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THE USE OF QFD AS A TOOL FOR QUALITY IMPROVEMENT IN THE RETAIL SALES AREA

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THE USE OF QFD AS A TOOL FOR QUALITY IMPROVEMENT IN THE RETAIL SALES AREA

Abstract. *The objective of this work is to use the QFD - Quality Function Deployment methodology to identify the desired and expected quality of the products and services in the sales area of a retail trade. The results will be obtained through VoC (Voice of Customer), which consists of data collection by interviewing and then a closed questionnaire, translating the real needs of the consumer into requirements of products and services. With the application of the QFD in the company it was possible to identify the target audience as well as its requirements, being necessary to carry out a planning to put in practice the opportunities raised. In view of these improvements, the company has had positive results both in product development and improvement in the production process and people, presenting to the company a growth of 7.7% in its sales.*

The QFD proved to be an excellent tool to aid in the quality management of the company, because it was possible to identify the main requirements and needs, thus allowing for more assertive information, eliminating assumptions.

Keywords: *Quality, Voice of customer, QFD, Productivity, Provides services.*

1 INTRODUCTION.

1.1 CONTEXTUALIZATION.

Due to globalization companies have had extreme competition in which the changes occur quickly, being necessary to adopt innovations and to make investments in order to obtain a competitive advantage and to perpetuate themselves to the market. It is observed in the Brazilian market a great effort of the companies in the sense of implementing managerial actions to maintain and improve the quality, but it is necessary that there is the quality planning. The quality function assumed a strategic perspective, being considered a competitive weapon, better identifying the needs of the clients. In this way it is unquestionable that the voice of the customer is the essence of success it is facilitated when it is aimed at the development of concrete products and mainly in the initiatives of the companies in meeting and surpassing the expectations of the clients.

According to (CAPELLO, 2007) companies that prospected their markets quickly through products that surpass the expectations of the clients can generate a considerable improvement of competitiveness. In this way, product development has become a requirement for survival and a competitive advantage.

The Brazilian and world market demands great competitiveness of the institutions, (PRÁ & MACHADO, 2007) the competitiveness of organizations depends, in large part, on their capacity to adapt to the oscillations of the environment in which it is inserted. This suitability can

be defined by the strategies of action and by the capacity to absorb and implement the information and innovations that have arisen in the environment.

Quality has become a very important requirement, which decides the choice of consumers when choosing services and / or products, this decision covers all types of customers, from a single individual, a store, a private organization or even public institutions (ECHEVESTE; WERNER; KOLOWSKI, 2008).

1.2 RESEARCH PROBLEM.

Many companies today do not know how to listen to their customers, because of that they no longer serve them, losing to competitors, many companies have made high investments in customer service systems to simply know why the customer is calling, but what we need to know is what the customers talk. To translate this information into actions, these decisions must have full support from top management as they focus more on numbers of units produced.

1.3 OBJECTIVES.

1.3.1 GENERAL OBJECTIVES.

This work aims to apply the techniques presented by the QFD method in the area of sales of a Bakery to present better service to its customers, meeting their requirements, increase the company's participation in the local market, reduce costs. Increase your sales and consequently your sales and profitability

1.3.2 ESPECIFIC OBJECTIVES.

This application of QFD will be developed from the need to understand the voice of the customer and the search for a greater participation in the local market, since currently the customers are directed to look for products and services with great prices and quality.

1.4 RESEARCH SUBJECT.

The research will be conducted in a food business to improve the quality of service in the sales area, as it is important to check what the quality requirements demanded by customers.

1.5 DELIMITATION OF THE THEME

This research is limited to evidencing the quality required by the customer, because through these requirements will be projected the quality demanded.

1.6 REFERENCE ESTABLISHMENT FOR RESEARCH

The research was limited to surveying customer requirements through a customer survey in a bakery for two months in September and October 2016

1.7 HYPOTHESES

If all companies can hear their customer's voice and translate them into quality requirements they are sure to exceed expectations. I hope that the QFD Statement helps to improve the quality in the sales area

1.8 JUSTIFICATION

By applying the QFD you can view the relationships between business processes and identify the needed opportunity for improvement, either in the process or product and ease of managing the performance and quality indicators.

1.9 WORK STRUCTURE.

Chapter 1 Introduction was contextualized with the importance of companies starting to think about opportunities for improvement in the face of the demands of the globalized market and mainly aimed at serving customers in a way that exceeded their expectations. Chapter 2 presents a review of the literature on quality and its occurrences, as well as the basis for the construction and application of QFD as an opportunity for improvement. Chapter 3 describes the methodology of the research and the methods used to apply the objective proposed by the work. In Chapter 4 I present the results and discussions regarding the data collected and in chapter 5 are the conclusions of the application of QFD.

