

Implementation of Operational Excellence's Framework on a Local Pizzeria

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Abstract — *During these last years, due to the economic impact that has arisen in Puerto Rico, all industries have sought to manage, control, and efficiently use their inputs. It is no surprise that this has impacted a local pizzeria, where they are seeking to implement improvements to ensure quality, control costs and satisfy customers and thus make them loyal customers and retain them. Next, we will use a tool widely used in practically all pharmaceutical companies, medical device factories, and combined product factories. Tools covered under Lean and Six Sigma, help critical and strategic thinking. A standard procedure was implemented and helped align everyone to create a final product using the same procedure. Everyone understood how to follow it, which was easy to implement. It will also be used to train new employees and leave the product with the quality of a pizza maker with more years of experience more easily.*

Key Terms — *Lean, Pizza, Six Sigma, Standard Operation Procedure.*

PROBLEM STATEMENT

We will take into consideration a local Humacao pizzeria for this investigation. With over two decades of pizza industry experience. The owner always enjoys continuous improvement to give their customers new experiences. The proprietor stated that they see a cost savings opportunity and always strive to produce the best product possible. This must begin when it purchases the pizza's ingredients and hires workers to make and serve the pizza. In addition, given that it has an impact on both the product's quality and its financial situation, this is a topic of extreme business significance.

RESEARCH DESCRIPTION

Operational Excellence and its framework are the subjects of this study. Concentrating on things like Six Sigma, Lean, and Kaizen will assist with understanding and carrying out legitimate functional greatness which is the way to find success in this undertaking. Additionally, the design project will be suitable for the local pizzeria's operations.

RESEARCH OBJECTIVES

Be able to educate the client in a strategic manner so that he can begin to understand and consider the Lean Six Sigma concepts. Beginning with a kaizen reunion, waste elimination, 5S, and operation standardization. in addition to comprehending the significance of operational excellence in avoiding poor products and high costs.

RESEARCH CONTRIBUTIONS

The goal of the study of these subjects is to use Operational Excellence's framework and its ideas to contribute to the improvement of future processes. So that the interaction process duration can be decreased and, thus, bring down the functional expenses. Likewise, to enhance and optimize future procedures. Likewise, to assist a different local pizzeria in a similar or similar circumstance.

LITERATURE REVIEW

Every business has at least one area that could use some improvement. But exactly how does an organization experience meaningful change? In some cases, it can happen through a significant drive or complete disturbance inside the business. However, most of the time, change is much less

obvious; it happens gradually and even more bit by bit over the long run. One illustration of this kind of change is operational excellence. An organization's culture and performance can be enhanced through operational excellence, resulting in sustainable growth over the long term. Businesses should consider moving away from the traditional one-time event and toward a change management strategy that is more long-term. Because everyone is valuable and has potential, the Shingo Model emphasizes treating everyone with respect. In any case, having regard for others is sufficiently not; You must also treat them with this respect. Participating in any necessary departmental improvements is one of the best ways to show respect for your employees. They will feel more empowered and motivated to make a positive contribution to the changes because of this. As a means of achieving operational excellence, numerous methodologies have been incorporated into the mainstream business culture over the years. The following three are among the most well-liked: In Japanese, the term "kaizen" refers to "continuous improvement," and in business, it was used to bring about positive, ongoing changes in the workplace. The tenets of Kaizen are that any process can be improved, that teamwork is essential to success, and that a good process will produce positive outcomes. Kaizen is used by businesses to foster a culture of continuous improvement. Representatives will cooperate to accomplish continuous work environment upgrades. Due to rising global competition and major changes in consumer demands, preferences, and tastes, many businesses today are using the Japanese management technique known as Kaizen to make adjustments in their production processes in order to meet these expectations [1]. However, the method does not always recommend making only minor adjustments; Kaizen emphasizes the involvement of all employees in bringing about real change. Kaizen emphasizes the significance of continuous improvement and the fact that making a change once and hoping it sticks is not sufficient. You should keep on making upgrades over and

over. Numerous organizations have utilized Kaizen to assist them with expanding worker efficiency, cutting costs, and further developing the client experience. The elimination of waste in a production system is the primary focus of lean manufacturing. It teaches that a business should only concentrate on adding value. Incline additionally instructs that each interaction has some kind of bottleneck and that zeroing in the entirety of your improvement endeavors on that bottleneck is the speediest way to progress. The vital standards of rest fabricating center around working on the nature of items and administrations, killing whatever doesn't add worth, and lessening general costs. The "seven deadly wastes" are seven areas of waste that are identified by traditional lean manufacturing. These are [2]:

- **Overproduction:** Overproduction happens when workers produce something before it is really required. Because it frequently conceals underlying issues and results in an excessive amount of inventory, this is one of the worst forms of waste.
- **Waiting:** At the point when workers are left hanging tight for the subsequent stage underway no worth is being added. Examining each step from beginning to end and determining how much time is spent adding value and how much time is spent waiting can be very eye-opening.
- **Transport:** Transport is squandered brought about by the pointless development of uncompleted or completed items.
- **Motion:** This step includes any movement that, typically because of poor work standards, does not add any value to the finished product.
- **Over-processing:** This happens when additional time is spent on handling than is needed to deliver what the client needs. Additionally, getting rid of it is one of the most difficult tasks.
- **Inventory:** This kind of waste occurs when the supply exceeds the actual demand.
- **Defects:** Defects are botches that will either be fixed, or the cycle should begin once again

completely. This usually looks like a part that needs to be completely remade or scrapped in manufacturing.

Six Sigma is a bunch of devices and procedures that are intended to further develop business processes that will bring about a superior item or administration. By identifying and eliminating variation, Six Sigma aims to enhance the customer experience. There will be no more than 3.4 defects for every one million opportunities in a Six Sigma company. Anything that doesn't live up to the customer's expectations is a defect. It primarily accomplishes this by utilizing DMAIC. DMAIC stands for define, measure, analysis, improvement, and control and is an acronym. Here is a more in-depth look at each step and how it contributes to the development of Six Sigma businesses:

- **Define:** In this initial step, you will essentially characterize the issue on the grounds that without understanding what the issue is, you truly can't fix it. Whenever you have characterized the issue, you can start arranging and assessing your accessible assets.
- **Measure:** Measure all your available data and examine your current procedure closely now that you understand the issue. What is effective and what can be improved?
- **Analysis:** Whenever you have estimated your information, you can dissect your discoveries and concentrate on the real issues at hand.
- **Improvement:** Start thinking of possible solutions after analyzing your data. You should test the results of these solutions on a small scale before making any necessary adjustments.
- **Control:** You must find a way to maintain your new procedure after it has been implemented. To maintain your process's effectiveness, continuous improvement is essential.

METHODOLOGY

Design for Six Sigma DMADV was chosen as the methodology for incorporating Lean Six Sigma into the management of operational excellence at the local pizzeria. The five-step process known as the Define, Measure, Analyze, Design, and Verify (DMADV) of Six Sigma can be summed up as follows:

Define (D): Determine the project's objectives and customers' (internal and external) needs [3]. Utilizing the accompanying apparatuses:

- **Voice of the Customer (VOC):** Quantifiably exhibits the client's particulars.
- **Project charter:** It demonstrates the project's history, stakeholders, goals, and objectives.

Measure (M): Survey client necessities and determinations [3]. Utilizing the accompanying apparatuses:

SIPOC: Suppliers, Inputs, Process, Outputs, and Customers are the acronyms for this process map.

- The inputs to the process are provided by suppliers.
- Inputs are materials, assets, and information expected to play out the cycle.
- The processes are the actions taken to turn the inputs into outputs.
- The finished goods or services are referred to as outputs.
- Customers are those who get the results of the process.

Pareto Chart: A bar graph with a line indicating the percentage of occurrence and the lengths of the bars representing frequency or cost (time or money). The procedure will be improved by addressing the bars that exceed the limits specified by the customer.

Analyze (A): Examine options for the process to meet the needs of the customer [3]. Utilizing the accompanying apparatuses:

- **Brainstorming:** It is a method for group creativity. Its motivation is to create whatever number of thoughts would be prudent to tackle an issue. The inquiries that ought to be addressed are "what", "why" and "how" [4].
- **Kaizen:** Emphasizes the involvement of all employees in bringing about real change. Kaizen emphasizes the significance of continuous improvement and the fact that making a change once and hoping it sticks is not sufficient.

Design (D): Create the procedure to meet the needs of the customer [3]. Utilizing the accompanying device: Redesign the process.

