

IMPLEMENTATION OF QUALITY FUNCTION DEPLOYMENT IN CONSTRUCTION PROJECT

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ABSTRACT

Quality function deployment (QFD) is a quality improvement technique that deals with quality problems from the outset of the product design and development stage and assures that customers' requirements are accurately translated into appropriate technical requirements and actions. The emphasis on "voice of the customer is the key to QFD. This makes good sense in the construction industry, as every construction project is unique. Each building is custom made to meet the requirements and needs of the client. As the construction matures, the ability to understand and translate the needs of the client into a finished building or product is fast becoming a prerequisite for the long term viability of a company.

Keywords: customer, construction and Quality function deployment.

INTRODUCTION

Improving customer satisfaction has identified as one of the most important challenges facing businesses over the past decade. As industries and companies worldwide face increasing competition, slower growth rates, and price pressures, greater attention continues to be placed on customer satisfaction. Private business entities are looking for magic ways to improve the quality of their products and services in order to survive in the keenly competitive world. The public sector is facing similar challenges regarding the quality of products and service provided, as one of its paramount responsibilities is to ensure that the community gets maximum value from the available resources. Over the past decade, Quality has been a differentiating factor within the construction industry [1]. It has been demonstrated that despite the constraints on quality differentiation efforts like project budget, rules and regulations etc., Many companies are competing using quality differentiation strategy and sustaining their competitiveness in the long run. Achievement of client satisfaction, however, necessitates the management of quality systematically, which further necessitates utilization of quality tools and techniques for this purpose. Quality function

deployment(QFD) is one of these techniques to deal with customer needs and expectations more systematically for achieving the most important objective of a construction company, satisfaction of clients. QFD is broadly a total quality management (TQM) implementation technique requiring clear assessment of client or end user expectations apart from the basic needs of a project to convert them into design targets. Construction facilities are usually made to order products that are based on the specific requirements of clients. These requirements are related to the ultimate need that the facility is intended to fulfill. For example, the need for office space for a business enterprise is satisfied by a building [2]. Thus, the requirements for such a building must reflect the requirements of the ultimate need .i.e, office space, if it is to fully satisfy the client. The realization of the client's vision of proposed facility are defined and communicated to the design team.

MAIN IDEAS AND TECHNIQUES

Several factors make it difficult to present a coherent overview of the ideas and techniques of the new production philosophy. The field is young and of constant evaluation. New concepts emerge and the content of old concepts changes. The same concepts is used to refer to a phenomenon on several level of abstraction. It is not clear where to place the boundaries between related concepts [3].

NEED FOR QUALITY FUNCTION DEPLOYMENT IN CONSTRUCTION SYSTEM

Industries such as manufacturing have shown that adopting new business processes such as QFD will increase productivity and improve overall quality. Although QFD was originally intended to help manufacturing companies improve, it has also been successfully implemented with construction industry and is rapidly becoming popular. the difficulty however is how to build the technique into one of projects which are so unique they require a totally different approach to building unlike housing for example which in some respects is more sequential and methodical.

The construction of building ranges from building an extension to constructing a high rise tower. The main obstacle within construction however is the client who often requires processes carried out in their own way. As many projects are unique , so are the processes used to built them, QFD will only work in construction if team works together to mass produce buildings or design construction processes so they become more sequential [4]. within the construction industry

processes cannot be as easily changed as they can in the manufacturing industry. Many firms work on a client bespoke order basis in the future this attitude will need to be changed from a more passive role to that of a more active role where contractors etc. will need to work and cooperate more closely with clients to develop new development methods and ways of working.

Research has shown that QFD can work within the construction industry. The research looked into the impact of implementing QFD in low cost housing. This is an overall process that can become very sequential, i.e., design all the homes the same way, give all the homes the same specification. An aspect where the construction industry could improve is its ability to accurately determine customers requirements and successfully incorporate them into plans. This paper ensures that the product is produced as quickly and efficiently as possible.

OBJECTIVES

- To understand the QFD technique and its step by step implementation in the planning and design phase of construction projects.
- To examine the feasibility of using QUALITY FUNCTION DEPLOYMENT as a project management tool in the planning and design phase of construction project.
- To examine the planning and design requirements of apartment building
- To develop a QFD application model that can be implemented in the design of apartment building.
- Developing a QFD application model that can be used in the planning and design of housing sector (apartment building) through a case study.

METHODOLOGY

Quality Function Deployment is a powerful development methodology with a wide range of applications. The main purpose of QFD in this study was to apply in construction a method of customer oriented design used in other industries. In this report, an attempt has been made to examine the applicability of QFD as a strategic decision making tool in design phase and after the construction stage of a housing project to determine the best marketing strategy, to make a comparison between the performances of different competitors and to transfer the experience gained from the current project to the forthcoming projects.

The research methodology consists of the following steps:

- ✓ Reviewing the papers and literature reviews, principles, theory and framework of the QFD technique.
- ✓ Understanding and analysing the housing project planning and design process.
- ✓ Identifying the various categories customers and needs in housing sector.
- ✓ Identifying the need of the customer.

Companies that have spent the effort to really understand and apply it have achieved excellent results with it. Many other companies have merely dabbled with it or perhaps concluded that it is a series of complex matrices that take a lot of time with little to show for it.