2 THEORETICAL REFERENCE

2.1 QUALITY

The concern with quality related to services and products has existed since the beginning of mankind, since the search for more resistant materials, the search for methods to obtain better results, thus showing concern for quality, perfection should not be an act, but should be a habit. (MILAN, 2014)

In services, customer-supplier interactions are infrequent, since these moments are direct or indirect and physical or virtual, that is, the quality of services is perceived in the details (EBERLE, 2014).

(TAYLOR, 1987) through the Scientific Administration in the 20th century, quality was treated differently, becoming part of the organizations' objectives, proposing industrial efficiency and consequently industrial development reform, there was an urgent need to apply the scientific method to the administration, guaranteeing a minimum cost with maximum production.

(TAYLOR, op cit) added in the production line, methods of evaluation and inspection of product quality and jobs, in his point of view the execution of the tasks should be with quality and speed, being the inspector the "owner" this process.

In a superficial analysis we can verify that due to the improvement of the technology in the last decades, some sectors such as: production, inventory control, logistics, human resources presented substantial evolutions, the demanded quality has demanded these changes (TAYLOR, op.).

2.1.1 THE EVOLUTION OF QUALITY.

According to OLIVEIRA (2006) has gone a long way for theories and practices of quality management to reach the point they are in, however, there is still a long way to go, especially in underdeveloped countries, due to the delay in access and deployment justified by historical and economic reasons.

(LOPES, 2014), the concern with quality in organizations has been evident since the beginning of the twentieth century. However, the ways companies demonstrate this level of quality has undergone great changes, responding to political, social and economic scenarios.

(GARVIN, 1992) presents concepts and techniques used in quality programs, divided the evolution of concepts about quality into four "eras": Inspection; Statistical Quality Control; Quality Assurance and Total Quality Management.

2.1.1.1 QUALITY INSPECTION ERA.

(DE MELO CORDEIRO, 2017) at the end of the XVIII century the quality was verified in a different way, the productive activity was small scale and artisan, the craftsmen themselves were responsible for the manufacture and quality.

(DE MELO CORDEIRO, op. Cit.) The inspection was based on a system of measurements, using jigs and other accessories, as well as a standard for reference.

(TAYLOR, 1976), the inspection technique used by artisans was focused on the control of attributes or control by variables, but only TAYLOR established the inspection as an organizational technique and a managerial function.

(CARVALHO and PALADINI, 2013), some companies are currently using Sampling Inspection, assisting other quality management mechanisms.

2.1.1.2 STATISTIC PROCESS CONTROL ERA.

Walter Shewhart in the 1920s in the U.S. started the basic concepts in statistical and scientific methodology in some factories, was the pioneer in the field, had as objective to control the quality, and not only verify it after the process carried out (MONTGOMERY, 2014).

SPC is not simply a group of tools, reducing variability is a strategy, since most quality problems are related to: product variation, delivery times, how things are done, non-uniformity of raw materials, individual skills and differences of workers, equipment and machines, sometimes from the conditions of the process and the determination of their limits (OAKLAND, JONH 1994).

(DA ROSA, 2016), the use of control charts makes process improvement more effective, but should be integrated with management tools used to solve problems: Pareto graph, histogram, Ishikawa diagram and others, usually with the knowledge of cause on the subject are supervisors, coordinators and operators, are they noticing the opportunities.

2.1.1.3 QUALITY WARRANTY ERA.

(DE MELLO CORDEIRO, 2017) in quality assurance, chronologically the third "era" of GARVIN, the prevention of the problem remained its fundamental purpose, was presented specific concepts of prevention to not quality, the forms and techniques employed went beyond statistical methods.

(GARVIN, 1992), quality assurance focuses on four basic aspects: Quantification of Quality Costs; Total Quality Control; Reliability Engineering; and Zero Defect.

