

A contribution for the QFD implementation as a tool to identify the market real necessities

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Abstract. *High levels of competition in both economic and industrial fields, make all companies worldwide to search for new methodologies that ensure them to survive and growth in the market. An advantage has been guaranteed against the competitors when companies identify the customers necessities and then develop successful products The Quality Function Deployment is a method for quality improvement in the development of products, and able to allow competitive advantages for the companies The QFD consists in translate the necessities and desires of the customers into parameters of project. In Brazil, the implementation of the method is increasing, because of its advantages and benefits, however, only a little more then 18% of the Brazilian companies use such a method. Some of the difficulties reported by the companies are: lack of experience dealing with the method, lack of training and compromising of the QFD team, difficulties in attributing weight and interpreting both the requirements of the customers and the results, to list and define the customer voices, , carry out efficient market research, among others. This work aims to make a discussion about the factors and parameters that cause the difficulties of implementation as well as the strategies for the success in the implementation of the method as a tool for the development of new products.*

Keywords: *QFD, development of products, marketing research*

1. INTRODUCTION

As a result to the growth of Japanese industry in the 60s, there was a need to create a method to implement the quality of the products launched at that time, mainly in the automobile industry. However, the industries showed problems to reach such a goal and they searched for solutions in Yoji Akao and Shigeru Mizuno's studies that later would give origin to the *Quality Function Deployment Method* or "QFD", created to help the product developing management process (Akao, 1996).

As the world was becoming a more competitive place and the benefits generated by the "QFD" were becoming more evident, its use got expanded to many different nations in the 80s, such as the US and many others in Europe, reaching Brazil in the 90s (Akao, 1996).

The "QFD" method is used to assist the customer's needs, changing them into project parameters and, after that, in products and services. It searches, translate and transmit the customer's needs and desires, looking for great quality since the beginning of the process (Cheng, 1995).

Currently, as the politics field as well as the economic and industrial ones, got really competitive, companies from all over the world are given the chance to think about methodologies that lead them to survive. And the only way for the companies to survive in this very selective global market is to sell their products and services and competitiveness is the main key which has to be pursued by companies from all different sectors. The company has to consider its clients as a priority aim, because it's up to them the survival of a product in the market. It means, the products and services offered by companies worldwide have to agree with the customers' needs. They have to work for this purpose. The identification of customers' needs and the capacity of changing them into products, give the company a certain advantage in relation to its opponents (Cheng, 1995).

The "QFD" is a method used to develop products in accordance with the real customer's needs. It's not about "guessing", or "deducting" the more appropriate company to develop a certain kind of product that matches the different customers' demands.

The literature shows us the main reasons that lead companies to implement the use of "QFD": to improve the product developing process; to take decisions based on knowledge (through method studies); to increase customers' satisfaction through identifying and interpreting clients' needs and change them into something useful to the project; to become a leader in products development; to develop a product that might be useful to its different markets around the globe; to clarify the relationship between quality characteristics and productive processes and its effects on the final product; to take the knowledge involved in products development to all different sectors; divisions and employees from the company; to contribute to the product quality and to decrease projects risks (Carnevali & Miguel, 2003) (Miguel & Carpinetti, 1999).

Among the benefits and advantages about the use of "QFD" found in specific literature we have: improvement in the relationship and communication between departments and workplace in general, improvement in terms of quality and reliability of teams, decreasing in the number of modifications on the project and the length of work spent on it, decreasing in the number of alterations on the final product (after launching), decreasing in the number of complaints,

decreasing the final cost, improvement on the final price, identifying the engineering bottle mouths, increasing customers' satisfaction levels, building database generated by "QFD" and enforcement simultaneous engineering practices. (Cheng, 1995; Ohfujii, 1997; Costa, 1999; Damante, 1997; Miguel, 1999).

