INTERNAL BENCHMARKING METHODOLOGY 
AND ITS IMPLEMENTATION ON APPAREL 
RETAIL INDUSTRY

İÇ KIYASLAMA METODOLOJİSİ VE HAZIR GİYİM PERAKENDE 
SEKTÖRÜNDE UYGULANMASI

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Received: 04.01.2015                                    Accepted: 02.12.2015

ABSTRACT
In this study, a methodology for an internal benchmarking process was proposed for apparel retailer companies with the subaims of the identification of customers’ requirements and the determination of working procedures related with them. To this aim, in the methodology of customer satisfaction and process benchmarking, Quality Function Deployment (QFD) and Analytical Hierarchy Process (AHP) were used in combination with some minor modifications within QFD. The proposed methodology was implemented on the two departments of an apparel retailer company.

Keywords: Internal Benchmarking, Customer Satisfaction Benchmarking, Process Benchmarking, Quality Function Deployment, Analytical Hierarchy Process, Apparel Retailer.

ÖZET
Bu çalışmada, iç kıyaslama çalışmalar için bir metodoloji önerilmiş, tüketicilerin hazır giym perakendeçilerinden bekletileri ortaya koymuş ve söz konusu bekletilerin hangi iş prosedürleri ile ilişkili olduğu belirlenmiştir. Bu amaçla müşteriler memnuniyeti kıyaslaması ve proses kıyaslaması yapabilme özelliğine sahip olan önerilen metodolojide, Kalite Fonksiyon Yayılımı (KFY) ve Analitik Hiyerarş Hücre Süreci (AHS) bir arada kullanılmaktak ve KFY teknigi içinde iç kıyaslamının gerekçiliklerine uygın olması için bazı değişiklikler önerilmiştir. Önerilen metodoloji bir hazır giym perakende firmasının iki departmanına uygulanmıştır.


INTRODUCTION
Increasing the customer satisfaction in apparel retail industry increases the sales amount and customer loyalty which provides the sustainability in the end. The competitive companies should continuously assess their own customers’ satisfaction level and the achievements of their closest competitors in this regard in order to position themselves and to find out the reasons lying beneath the success.

Benchmarking is identified as the investigation of the best practices within the industry. Whereas best practice benchmarking can be established against an organization that is active in completely different field of industry; internal benchmarking can be established within two different departments of an organization. The companies may benefit the internal benchmarking because the performance levels can be increased to the one’s having higher performance, without coming across any problems such as avoidance of information sharing. On the other hand, the customer satisfaction benchmarking is helpful to evaluate the products’ and services’ characteristics in terms customers’ needs and to integrate the customers’ opinion in the selection of critical factors; process benchmarking allows to analyze the both the current and potential techniques or work procedures in detail(1).

Although benchmarking process proved its importance for the organizations, no specific method in literature was identified for the establishment of benchmarking process. Quality Function Deployment (QFD) with the primary usage in product development, quality assurance and control, was found to be working well in conjunction with the
benchmarking process. Getting the voice of the customer as an input in order to determine the prior issues, QFD establishes a benchmarking process in terms of customer satisfaction in the competitive analysis. QFD allows explaining the relationship between the customer requirements and technical capabilities which can be taken as the benchmarking objects for further investigation in more detail. The usage of QFD with Analytical Hierarchy Process (AHP), on the other hand, clarifies the prior issues systematically before evaluating the performance of the companies in benchmarking process.

Within this respect, the purpose of this paper is to propose a methodology for an internal benchmarking process that allows making both customer satisfaction and process benchmarking for an apparel manufacturer and retailer company benefiting QFD in conjunction with AHP with minor modifications in QFD, such as; elimination of some steps, improvement in calculations and, identification of working procedures instead of technical capabilities. The subaims of the study are identification of the requirements of customers from an apparel retail company and determination of the working procedures involving the technical capabilities related with these customer requirements in concern. The proposed methodology was validated with an implementation on a real world case.