2.1.1.3.1 COST OF QUALITY.

(SILVA NETO, 2016) comments that applying the methodology costs even simple quality is a viable and potentially advantageous alternative. Generating interaction between costs and engineering, addressing other peculiarities that:

"... influence the cost of the product, the company can significantly reduce the cost of losses, caused by internal and external speeches, in the short term, through investments in continuous improvements, corrective and preventive actions"

(Rosseti, 2003) says that Deming, considered a quality control mentor, stated that quality begins in top management and presents some points for quality improvement, better known as the 14 Principles of Deming:

1. *Create constancy of purpose.*
2. *Adopt a new philosophy.*
3. *Cease the inspection dependency.*
4. *Avoid winning business based on price.*
5. *Constantly improve the production and service system.*
6. *Institute work training*
7. *Institute Leadership*
8. *Eliminate fear*
9. *Break down interdepartmental barriers*
10. *Eliminate slogans and exhortations*
11. *Eliminate quotas or standards of work*
12. *Make people proud of work.*
13. *Establish an education and self-improvement program*
14. *Get everyone to work to achieve their goals.*

(DEMING, 1990) proposes the Continuous Improvement Process through the Deming Cycle, PDCA - Plan, Do, Check, Act as a way of constantly reducing the costs of obtaining quality.

(JURAN and GRZYNA, 1991) until the mid-1950s there were few concerns about the costs resulting from the lack of quality of products and services, the cost levels for a product or service were defined: avoidable and unavoidable costs through a study on the economy of quality.

Avoidable costs are those related to: scrapped material, rejected and nonconforming product, reworked product and customer non-satisfaction. Inevitable costs related to prevention:

due to the cost of manufacturing, costs of inspection, sampling and other initiatives for quality improvement (JURAN, GRAYNA, op cit).

(TAGUSHI, 1986) remarks that one must reverse efforts in process control, turning to product and process design, its premise is simple: instead of concentrating efforts on the production process to ensure quality, it should greater commitment to product development for variations to occur.

(TAVEIRA, 1997) the TAGUCHI methodology, based on statistical methods, establishes a methodology to quantify, the loss of quality in monetary terms, thus advising the technical-economic decisions in the different stages of production, it is called the Quality Loss Function (FPQ) or simply Quality Loss.

2.1.1.3.2 TOTAL QUALITY CONTROL ERA

(LONG, 2013) Feigenbaum, in 1961, presented an evolved version of the propositions published ten years before the Deming, which he called Total Quality Control (TQC), where the customer's interest was the point of departure, that is, the human factor plays a major role.

(CRATO, 2010), the implementation of the concept of total quality control has long-term results and depends on a lot of commitment of the organization, because it forces the organization to know the requirements of its stakeholders and to appreciate their decisions.

(SILVA, 2009) considers that the quality management system are agents responsible for a definition of a set of measures showing the way in which companies face some aspects:

- *the results of evaluations of your products or services;*
- *customer feedback;*
- *the results of internal or external audits;*
- *treatment of nonconformities;*
- *handling of internal or external complaints;*
- *triggering, monitoring and verifying the effectiveness of corrective, preventive and improvement actions.*

(FEIGENBAUM, 1956) apud (GARVIN, 1992) presents some questioning about the compulsory manufacture of advanced quality products in isolated sectors. This positioning started the Total Quality vision.

"... to achieve real effectiveness, control must begin with the design of the product and only end when the product has reached the hands of a customer who is satisfied."

2.1.1.3.3 RELIABILITY ENGINEERING.

Reliability Engineering provides theoretical and practical tools for specifying, designing, testing, and demonstrating the probability and ability of components, equipment, and systems to perform their functions for specified periods of time in specific environments (JANUARIO, CRUZALALDO; APARECIDA, AUGUSTO, 2014).

Reliability Engineering in its broad concept was born to identify defects in large scale production, its main objective is to ensure acceptable performance of a product, however lately has presented great progress and growth in maintenance in companies, with the function of increasing the availability of equipment (SLACK, CHAMBERS and JONHSTON, 2002).

Reliability means doing things in time for consumers to receive their promised goods and services, their application provides knowledge of the productive process and assets as well as their opportunities for improvement, its purpose is to find the possibility of encountering repetitive problems (SLACK; CHAMBERS JONHSTON, op. Cit.).

This approach was developed by the electronics and space industries, aiming to minimize the number of technical failures, among the main actions to make this approach feasible are: analysis of individual components; components used below two specifications: and use of parallel systems. (SLACK, CHAMBERS, JONHSTON, op cit).

2.1.1.3.4 ZERO DEFECTS OR ZD

(PEINADO, GRAEML, 2007) describes that: Crosby rejected the idea that there would always be an uncontrollable percentage of defective parts and developed the concept of zero defect during the 1960s, popularizing the celebrated phrase about "doing right the first time."

Second (CROSBY, 1990), zero defect is a concept about which management needed to do something.

