

## LINKING MARKETING AND MANUFACTURING STRATEGIES: UNIFYING APPROACH USING QFD

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### **Abstract**

The success of any product depends essentially on the response of this products to customer expectations. The companies that accurately respond to consumer needs take a crucial market leadership in an environmental characterized for high competitive, resulting from high variability of products and processes. Marketing and manufacturing strategies provide a way to obtain basic and important information about customer's expectations and incorporate them into a finished product. A coincidence in objectives for both strategies would permit to warranty a better translation of customer needs as QFD approach require. This paper deals with different variables to be considered when constructing a QFD strategy using advantages of both manufacturing and marketing issues.

### **Keywords**

Manufacturing strategies, marketing strategies, new product development, Quality Function Deployment

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## Introduction

The relationship between marketing and manufacturing has always being a polemic one within the majority of the organizations. The need for an effective interface that allows both departments to talk the same language is determinant in order to work together for achieving the same objective: increase the customer satisfaction [9]. Philosophies such as Total Quality Management and Market orientation should be joined so that the company becomes an integrated and strong organization that can create better and more competitive advantages. [18]

To achieve a competitive advantage, marketing strategy and manufacturing strategy should be interlinked and be incorporated in corporate strategy [26]. When companies fail to recognize the relationship between manufacturing strategy and corporate strategy, they may become saddled with non-competitive production systems, which are expensive and time consuming. In the current competitive scenario, manufacturing strategy and marketing strategy must be only one and this assumes a significant importance and calls for serious research attention [11]. While some organizations have attempted to build competitive advantage by focusing on efficiency and productivity, these efforts usually lead to only modest improvements are easily copied [26].

The new markets demands and competitive trends require that the communication among manufacturers, distribution centers, retailers, and customers be clear and quick. To satisfy these new challenges, it is necessary to have effective and appropriate marketing and manufacturing strategies defined under the same goals and objectives [19].

The continuous changes that are affecting the current business environment due to the globalization process and the technology innovations encourage organizations to pursue competitive advantages in order to maintain and improve their position in current markets. As this decade progresses, it will become increasingly clear that economic conditions dictate the involvement of all company fields in the crusade for quality improvement, factors such as stronger quality competition and more knowledgeable customers are determinant in the need for faster respond to customers' needs and requirements [5].

Global competition has forced many companies to operate on the basis of cost efficiency, customer service, response time and superior quality in order to achieve customer satisfaction [10]. Therefore, firms must develop integrated strategies that link the various departments and divisions in order to respond as a whole stronger network to the market, rather than small weaker independent parts working for their own benefits.

A very common situation presented in large, medium and small companies is the continuous problem of each department trying to achieve its own objectives and goals, [12]. But the fact is that they don't realize how damaged is this behavior to the organization's objectives. If each department works for its own interests, then, there is going to be a moment when this pulling system is going to break and all the separate units are going to be unsuccessful in their organization's goal achievement of being competitive in the market place. There are four

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different departments that are essential for achieving customer satisfaction, because they are directly involved in product and service development, these departments are marketing, manufacturing, sales (delivery) and design. There must be a link between them in order to develop products and services focused on the customer, [16].

The product/service development process starts with the customer (acquiring information) and ends with the customer (delivering product/service and obtaining feedback). This process should be developed as a project performed by a cross-functional team, which would include people from different departments in the organization [20]. The firm must ask the customers their needs, requirements and it also must find out areas of opportunities for new needs or requirements. Therefore, marketing and sales must obtain reliable information from the customer and share it with the rest of the organization [13]. In this case, design uses marketing information in order to design the products or the services that accomplish the marketing requirements, but it must also consider manufacturing so that the new design is feasible for the manufacturing facilities and capabilities [19].

According to [25] marketing and sales departments, historically, are two fields largely overlooked by the quality movement. Similarly, both disciplines have been largely unaware of the technical aspects of the quality movement. For instance, marketing defined its domain as series of tasks performed out of factory gate whereas quality defined its domain as conformance of different parts, sub-assemblies, and finished products to design and manufacturing specifications. Marketing concerns about distribution issues and quality focus on only design specifications have provided little common ground between the two disciplines, [29].

After the Second World War, quality control people began to be concerned about conformance to customer requirements and marketing people began to be concerned about the importance of customer input to product design knowledge of manufacturing issues. At this moment, the convergence of the two disciplines became essential and the importance of a framework for manufacturing and marketing strategies came out. A clear example of the importance of marketing in process improvement is given by the fact that the ISO· 9000 series (ISO· 9004) considers marketing as an important element in the development of the quality strategy. [20].