**Literature Review**

Benchmarking was applied using different techniques such as AHP; DEA; DEAHP and DEANP; combination of Principal Component Analysis and Clustering Techniques (2-5). On the other hand, benchmarking has the potential to be used in conjunction with QFD since they built a synergistic effect to meet and even exceed the increasing customer expectation (1). According to Kumar *et al.*, (1) benchmarking helps to modify the existing products using the processes and/or practices that yield the most value in QFD whereas QFD satisfies the beneficial allocation of the resources. Because of this reason, QFD was used with benchmarking processes or to establish benchmarking in many studies in literature in fields of education, marketing and health (1,6-9).

Developed in Japan in early 1970s by Professor Yoji Akao and Professor Shigeru Mizuno (10), QFD provides translation of market research and customer requirements into strategies increasing the level of satisfaction for the consumers (7). Shubhapriya and Byoungho (11) describes the quality in Quality Function Deployment as value and adds that this value is created by analysing the customers’ needs and wishes and transforming these requirements into services. On the other hand, Kumar *et al.* (1) draws attention to the superiority of the QFD methodology to design and develop new products and product improvement programs using least resources.

QFD was developed as a concept for new product development in total quality control (11), but then, QFD was used in many fields such as, healthcare, retail, information services, e-banking, education (12-16). And it was also established in textile and clothing manufacturing industry in establishing a model to identify and integrate the customer requirements about the manufacturing of synthetic yarns (17); to design an economic sampling plan (18), to develop a training course for clothing merchandise (19).

QFD was accomplished in conjunction with AHP in most of the studies in the fields of education, material production, project selection, tourism (7,16,20-22) and in determination of design characteristics, facility location and new product development (23-25) but not specifically in textile and apparel retail industries. On the other hand, AHP found itself a usage in many applications in textile and apparel industries especially in terms of supplier evaluation (26) and selections models, logistics for textile industry(27), identification of performance indicators (28), supply chain optimization (29).

Nonetheless, there is no study within the literature that uses these two techniques together within the apparel retailing industry. Within this study, it is aimed to propose a methodology for an internal benchmarking process for an apparel retailer involving these two techniques together.

**Proposed Methodology**

The proposed internal benchmarking procedure was derived from QFD which uses the House of Quality Matrix (HOQ) shown in Figure 1 as a central component.


**Figure 1. House of quality matrix (7)**
In case that QFD can serve as an internal benchmarking tool, Customer Competitive Assessment block in HOQ was used for making Customer Satisfaction Benchmarking whereas AHP was integrated into the technique in order to find the importance ratings. Process Benchmarking was achieved after the selection of working procedures based on the relationship matrix. Having the usage in product design considering the quality requirements from consumers and technical capabilities, correlation matrix block was eliminated from QFD. Working procedures were used in hows instead of technical capabilities. Finally, the calculation of ranks was eliminated and relative scores were calculated and used for determining the key working procedures. The proposed methodology was summarized in Table 1 with the explanation of the steps and corresponding parts of HOQ.

Implementation of Proposed Methodology on Real World Case

The proposed methodology was implemented on a Turkish apparel manufacturer and retailer company. Manufacturing men’s, women’s and children’s wear, the company sells its products under its own brand in chain stores. The internal benchmarking procedure proposed was applied within the two departments of this company which are women’s wear and children’s wear.

The data for the 1st, 2nd, 3rd and 7th step were provided based on the literature and brainstorming established among the company specialists whereas the data for the 4th and 5th step were gathered from the surveys conducted on the focus group of consumers.

Specifically, in the 3rd step, a relationship matrix was build to analyzed the strength of the relationship between customer requirements and working procedures. The strength of the relationships was shown using the symbols a triangle, circle, and a dark circle having the numerical values of 1, 3 and 9 which indicated a weak, moderate and strong relationship (1,6).