"Zero Defect means doing what we agree upon when we agree to do so. It means making clear requirements, training, a positive attitude and a plan (CROSBY, 1990). "

(CROSBY, 1990) says that those who take real risks, such as mountaineers or astronauts, must make sure things are correct before they leave. This is the Zero Defect, and to ensure that it is necessary to hold knowledge, attention, equipment and adequate facilities.

(CROSBY, 1979) published the book *Quality is free*, which follows the line of thinking of the other gurus of the time, proving yet again that the costs of non-quality are so high that the investments needed to improve quality are more than compensated for by their reduction.

(CROSBY, op. Cit) the zero defect proposes a greater importance to the philosophy, to the awareness, to the knowledge and less relevance to the techniques to solve problems, for the success in the implantation of these actions one must use managerial and technical training, exposure of results and feedback.

The success of the Zero Defect is linked to the development, attitudes and management behavior, necessarily through a realignment of the organization's culture (CROSBY, op. Cit.).

2.1.1.4 TOTAL QUALITY MANAGEMENT ERA

(REGINATO, GRACIOLI, 2012) strategic quality management seeks the engagement of the entire institution, administration and quality, through the involvement of top management and the entire operational body, prioritizing the relationship between quality and basic objectives and of the company.

Training and team building are key factors in the development of this quality approach. In order to ensure strategic quality management, it is ideal to have market research and a meticulous analysis of competitors' products and strategies. Current quality programs have been used methods, techniques and tools to assist in quality management (REGINATO and GRACIOLI, 2012).

(ROSSETTI, 2003) discusses the reasons for competitiveness and its challenges: The great global challenge of the beginning of the 21st century is to reconcile the requirements of continuous improvement of the competitiveness of enterprises and the expansion of employment opportunities for the labor factor. The reasons for these requirements are overwhelming.

(ROSSETTI, op. Cit.) In an accelerated rhythm the expansion of competitiveness, reflects a lot of the competition among companies in all markets and on a global scale. This expansion is due to the following factors:

- Multipolarization: Competition between asymmetric national structures;
- Macroparticles Integration of national economies, creation of free trade areas and customs unions;
- Liberation of world trade;
- Global-strategic strategic purposes of large corporate corporations;
- Acceleration of the Innovation Process;
- Falling barriers for entry of new competitors.

(ROSSETTI, op. Cit.) And for the expansion of employment opportunities for the labor factor, the following stand out:

- Accelerated growth of the economically mobilizable population, especially in countries with low levels of social and economic development;
- The continuity of the process, the expansion of the presence of women in the workforce;
- Removal of involuntary unemployment;
- The challenge of universalizing the material conditions of well-being.

2.1.1.5 QUALITY TOOLS.

(MARQUES, 2015) the use of quality tools in process management helps to improve: performance, reduction of variability, reduction of defects and as a result decrease of production costs, this contributes to competitive advantage, increase in profit margin and greater customer satisfaction.

(CARVALHO, PALADINI, 2013) as a rule, quality tools are simple techniques, with the basic objective: to do with quality.

The tools and techniques used to analyze, measure, define and propose solutions to quality problems allow better control of the production process and its improvements, some of the most frequently used tools are: Pareto Diagram, Brainstorming, Cause and Effect Diagram or Diagram of Ishikawa, Benchmarking, Reengineering, Kaizen, Quality Function Deployment - QFD (CARVALHO; PALADINI, op. cit.).

2.1.1.5.1 PARETO DIAGRAM

(ARAUJO, 2010) the Pareto diagram is a method, which involves classifying the information items in the causes of the problem in order of importance, its application is to distinguish little vital and very trivial subjects, its analysis is based on the phenomenon that often occurs few causes explain most defects.

It is a vertical bar chart ordering the occurrence frequencies from highest to lowest, determining the priorities to be worked on. A generality observed by the Pareto diagrams is that 80% of the problems are caused by 20% of the causes (SLACK; CHAMBERS; JONHSTON, 2002).

2.1.1.5.2 ISHIKAWA DIAGRAM OR FISHBONE

Cause and effect diagram, also known as fishbone, is a diagram that establishes the relationship between the effect and the possible causes of a process created in 1943 is used in industrial environments to analyze the dispersion of products and processes (BAZONI, 2015).

The detail of the main causes is grouped using the 4M's (method, labor, material and machine) or 4P's (politics, procedures, personnel and plant) (BANZONI, op. Cit.).

