

# House of Quality as a Quality Tool in Higher Education Management

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## Abstract

Nowadays, the universities are unique in their structure and purpose. So, the activities which tailored for productive and industrial sectors become unsuitable to be applied and conducted in universities. This concept paper is talking about investigating how can use the house of quality tool for engineering and industrial services to higher education services. Then how can use it in the public university.

## Introduction

The public service can sometimes be an intimidating environment for decision making. This is because, as noted by Fielding, Gunzenhauser, and Smith (2010), they have unlimited demands and opportunities to do good work. Besides, public service managers and personnel are always held accountable by the communities they serve or the general public, the media, superiors, legislators, and so on, for every decision they make and service they offer. They have to make decisions regarding resource allocation and service delivery, while at the same time ensuring transparency in their activities, especially on the decisions affecting service delivery (Fielding et al., 2010). Thus, managers in public organizations consistently use generic management tools to help them in their management practice (Thompson, n.d). Thompson argued that when public management, for example, of an institution of higher learning, ignores these tools, then it would mean that it has ignored the users (who in this case are students). This emphasizes the need for managers to use various generic value-creating tools and processes to enable them gather a lot of information on every aspect of the organization's operations, which can be used to guide decision making (Thompson, n.d). One of the management practice techniques that has been used to help organization's managers guide their decisions on the service delivery and activities related to service delivery is the Quality Function Deployment, which majorly employs the House of Quality (HOQ) tool (Fabik, Halfarova, Klaput, Plura & Vykydal, 2013; Hauser, 1993). The literature review explores the house of quality tool focusing on how managers in public organizations can use it to guide their management practices.

## House of Quality

Organizations are working to improve quality, productivity, and responsiveness to consumer needs and preferences by adopting Total Quality Management (TQM) as a key element of their business operations (Kim & Park, 1998). Many of these organizations adopt the use of TQM methods such as Quality Function Deployment (QFD) and so on. QFD is a design approach founded on the premise that for a product to be designed right, the design team has to know what it is they are designed, as well as what the consumers (or end-users) will expect from what they are designing. Thus, QFD is a systematic means of making certain that customer requirements are correctly translated into relevant technical descriptors all through every stage of the product development. AUT University (2000) therefore defined QFD as "a systematic approach to design based on a close awareness of customer desires, coupled with the integration of corporate functional groups" (p. 1), so as to achieve customer satisfaction (Bernal, Byrnes, Dornberger & Suvelza, 2009). The technique is based on the analysis of customer requirements, which are more often than not, expressed in qualitative terms. These are translated into quantitative product or service design requirements using QFD (Clausing & Hauser, 1988). Bernal et al. (2009) further explained that the product or service is not developed as a whole, but is developed through the incorporation of various components. It is the component features that provide product or service functionality, and that satisfies customer requirements.

The QFD product/service development process or methodology is based on the development of a sequence of matrices known as 'House of Quality' (Bernal et al., 2009). Clausing and Hauser (1988) defined the 'house of quality' (HOQ) as "the basic design tool of the management approach known as quality function deployment (QFD)" (p. 3). According to Clausing and Hauser (1988), the HOQ is a type of conceptual map that offers the means for interfunctional planning as well as communications during the product or service development process. They noted that this would allow individuals with different responsibilities as well as those who hold different views to "thrash out design priorities while referring to patterns of evidence" on the matrices or HOQ's grid (Clausing & Hauser, 1988, pp. 3-4). According to Kim and Park (1998), HOQ is a QFD tool that is used to identify customer requirements and to establish priorities of design requirements in order to satisfy the customer requirements. QFD applies four phases of HOQ to integrate informational needs of customers (Clausing & Hauser, 1988; Hauser, 1993). Specifically, HOQ is used to understand the customer needs (the voice of the customer) and to translate into the designer's language so that the voice of the customer can be

integrated in product/service features, key process operations, as well as in the production requirements (Hauser, 1993). Bernal et al. (2009) suggests that it can be used to calculate benchmarking index, prioritization index, as well as quality improvement index (Johnson, Muller, Sieck & Tapke, n.d), which can be used to guide management practices in public organizations.

## **Applications of House of Quality in the Management of Public Organizations**

### **Determining Quality Improvement Index**

Managers can use the house of quality to guide the quality demanded by service users (Johnson et al., n.d). Knowledge on what improvements need to be made allows organization managers to list performance measures or metrics to be generated. A performance measure refers to a technical measure for evaluating the service's performance of a demanded quality (Johnson et al., n.d). In other words, the organization has to get the perceptions of the people or community they serve and translate them into business or engineering terms. Hauser (1993) noted that the house of quality process begins by identifying the customer needs (Hauser, 1993), also known as customer attributes (Clausing & Hauser, 1988). Customer needs are identified from the "phrases that customers use to describe products and product characteristics" (Clausing & Hauser, 1988, p. 5) regarding the benefits they want the product/service to offer them (Hauser, 1993). This means that the organization has to conduct personal interviews and/or focus group to understand customer needs.