Verify (V): Verify that the design meets the needs of the customer [3]. Utilizing the accompanying device: Control Instruments

The steps of the methodology, as well as the tools that will be used, are outlined in Table 1. A Gantt chart was also added every three weeks to estimate how long it would take to complete the project.

Table 1
Project Timeline

DMADV [4]		Tools	Gant Chart		
			March	June	Sept to Oct
Define	Determine the project's objectives and customers (internal and external) needs.	Project Charter VOC	■		
Measure	Survey client necessities and determinations.	SIPOC Pareto Chart		■	
Analyze	Examine options for the process to meet the needs of the customer.	Brainstorming Kaizen		■	
Design	Create the procedure to meet the needs of the customer.	Process Redesign			■
Verify	Verify that the design meets the needs of the customer.	Control Measures			■

RESULTS AND DISCUSSION

Section 4 presents the examination of results and conversation of the issue proclamation and how the plan and the execution of functional excellence's system on a neighborhood pizza joint were accomplished involving the DMADV procedure for this undertaking.

Define

In this fragment, we will describe the goal of this test, including the DMADV way to deal with the overhaul improvement process. As we analyzed in the clarification of the issue, the drive to do that mindset of ceaseless enhancements and Lean Six Sigma ideas like normalization of tasks. A standard system will be utilized to guarantee item quality and keep costs more controlled while making the item by various pizza creators. 5s will likewise be utilized to have things within reach and in this way accelerate the cycle and season of serving every client.

Measure and Analyze

Over the span of this work, eight pizza producers were consulted to distinguish areas of progress and their insight into Lean and Six Sigma instruments. During the long stretch of June 2023, management was done on the 8 pizza producers during their execution on an ordinary workday. Then, at that point, they were given a progression of inquiries in How many years of experience do you have making pizzas? (Figure 1), Do you have knowledge about standard procedures and 5s? (Figure 2) Do you understand that without the same procedure, the final product is the same as that of your colleagues? (Figure 3), What was your method for making an XL pepperoni pizza? Explain the quantity of crust, marinara sauce, pepperoni, and cheese (figure 4 and 4.1). The outcomes are itemized graphically underneath for more prominent comprehension.

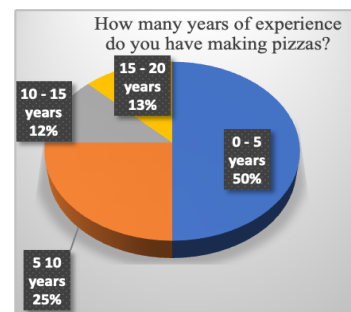


Figure 1
How Many Years of Experience Do You Have Making Pizzas?

This question shows us the assortment we have in long stretches of encounters with the different pizza creators. Half and the greater part with half just have under 5 years of involvement, while we have 25% somewhere in the range of 5 and 10 years of involvement and the other 25% somewhere in the range of 10 and 20 years of involvement.



Figure 2

Do You Have Knowledge About Standard Procedures and 5s?

The consequences of this question show that obviously, most pizza makers have barely any insight into lean and Six Sigma instruments. Indeed, just 3 individuals are familiar with standard systems and the 5s.

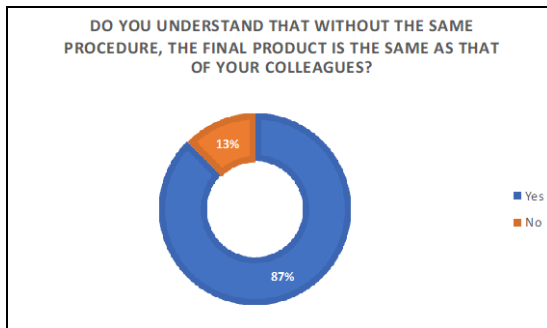


Figure 3

Do You Understand That Without the Same Procedure, the Final Product is the Same as That of Your Colleagues?

With this question, we wanted to observe the point of view of the pizza makers. In the results, we can see how almost everyone understands that the product is the same because it is a “pizza” at the end of the day. Although the procedure and

completion are not the same, they look the same. Only 1 person indicated that the product is not the same compared to the others.

What was your method for making an XL pepperoni pizza? Explain the quantity of crust, marinara sauce, pepperoni, and cheese.