Second (MARSHALL, 2003) the issues raised during brainstorming are brought together by classes and affinities and placed in a horizontal line that is the main axis, resembling a fishbone.

(ISHIKAWA, 1993) Process analysis is the analysis that clarifies the relationship between cause factors in the process and the effects such as quality, costs

and productivity, etc., when engaged in process control. Process control attempts to uncover cause factors that hinder the smooth running of processes. He looks for technology that can carry out preventive control. Quality, cost and productivity are effects or results of this process control.

2.1.1.5.3 BENCHMARKING

(DAL FORNO, 2012) is one of the ways to celebrate the learning of lean development and the use of benchmarking as a tool to achieve competitive advantage.

Benchmarking gained during Total Quality, the movements of quality control circles by Taylor's scientific management fundamentals, Shewart's statistical control of the process, Deming's PDCA and Management by Drucker's Objectives (PALADINI, 2002 and 2004; CHIAVENATO, 2001 and SLACK, 2006).

Benchmarking is understood as the search for improvement through a reference, organizations need to know where they are in comparison to their competitors, for its operation it is imperative that the team is empowered to understand the environment, the company's business and meet its competitors (Spendolini, 1993).

2.1.1.5.4 KAIZEN

(LIKER, 2016) the term kaizen in Japanese has the meaning of continuous improvement, independent if the improvement is small the actions are aimed at achieving the goal of eliminating waste. The purpose is to teach people the skills to work efficiently, analyze and collect data, solve problems, present improvements and make decisions until their implementation.

(DE ARAUJO, 2006) the word kaizen has the meaning of continuous improvement of a sequence of value or individual process, with the pretext of adding more value and less waste. There are two levels of kaizen:

- Flow Kaizen: Emphasizes the flow of value to management.
- Process Kaizen: Emphasizes individual processes directed at leaders and groups.

Continuous improvement or Kaizen as known was created by (IMAI, 1986) a performance improvement approach, no matter whether the improvement is small or large, the important thing is that the actual improvement happens at regular and appropriate times.

"Kaizen means improvement. More: it means improvement in personal life, domestic life, social life, and work life. When applied to the workplace, Kaizen means continuous improvements that involve everyone - managers and workers alike "(IMAI, 1986).

2.2 VOICE OF CUSTOMER

(DE LIMA LUCENA, 2006) comments that in the business universe, customers are vital for the growth and development of companies, all the way through the revenue of organizations are generated by the sale of products and services, resources that are used to pay operational expenses and tributes as well as provide profits.

(DRUCKER, 2000) states that:

It is the customer that determines what the company will be. Only the client, with the willingness to pay for a particular good or service, turns the economic resources into wealth, things into goods.

(SLACK, CHAMBERS, JONHSTON, 2002) customers buy concepts, when the customer makes a purchase, it is understood that they are acquiring a package of benefits to meet their needs and expectations, customer requirements are used as input information for the creation specifications for a product or service.

2.3 QFD – QUALITY FUNCTION DEPLOYMENT

(BALDISSERA, 2012) in order to achieve success in the development of a product or service, the customer's expectations must be met, for which QFD has proved to be a widely used tool, since it seeks to meet these requirements.

(MIRANDA, 2010), the QFD begins by listening to the customer's voice, identifying the quality demanded and subsequently the product, process or service requirements unfolding.

(DE OLIVEIRA LOTUFO, 2011) QFD transforms customer requirements into product quality characteristics and assists in the development of project quality in finished products, with methodical and organized developments of consumer requirements and product characteristics.

(MIGUEL & CARNEVALLI, 2006), QFD is an effective methodology that has the premise of listening to the needs and expectations of the customers on products or services, arose in the face of difficulties faced by Japanese companies in 1960 due to their competitiveness.

At an early stage the difficulty was how to define: the product design phase, the quality critical points before the start of production and another important point was the sequence of product development. These needs promoted the development of QFD in the mid-1960s to the mid-1970s (MIGUEL, CARNEVALLI, op. Cit.).

(GUEDES, 2011) since 1983 QFD is used by several companies for the development of new products is evidenced that its use has evolved in other directions and is effective in developing processes, services and unconventional applications.

(DE LIMA, 2009) QFD listens to customers' needs and translates into quality characteristics that can be verified, achieving products and services that best serve the customer.

(GUSSONI, 2009) Quality Function Splitting is a method that transforms customer demands into design quality functions, which through the unfolding we obtain the quality of design in manufacturing processes or services.

