



Application of Quality Function Deployment with Different Consumer Behavior of Generations in Jewelry Sector

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Abstract

The jewelry industry has shown a rapid growth in recent years. There are significant changes in both consumer behavior and the industry itself. It is an undeniable fact that generational differences affect the consumption perception and purchasing behavior of consumers in jewelry. Product design in jewelry is intended to develop, differentiate and design the functional structure of jewelry items according to the consumers' preferences and the needs of the different stages of the life cycle of the jewelry product. In this study, Quality Function Deployment is applied, which aims to satisfy the customer and improve product quality by transforming customer demands into design targets and main quality assurance points to be used during production. Systematic and quantitative use of the relationship between customer demands and engineering features will bring businesses to the target customer satisfaction in the jewelry industry. With this study, an unprecedented research is presented in the literature by taking into account the generation-based consumption behaviors of the customers while applying the QFD analysis.

1. Introduction

With the effect of globalization, the development of the concept of quality and the rapid change in customer expectations made it necessary for businesses to reflect the voice of their customers on their products or services. Thus, the only way for businesses to gain competitive advantage has been to develop the right strategies according to the sector they are in. In this direction, businesses had to give importance to product quality and make consumer-oriented production. Providing customers' requests and requirements with the desired quality at the lowest cost and in the shortest possible time has been a continuity for businesses. Businesses that adopt this idea have started to look for ways to integrate with their customers. In this study, QFD is applied, which aims to satisfy the customer and improve

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product quality by transforming customer demands into design objectives and main quality assurance points to be used during production (Akao, 1997).

Jewelry product design is to create, decompose and design the functional structure of jewelry products according to the needs of users and the requirements of various stages of the jewelry product life cycle. Every jewelry company should strive to strengthen and differentiate their brand with unique, distinctive designs. In addition, jewelers' product designs should reflect customer requests and requirements accurately to the product (Linda vd., 2014). With the QFD method, the priorities of customer requests and requirements are determined and product-related features are prioritized according to the customer's voice. Thus, when the designer has to choose between customer requests and requirements for technical or aesthetic reasons, it will be possible to examine this order and design the product according to this order. This method will bring the businesses in the jewelry sector to target customer satisfaction. In order to maximize this degree of customer satisfaction, the purchasing behavior of customers in jewelry should be examined. Researching the purchasing habits of different consumers is important in revealing product trends for these consumers.

Today, businesses need to analyze consumer behavior well, develop new products in line with customer demands and expectations due to global competition, technological innovations, shortening of product life cycle, changes in customer profile. Determining the consumer profile of the future is only possible by understanding the characteristics, life perceptions and ideals of different generations. In the new product development process, the relationships between demographic characteristics and purchasing preferences of generations should be examined. Generations experience differences due to their upbringing and economic, social and political changes in their environment. When the consumer wants to buy a product from among the various options available in the market, he will choose the one that suits his taste, needs, motives and lifestyle. Many businesses try to communicate with more than one generation, to get them to understand and to persuade them to buy the product or service. Even if the target audience is more than one generation expressed as individuals from each age group, it can be considered important to analyze the characteristics of the generations separately and to take this factor into account when determining marketing strategies.

People born between 1965 and 1979 are known as Generation X. They're the first generation to care about brands. In terms of purchasing behavior, they are quite sophisticated (Sarı ve Harta, 2018). Traditional purchasing research and decision-making processes are still used by this generation. We can observe that the most of them are still wary of internet shopping and are unwilling to make purchases. When they are undecided about a purchase, they may seek out the advice of others. They are wary of marketing stimuli and oppose various marketing techniques. As a result, influencing and persuading the Generation X consumer segment is challenging. Individuals born between 1980 and 1999 are known as Generation Y. They are the first generation to break over the barrier of production-based world perception and enter the world of consumption (Sarı ve Harta, 2018). As a result, Y is an important generation for organizations to consider while conducting market

research. Consumers in Generation Y are more educated and aware of marketing strategies than earlier generations. Consumption of particular products serves as a symbol in the formation of one's own identity and communication with others. The generation Z born after 2000. It creates a persona capable of multitasking and making several decisions at the same time, demanding everything be done rapidly and ingesting everything immediately. The members of this generation, who are still in their childhood, have an impact on their consumption decisions as a result of economic, social, cultural, and technical revolutions. As a result of these qualities, all other generations' marketing and consuming practices are expected to shift dramatically, forming the future consumer profile (Altuntuğ, 2012).