In the 4th step, a questionnaire including the questions corresponding to the pairwise comparisons of the customer requirements were required to be done by a focus group of customers composed of 50 people. Using the 1,3,5 scale as proposed by the researchers, (30-32), the priorities which were defined to be Importance Ratings (IR) were obtained following the procedure by Saaty (33) using geometric mean of the results (31).

In the 5th step of the customer satisfaction benchmarking, the data was gathered from a survey conducted among mothers considering the fact that children are not capable of assessing the performance level of the company. A questionnaire of 21 questions was prepared using five point likert scale in which each question corresponded to one customer requirement. Each participant was required to fill in two questionnaires, one for themselves and one for their children considering women’s wear and the children’s wear products respectively. In order to eliminate the similarities given to the questions, the two questionnaires from each participant were subjected to paired sample t-test and only the questionnaires for which the difference was found to be statistically significant were used for performance comparisons. By averaging the answers from the respondents, final paired sample t-test was applied and its significance was tested within the significance level of 0,05 and degrees of freedom 20.

In the 6th step of determinations of key working procedures, getting the Importance Ratings (IR) results from the 4th step and identifying the performance level of more successful department as Target Performance Levels (TPL) for the department that is less successful with the Current Performance Level (CPL); the Improvement Ratios (IMPR), Overall Weight (OW) and Relative Overall Weights (ROW) which the normalized form OW were calculated for each customer requirement using Equation 1 and 2 below:

Analyzing the results of OW, more influential or key customer requirements for reaching performance level of more successful department were identified. The key working procedures were further carried out considering the results obtained and further calculations of Absolute Scores (AS) and Relative Absolute Scores (RAS) were calculated for each working procedure.

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\[ \text{IMPR} = \frac{\text{TPL} - \text{CPL}}{\text{CPL}} \]  
\[ \text{OW} = \text{IMPR} \times \text{IR} \text{ for all customer requirements} \]  
\[ \text{AS} = \text{The weight assigned to the relationship matrix in the third step} \times \text{IR} \]
The usage of the equations for calculations were given for one customer requirement and working procedure under Figure 2. The key working procedures were selected to be the ones corresponding to the customer requirements with higher OW. Nonetheless, the working procedures having lower AS were eliminated, whereas the working procedures with higher AS were added into the assessments.

ASSESSMENT OF THE RESULTS

Following the methodology, the findings were summarized under 5 headings corresponding to the steps covered within the methodology part.

Step 1, 2 and 3: 21 customer requirements shown in Figure 2 were identified and classified under five groups which were determined as 'Quality', 'Price', 'Timeliness or flexibility', 'Fashion and variety of design' and 'Service' including 5, 4, 2, 6 and 4 criteria respectively.

20 working procedures were identified related with the customer requirements which were grouped under 5 working stages as seen in Figure 2. While 'Procurement' stage had 10 working procedures, 'Design', 'Production' and 'Service' included 2 procedures each and finally; 'Planning' had 4 working procedures.

The strength of the relationships between the customer requirements and the working procedure were shown in relationship matrix as seen in Figure 2. Each customer requirement was matched with at least one working procedure.

Step 4: According to the final priority values obtained by multiplying the priorities in the first and second level of hierarchy, it was observed that, the prior issues were related with the parameter 'Service' as seen in Figure 2 in importance ratings column. The other significant parameter that was as important as the service parameter was the 'Timeliness or flexibility'. This enabled CR10, CR11 and CR20 to be the top most important requirements. Other than the requirements belonging to the groups 'Service' and 'Timeliness or flexibility', CR9 under 'Price' followed with the 'CR3' and 'CR1' under 'Quality' were found significant.