Successful companies have showed that an adequate congruency of marketing and manufacturing strategies is the key for successful industries, good examples are IBM, Microsoft and General Motors. These congruent strategies provide the consideration of processes, materials, human resources, machine in conjunction with customer expectations and market considerations [13]. Many approaches have been proposed for manufacturing but few systematic methodologies have been developed ([17], [28]).

For sustainable increases in market share and profitability, companies are focusing on improving product development practices [6]; [8].

Quality Function Deployment (QFD) provides an excellent mechanism for integrating the important concepts and linking these strategies, [9].

Quality Function Deployment (QFD) is a means for making easy the communication between the departments so that the firm can perform an effective and efficient product or service development process, [1]. Quality function Deployment (QFD) has been heralded as an important part of the product development process [22]. QFD facilitates the growth and prosperity of a firm by developing an array of products that are attractive to existing and new customers ([1]; [7]; [14]). It also helps organizations to develop customer-oriented products and services [30]. This methodology enhances the firm's competitiveness and develops the fundamental base to maintain satisfied customers [16].

As stated by Akao [1], QFD can be defined as a system for translating customer requirements into appropriate company requirements at each stage from research and product development to engineering and manufacturing to marketing/sales and distribution. As can be seen QFD is a natural link between manufacturing and marketing activities. However, QFD does not include all activities required for product or service development, but it can facilitate the translation of the customers' needs, wants and requirements to the technical requirements of the product or service. This process is performed by the use of different matrixes where the output of the previous one becomes the input of the next one.

QFD spans the entire cycle from concept of a product or service to the launch and delivery. That is, from customer research and product development to engineering and manufacturing, to marketing, sales and distribution. Every phase requires an objective or target setting, development and validation. QFD structures the New Product Development (NPD) process so that teams focus on the needs of customers throughout the development cycle. The main success factor in QFD is that the voice of the customer guides the product or service design.

### **The Customer Voice tool, as a Marketing Strategy**

In the marketing literature, a number of improvement marketing actions have been proposed considering the market entry process as one consisting pre-entry, introduction and post-entry, but only a few papers have considered total quality tools, in order to increase the impact of the marketing strategy, [17]. Sometimes, the customer information is lost through the system. When this situation happen the right translation into manufacturing requirements can be wrong. Getting incorrect results or requirements for the product, therefore, is very important to know the consumer expectation with reliable information, and the marketing area has some tools for this job. ([20]; [19] ; [3]; [31] ).

Marketing is a process that takes customer input (tastes, shapes, design, use, availability, service, etc.) and translates it to manufacturing operations in order to produce products which satisfy that input ([20]; [1]; [7]). Similar when we use the Quality Function Deployment (QFD), the customer voice is the most important element in order to design and produce products and services according the customer's desires. Marketing, however, means not only consumer expectations but also accomplishment of standard. Here, it is important to introduce the marketing orientation concept as a cornerstone of the marketing discipline. Two teams of researchers Kohli and Jaworski [18] and Narver and Slater [24] introduced the term market

orientation to mean the implementation of the marketing concept. Hence, a market – oriented organization is one whose actions are consistent with the marketing concept (Kohli and Jaworski, [18]). According to Kohli and Jaworski [18]) “Market orientation is the organization wide generalization of market intelligence pertaining the current and future customer needs, dissemination of the intelligence across departments, and organization wide responsiveness to it”.

In defining the conceptual domain of market orientation have been identified three behavioral components: (1) customer orientation, which involves understanding target buyers now and over time in order to create superior value for them;(2) competitor orientation, which involves acquiring information on existing and potential competitors, understanding the short term strengths and weaknesses and long-term capabilities of both the key current and potential competitors; and (3) inter-functional coordination, which is the coordinated use of resources in creating superior value for target customers.

Being market oriented implies delivering products and services valued by consumers, usually accomplished through (1) ongoing monitoring of market conditions and (2) adaptation of organizational responses ( Narver and Slater [24]).

Market Orientation is indeed a learning process in which organizations learn from all aspects of their environment, including customers and competitors, and take both short and long term organizational goals in consideration (Kohli and Jaworski [18]).

In our study we tried to reduce the traditional marketing and manufacturing conflict through communications and improvement tool like Quality Function Deployment (QFD), aligning the interest of both to customer satisfaction through a QFD approach.

