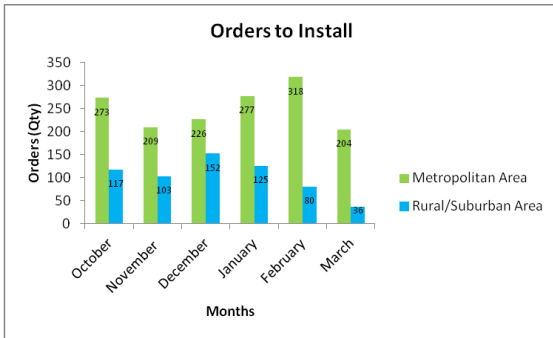
The current average days of installation for Rural/Suburban areas are 5 days while in the Metropolitan area is 1 day.



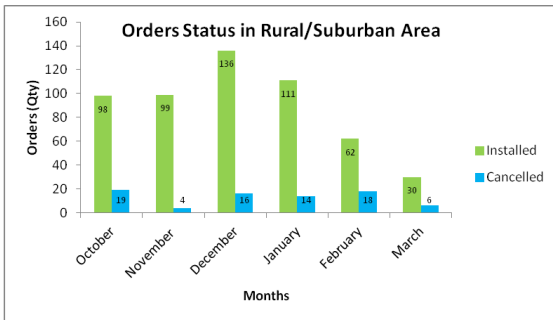
**Figure 4**  
**Average Days of Installation**

The intended purpose of this project is determined by the status showed in Figures 5 and 6.

Figure 6 shows the quantity of order installations cancelled by customer dissatisfaction.



**Figure 5**  
**Orders Classification to Install**



**Figure 6**  
**Order Status in Rural/Suburban Area**

### Analyze

After identifying where the muda was located through the system, the 5 Whys method was used to determine the root causes of the muda and reduce them or eliminate.

- Why the order took 5 days to be installed?

Because, there were not resources available to perform the service.

- Why there were no resources available to perform the service?

Because the technician has no equipment/material available.

- Why the technician has no equipment/material available?

Because no additional equipment was given to him

- Why no additional equipment was given to him?

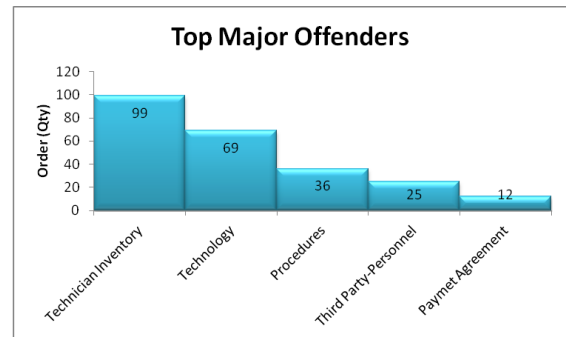
Because the equipment is assigned exactly according to the order to be installed

- Why the equipment is assigned exactly according to the order to be installed?

Because there is no procedure/document that control the inventory given to technicians.

The same methodology was followed to determine the other offenders of the process.

In addition, a Pareto diagram (Figure 7) was created to obtain a visual indicator of which deficiencies represented those top major offenders on the last three months for orders installed after 5 days of sale was closed.



**Figure 7**  
**Top Major Offenders for 5 days Installation**

The Pareto Chart analysis allows focusing attention on problems in priority order. The Pareto shows that the first major offender is: Technician Inventory. Currently, technicians receive the right equipment for the order. This situation limits them if any event for a new installation or a change in the order were to come up in the designated area.

The second offender is lack of technology. Technicians must have the contract to sign once the installation is completed. If an event arise to an extra installation or change in the order, they cannot perform the job, since they do not have the new contract on hand to be sign.

The third offender is represented by procedures. It is clear that procedures are a critical key to establish parameters and requirements for any process. Lack of procedures that indicate the actions to follow for any situation is one of the recurrent causes for the delay in the Rural/Suburban areas installation.

## **Improve**

Based on the analysis developed the following improvements are recommended.

Technicians must be supplied with extra equipment. In case they already are in the key area, if an extra order arose, the technician would have the means to respond and perform the installation for another customer the same day. This is not only beneficial to the Retailer since it closes the sale faster, but the customer service would be given to the client in less than 24 hours as it is pursued. This strategy must be accompanied by an update in the technology used in the Retailer. When technicians performed installations in the Rural/Suburban area, they can be supplied with a tablet, where they can download the contract to be signed, and customer could sign electronically the contract. The Retailer does not have to wait for the technician to release the contract at the office since it would be send via e-mail.

On the other hand, the establishment of procedures and guide lines that lead the changes to be implemented are necessary if the target is to succeed.

The development of a checklist to document the extra equipment delivered to the technician is required in order to maintain the control of inventory and the responsibilities established.

Procedures that determine the course of actions in situation where technicians do not want to accept an order assignment is essential to establish hierarchy and process control. Orders reassignment, which represents a 20% of waste in the process flow, would be avoided and everyone would know their functions and responsibilities.

Finally the last two offenders cannot be segregated of this improvement process. Third Party-Personnel and Payment agreement must be part of this implementation because they are the supporting keys for the success of this strategy.

After implementing these recommendations, the team projects a reduction of 20% of waste. In addition, the lead time will be reduced by 60% and process variation will be reduced by 50%.

## **Control**

The control plan proposed involved a Standard Operating Procedure (SOP). This is a useful tool to maintain consistency in the activities performed to reach a target and prevent the process to be performed inadequately. Furthermore, SOPs are used as a tool to train new personnel and reduce the learning curve/training time. A process owner will be identify, who will the responsible to sustain the improvement. Key documentation as a checklist to control the equipment inventory given to the technicians and templates to monitor the orders assigned will be also developed with the purpose to monitor the status of the process.

## **CONCLUSIONS**

Implementing the Lean Six Sigma methodology in the Cable Company can improve its installation order assignment process.

In this project the Lean Six Sigma began by identifying the baseline of the process and the current process flow was created. Then a 5 whys method was used to identify the root causes for the 5 top major offenders that kept the company from moving toward to give the service desired. Finally, improvements were recommended to overcome the barriers and achieve greater process efficiency.

With the implementation of these improvements is planned to meet the main objectives of the project.

- To reach a process free of waste and activities that not add value.
- To develop a standardized and documented procedure to assign orders.
- To assure an Installation in 24 hours to all Island customers, regarding the classification of theirs location (metropolitan, suburban/rural areas).

Today, customers have higher expectations for the quality service. This situation has led that companies implement strategies to enhance their competitiveness in the global market and can be sustainable. The cable company will improve its

quality service and the success of the methodology can lead the adoption of lean concepts as an ongoing business strategy.

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