Step 5: After elimination of the questionnaires whose answers were found to show difference statistically getting the t-value of 4.44 which is bigger than the critical t-value 1.725 within the statistical significance of 0.05 with 20 degrees of freedom, the average scores for the two departments were obtained as seen in Figure 2. The final scores taking the arithmetic averages of 53 questionnaires revealed that, the children's wear department was certainly better than the women's wear department. Based on the IMPR calculated, the women's wear department required more improvement in the customer requirements groups of 'Fashion and variety of design' and 'Quality'. The customer requirements regarding 'Price' got the lower IMPR scores. Nonetheless, CR17, CR13 and CR14 under the customer requirement group of 'Fashion and variety of design'; CR21 under 'Service', CR1 under 'Quality' and CR10 under 'Timeliness or flexibility' were found to need more improvement compared with the other ones getting IMPR > 0.24.

On the other hand, adding the influence of IR on the improvement ratio, the results changed significantly pointing out the contribution of the importance levels. According to OW, all the customer requirements under the groups of 'Service' and 'Timeliness or flexibility' were found to have higher values ≥ 1 enabling to determine most important customer requirements within the customers perspective, although they didn't get as high scores as in the case of not integrating IR. CR14 and CR13 under the group of 'Fashion and variety of design', and CR1, CR2 and CR3 under the group of 'Quality' were found to have higher ratings when compared with the other customer requirements so they were included in the key customer requirements. The key customer requirements were signed with dark gray color in Figure 2.

Step 6: The key working procedures were determined considering the key customer requirements and AS values calculated which were depicted in Figure 2. The working procedures corresponding to key customer requirements were checked and the ones with the Relative Absolute Scores ≥ 0.05 were selected as key working procedures. Having lower Absolute Scores, the working procedures including WP6, WP7, WP13, WP14, WP15, WP17, WP20 were eliminated from the working procedures that would be subjected to process benchmarking. On the other hand, the working procedures having higher relative AS≥0.05 which are WP1 and WP9 and WP18 were added to the working procedures considering the fact that these working procedures were important because of being in strong relationship with more than one customer requirement.

Within these respects, the working procedures that would be subjected to process benchmarking were signed in Figure 2 with a special emphasis on the 'WP10, WP11, WP3, WP16, WP1, WP4 and WP5.'

Step 7: The process benchmarking was accomplished in order to find out the critical differences that should be employed to improve the performance by analyzing the key working procedures determined in the previous step and by establishing a brainstorming with specialists related with these working procedures. In general, it was found out that the production pursuit was done more strictly by the children's wear department thanks to the higher number of personnel employed. More visits were found to have been made both to the suppliers and the contractors' which had probably caused a decrease in the quality problems as they allow detecting the possible delays before they occurred. Specifically, following suggestions can be made for the company.

Regarding WP4 and WP5, the standards were found to be more rigid within the children's wear department in relation to the probable requirements of the products. In WP1, lower priced items can be added within the collection to increase the attractiveness of the products. In WP18, more accessorizers can be included within the combines causing a perception in consumers mind that they were having more promotions as they were buying more items. Regarding WP16, same or similar product categories should be available in the stores located in different regions. In WP10, an individual team should be kept responsible in preparations of combines and checking the stores for the establishment of the sample combines. In WP11, more trendy colors and designs should be included within the collections in order to raise the perception of the customers about getting new items from the stores.
### HOUSE OF QUALITY (RELATION MATRIX)