One of the common issues with this latter group of companies is that they have not understood what QFD really is not what it can do for them. If one explores the common issues companies face with new product development, one can better understand how QFD can fit into the development process to address these issues [5].

ISSUE 1: CURRENT AND FUTURE CUSTOMER NEEDS ARE NOT ADEQUATELY UNDERSTOOD.

Innovation based companies may focus on pushing a technology into the marketplace without truly understanding customer needs. Companies with existing products, assume they understand their customer needs. Or needs may rapidly evolve, but the company doesn't recognize this situation. Marketing may understand the needs, but this knowledge is not passed on to the development team.

QFD SOLUTION

Voice of the customer (VOC)-the effort to investigate and analyze customer needs is a prerequisite for a QFD effort. With QFD, VOC data is reduced into a set of critical customer needs using techniques such as affinity diagrams, function analysis, etc., defined and documented in customer needs data dictionary, and prioritized. This VOC effort is also the opportunity to recognized unfulfilled needs that can provide, at a minimum, competitive advantage, and potentially,

a break-through product or true value innovation. A basic principle of QFD and any other system is “garbage in, garbage out”. If adequate effort is not spent in understanding customer needs, the result of QFD, as well as the entire development effort, will be a less than optimum product.

ISSUE 2: THE COMPETITIVE SITUATION IS NOT UNDERSTOOD NOR ADEQUATELY CONSIDERED.

Marketing may understand the competition, but this knowledge is not transferred to the team. No formal data collection or analysis is performed. This can lead to non-competitive or me-too products or products that rapidly lose their competitive advantage.

QFD SOLUTION

Once customer needs are defined, the second major step with QFD is to perform competitive analysis. This includes not only analyzing current competitive strengths and weakness, but also considering future directions of competitors. It also involves mapping competitor’s positions against market and demographic characteristics and against key product characteristics to recognize threats and opportunities. This analysis is a key part of planning the new product.

ISSUE 3: INADEQUATE ATTENTION IS PAID TO DEVELOPING A PRODUCT STRATEGY AND VALUE PROPOSITION.

There may be an implicit strategy understood by management, Marketing, or some team members, but not all team members understand this strategy, leading to sub optimal decisions. In the absence of competitive analysis and strategy, the team may want to exceed competitive product’s performance parameters in all areas, leading to a more costly product or a risky development project. The product may be aimed at the wrong market niche or miss the opportunity that exists.

QFD SOLUTION:

A third step in the QFD process is to develop the product strategy and value proposition. The objective is to get the “most bang for the buck” out of the development effort. This strategy needs to be explicitly defined, understood and agreed to by all participants. The strategy should reflect where the team will focus its development effort to achieve the customer value proposition (e.g. improvement goals, etc.). Use of related tools such as conjoint analysis can also

help to validate the value of certain capabilities to the customer.

ISSUE 4: PRODUCT REQUIREMENTS AND SPECIFICATIONS ARE NOT CAREFULLY BALANCED AGAINST NEEDS AND IMPLICATIONS.

Marketing wants it all when they create a marketing requirements document. Specification target can be arbitrarily established to exceed the competition without regard to cost or the value proposition. Inadequate consideration may be given to tradeoffs among product parameters leading to additional cost and development effort. A requirement may be established because the developer thinks it would be a good idea.

QFD SOLUTION

Requirements (technical characteristic) are only established in response to customer needs (stated or unstated but recognized). Technical benchmarking is performed to help understand the competitive position and establish appropriate specifications (target values). Trade-offs and cost drivers are analyzed in the interaction matrix. Risk and difficulty is considered in establishing specifications (target values). In short, there is a rigorous consideration of a variety of factors in objectively developing requirements and specifications.

ISSUE 5: INSUFFICIENT ATTENTION IS GIVEN TO DEVELOPING COLLABORATION AND TEAMWORK.

Team members are assigned and thrown together in an investigation or feasibility stage, but frequently little explicit effort is given to develop collaboration and teamwork.

QFD SOLUTION

QFD is a planning and decision making methodology that is performed by the product team. It forces early communication, planning and decision making among team members. It requires open sharing of information, overcoming the hidden knowledge that can otherwise plague a team. It bridges the gap between Marketing, Engineering, Manufacturing and Quality. Team member's knowledge is "levelled" through this process. The initial product planning with QFD leads to rapidly developing collaboration, teamwork, and commitment to the product strategy and plan.

ISSUES 6: IN THE RUSH TO DEVELOP A NEW PRODUCT, INADEQUATE ATTENTION IS GIVEN TO DEVELOPING AND EVALUATING CONCEPT ALTERNATIVES.

Traditional architectures, technologies, and concepts are assumed as the basis for the new product because time is short.

QFD SOLUTION

QFD is oriented toward defining requirements (technical characteristics in a global manner) Independent of a particular technical solution so that multiple concept alternatives can be considered and the best one selected. After the product planning matrix is completed, the QFD process includes a concept development and evaluation step with an emphasis on developing alternatives. The intent is to identify a more optimal, and perhaps even a breakthrough solution rather than continuing with the traditional concept used for past products. QFD provides a concept selection Matrix using the requirements as a basis for decision criteria. QFD places an emphasis on innovation and providing innovative and exciting capabilities to customers.

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