Although companies are now having great results, according to the beginning expectations, there are still so many obstacles to be overcome in terms of the usage of "QFD" and only 18% of the Brazilian companies use the method. In Brazil, around 25% of the companies used to use "QFD" and they interrupted its use for many different reasons, such as: expectations weren't being reached, implementation problems, deficient or inadequate application, lack of manager support, insufficient training and others (Carnevali, 2002). As a consequence to the recent use in our country, there is a need for more advanced studies about "QFD" and mainly about the difficulties found in order to expand its use and, as a consequence, its benefits. This paper aims to cite the problems and try to find a better way to solve or, at least, minimize them, increasing the impact upon the customers' needs and expectations. A brief discussion will be presented about the difficulties encountered in three case studies, and what was done to circumvent them.

2. DIFFICULTIES ON QFD IMPLEMENTATION

In specific literature we can find several examples of problems found by companies in our country related to the use of "QFD". On the following lines the main problems and the best way to solve them.

The lack of commitment from the members and the task of dealing with a multifunctional team is a barrier found on "QFD" implementation (Miguel & Carpinetti, 1999).

Work group or team work aggregates information and experience from different fields. The decisions are to be made together, as the result of a common sense discussion and not from only one person's desire. Miguel (2001). The main characteristics of a "QFD" team are: technical competence and knowledge, belonging department, team work done as a simple thing, great level of motivation and companionship from each single member of the team (Cheng, 2005).

There is no exact number of members for a team, the number varies according to the stage, the essential is that all members are capable of developing the necessary work functions (Cheng). The "QFD" teams in Brazil have around 4 to 7 members and the average general number is 6 members in a team. Work teams with less than 4 members are considered too small and it might cause problems such as work and task division and also accumulation and delay in having the tasks done. Work teams with more than 7 members are considered too big and it also might generate problems such as bigger discussions and conflicts (Ohfujii, 1997).

It is important that the leader of the work group inspire authority and take responsibility for the groups' results as well as for the possible failures. He has to clearly assign members' responsibilities, emphasizing the participation of the only necessary people to do the task (Carnevali, 2008). When the leader shows he knows how to deal with conflict situations he influences the group common sense at all, improving task development and consequently enhancing the other members' commitment with the team (Guimarães, 2003).

According to Miguel (2003), Lowe & Ridgway (2000), Martins & Aspinwall, (2001), Ginn & Zairi (2005), Carnevali (2008), working with multidisciplinary teams requires a lot of movement towards integration and commitment, minimizing conflicts and the lack of common sense. This very kind of group gains in knowledge, helping to develop a conceptual model a bit more applied and stronger.

To define the conceptual model, taking in consideration the main function of reaching the project's objectives, it's necessary to analyze industry characteristics and product and process as well. The conceptual model must be formed by basis which agree with the customers' ones. It is defined how many and what the basis are, the distribution and the sequence have to be done very appropriately to achieve the project's goals (Cheng, 2005).

Another obstacle found is to list and define the customer's voice, identifying his needs and keep these parameters. The exploration of the communication's channels with the customers is absolutely essential. Companies can get customers' requests through interview, observation, information given by sales and complaint letters, it means, internal and external information. Knowing what to and how to ask, and, lately, interpret the answers and analyze subjective data in a very adequate way makes it possible to identify very efficiently the customers' needs and select the most relevant information. To make a good market research it is necessary to have the necessary tools to define the best data sample to the research (Miguel & Carpinetti, 1999).

The main difficulties to elaborate the quality basis are related to the definition of the projected quality, working on correlations, interpreting customers' requests and identifying the most important requirements. Working with huge database has been a great trouble and it is also time consuming. It is necessary research to optimize its application and, consequently, extend its use (Miguel & Carpinetti, 1999). According to Cheng (2003) it's recommended not to follow as a rule the elaboration of charts and database from "QFD" found in specific literature, only as examples. Research can be done in all possibilities of solution, assessing the different examples displayed to improve the "QFD". Doing that it's possible to identify the best solution to solve the problems in elaborating great quality database. Huge database might maximize the difficulties, demanding more time to make them work and to define the projected quality. Small database might influence the effectiveness of the project.