2. Material and Method

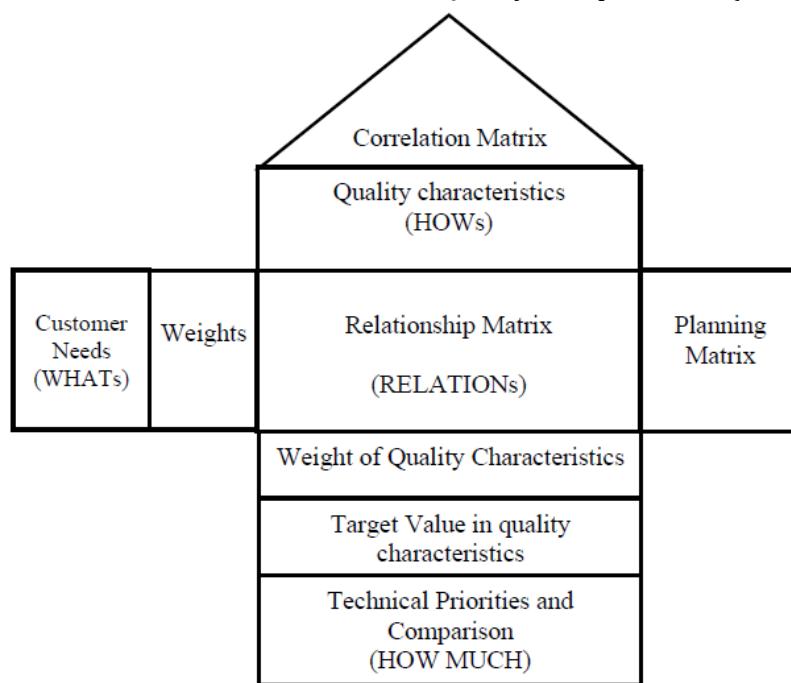
2.1. Method

QFD is a process for enhancing design quality in order to satisfy consumers by translating client requirements and expectations into product design objectives and quality assurance points that can be used during product development [19]. It is based on the premise that products and services should be developed in direct response to client demand [20]. The method's main point is "Customer Voice." QFD's concept is to listen to and comprehend customers, then translate their demands and expectations by putting them into technical distinctive shapes. QFD is a product development and enhancement methodology based on a set of matrices known as the House of Quality. The general structure of the house of quality is shown in Figure 1. WHAT do customers want, HOW can we fulfil these requests? and HOW MUCH can we make improvements? This matrix gives us the answer to your questions. End of the QFD process, goods and services suitable for customer requests are produced.

2.2. Material

In order to better understand the QFD, a "Quality House" will be built and practiced on a sample. For this purpose, first of all, an enterprise where the application trial can be made was selected. Turkey's third largest gold jewelry producer and exporter "GOLDENLINE Jewelry and Giftware Industry and Trade Inc." has been discussed with. Necessary organizational support was provided by meeting with the company's quality and customer service department employees and senior managers, briefly explaining the project's purpose and implementation steps. The aim of the project is to investigate the position of the company in the market in the eyes of the customer and to understand the customer requests and requirements. The purchasing behavior of generations is also included in the study. Thus, it is aimed to improve the production quality by providing the greatest customer satisfaction. The company makes wholesale sales to companies that will personally offer the final products to the users. In addition, he started retail sales with the website he established in the last 1 year. Addressing the end user directly has led to an expansion in the customer portfolio. The customers selected for this study are the end users who shop with the website. The project time frame has been determined as March 2021-May 2021.

Figure 1: General structure of “House of Quality”, adapted from (Akao,1997)



In order to decide on the product to which the study will be applied, the company's best-selling products in recent years have been taken into account. According to the data of 2020, the pendant, which is the second best-selling product of the company, was decided. 4 different production technologies are used for pendant production within the enterprise. It is possible to obtain very different designs according to the consumer preferences and the imagination of the designers in the models designed as gold pendant. These differences are due to the features of the product and the qualities that are in different order of importance by people. The main features that make up the differences are color, setting, size, appearance and shape. While implementing the QFD stages in the project, the main team; Project manager Betül ÇITIR consists of marketing and customer relations department manager and 2 department employees. When necessary, the opinions of different department employees and senior managers were consulted and these employees were included in the team.