In the current markets, customers require constant changes in product design which amply the use of new materials, the development of new styles, and sometimes the development of new processes. Therefore, the company needs to anticipate these unexpected situations and establish the best strategy in the manufacturing processes in order to satisfy economically these requirements and produce products and services with high quality, competitive, prices, and quick delivery. The combination of marketing and manufacturing strategies should involve the entire process form product development to the ultimate consumer sale.

Marketing activities should start with the clear understanding of the organization mission and objectives. This understanding provides marketing management direction and combined with manufacturing processes warranties a successful end. Figure 1 shows the most important variables that marketing should consider.

(See Figure 1).

As can be seen in Figure 1 the combination of factors such as service, process, management, and market with the marketing components ( promotion, product, price ,and distribution ) permit to link all the elements about the product or given process. The dynamic of this marketing circle incorporate all the possible roads for the identification, execution, interpolation, and satisfaction

of customer expectation. The analysis of this marketing circle permit to visualize strategic fields for the administration to find better routes in the operational costs reduction without losing the sight consumer expectations and satisfactory fulfillment of quality standards. This process assures competitive levels of quality, low cost, and high productivity levels since it considers a great variety of important factors in labor of marketing. When top and middle management in an industry want to define a marketing strategy, they must base their ideas on the fact that customer satisfaction is the key to profitability in any industry. This is the most important reason that an adequate management tool must be used in order to generate the customer feedback. This action must be based on the search of the best combination of quality features such as style, color, size, price, value, comfort, and overall appearance. One important factor to consider is that in a process of product development and manufacturing, there are many departments involved such that they can be seen like a chain of customers. This chain is identified by the different stages of product development from the point of conception through design, manufacturing, sales, distribution, and use. It is the end - user, however, who judges the value of new or improved products.

To satisfy the broad of expending desirable exchanges, the marketing manager is responsible for the development and management of marketing strategies. Specifically, marketing strategy encompasses the selection and analysis of a target market and creates and maintains an appropriate marketing mix that satisfy that target market. A marketing strategy enunciates a plan for the best use of the organization resources and plans the tactics to meet its objectives.

When marketing managers attempt to develop and manage marketing activities, they must deal with two broad sets of variables: those related to the marketing mix and those that make up the manufacturing environment. The components of the marketing mix are product, distribution, promotion, and price and over them an organization must have control. In this perspective, a marketing strategy should consider these four components. Figure 2 shows these components in the marketing strategy. A manufacturing environment based on the customer voice or marketing strategy should consider aspects of product design, requirements, and standards in order to obtain the best product using the best processes.

A manufacturing environment includes the design of facilities and the selection of the most adequate machines, human resources, tools and materials which are able to meet product design requirements. The goal is that every workstation in the manufacturing system must satisfy production goals based on customer expectations.

(See Figure 2).

The marketing strategy should be defined with basis on three areas: strategic plan, strategy of development, and strategy of control. A strategic plan ensures a strong relationships among what to produce, how to produce it, and when to produce it. Each of these points must be related with the customer's expectations, in order to translate it and produce an added value to the customer and satisfy their expectations.

Figure 3 shows the some important components of a strategic plan. When everybody knows what the mission is and what the company objectives are, a better communication channel among all

departments of the company arises. A strategy of development combines marketing and company objectives in order to design a marketing plan, which considers the most important aspects shown in Figure 3. Another important component of this strategy is the execution of financial, marketing, and quality analyses in order to compare them with the competitors and so evaluating the current state of the organization. These analyze permit not only to understand competitor strategy but also to design a better alternative to meet customer needs.

(See Figure 3).

A strategy of control consists of the generation of information in order to compare product development policies with the corresponding ones of the best competitor (benchmarking). In this part of the marketing strategy, Research and Development (R& D) plays a very important role because new approaches solve old problems and improve current system.

In this part of the strategy, it is necessary to control goals and final results in order to check constantly the meeting of consumer expectations. As can you seen, when we tank about marketing strategy, we are taking about customer's expectations, and customer's expectations is QFD, the best way to translate expectations on manufacturing requirements.

### **Manufacturing Strategy, the way to satisfy the customer expectations**

The development and implementation of a manufacturing strategy in the industry requires a clear definition of company goals, objectives, planning procedures, and market segment. Macbeth [23] states that a manufacturing strategy company aims to gain advantages over its competitors.