In Japan it usually takes two years for the “QFD” to be systematized by companies and other six years for the method to be really assimilated as a continuous practice. So, more elaborate results may be only observed after the two first years of systematization of the “QFD” (Cheng, 2005).

According to Ross (1999) “The simplified QFD process” or “The Streamlined QFD process” created by the American GM makes it possible for the company to run a critical analysis to identify the requests and the parameters from the most important qualities and only these will become part of the database. Then, it’s possible to reduce database size and, as a result, the method’s application time (Miguel & Carpinetti, 1999).

“QFD” generates significant structural and procedure changes, it means, the management team support is something essential for the “QFD” to be successful (Cheng, 2005).

“QFD” training can also be considered something essential for the project to be successful. According to Cheng (1995) the training length should be seven days for the team members and six hours for the ones involved indirectly in the process for them to have a basic knowledge of the subject. Having a shorter training might contribute to problems in implementing the process for lacking QFD experience.

Communication among the ones involved is really important too. To reduce the trouble impact of transferring information from the development to production, the huge database generated by the method should be presented in a very clear and organized way. The commitment and the collaboration of all sectors and departments towards customers’ benefit clarify doubts about the necessary parameters and identify the requested quality, making the project better. The more they communicate and contribute to each other the more knowledge they would have about the project (Cheng, 1995).

Assessing “QFD” implementation is important to identify if the investment on the project brought the expected results, as well as assessing the cost to verify if it’s worth doing. It’s possible to monitor all “QFD” stages using the database through a seasonal evaluation and not only at the end of the process. The companies which don’t get the expected results cannot show either positive or negative results from the “QFD” method (Lowe & Ridgway, 2000). There are two different kinds of results that might be analyzed the execution application group and the afterwards generated benefits group, serving the managers demands that expect to obtain operational improvement with the “QFD” (Carnevalli, 2008).

After the product is launched or the service is offered it’s important to verify the customers’ satisfaction, because it helps to assess the benefits generated by the “QFD”. This can be done by surveys, interviews and others (Cheng, 2005).

Table1: The Difficulties found in QFD and each possible solutions

Difficulties	Possible Solutions				
Work with a multidisciplinary group	Make decisions together	Stimulate motivation	Stimulate technical competence and knowledge	All members have to be capable of developing their work functions	A good leader of the group
Define the conceptual model	Analyze industry characteristics and product and process	Reach the project’s objectives	Formed by basis that agree with the costumers one’s		
Define the customer’s voice	Identify his needs and keep these parameters	Exploration of the communication’s channels	Knowing what to and how to ask	Interpret the answers and analyze subjective data	Define the best data sample to the research
Elaborate the quality basis	Definition of the projected quality and Working on correlations	Interpreting the and use the most important customers’ requests	Assess the different examples displayed to improve the “QFD”	Use the best solution to solve the problems in elaborating quality database	
Structural and procedure changes	Management team support				
Problems in implementing the process	QFD training				

Communication among the ones involved in the project	Database presented in a very clear and organized way	Commitment and the collaboration of all sectors and departments	More communication and contribution between the group		
Assess the benefits generated by the “QFD” and the investment	Monitor all “QFD” using the database through a seasonal evaluation	Verify the customers’ satisfaction			

3. STUDY CASE

3.1 First Study Case

In a study case ran with an industrial company it became clear that, in comparison to its market opponents, they have quality products and services in many different aspects. The reliability and durability of its products were a lot higher than the ones from its opponents and its assistance was efficient and quick, being available for clients all over the world and solving their requests up to 48 hours after the request. The unique characteristics of the product were exactly the ones expected by customers. The “QFD”, in this case, was looking for new customers’ demands, involving all departments from that company: advertising, finances, identifying the role of each one of them and also trying to bring something new to the market in terms of quality. Then, market research, monitoring the costs of the innovation plan and altering the producing process were all connected. It could be seen the importance of communication and group work in that company in order to minimize the struggle generated by the lack of interaction about the project (Santos & Pires, 1999).