| Customer Requirement | WP1 Price determination | WP2 Cost evaluation | WP3 Production pursuit | WP4 Raw material endorsement | WP5 In line quality control | WP6 Inspection | WP7 Shipment | WP8 Competitive analyses | WP9 Preparation of sales collection | WP10 Preparation of combines for catalogs | WP11 Identification of trends in season models | WP12 Identification of trends in season colors | WP13 Preparation of body sizes | WP14 Preparation of patterns | WP15 Planning the number of collections | WP16 Planning the shipment between warehouse and store | WP17 Production planning | WP18 Promotion planning | WP19 After sales services planning | WP20 Window design |
|----------------------|-------------------------|---------------------|------------------------|-----------------------------|-----------------------------|----------------|-------------|--------------------------|-----------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|-----------------------------|
| **Importance Ratings (%)** | CR1 Durability 0.0492 | CR2 Colour fastness 0.0483 | CR3 Quality of print and accessories 0.0547 | CR4 Conformance to child safety requirements 0.0222 | CR5 Conformance to ecological requirements 0.0259 | CR6 Quality-price balance 0.0369 | CR7 Price attractiveness 0.0399 | CR8 Convenience of sales season price levels 0.0424 | CR9 Attractiveness of promotional activities 0.0626 | CR10 Shipment to store on demand 0.1122 | CR11 Availability of brand new products at the beginning of the seasons 0.1003 | CR12 Fitness of patterns 0.0340 | CR13 Convenience of patterns sizes 0.0313 | CR14 Variety of style options 0.0389 | CR15 Variety of color options 0.0315 | CR16 Harmony with fashion and trends 0.0237 | CR17 Annual divergences in collection 0.0222 | CR18 Accessibility to catalog products at store 0.0544 | CR19 Credibility of catalog information 0.0602 | CR20 Correct settlement of products and accuracy of combines 0.0744 | CR21 Return or changeover after sales 0.0347 |
| **Average Scores (Children’s wear)** | 2.77 | 2.79 | 2.85 | 2.74 | 2.74 | 2.89 | 3.47 | 2.64 | 3.26 | 2.75 | 2.91 | 2.87 | 2.79 | 2.77 | 2.92 | 2.64 | 3.26 | 3.26 | 3.42 | 3.47 | 3.26 |
| **Improvement Ratio (IR)** | 0.24 | 0.22 | 0.21 | 0.13 | 0.13 | 0.08 | 0.08 | 0.16 | 0.19 | 0.25 | 0.14 | 0.22 | 0.28 | 0.24 | 0.12 | 0.28 | 0.28 | 0.30 | 0.29 | 0.17 |
| **Overall Weight (OW)** | 1.21 | 1.04 | 1.16 | 0.29 | 0.34 | 0.29 | 0.30 | 0.70 | 2.50 | 2.84 | 1.37 | 0.74 | 0.87 | 0.93 | 0.74 | 0.28 | 1.59 | 1.59 | 0.30 | 0.46 |
| **Relative Overall Weight (ROW)** | 6.61 | 5.73 | 6.37 | 0.24  | 1.86 | 1.59 | 1.67 | 3.82 | 2.50 | 15.60 | 7.50 | 4.05 | 4.76 | 5.08 | 3.59 | 1.51 | 16.21 | 5.52 | 6.41 | 5.96 |

**Figure 2.** Customer satisfaction benchmarking results and identification of key working procedures.
CONCLUSION

In this study, an internal benchmarking procedure was proposed which covers customers satisfaction benchmarking followed with process benchmarking. Emphasizing the claim that there is a synergistic effect between benchmarking and QFD, QFD was benefited in building the framework of the study with minor modifications of elimination of some of its steps, improvement in calculations and usage of working procedures instead of technical capabilities. AHP was integrated within the procedure in order to better determine the importance of the customer requirements in terms of increasing satisfaction level.

Establishment of the procedure in a real world case provided enough clues and discussions for showing how an internal benchmarking can be made within an apparel retail company and what the set of customer requirements and working procedures related with them could be identified for this industry. The numerical results put forward the importance of providing good service, being on time and flexible for customers. Besides, it was pointed out that these can only be achieved with a close inspection of the processes and by focusing on customer expectations.

The procedure explained here presented a systematic benchmarking methodology enabling to obtain quantitative results. The identification of customer requirements and working procedures related with them are helpful and can be used as initial parameters by the companies in apparel retailing industry that wish to establish both internal and external benchmarking. Nonetheless, the procedure can be expanded or modified with the integration of different techniques in especially determination of the importance ratings such as ANP or fuzzy AHP.

REFERENCES