The purpose of any strategic evaluation of a business is to identify those few major factors and variables, seen from the perspective of the customers, which positively discriminate in favor of the business [20]. Here we can find the link between manufacturing and customer expectation or marketing strategy. We have to remember that the consumer, after all, is who judges product success or failure. A competitive advantage is defined by those features, which the company supplies in a special fashion to which the competitors cannot immediately compete with. It could be any combination of the various items, which make up the mix of components and constitute the product, the delivery system, and the cost.

In order to facilitate the decision making process, it is necessary to translate the competitive advantage statement into a definition of what manufacturing has to do to support the desired strategy. In this way, the predominance of the customer voice is guaranteed and others can recognize the implications of the manufacturing process and infrastructure decisions in the company.

The other important thing is to identify those factors and variables, which allow the product to capture ahead orders in the market. In any manufacturing company, this identification gives an important advantage because quality features, in many cases, change constantly and manufactures need to have means to constantly investigate these changes.

In the development and implementation of an adequate manufacturing strategy, two important aspects must be considered; financial support and strategic plan of the company. This means that



before enrolled in the challenge of new and advanced technologies, a study to know the financial support that permit the implementation should be developed. A manufacturing strategy must be supported by the knowledge and understanding of all people in the company. This road includes some of the different programs and techniques that should be considered for implementation prior to the development of the manufacturing strategy.

The other fundamental aspect in the development of a manufacturing strategy is connection to the goals, objectives and general planning of the company, this is the same road that the marketing strategy. This means that the productivity of the company should have a complete relationship in order to satisfy the final expectations of the consumer. Figure 4 shows the principal activities needed to develop a manufacturing strategy.

(See Figure 4)

A manufacturing strategy must be based on two strong supports: the technical support and the managerial effort (see Figure 4). These aspects provide the opportunity to build a model based on the understanding and communication of all system components. Technical support considers aspects such as production organization, operational costs, standard requirements, production planning and control, quality inspection programs, and inventory levels.

This technical support plays an important role since this is the base of the organization to participate with success in the market. This support has two important components: infrastructure and training and education. Both are of vital importance in the design and the knowledge base to manufacture the product.

The managerial effort should be an important source of support for production with the objective of fulfilling not only customer expectations but also requirements and production standards of products and processes. Knowledge about market conditions, competence positions, and customer requirements must be incorporated into the manufacturing processes.

Figure 4 shows a manufacturing strategy in three traditional stages of planning, implementation, and control. The first stage consists of the knowledge and definition of goals and objectives in addition to limitations that the organization has. In production planning, resources (materials, machines and labor) are selected to accomplish the demand of a specific product design delimited by the marketing strategy. Implementation and control are in charge of monitoring that the manufacturing processes achieve the goals of customer satisfaction stated in the marketing strategy through the accomplishment of the goals defined in production planning. This stage must identify those characteristics that permit to relate management aspects such as sales, marketing, financial expenses, distribution, and customer service.

The development of a strategic plan is the stage where management and technical support must be joined and both planning and goals bound through the objectives defined to satisfy the consumer expectations.

Table 1 shows the degree of involvement of different departments to the implementation of special manufacturing techniques. This is very important because it shows how useful is that

everybody in the organization knows about the advantages and disadvantages of implementing new manufacturing techniques. For example, implementation of the Just in Time philosophy is not only important for manufacturing and engineering but also for other departments in the organization. Marketing, for instance, must be familiar with the manufacturing process and how a product is assembled. In distribution, it is important because this department will design routes according to manufacturing planning and schedules to deliver the product on time.

(See Table 1).

Finally, a strategy for quality planning is an important component of a manufacturing strategy. Description and analyzes of data and results must be done frequently. This strategy of quality must generate plans for product quality assurance and services, customer satisfaction measurements, and analyzes of supplier materials. Another important requirement of a manufacturing strategy is flexibility. The industry receives sometimes rush and customer special orders that may cause delays. These orders may also cause new and frequents set ups, models redesigns, production changes, and additional suppliers and materials. Manufacturing flexibility permit a faster response to these situations.

### **Congruency in marketing and manufacturing strategies through QFD**

A close relationship among the strategic plan, the manufacturing strategy, and the marketing strategy must exist. This will make possible for the company to know the procedures to accomplish the activities needed to satisfy customer expectations and gain market advantages for the product using Quality Function Deployment as a tool which can translate the customer expectation as a product or process part. An approach considering elements of marketing, planning, and manufacturing gives a better idea about customer expectations and needs.