Bailom, Hinterhuber, matzler, and Sauerwein (1996) emphasized that when deciding about a product or service development, those features which have the greatest influence on the perceived product/service quality have to be given the primary consideration. Berger, Blauth, Borger, Bolster, Burchill, et al. (1993) distinguished two types of requirements that need to be fulfilled: requirements to prevent service user (or end-user) from being dissatisfied and requirements that influence satisfaction. Thus, when making decision on which attractive requirements need to be satisfied, the most important factor is how vital they are for the service user. Bailom et al. (1996) and Berger et al. (1993) suggested that the individuals or managers leading the product development have to calculate 'customer satisfaction coefficient' to determine whether service user satisfaction would be increased by meeting product/service requirement or whether by fulfilling these product/service requirements would only prevent the customer from being dissatisfied. As noted by Bailom et al. (1996), the customer satisfaction coefficient is indicative of how a product or service feature is likely to influence satisfaction or dissatisfaction.

Decisions on service quality improvements are guided by what Bailom et al. (1996) referred to as quality improvement index. The quality improvement index refers to the "ratio calculated by multiplying the relative significance of a service requirement, identified from the service users' self-stated-importance, for the service user with the gap value of the perceived service quality gained from the rating scale in the questionnaire" (Bailom et al. 1996, pp. 11-12).

According to Temponi, Tiao, and Yen (1999), successful translation of customer requirements offers very important criterion in quality management and can be used to align organization performance as well as management issues with customer satisfaction. The tool is used by organizations to capture or translate explicitly the customer's requirements which provide a formal and quantitative representation of requirements. Based on this representation, the organization or management can develop heuristic inference scheme through which different parties within the organization or department can reason about the identified technical requirements (Temponi et al., 1999). According to Bailom et al. (1996), analysis of service user perceptions or desires can help the organization managers identify expectations which the user or consumer is aware of, but which have not yet been fulfilled by the current services offered. Thus, the house of quality offers an important source for potential improvements as well new investments (Bailom et al., 1996).

The quality improvement index has extreme values which are very important when making decisions about quality. The extreme values are indicative of how important the service requirements are. According to Bailom et al. (1996), the higher the value of the positive range, the higher the relative significance in the perceived service quality from the service user's viewpoint. Conversely, the higher the negative value of the quality improvement index, the higher the lower the relative significance of the service quality (Bailom et al., 1996). Similarly, Johnson et al. (n.d) noted that high priority quality characteristics signify that investing in the identified service user needs will deliver great value to the people or the community they serve. After the translation of customer requirements, managers and personnel in charge use the identified technical requirements to estimate cost, feasibility, as well as the probable technical difficulty for each change in every technical requirement identified (Temponi et al., 1999).

### **Benchmarking**

Managers can also use the house of quality metrics to conduct benching or what Keegan and O'Kelly (2004) referred to as applied competitive benchmarking, and which they noted, enables organizations conduct objective evaluations so that they are able to understand their current situation and take steps to improve their

performance. Keegan and O'Kelly (2004) therefore defined benchmarking as "a continuous, systematic process for comparing performances of organizations, functions or processes against the 'best in the world', aiming not only to match those performance levels, but to exceed them". According to Keegan and O'Kelly (p. 1), benchmarking allows organization managers to conduct an objective evaluation of the organization's business with an aim of identifying issues as well as areas that require attention and improvement. To do this, the organization managers have to compare their organization's business areas and processes with those of competitors so as to measure progress in those business areas and/or process and to learn from the competitors or organizations offering similar services. Bernal et al. (2009, p. 17) suggested that this can be done by conducting competitor assessment using the house of quality tool.

The house of quality tool allows organization managers to carry out a competitor assessment from the customers' perspectives (Bernal et al. 2009, p. 17). Lankford (2001, p. 59) referred to this as reverse engineering benchmarking, which simply means analyzing "the entire customers' path of organization's competitor". The house of quality tool therefore enables managers to make decisions based on facts rather than instinct or opinion since it has formal and quantitative representation of requirements which are used to identify customer requirements (Temponi et al. 1999, p. 341). Using the house of quality, competitor's services and/or products are compared to the organization's products and/or services from the customers' perspective (Bernal et al. 2009, p. 17).