(GARVIN, 1992) apud (CAPELLO, 2007) the QFD assumes strategic role is considered a competitive tool that helps companies to identify the needs of consumers and on account departure expose the strengths and weaknesses of competitors.

2.4 PRODUCTIVITY

For (FONSECA, 2017) productivity is the use of resources in a way that costs are reduced by increasing competitiveness, requiring synergy between the departments of the organization, areas must align the company's philosophy, creating a productive chain which aims at improving productivity.

(FALCONE, 2004) comments that increasing productivity is producing more with less, the constitution of a company is related to the human being's intention to make his life more comfortable. (FALCONI, op. Cit.) Cites that these companies produce products and services to reach the needs of the customers, in a more precise approach the definition of productivity is the ratio between billing and costs, since it has a great advantage, first: take into account internal factors of the company, second: inclusion of the client as a decisive factor of productivity.

(BONELLI; FONSECA, 1998) states that:

In Brazil, the liberalization of foreign trade, the Quality and Productivity Program, the privatization process, the deregulation of the economy and the diffusion of new managerial techniques provoked a vigorous movement to raise industrial productivity.

2.5 SERVICE PROVISION.

(FITZSIMMONS, 2014) in his book says that the act of rendering service is divided into two subjects: 1- who or what is the agent that receives advantages and 2- the tangible nature of the service. According to (FITZSIMMONS, op. Cit.) This results in 4 classifications: tangible actions directed to the client and his assets, intangible actions directed at the client's intellect and on the patrimony of the client.

(MACHADO, 2006) the most important studies on services, defines that the consumer will be satisfied in the provision of services if expectations are exceeded, ie, exceed expectations, the parallel enters the perception of performance and consumer expectation generates a space and the larger this space, the greater the dissatisfaction.

(ALBRECHT and BRADFORD, 1992) Quality in services and the opportunity to satisfy the need, solve problems or generate benefits to the client. It is the ability to attribute, to provide, to enable full customer satisfaction.

Second (ALBRECHT, 1998):

..., apathy, coldness, inflexibility, service, disrespect to the deadline, high prices, delay and disorganization in service are some of the common complaints of customers in relation to services.

In order to avoid or eliminate the existence of problems of this nature, it is fundamental that organizations have a management structure focused on Quality of Services (ALBRECHT, op. Cit.).

3 METHODOLOGY

3.1 RESEARCH METHODOLOGY

The methodology of this research is of an applied nature, since it will generate knowledge for practical application directed to the solution of problems using the QFD tool and its applications. The intention of this work is to demonstrate the results of its use for exploratory purposes. It is a qualitative approach, since the results obtained through research that refer to the application of QFD will be analyzed in order to improve lean thinking in product development, process and service delivery.

3.2 METHODS

For this work was carried out in a company of the retail trade of the food industry applying a research with the clients, realizing the survey of the results obtained by the use of the unfolding of the quality function. Where later will be made the definition and planning of the application of QFD in the area of retail sales of a family business.

4 RESULTS AND DISCUSSION

In this specific study after the application of the interview with the consumers, it was possible to identify the factors determining the quality required by the clients at two levels. Level I for the product and services and level II for the specific characteristics of the previous items (level I). As figure 1

In level I the items pointed with greater relevance were referring to:

- French Bread Product with 50.49%
- Customer Service 27.30%
- Location (environment): 22.21%

Em nível I os itens apontados com maior relevância foram referentes ao:

- Produto Pão Francês com 50,49%
- Serviço de Atendimento 27,30%
- Local (ambiente): 22,21%

In Level II the following items are highlighted:

- For French Bread: texture with 18.51%, followed by 11.85% with respect to the price and 10.66% with the bread size.
- For customer service: Staff uniforms with 14.22%, educated employees 11.11%.
- For the location (environment): Cleaning with 8.88%, Organization with 8.88% and modern environment with 4.4%

Required Quality Table		Planned Quality									
		Performance evaluation			Planning			Value			
Level I	Level II	Degree of Importance	Our Company	Company X	Company Y	Quality Plan	Improvement Index	Sales Argument	Absolute Value	Relative Value	
Characteristics of French Bread	Cheap	4	3	2		4	1,33	1,5	8,00	11,85%	
	Standard size 50 grams	3	2	2		4	2,00	1,2	7,20	10,66%	
	Gold color	4	3	1		4	1,33	1,2	6,40	9,48%	
	Texture (crispy, mashed and fresh)	5	3	2		5	1,67	1,5	12,50	18,51%	
Customer Service	Uniformed clerk	4	2	1		4	2,00	1,2	9,60	14,22%	
	Employees polite	5	4	2		5	1,25	1,2	7,50	11,11%	
	Good employee appearance	2	3	2		2	0,67	1,0	1,33	1,97%	
Local	Clean	5	5	3		5	1,00	1,2	6,00	8,88%	
	Organized	5	5	3		5	1,00	1,2	6,00	8,88%	
	Modern place	2	2	2		3	1,50	1,0	3,00	4,44%	
									Total	67,53	100,00%

Figure 1. Quality house result. Source: the author.