The congruency of the different strategies will provide a complete improvement system. As a result of these congruent marketing and manufacturing strategies, a circle of improvement for the system arises. This improvement cycle considers all variables and factors to design, plan, do, and control any process and any product so satisfying consumer expectations and any goals.

A continuous improvement strategy, which should be effective and efficient, must considers all factors concerning to marketing, manufacturing and planning. Inside these factors are company goals and market objectives. The search of information about customer expectations in order to handle them according to a structured and planned manufacturing strategy is imperative. Faster response to faster changes is a good initiative in any manufacturing system.

Figure 5 shows the first step in an improvement strategy where manufacturing and marketing strategies play a critical role in order of satisfy the customer expectations. This Figure presents the components of the marketing strategy. The improvement strategy, which is the link between both strategies, is based on the congruency between the components of each strategy. This information can be necessary in order to use the Quality Function Deployment tool.

There are several important factors in an improvement strategy such as quality assurance, manufacturing planning, and control of system and work force that must have a relationship with

marketing process. In an improvement strategy factors such as capacity planning, process, technology, materials management, master production scheduling, distribution management, production planning, inventory control, purchasing, supplier relationship, process planning, product planning, quality management, production organization, organizational development, work force organization, and the department inter functionality are very important for the accomplishment of requirements and standards established in the planning stage and, obviously for the success of the company in the market.

(See Figure 5).

Overall, the base for a good link between the manufacturing strategy and the marketing strategy, is commitment to work together in the organization, accomplishing goals and improvement in every step or the process, at the management level and at the relationship with suppliers and customers. The final design, analysis, and implementation of an improvement strategy is critical to the success of any manufacturing. Figure 6 shows the QFD planning matrix which permits translate customer's need on technical requirements, this study permit to analyze in detail all the variables involved in the manufacturing and market systems. An improvement strategy should consider aspects to develop potential advantages not only marketing and manufacturing factors but also for organizational and management matters. Before the strategic analysis is done, it is necessary to know if any manufacturing action is in place. These actions must be support by everybody in the company in order to satisfy the consumers' expectations. In addition to this, consumers must know about every improvement activity in the industry.

In the current industry, customized orders, fashion, service, fast delivery, warranty, parts, costs and styles are important factors in a vigorous market. These aspects should be analyzed and In the current industry, customized orders, fashion, service, fast delivery, warranty, parts, costs and styles are important factors in a vigorous market. These aspects should be analyzed and controlled in order to participate in the new era of challenges and open markets of the 2000's. A good interpretation and translation of customer expectations to the manufacturing process give the key for success.

A high quality level of products will be the best weapon in the market. This final quality is the result of the strategy designed and controlled always towards a sustained improvement.

(See Figure 6).

## **Conclusions**

From the analysis of marketing and manufacturing strategies role in process improvement, the following conclusions may be draw.

1. For every company, the commitment to meet customer needs should be the support for every policy to link marketing and quality disciplines.
2. Each company must be able to collect information about customer expectations and needs.

3. In any industry, the link between marketing and manufacturing strategies provides the means to identify and control the most important factors, which increase product competitiveness in the market place. By this link, the manufacturing activities can be performed based on marketing requirements. Consequently, the possibility to accomplish customer's requirements is high.
4. One of the keys to success in world marketing of the 2000's is the integration of functional perspectives at the level of corporate strategy debate. Congruency in marketing and manufacturing strategies gives an important and competitive advantage to the industry.
5. Knowing whom the customers and end-users are is a critical step. Next we have to decide what we will want to know about them, who will gather that information, and how it will be used. A satisfied customer – manufacturer relation.
6. It is a requirement for company profitability that every individual of the organization work together directed by accurate strategies.
7. Manufacturing needs and limitations must be considered by the corporate strategy. The implications of corporate marketing proposal should be able to influence a strategy decision for the future of the business.
8. An important requirement for the inclusion of marketing issues in the quality process and therefore in the manufacturing process is in the ISO 9000 quality standards management guide (ISO-9004).
9. QFD is an interactive process that allows different internal departments to communicate and to understand the real needs and the real requirements of the customers. In this way, the firm can focus its efforts in fulfilling the requirements that are important to the customers instead of wasting time in improving requirements that the customers are not willing to pay for. The use of QFD give the companies many benefits, such as improve customer satisfaction, improve communication within the organization, ease customer-focus planning approach, enhance teamwork.
10. QFD systematically combines knowledge and innovation of team members from all functional areas involved in product and service development, as well as it enhances consciousness of the importance of the customer in the whole process.

