Needs, values and post-occupancy evaluation of housing project customers: A pragmatic view

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Abstract

New management concepts focus their efforts on meeting the needs of those involved, especially the customer. Likewise, one of the Lean Construction philosophy objectives bases its management model on the maximization of value for the client. Much research has been conducted on theoretical concepts of needs and value, and the purpose of this paper is to make a pragmatic proposal on how to apply these concepts to housing projects.

This paper presents a compilation of customer needs that housing must meet, taking into consideration that these needs are virtually universal and what changes is the customers' wishes and their level of importance. These needs—obtained through market research conducted on customers themselves—as well as the habitability conditions recommended by housing policies, codes, and regulations, must become the customer quality standards guiding the process. At the end of said process, once the product has been delivered and in the post-occupancy stage, this same document must serve as a tool to assess customer satisfaction and corresponding perceived value.

For the development of this proposal and in order to gather the requirements that every dwelling must meet to satisfy both its residents and society, we have reviewed various rules and regulations of several Latin American countries; we have conducted extensive interviews with customers from different social backgrounds; we have reviewed the literature on this matter; and we have analyzed 10 housing project claims with various construction systems and socioeconomic strata.

Finally, the results of these post-occupancy evaluations will serve as a powerful feedback tool, thus promoting continuous improvement in housing projects.

Keywords: Lean Construction, Value Generation, Customer Value, Post-Occupancy Evaluation, Architecture

1. Introduction

The various theoretical fundamentals of customer-focused management systems are very convincing and completely logical. This key concept is applicable to the provision or delivery of any type of service or product and to any industry or sector. In the construction sector, like in other sectors, theories and concepts also abound, but not as many as their corresponding applications. The reason for this may be that, when we refer to construction, we are also referring to a wide range of services and products. To propose a pragmatic application, this paper refers to the needs, desires, quality requirements, customer satisfaction and perceived value of a specific product: housing.

2. Customer-Focused Approach

Traditionally, success in the construction sector has been measured by cost, time and quality, or cost, time and scope. According to this, many times a project is considered successful if the work is delivered within the deadline, the budget and according to technical specifications. Thus, the work often takes the lead role and the client is a passive recipient of the building at the end of the construction value chain, Kärnä (2009). However, customer-focused management systems are changing this mindset.

In addition to proposing this triple constraint (also called the iron triangle), Atkinson (1999) presents three additional success criteria: the information system, the benefit for the organization and the benefit for the community involved. In this last criterion, customer satisfaction plays a major role.

ISO 9000 reads: "Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations". Figure 1 illustrates the Quality Management System described in the ISO 9000 family of standards. This illustration

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shows that customers play a significant role in providing input to the organization. Once the product has been manufactured, all information on customers’ perception of how and to what extent their needs and expectations were met is necessary for monitoring customer satisfaction.

The Lean Construction Institute declares loss reduction and value creation for the customer as its main management philosophy. The Institute’s various methods, techniques and tools are grouped into the Lean Project Delivery System™, shown schematically in Figure 2. The system proposes a sequence of processes which acknowledges the fact that a construction project should start with the identification of customer needs and values.

One can also see that the project does not end with delivery and use, but requires a post-occupancy evaluation which—after obtaining information about meeting the needs and desires of the customers and their perception of value—is used as feedback for new projects. Thus, it creates a cycle of continuous improvement aimed at eliminating loss and creating value. Losses and rework are very common because the needs and values of either investors or customers are not completely clear (Orihuela, Orihuela, Ulloa, 2011.)
3. Customer Needs

Kotler, P., Armstrong, G., Saunders, J., and Wong, V. (1996) define Human Needs as a state of deprivation felt by a person. They state that human needs are plentiful and complicated, and are not created by external agents but are an essential part of human nature.

Similarly, human desires are defined as a manifestation of those needs, according to culture and individual personality. As a society evolves, the desires of its members expand, so producers undertake specific actions for the public to feel the desire to acquire their products. They try to establish a connection between what they produce and what people need, and promote their product as a satisfier of one or more needs.