- Busco la masa, le echo la salsa, el queso y la tiro al horno, cuando este casi hecha la saco le hecho pepperoni la verifico al rato cuando esté lista la saco y listo. Uso 2.2 libras de masa, 2 cucharones de salsa y queso hasta que se llene la pizza, igual el pepperoni.
- Uso una masa de 2.2 libras, le echo un cucharon y medio de salsa y mucho queso hasta que no se vea la salsa, pepperoni hasta llenar toda la pizza la tiro al horno como de 15 a 20 minutos, cuando la vea lista la saco, le echo un poco de ajo al borde y la pico.
- Utilizo la masa de 2.2 libras, con un cucharon de salsa, el queso regadito hasta llenar la pizza, el pepperoni regadito hasta llenar la pizza, un brochazo de ajo y la meto en el horno por 15 min.
- Busco la masa para pizzas XL de 2.2 lbs, la empano en harina, la maso, la estiro, le echo 2 cucharones de salsa, lo riego, le echo queso a gusto y la meto a cocinar después de 15 min la saco le echo pepperoni y ajo en el borde, la tiro 2 minutos más para que se cocine el pepperoni, la saco, la pico y la entrego.

Figure 4

What was Your Method for Making an XL Pepperoni Pizza? Explain the Quantity of Crust, Marinara Sauce, Pepperoni, and Cheese

- Uso la masa de 2.2 lbs, 1 cucharon y un poquito más de salsa, queso hasta tapan la salsa, la tiro a cocinar cuando este durita la saco le echo el pepperoni el ajo y la meto otro rato hasta que dore, después la saco y la entrego.
- Busco la masa de 2.2 libras, la preparo le echo la salsa (1 cucharon y medio), queso regado por toda la pizza y la tiro a hornear la saco como en 10 minutos le echo el pepperoni espero como 5 minutos y la saco le echo ajo y la pico.
- Se usa la masa de 2 libras, 2 cucharones de salsa y queso hasta que no se vea la salsa, se cocina, se saca se echa pepperoni y se cocina otro poco hasta que esta tostadita, se saca y ya está.
- Con la masa de 2.2 libras se le echa 1 cucharon y mitad de otro, queso hasta llenar toda la pizza, pepperoni y se tira a cocinar, cuando se tueste se saca se le echa ajo y se entrega.

Figure 4.1

What was Your Method for Making an XL Pepperoni Pizza? Explain the Quantity of Crust, Marinara Sauce, Pepperoni, and Cheese

This was a question to see the procedure of the different pizza makers; on this occasion, we

focused on an XL pepperoni pizza that according to the owner was the best seller. By analyzing the responses, we can quickly realize the discrepancies that exist in the processes even though the result is similar.

After seeing the outcomes of the following four questions:

- How many years of experience do you have making pizzas?
- Do you have knowledge about standard procedures and 5s?
- Do you understand that without the same procedure, the final product is the same as that of your colleagues?
- What was your method for making an XL pepperoni pizza? Explain the quantity of crust, marinara sauce, pepperoni, and cheese.

We can analyze that most pizza makers do not have much experience in their work. On the other hand, we understand that they do not have extensive knowledge of working with tools such as standard procedures and 5s. Who understands that the pizzas, in this case, an XL pepperoni, fit the same, although the procedure of none of the respondents was 100% the same as that of another colleague.

Design

In this section, a standard operating procedure will be designed for creating an XL-sized pepperoni pizza. This tool will help us align all the pizza makers when making this pizza. With this we will help create a consistent and highest quality final product for customers.

Standard Operating Procedure

The purpose of this SOP is to create an XL-sized pepperoni pizza with the highest quality attributes.

Roles and responsibilities

Pizza makers – Following the SOP, to create a consistently final product, assurance quality and avoid discrepancies.

Steps:

1. Search the dough in the refrigerator with 2.2 pounds and transfer it to the worktable.
2. Bread the dough in flour until it is completely covered, knead it, and stretch it to 18 inches.
3. Place a board to throw pizzas, add 1 tablespoon of flour, and distribute around the board, place dough on the board.
4. Pour one and a half tablespoons (12 ounces) of marinara sauce into the center of the dough and distribute the sauce in circular motions until almost the entire dough is covered, leaving half an inch of space for the edge.
5. Using a measuring cup, fill up to 10 ounces of shredded mozzarella cheese, and distribute it on top of the sauce.
6. Move the table a little to check that the pizza is not stuck and proceed to throw the pizza to cook for 10 minutes.
7. Remove the pizza from the oven, rotate 180 degrees, and add 50 to 56 pepperonis; put the pizza back in the oven for 5 minutes.
8. Take the pizza out of the oven, place it on a tray or box to deliver, brush it with garlic around the edge, and cut it into 16 homogenous pieces.
9. Deliver the finished product.