Figure 1. Marketing Components

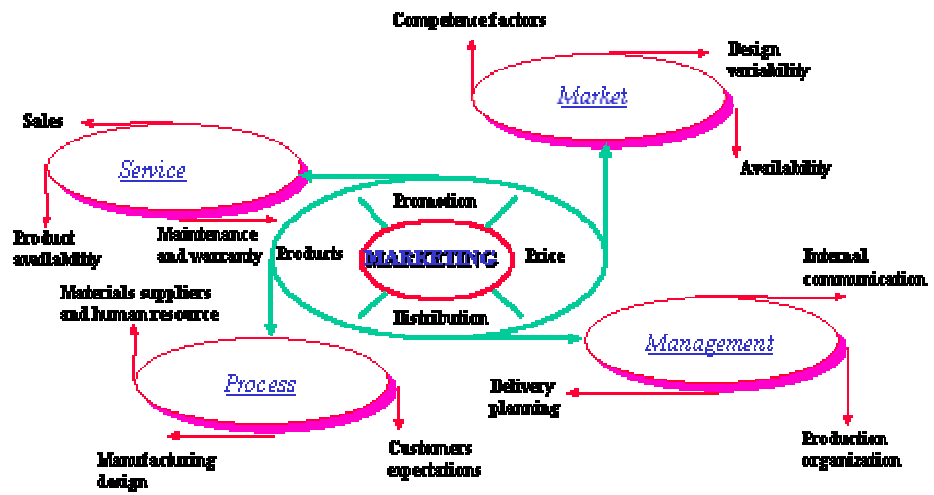


Figure 2. Marketing Strategy Components

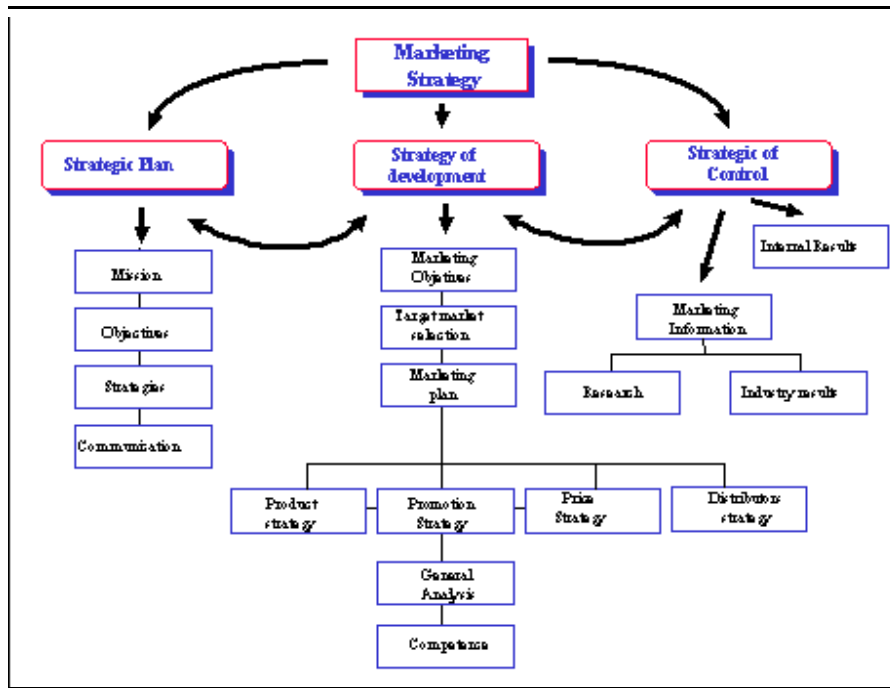
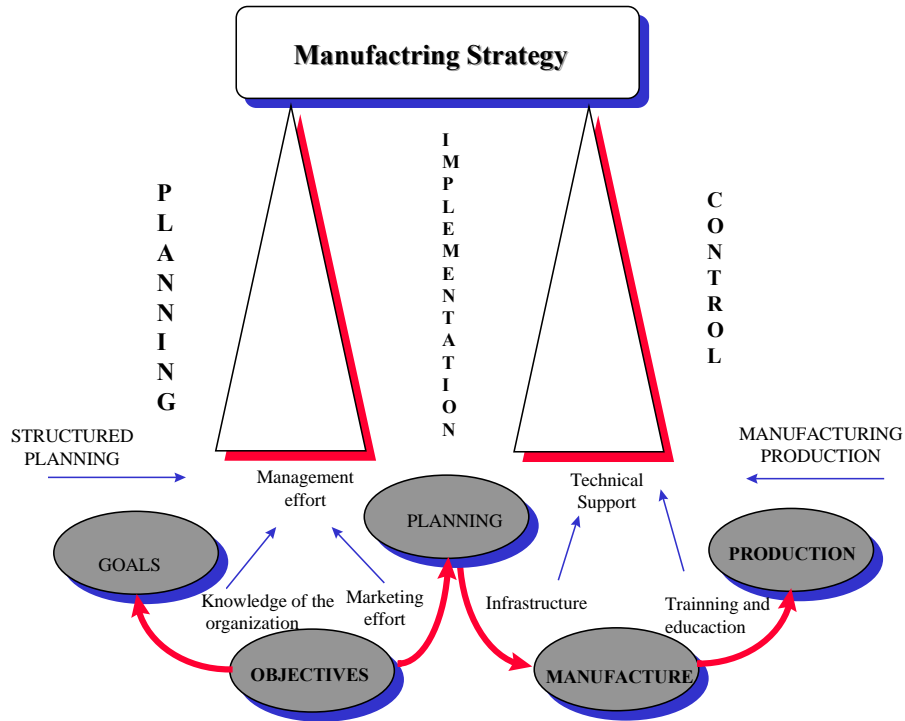