After lifting the qualities required by the customer, the Quality Matrix was built with the main requirement demanded by the customer in this case the French bread. As figure 2

Required Quality Table		QUALITY CHARACTERISTICS									Performance		Planning		Value																																																																							
		Oven idle (hours)	Exposure time of products ready (hours)	Flavor of the dough	Time to Bake	Oven Temperature	Amount of French bread per baked	Oven Maintenance	Quality of raw material used	Baker's Training	Degree of Importance	Our company	Quality Plan	Improvement Index	Selling Argument	Absolute value	Relative Value																																																																					
Characteristics of French Bread	Cheap	9	3	0	9	9	9	9	0	4	3	4	1,33	1,5	8,00	23,46%																																																																						
	Standard size 50 grams	0	0	0	3	3	0	0	9	3	2	4	2,00	1,2	7,20	21,11%																																																																						
	Gold color	0	0	9	9	9	3	3	9	4	3	4	1,33	1,2	8,40	18,77%																																																																						
	Texture (crispy, mashed and fresh)	0	9	9	9	9	3	3	9	5	3	5	1,67	1,5	12,50	36,66%																																																																						
<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> </tr> </thead> <tbody> <tr> <td>Absolute value</td> <td>2,1</td> <td>4,0</td> <td>5,0</td> <td>7,7</td> <td>7,7</td> <td>3,8</td> <td>3,8</td> <td>7,1</td> <td>6,9</td> </tr> <tr> <td>Relative Value</td> <td>4,39%</td> <td>8,32%</td> <td>10,37%</td> <td>16,08%</td> <td>16,08%</td> <td>7,85%</td> <td>7,85%</td> <td>14,76%</td> <td>14,32%</td> </tr> <tr> <td>Our Company</td> <td>3 h</td> <td>1 Day</td> <td>30%</td> <td>18 min</td> <td>170 °C</td> <td>200 uni</td> <td>4h/month</td> <td>60%</td> <td>1Day/year</td> </tr> <tr> <td>Product Company X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Product Company Y</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Performance Targets</td> <td>1 h</td> <td>4 h</td> <td>60%</td> <td>15 min</td> <td>187 °C</td> <td>200 uni</td> <td>5 h/month</td> <td>80%</td> <td>1 /month</td> </tr> </tbody> </table>																		1	2	3	4	5	6	7	8	9	Absolute value	2,1	4,0	5,0	7,7	7,7	3,8	3,8	7,1	6,9	Relative Value	4,39%	8,32%	10,37%	16,08%	16,08%	7,85%	7,85%	14,76%	14,32%	Our Company	3 h	1 Day	30%	18 min	170 °C	200 uni	4h/month	60%	1Day/year	Product Company X										Product Company Y										Performance Targets	1 h	4 h	60%	15 min	187 °C	200 uni	5 h/month	80%	1 /month
	1	2	3	4	5	6	7	8	9																																																																													
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											Total	48,1																																																																										
											Total	100%																																																																										

Figure 2. Quality Matrix. Source: the author.

The results were:

The French Bread should have Texture (Crunchy, be soft and fresh) with 36.66%, then the price with 23.43%, the size (50g) with 21.11% and the golden color with 18.77% according to figure 3

Required Quality Table		Value			
Level I	Level II	Absolute value	Relative value		
Characteristics of French Bread	Cheap			8,00	23,46%
	Standard size 50 grams			7,20	21,11%
	Gold color			6,40	18,77%
	Texture (crispy, mashed and fresh)			12,50	36,66%
Total		34,10	100,00%		

Figure 3 - Customer Requirements for French Bread Characteristics. Source: the author.

Based on customer requirements, the quality matrix presents the projected quality: it is necessary to draw up an improvement plan for the technical characteristics of the product, according to figure 4.