3.2 Second Study Case

When using the “QFD” method in an engineering school library, the customers were chosen very carefully, because an incomplete or mistaken selection would have given distortion on the results.

To get to the customers’ view, it was used surveys and they followed Albrecht & Bradford’s (1992) theory: “you have to be inside your customer’s head and see your own company the way he sees it, not the way you see that or, at least, think it is” (p.19). So, some considerations were made to effectively decide what the best way to capture customers’ thoughts was and what they really wanted from the company. Then all the information could be organized and used taking into consideration their importance and priorities. The quality items demanded (most of the time subjective) were analyzed according to their importance and quality characteristics.

It was necessary to rethink some of the parameters to better improve them, aiming the total and complete acceptance of the clients’ needs.

The authors considered important for the project to be successful the correct interpretation by the QFD members of the information obtained from the survey, identifying information that could be key points to develop a great project, translating the customers’ voices into technical language (Ferreira, 1997).

3.3 Third Study Case

Another case study found in the specific literature shows the QFD use in the field of services (Bastidas, 2001). According to Denton (1990) some companies see the QFD method from a different perspective, when applied to the field of services, not considering the “service” as a product itself. A way to get results and increase competition is to differ in the market what is product quality and what is service quality.

According to Denton (1990) for someone really to get great quality services it is necessary a cultural changing as well as a perception changing inside the organization. If the board directors and executives don’t change the service philosophy into something useful and a synonym of quality, it’s hard to implement other changes. Customers’ satisfaction occurs when the company emphasizes all its strength into offering great quality services, changing into product what the advertising department promises. And for that to happen, it is necessary to understand who the clients are and what they really need. Training and motivation are essential to help the employees to understand their role in this developing customers’ satisfaction process.

To measure customers’ perception about the service quality, the authors used surveys regarding the following dimensions: competence, courtesy, credibility, security, access, communication and understanding the client, empathy, tangibility, reliability (Bastidas, 2001).

The main goal on the service surveys covered by this study case was to identify the most important services for each segment of clients and group them under the same category. This grouping allows the companies to segment the market and offer specialties for each different group. For this purpose the “QFD” method may be used to get to know the customers’ requests a bit better (Bastidas, 2001).

It was realized, by the results presented, that the team members showed a common understanding about the decisions, their reasons and implications and they also became more committed with initiatives whose main objective was to implement the decisions which were taken collectively. The “QFD” team was made by members who were directly linked to the service, with good knowledge about the possible costumers’ needs. They were: operational manager, marketing people, quantity surveyors, drivers and assistants.

It was also seen that it is necessary to adapt the quality consensus in order to build a conceptual model which cover all different market sectors.

The importance of customers’ requirements is defined by the client himself and they were obtained using the results of multiple choice surveys. The degree of importance was given according to parameters previously discussed with the group based on the results from the surveys.

On this study, it was also evident that it’s extremely important the direct involvement and participation of all executive board managers of the project, mainly in reorganizing people, physical layout and finances.

Having the customers’ voice as a starting point, the “QFD” allowed the identification of the most important items, besides it became easier to understand the involved aspects on the load transporting services, it got more objective the comparison with the opponents and also established an action plan for this important requirement.

4. CONCLUSIONS

The QFD, which seeks to incorporate the development of products or services to fully meet the needs explicit, implicit, current and future of the customers in a rapidly and effectively way.

Among the difficulties about the use of “QFD” found in specific literature, the most importants are: work with a multidisciplinary group, define the conceptual model, define the costumer’s voice, elaborate the quality basis, structural and procedure changes, problems in implementing the process, communication among the ones involved in the project, identify the investment on the project and assess the benefits generated by the “QFD”.

Discriminate and analyze the difficulties in applying the method solves them and seek the best possible way, influence the results and in view of the entire team of project that works with QFD. The reduction of the difficulties may lead to greater adherence of the companies to use the method, bringing many benefits to this since, will serve costumers in a satisfactory way.

According to Cheng (2003) the results of a project for development of product are the result of the use together of various techniques and methods used efficiently so that the method could have achieved the initial objectives.

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