

Dimensions of Product Quality and Client Satisfaction for a Large Construction Company

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Abstract

Obstacles for achieving high product quality from a contractor's perspective, e.g. inefficient work processes, attitude problems, and stress, have been scrutinized and debated for many years. However, obstacles for achieving high product quality from a client's perspective are seldom investigated. Since contractors normally work for clients in several lines of businesses, with various requirements and expectations, the implication of “high product quality“ is ambiguous for the contractor. Addressing all expectations in all projects is impossible, or at least very costly, and therefore contractors must prioritize what to focus on. The purpose of this paper is to investigate how product quality affects client satisfaction in the field of commercial buildings for a large construction company. The study uses an approach that combines eight dimensions of product quality, proposed by Garvin and Kano's model for characterizing attributes for client satisfaction. Results show that quality requirements tend to be individual, and dimensions of product quality affect client satisfaction differently. Hence, there exist no general “high product quality” formula for a contractor. Instead a contractor needs to understand client expectations in each project, and act accordingly, in order to satisfy its clients.

Keywords

Product quality, client expectations, quality management, commercial buildings

1. Introduction

During the last couple of years, Swedish media have paid a lot of attention to inadequate product quality in the construction industry. This is mainly due to the negative outcome of some large projects, which failed to reach the quality levels expected by the clients. In February 2002 the Swedish government appointed a “Building Commission” to investigate measures to promote competition in the industry and to propose measures to increase quality and reduce costs. In their report, the commission concluded that terms like ethics and moral, long-term benefits and durability are frequently used, but lack meaning in operative activities. The commission suggests that both contractors and clients need to improve their working processes (SOU 2002:115, 2002).

Skanska is the largest construction company in Sweden and therefore one of the companies the commission's suggestions are directed towards. In-house measurements show that the public image of Skanska in Sweden has deteriorated significantly. The negative attention in the media and the conclusions

of the commission report have probably strongly affected the public image, but it cannot be denied that there are inadequacies in quality found in some projects. Inadequacies with regard to defined quality requirement cannot be accepted. However, meeting the specified quality for a product may not always result in client satisfaction. According to Feigenbaum (1994), quality is what the customer says it is and, consequently, product quality needs to be defined by the customers. A contractor normally works for clients in several lines of businesses, with various requirements and expectations about premises. The meaning of “high product quality“ is therefore ambiguous for the contractor. Moreover, client requirements are dynamic and may vary between projects. Addressing all expectations from all the clients in all projects is therefore impossible or at least very costly and time consuming. Therefore construction companies need to know each client’s view on quality and what dimensions of quality affect client satisfaction the most.

The purpose of this paper is to investigate how product quality affects client satisfaction in the field of commercial buildings for a large construction company. Using an approach based on models suggested by Garvin and Kano, nine persons representing clients in the product field of commercial buildings were interviewed. The interviewees represent large clients in the field of commercial buildings to Skanska in the Gothenburg area of Sweden.

2. Quality and Expectations

Conformance to requirements and *fitness for use* are some of the most commonly used definitions of quality. *Conformance to requirements* means “doing things right” with regard to formal requirements set by the producer. Experience shows that this often caused significant gaps between the clients’ needs and expectations and the requirements that the producer was striving to meet (Sörqvist, 1998). Other definitions, such as *fitness for use*, are user-based and emphasizes “doing the right things” rather than just “doing things right”. User based definitions of quality are predominant in recent research. Sebastianelli and Tamimi (2002) even claim that no definition of quality can be unrelated to the client’s viewpoint.

In construction, the complexity of projects and the number of different clients and users complicate defining quality in a way that reflects the needs and expectations of clients. Another obstacle might be that the construction industry has a tendency to blame clients for problems in projects because “*they [the clients] do not understand construction*” (Barrett, 2000). However, the question is whether the clients should be expected to understand construction. The problems referred to may just as well be caused because contractors don’t understand clients.

The task for the construction industry is to more accurately determine clients’ requirements and expectations and successfully transform these into plans and specifications within each project. Some would describe this task as the essence of Quality Function Deployment, QFD, (Abdul-Rahman et al., 1999, Akao and Mazur, 2003). Applications of QFD are often found in complicated one-off processes, such as product development. However, even if the purpose is similar, many QFD approaches may not be as simple and concrete as required in construction projects. Anyhow, QFD approaches are seldom used in construction industry. For determining how product quality affects client satisfaction a contractor first needs a concrete framework for classification of dimensions of product quality and then a way to investigate how each of them affects satisfaction in each project.