ISO 9000, states “Customers require products with characteristics that satisfy their needs and expectations. These needs and expectations are expressed in product specifications and collectively referred to as customer requirements. Customer requirements may be specified contractually by the customer or may be determined by the organization itself. In either case, the customer ultimately determines the acceptability of the product.”

During interviews conducted to understand the customer need for housing, we took into account that there are several types. Kotler (2000) presents the following classification: the needs which are expressed directly by the customer, those which are not specified but are expected, those which are unexpected, and those which are undisclosed.

4. Housing Quality Standards

Many housing rules and regulations specify some quality requirements every home should have. However, not all of these requirements are noticed by customers. On the other hand, there are other customer requirements and expectations that are not specified in these documents.

To select the most important housing quality standards, four sources of information were used: 1.) Collection and review of habitable conditions specified in the housing policies, rules, and regulations of various Latin American countries (Peru, Chile, Brazil, Colombia, Ecuador and Mexico), 2) Research papers published in various journals on attributes that generate satisfaction among residents; 3.) Analysis of 4000 claims generated in 10 housing projects with different construction systems and different socioeconomic levels (Vidal, 2014) and 4.) Residents’ interviews on their housing needs, desires and perceptions of value.

Table 1 presents these quality standards grouped into three criteria (Perez and Gonzalez, 2011): 1) Criteria regarding the city, 2) Criteria regarding the neighborhood and 3) Criteria regarding the building itself. Each one is broken down into a second and third level, the latter being questions about the level of compliance with the expected requirements, which the customer and/or organization itself must rate. We have selected a total of 80 questions, 50 to be answered by the customer and 30 to be answered by the organization due to their technical nature. The organization could also rate the customer-directed questions so as to identify and quantify compliance gaps.

5. Post-occupancy customer satisfaction

Kotler (2000) defines Customer Satisfaction as the feeling of pleasure or disappointment resulting from comparing the perceived performance of a product with the customers’ expectations. Kano (1984) proposes five types of attributes that a product or service may possess and which generate various feelings of satisfaction or dissatisfaction in customers: 1) Must-be quality element: attributes whose compliance do not generate additional satisfaction but when not provided, generate high levels of dissatisfaction. 2) One-dimensional quality element: attributes whose presence generate satisfaction directly proportional to their implementation. 3) Attractive quality element: attributes which are not expected, but when implemented generate high levels of satisfaction. 4) Indifferent quality element: attributes which if not implemented, will not generate satisfaction or dissatisfaction. 5) Reverse quality element: attributes whose presence are unwanted.

Atkinson (1999) shows us that during the process initiated by the company to meet customer needs, gaps that undermine this objective are generated. Gaps are created in: 1) the real customer needs; 2) the needs described by the customer; 3) the needs as perceived by the project team; 4) the plan developed by the team to meet these needs; 5) the final product delivered to the customer; and 6) customer perception of whether the product meets his/her needs or not.

A multidisciplinary group of professionals with different systems, methodologies, techniques, and tools is involved in this chain of processes; however, at the end of such a chain, the customer is the one who rates the
product. Dr. Edwards Deming mentioned in one of his lectures: "... the customer is the judge of quality; he is the only judge who should matter when providing a service or product, the customer will decide on quality."

To measure a customer’s satisfaction using Table 1, it is necessary to determine the importance placed on quality standards at the second level. This weighted calculation is independent for each of the three sets of criteria and can be done by the method of scoring and using the Likert psychometric scale (1 to 5). For better validation methods, matrix pairs or hierarchical analysis could also be used. Then the 50 questions of the third level must be answered, asking customers to express their perception of satisfaction or dissatisfaction through a rating scale. In practice, we have found that a good alternative is to use the school grading system, as this is very familiar to our customers; therefore, scores will be clearly expressed.