QUALITY CHARACTERISTICS										
		Oven Idle (hours)	Exposure time of products ready (hours)	Flavor of the dough	Time to Bake	Oven Temperature	Amount of French bread per baked	Oven Maintenance	Quality of raw material used	Baker's Training
Projected Quality	Absolute weight	2,1	4,0	5,0	7,7	7,7	3,8	3,8	7,1	6,9
	Relative Weight	4,39%	8,32%	10,37%	16,08%	16,08%	7,85%	7,85%	14,76%	14,32%
	Our company	3 h	1 Day	30%	18 min	170 °C	200 uni	4 h/month	60%	1 day/year
	Performance Goals	1 h	4 h	60%	15 min	187 °C	200 uni	5 h/month	80%	1 /month

Figure 4 – Projected Quality. Source: the author.

To put the projected quality into practice it was necessary to make improvements and some changes in the process:

- The bread will only be placed in the oven to roast as it exits. Decreasing the exposure time of the product (Fresh products).
- The Flavor of the pasta is directly linked to the quality of the raw material, so with the help of a Baking Technician, we internally develop a mixture using special type flour and type 1 flour on the market, reducing the cost of the raw material consecutively. sell a product with a more affordable price and with more quality (Crunchiness, Softness, Price).
- Standardization of the baking time and oven temperature (Gold color).
- Preventive maintenance of the furnace
- For these requirements to be maintained, there is training for employees every month.

After the improvements made in the company in the month of June, it is observed that the production had an increment reflecting the higher consumption of the customers, meeting the requirements of the demanded quality, according to figure 5.

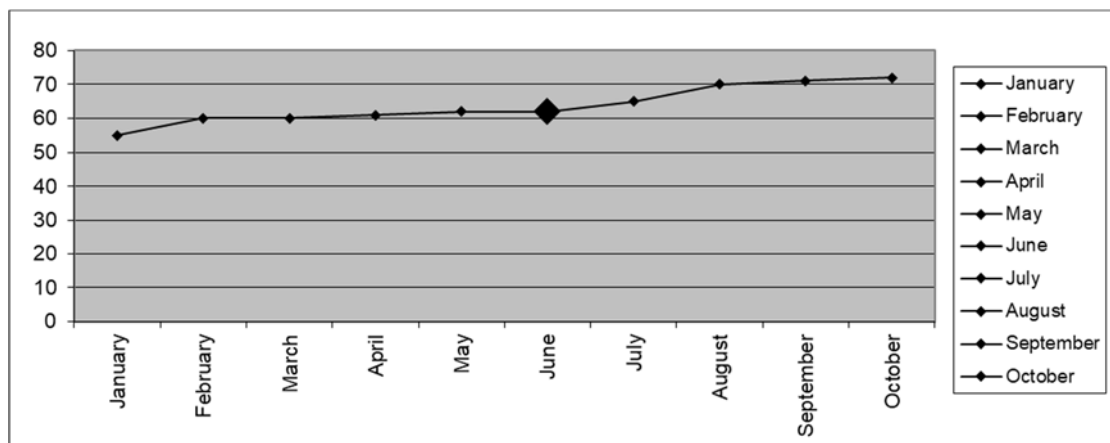


Figure 5 – QFD Application Result Source: the author.

5 CONCLUSION

The use of QFD as a tool for improvement in this work presented positive results, allowing the clients' needs to be met.

It was possible that the company could perceive what the real needs of the customers are, what they consider to be of greater importance in the products and services rendered and what they consider to be inherent.

It also gave us the opportunity to develop a raw material that would help improve product quality at lower cost.

The application of QFD had an effect on the production of the company with an increase of around 7.7% in July, an increase of approximately 11,100 loaves per month.

The waste of products was relevant, once the quality demanded by customers was known, there were days when the main product, the French bread finished before the time, and it is necessary to make a well defined production schedule.

The self-esteem of the employees also increased, therefore, the company invested in standardized uniforms and also for participating in monthly trainings.

The furnace's idleness was controlled by adding other products with a higher profit margin, the preventive maintenance of the furnace also contributed to the better functioning of the furnace.

The standardization of the temperature and time of baking the French bread gave the company greater productivity, we were able to bake more French bread in less time. Before 668 breads per hour currently 800 breads per hour, an average increase of 20%.

QFD is a tool that requires time to collect and process the data obtained through the research, in order to obtain the clients' needs. In order for the application of QFD to be effective, it is important for the implementation team to be thoroughly familiar with how the research is done, knowing its details, and the knowledge required in the practice of QFD. The quality of services can also be improved because the technique allows us to deploy customer wishes and needs into items that can be standardized and improved, thus increasing the quantity and quality of products and / or services.

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