2.1 How to determine client expectations

In order to find out about clients' perceptions of quality, Garvin (1987) concludes that companies must break down the word quality into manageable parts. This would, according to Garvin (1988), offer an opportunity to investigate what particular requirements of product quality are important for client satisfaction. Lawton (1993) offers one approach to break down quality into parts. According to him, client perception of quality is based on three criteria: *Performance* of the service or the manufactured product defined by objective criteria, *Perception* of the product and related subjective criteria, and *Outcome* or results obtained by using the service or manufactured product. However, to analyze the phrase quality more thoroughly it can be broken down further into even more manageable parts. Garvin (1988) proposes eight critical dimensions of quality:

1. *Performance* refers to the primary operating characteristics. It involves measurable attributes but some performance standards are based on subjective preferences.
2. *Features* are the characteristics that supplement the basic function. The line separating primary performance from secondary features is often difficult to draw, but it is important that the features involve objective and measurable attributes.
3. *Reliability* reflects the probability that a product malfunctions or fails within a specified time period. The most common way of measuring is the mean time to first failure or mean time between failures.
4. *Conformance* is the degree to which a product's design and operating characteristics meet established standards.
5. *Durability* is the measure of product life. Technically, durability can be defined as the use one gets from a product before it becomes unusable. Economically, one compares future repairs with the investment and operating expenses of a new model.
6. *Serviceability* is the speed, competence, and ease of repair.
7. *Aesthetics* involves how a product looks, feels, sounds or smells and is a matter of personal judgment due to individual preferences.
8. *Perceived quality* is closely connected to the reputation of a company. It is often based on the apprehension that product quality of today is the same as the product quality of yesterday.

It is almost impossible for a company to encompass all eight dimensions at the same time unless prices for its products increase significantly. Then the scope will be too wide and the company risk overshooting the target by introducing dimensions of quality that are unimportant to consumers (Garvin, 1988). To avoid this, companies need to investigate how different dimensions of product quality affect different clients and narrow the scope by selecting which dimensions to compete on.

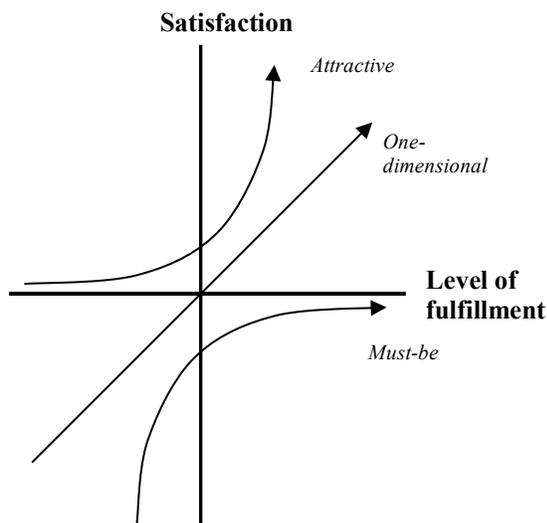


Figure 1. The Kano model, as described by Matzler et. al (1996).

Involving the client in these selections may be advantageous. The link between client satisfaction and performance in terms of different dimensions of quality is here investigated by using the Kano model, as it is presented by Matzler et. al (1996). Originally, the model was developed to identify and categorize client expectations in product development (Shen et. al, 2000)). However, as the execution of a construction project often start out from unique client expectations and requirements. It is equally important to identify important attributes here, as it is in industrial product development. Essentially, the Kano model offers a structured way to divide product features into three distinct categories, each of which affects client satisfaction in different ways (see figure 1).

1. *Must-be attributes*. These are basic attributes of a product that clients take for granted, but should the product fail to meet these basic needs sufficiently, the client become very dissatisfied.
2. *One-dimensional attributes*. Client satisfaction is proportional to the fulfillment of these attributes. These attributes are also known as spoken qualities.
3. *Attractive attributes*. Clients do not expect these attributes and the absence of them do not cause dissatisfaction. However, strong achievements in these attributes may affect the satisfaction of clients to a great extent.

Inherent in Kano’s thinking is that client needs are dynamic over time. What were once innovative and attractive attributes can therefore become one-dimensional attributes. Also, the model suggests that client satisfaction is a multi-level issue.

3. The Study

3.1 Methodology

In order to investigate how dimensions of product quality affect client satisfaction interviews were carried out with nine representatives for large and frequent clients to Skanska in the field of commercial buildings in the Gothenburg region of Sweden. All interviewees had long experience from procuring commercial building projects from contractors and therefore should have a well-based opinion of what to expect regarding product quality. In all, the selection of interviewees represents the most significant clients for the local Skanska organization. Still, they had long experience from working with other contractors as well, and the questions concerned their overall experience.

The first part of the interview consisted of open questions regarding how the interviewees perceived quality in commercial buildings. These questions intended to outline what determines product quality in the clients’ opinion, without referring to Garvin’s dimensions of quality or other categorizations. An interview guide was sent out in advance to give the respondents some time to reflect over the questions.

The eight dimensions of product quality, defined by Garvin, were introduced in the second part of the interview. The interviewees were given eight notes on which one of the eight dimensions was printed per note. Each of the dimensions was carefully explained and the interviewees were given the opportunity to comment on whether the dimension was appropriate or not. Next, the Kano model was described. The interviewees were asked to place each of Garvin’s eight dimensions on one of the three “category graphs” in the Kano model. The placement of the eight aspects was noted and then the interviewees were asked to comment and criticize both the Kano model and Garvin’s eight dimensions. The interviews were conducted at the interviewees’ respective workplaces and lasted for approximately one hour each.