Bernal et al. (2009) describe how the house of quality's two steps of evaluation can be used to by managers to benchmark. The first step is known as customer (service user) competitive assessment, in which the service users assess the relative performance of the organization's services and its main competitors in the private sector or 'best in the world' organizations on the service user's needs identified (Chan & Wu, 2005). Bernal et al. (2009) noted that the benchmarking begins by comparing the two organizations' products and/or services along the lines of the customer requirements. A characteristic measure is therefore established for each service feature. Service user competitive assessment is usually expressed and measured by a 5-point scale (Chan & Wu, 2005). This allows the evaluators to assess and compare the service users' perception of the satisfaction requirements to the 'best in the world' organizations' or competitors' (Bernal et al., 2009). In the second step, the evaluators perform technical competitor comparison, in which the design requirement fulfillment is compared. Bernal et al. (2009) emphasized that the second step should be done specifically by the personnel in charge of the product and/or service design.

### **Prioritization**

Managers can also use the house of quality to determine the organization's priorities according to the consumers' perspectives (Bernal et al. 2009; Hauser 1993; Temponi et al. 1999). Fielding, Gunzenhauser, and Smith (2010) noted that public organizations often have limited resources at their disposal yet they are expected to deliver meaningful services. Thus, they have to prioritize their services and the options that will lead to greatest impact on improving the services offered. Fielding, et al. (2010) therefore recommend that managers in public organizations use tools and processes that result in informed, responsible decisions to ensure that the decisions affecting resource allocation are deliberate rather than just skill and experience. Effective prioritization is linked to two very important levels of accountability: the focus of the resources on issues that are of utmost significance to the community; the use of the resources to "support strategies and interventions that are effective and acceptable to the community" (Fielding et al. 2010, p. 2). Accordingly, managers in public organizations and agencies have to get the views of the community they serve so as to establish the community's needs in relation to the resources available (Gibson, Martin & Singer 2004, p. 27). This means that these managers have to determine the magnitude of every issue, the importance of every issue, the effectiveness of proposed interventions, as well as the feasibility of implementation of the every proposed intervention (Fielding et al. 2010, p. 2).

According to Hauser (1993, p. 5), the first step in the house of quality assessment is the determination of customer or user needs as well as their arrangement, the assignment of priorities to user attributes or wanted benefits in a service, and the evaluation of user views. This is done by determining the importance level (Bernal et al. 2009, p. 20). The importance level defines the relative significance of each consumer or user attributes ("what") and the design and/or improvement requirements ("how") to achieve the desired goal. The relative significance is determined through an evaluation of the user or consumer. The house of quality provides a relative scale of 1-5 or 1-10, which is used to establish the user importance level (Bernal et al. 2009, p. 20). To determine the priority levels, the design or improvement requirement levels and the user attribute importance levels are multiplied by corresponding weightings (rating service users assign to existing or expected services) (Hauser, 1993). This enables the evaluating team to create a value for each relationship between service user attributes and the design or improvement requirements (Bernal et al. 2009, p. 20). The weight comprises the weighted sum of the elements of the services corresponding to a design or improvement requirement multiplied by the identified customer needs (attributes) importance levels. The evaluators compute the importance levels of

the design and/or improvement requirements by adding the values together (Bernal et al. 2009, pp. 20-21).

Chan and Wu (2005) explain that the main output of the HOQ which is used for prioritization is the importance ratings of the service users' needs identified. The team of evaluators therefore uses house of quality to calculate the correlation matrix of all elements of the design and/or improvement requirements for the services offered by the organization (Bernal et al., 2009). Thus, it is calculated by summing the final importance rating of service users' needs identified multiplied by the relationship values between the needs identified and the design or improvement requirements (Chan & Wu, 2005). The manager's decision-making is aided by both the positive and negative correlations. After determining the priority areas for new investments and improvements, the team of evaluators can proceed to estimate costs, feasibility, as well as probable technical challenges taking into considerations the resources available at the organization's disposal (Hauser 1993, p. 65). This information can be used by managers for both service prioritization and planning since it enables the organization managers to understand the strengths and weaknesses of the current services and programs offered as well as priority areas as per the views of the people or community the organization serves (Johnson et al., n.d).

### Conclusion

The literature review has shown that the house of quality tool can be used to obtain useful information that can significantly enhance the management of public organizations. This is because it is based on the premise that customers' (or service users') perceptions are very important in determining what to offer to consumers as well as how to offer it. Similarly, public organizations seek to offer services which are in line with the actual needs of the people they serve. Thus, they have to collect the views of the people they serve to be able to customize these services or improve them according to the identified needs while ensuring that the resources available can support the redesign or introduction of the new services. At the same time, they have to offer high quality services to the people they serve, meaning that they also have to benchmark their services and activities against the "best in the world" or an organization in the private sector perceived in the consumers' opinion to be offering the best services. The literature review therefore identified areas in which the house of quality tools can be used by managers in public organizations as: quality improvement; benchmarking; and prioritizing.

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