Figure 3. Strategic Plan Considerations



Figure 4. The Manufacturing Strategy





**Table 1. Departmental Involved in the Implementation of New Manufacturing Techniques**

Department Production technique	Service	Sales	Finantial	Marketing	Design	Distribution	Manufacturing
JUST IN TIME	+	S	S	S	S	S	S
MANUFACTURING CELL	+	+	+	+	+	+	S
QUALITY ASSURANCE	+	S	S	S	S	S	S
MANUFACTURING RESOURCES PLANNING	+	S	S	S	S	+	S
DISTRIBUTION	S	S	☆	S	☆	☆	S




-  Strong
-  Important
-  Occasional

Figure 5. Corporate

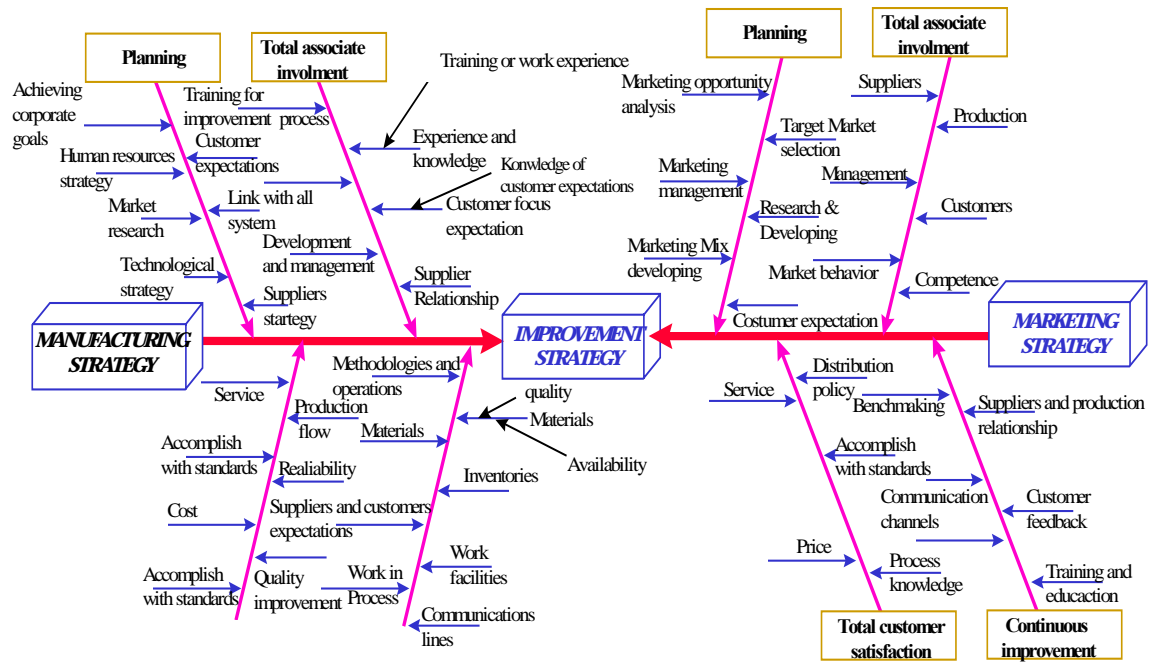
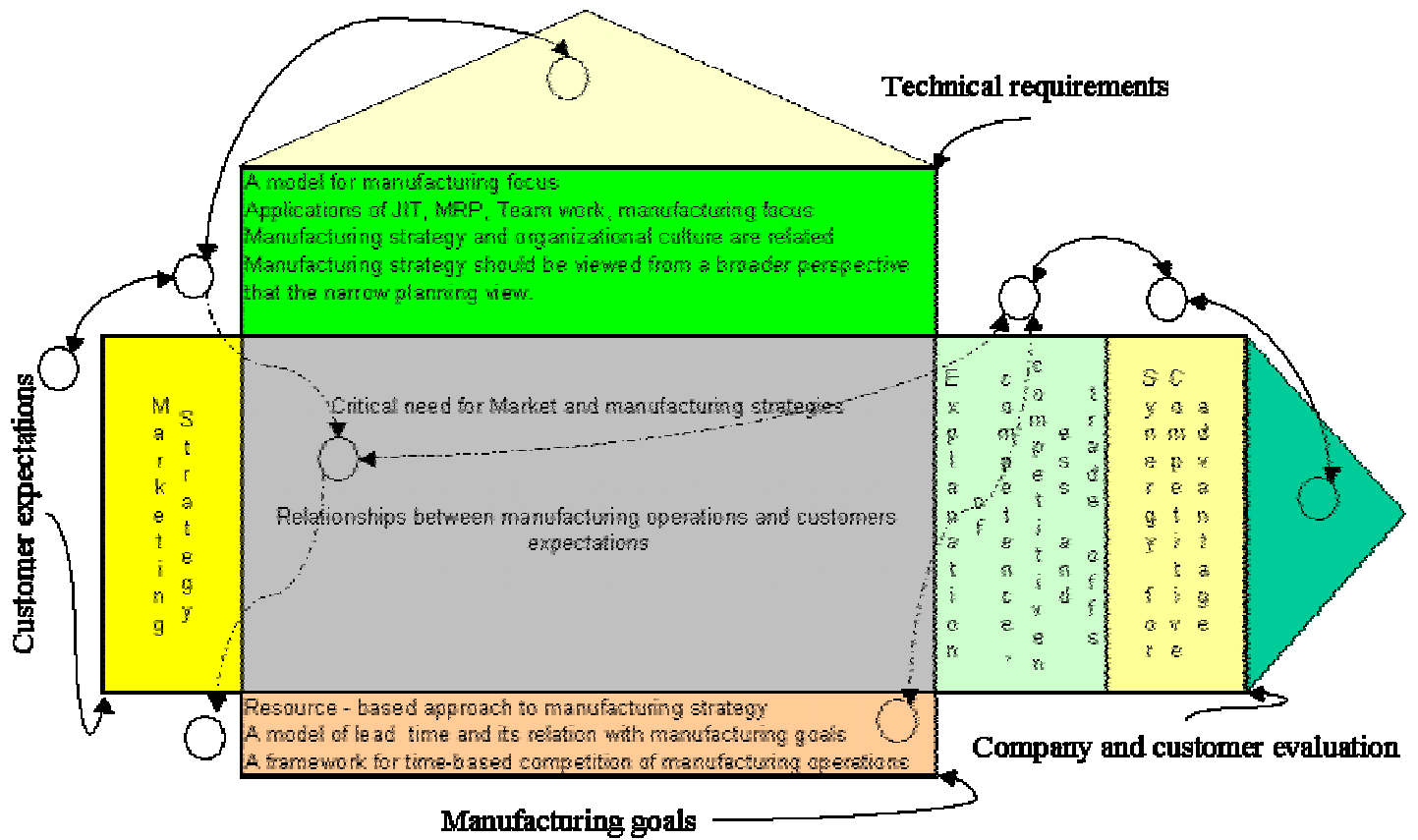


Figure 6. QFD as an Improvement Strategy



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