Verify

In this segment, we will talk about how we checked that the plan and execution of the Standard Operating Procedure for the pizza shop had been fruitful. After execution, we directed one more poll to gather the encounters and responses of the pizza creators, after utilizing the Standard Operating Procedure. Along these lines, we look to check assuming this instrument meets the quality rules anticipated by the client and if it is a simple device to utilize while cooking XL pepperoni pizzas. Moreover, we included unassuming inquiries to accumulate input and ideas to additionally work on the strategy.



Figure 5

Do You Understand that the Standard Operating Procedure Meets the Quality Requirements Expected by the Client?

All respondents (100%) understand that the standard procedure meets the quality requirement expected by the client.

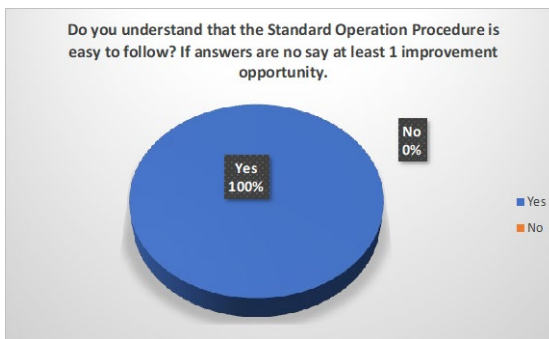


Figure 6

Do You Understand that the Standard Operation Procedure is Easy to Follow? If Answers are No, Say at Least 1 Improvement Opportunity

After checking this question, 100% of pizza makers commented that the standard procedure is easy to follow. It can also be inferred that they do not have extensive knowledge of the skill, and yet they followed it, and the final product came out as the pizzeria owner expected.

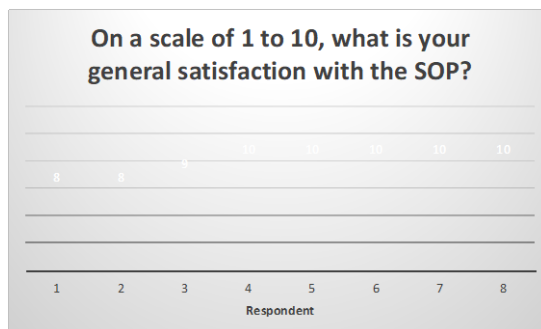


Figure 7

On a Scale of 1 to 10, What is Your General Satisfaction with the SOP?

With this question, we want to know the general satisfaction of pizza makers with the SOP. The scale was from 10 very satisfied to 1 very dissatisfied. 62.5% vote for being very satisfied. While the rest vote for 8 and 9 satisfactions for 37.5%. We can conclude that the SOP was a good tool for the pizzeria and that the design is useful and easy to execute.

CONCLUSION

This part will sum up the advantages of planning and carrying out the Standard Activity Strategy utilizing the DMADV philosophy. We can infer that the device has introduced various advantages for the pizza shop following execution. These advantages are summed up in the following:

- The SOP presents ease and comfort when following it.
- Helps ensure the quality of the final product.
- It is an easy way to train new staff and align all pizza makers with the same procedure to always deliver the same product.

We perceive that the information introduced by this device shows the chance for development that was absent in the pizza joint. In any event, perceiving that a technique permits everybody to make a similar item and stay away from errors. Nonetheless, there are consistently potential open doors for areas of progress that ought to be followed up. You need to resolve a method for each size of the pizza, and fixings, recognize segments to the client and utilize the markings on the work devices. One of the main limitations would be the implementation and creation of procedures for all types of pizzas, such as personal, medium, and large. You still must implement a process so that the pizza makers always carry out the procedure. Well, the manager or owner of the pizzeria must carry out oversight to correct failures or any deviations that he sees in the process. There will always be areas of opportunity and any employee must raise their hand to continue with continuous improvement.

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