3.2 Clients’ conception of product quality

Most of the interviewees agreed that product quality meant fulfillment of client demands and expectations. However, the meaning of client demands and expectations varied considerably among the respondents, even though they all referred to the same kind of product and had similar professional background. Each interviewee used several words to define quality. Words used by more than one of the nine respondents are listed in table 1. Four interviewees defined quality with the word *durability*. The second most frequently mentioned definition was *conformance*. No other definition was used by more than two of the nine interviewees. Two

Table 1. Definitions of product quality.

Definitions of product quality	Number of respondents
<i>Durability</i>	4
<i>Conformance</i>	3
<i>Economy</i>	2
<i>Entirety</i>	2
<i>Expectations</i>	2
<i>Happy client</i>	2
<i>Serviceability</i>	2
<i>Time</i>	2

considered product quality as holistic, as an *entirety* also involving how the product was delivered and the contractor's attitude towards product quality. Other, more concrete, examples were *time* and *economy*.

3.3 Quality dimensions' effect on client satisfaction

Table 2 presents how the respondents placed Garvin's eight dimensions of quality in Kano's model. Grey-marked cells indicate where most interviewees placed each dimension. None of Garvin's dimensions were placed unanimously in one category, but seven interviewees placed *features and conformance* similarly and six interviewees placed *perceived quality* and *reliability* in the same category. However, other dimensions were placed very differently.

Table 2. Placement of Garvin's eight quality dimensions in categories of the Kano model.

Garvin's eight dimensions	Ranking in Kano's model		
	Attractive	One-dimensional	Must be
<i>Performance</i>	1	3	5
<i>Aesthetics</i>	3	2	4
<i>Conformance</i>	0	7	2
<i>Reliability</i>	1	6	2
<i>Perceived quality</i>	2	6	1
<i>Durability</i>	1	5	3
<i>Serviceability</i>	4	2	3
<i>Features</i>	7	1	1

3.4 Discussion

This study supports the predominant conception that quality in construction is a complex and indistinct subject. The results imply that clients to a large construction company have diverse views on what quality is, even though they represent similar professional background, refer to the same type of products and come from the same geographical area. In the first part of this study the clients started out from a blank paper when describing their definition of quality. Perhaps, it is therefore not so surprising that their answers varied considerably and ranged from TQM-like definitions to conformance. In the second part of the study all respondents were given a guiding framework, in the form of Garvin's eight dimensions of quality and Kano's model for how different attributes affect client satisfaction. The most frequently suggested definitions from the first part of the study correspond with Garvin's dimensions *Durability*, and *Conformance*. The second part also showed that *Durability* and *Conformance* were seen as important, since they were prioritized as *one-dimensional* or *must-be* attributes by most interviewees. *Conformance* was the dimension of quality with the most agreement in the Kano model. However, it was remarkably placed as *one-dimensional*, and not as a *must-be* attribute. Hence, clients in the field of commercial buildings are more satisfied the more requirements are fulfilled and, consequently, they do not presuppose to get what they order. The placement of *Conformance* on the *one-dimensional* graph is an indication of a failing mark to the construction industry.

The dimensions of quality that were placed as *must-be* attributes, and therefore most important not to under perform in for the contractor, were *Performance* and *Aesthetics*. If the contractor was to put an extra effort on any of the dimensions, most clients believe it would increase their satisfaction most effectively if it was put on *Serviceability* and *Features*. Still, there is no common view on what affects satisfaction the most and it may therefore be dangerous to generalize the results. On the contrary, this study shows that the total view of how different dimensions of quality affect satisfaction is very indistinct.

Furthermore, the selection of interviewees for this study was chosen to describe the situation for one contractor. Results are based on the views of a homogeneous group of clients, limited with regard to product, size, experience, and geography. Therefore, the results considering prioritizations and definitions

do probably not describe the generic view of clients in construction projects. Still, if the selection had been wider, the indistinct view of how dimensions of quality affect client satisfaction would likely have been even more indistinct. Hence, even if this limited study is inadequate in order to show how clients in general prioritize dimensions of quality, it indicates that their views are dissimilar.

4. Conclusion

Client expectations on quality seem to be low in the Swedish construction sector. Some companies chose to see this as a fact, but it is an opportunity. If a contractor succeeds to fulfill all client requirements and, additionally, manages to address some attractive attributes for their clients they would be in a matchless competitive position, considering the results of this study.

The results of this study describe the wide range of client expectations that a large contractor strive to meet. Fulfilling all client expectations is not an easy task, but in order to succeed there is a need to focus the meaning of the word quality from the client's perspective. The client must be allowed to prioritize what aspects in his particular conception of quality that he finds most important in a project. It is a prerequisite for the contractor to listen and act accordingly in order to fulfill the client's expectations.

The simple methodology used in this study is one approach to describe the individual client's view on quality. All interviewees found Garvin's dimensions of quality and Kano's model easy to understand, but the models needed to be explained carefully. In a construction project there is little time for explaining, so if an approach is to be used continuously it might be wise to break down the word quality to even more concrete dimensions, adjusted for a specific project. Then the client could more easily describe his view on quality, and the contractor could even better understand how different dimensions of quality affect the client's satisfaction.

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