Table 1. Housing quality requirements and perception for customer satisfaction

| HOUSE QUALITY REQUIREMENTS | IMPORTANCE (Weight) | SATISFACTION (Score) |
|---------------------------|---------------------|----------------------|
| First level               | Second level        |                      |
| RESEARCH THE CITY         | Location in relation to workplace | 2 | 2 |
|                           | Location in relation to other activities | 2 | 2 |
| RESEARCH THE NEIGHBORHOOD | Security from natural events | 3 | 3 |
|                           | Urban conditions    | 8 | 8 |
| RESEARCH THE BUILDING ITSELF | Structural safety     | 6 | 6 |
|                           | Fire safety         | 7 | 5 |
|                           | Safetyivity         | 6 | 2 |
|                           | Functionality       | 10 | 5 |
|                           | Ascheries           | 3 | 3 |
|                           | Safety in use       | 5 | 2 |
|                           | Property security   | 2 | 2 |
|                           | Legal security      | 3 | 3 |
|                           | Thermal, acoustic, luminance and ergonomic comfort | 5 | 1 |
|                           | Disability          | 3 | 1 |
|                           | Impermeability      | 3 | 3 |
|                           | Environmental impact | 8 | 4 |
|                           | Accompaniment post-sale | 4 | 4 |

The average of the third level gives the rating of the second level and the weighted average of these gives the rating for each of the three first-level groups. The rating of the first two groups evaluates the attributes of building location and the third group evaluates design and construction.

According to the Guide to Post-Occupancy Evaluation of the HEFCE (2006), these assessments should be made in the post-occupancy stage, which occurs after a period of approximately one year following handover. It is deemed that the customer may not have sufficient experience to make a proper judgment at any time before this.

6. Customer value

The Institute of Value Management defines Value using formula 1 below:

\[
\text{Value} = \frac{\text{Function}}{\text{Cost}}
\]  

(1)

This formula shows that value results from comparing the achievement of purposes or delivery of the expected benefits of the product with their cost. When this comparison is purely economic, it is known as Cost-Benefit Analysis, where the numerator and denominator are expressed in monetary units resulting in a tangible indicator and numeric value.
6.1. Customer perceived value

The perceived value involves the customer assessment of the ability of the products to meet his/her needs. He/she therefore considers the value of the product and its price before making the decision to choose the product that represents the maximum value for the money (Kotler, 2000).

When it comes to the customer perception of value, the numerator in formula 1 represents the degree of customer satisfaction which—as stated above—is a subjective rating. The denominator, in addition to the monetary amount paid, also represents other sacrifice factors involved in buying the product or service. This is especially true when it comes to a house, which is usually one of the most important acquisitions of an individual or family. Therefore, when it comes to assessing the value that the customer places on a house, ratio 2 is more appropriate:

\[
\text{Customer perceived value} = \frac{\text{Perceived satisfaction}}{\text{Perceived price paid}}
\]  

Once the customer has answered the questions in Table 1, the results are presented to the customer, and then he/she is asked to carry out a second rating on the perceived value, considering the price and the sacrifice made to pay for the house.

6.2. Added Value

Lean Six Sigma defines Added Value as: "activities or essential works that ensure a product or service meets customer needs." A more precise definition would be: "An additional attribute that the customer did not expect, and when perceived, it contributes to increased value." This definition is in line with what Kano (1984) classified as an Attractive quality element.

Posing a simple question to the customer, who has received an attribute or benefit that was not expected, and asking him/her to describe and comment on it will provide a good indicator of whether or not added value has been generated for the customer.

7. Conclusions

To generate value for customers, we need to understand and identify their needs and desires. These should be provided in a document that also indicates their level of importance. This document, supplemented with the relevant technical specifications, will help establish quality requirements that guide the customer-focused management. Once the project is finished and the product is delivered, this document will serve to evaluate customer satisfaction during the post-occupancy period. After rating overall satisfaction, customers will be able to form a second opinion on perceived value and added value.

In brief, this paper proposes the model of a document with the above-mentioned characteristics which serves for housing projects, and can be improved and modified insofar as it is used.

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