3. Application

QFD is a matrices-based approach that provides practitioners with a backbone structure for the NPD process. There are three stages to the QFD Process. Since the focus of this method is the customer, the first stage of the process is to determine the wishes and needs of the customers. The second stage is the stage where the determined wishes and needs turn into product characteristics. The installation steps of the house of quality are detailed one by one. In the third stage, each step of the second stage is analysed. For this reason, these two stages are considered together.

3.1. Gathering the Voice of the Customer (Stage 1)

3.1.1. Defining customer requirements

Goldenline jewelry company, customer relations department employees and managers were tried to define customer requests by taking the opinions of other department employees and taking advantage of the data obtained from academic publications. The wishes at this stage are: 1) Including figures, 2) Quality, 3) Not darkening, 4) Color option, 5) Color combinations, 6) Polished 7) Heavy, 8) Detailed, 9) Minimal design, 10) Geometric form, 11) Combination of more than one piece (hybrid product), 11) Not scratching, 12) Handcrafting, 13) Suitable in train, 14) Containing colored stones, 15) Appealing to the eye.

3.1.2. Listening to the “Voice of Customer”

The purpose of listening to the voice of the customer is to make one-on-one meetings with customers to reveal their requests in an open or confidential manner in order to better define customer needs. There are different ways to listen to the voice of the customer. Focus group study was deemed appropriate for this research. As a result of online interviews with 10 customers, the requests were determined. Customer wishes determined in line with the focus group work: 1) Visually attractive, 2) Elegant, 3) Color combinations, 4) Simplicity, 5) Craftsmanship, 6) Originality, 7) Having a specific theme, 8) Geometry, 9) Brightness, 10) Not irritating the skin, 11) Stony, 12) Including figures, 13) Affordable price, 14) Setting, 15) Weight, 16) Eye contact. 17) It is enamel.

3.1.3. Management of customer requirements

All requests have been brought together during the configuration of customer requirements. In the meetings held by the KFY team, the expressions of some requests were changed, some requests were collected under different headings, the unimportant ones were eliminated, and the most important 9 requests were determined: 1) Brightness, 2) Color options, 3) The theme of the design, 4) Being cheap, 5) Combination of more than one piece (hybrid), 6) Containing stone, 7) Minimal design, 8) Being in geometric form, 9) Containing different surface patterns.

3.1.4. Weighting of customer requirements

Analytical Hierarchy Process (AHP) is used to determine the importance level of customer requests, which are structured in the KFY method, in the eyes of customers. In practice, by comparing the rows with columns, "How important is the activity in the row compared to the activity in the column?" The answer to the question is given for each cell. While making this comparison, if the row is higher than the column, the scoring is given as an integer according to the degree of superiority, and if the column is above the row, the scoring is given as 1 / (degree of superiority). Scale between 1-9 was used for the level of importance. A questionnaire was applied to determine the importance level of the determined requests for customers. The sample volume of the questionnaire is 30. 10 Generation X, 9 Gen Y and 11 Gen Z filled the questionnaire. Table 1 contains a

sample of the questionnaire. In the questionnaire, the customers were asked to fill the right diagonal of the matrix by performing binary comparison for the specified requests. The left diagonal is filled in by the QFD team with the symmetry of the data on the right. Later, the data were categorized by generation and AHS was applied.

Table 1. AHP Survey sample

| Requests | Brightness | Have color options | The theme of the design | Affordable price | Combination of multiple parts (hybrid product) | Containing stones | Minimal design | Being in geometric form | Containing different surface patterns |
|------------------------------------------------|------------|--------------------|-------------------------|------------------|------------------------------------------------|-------------------|----------------|-------------------------|---------------------------------------|
| Brightness | 1 | 3 | 0.333 | 0.143 | 1 | 3 | 0.2 | 0.2 | 3 |
| Have color options | 0.333 | 1 | 0.2 | 0.143 | 3 | 3 | 0.143 | 0.2 | 3 |
| The theme of the design | 3 | 5 | 1 | 0.333 | 5 | 5 | 3 | 3 | 7 |
| Affordable price | 7 | 7 | 3 | 1 | 7 | 7 | 1 | 3 | 7 |
| Combination of multiple parts (hybrid product) | 1 | 0.333 | 0.2 | 0.143 | 1 | 1 | 0.143 | 0.2 | 5 |
| Containing stones | 0.333 | 0.333 | 0.2 | 0.143 | 1 | 1 | 0.143 | 0.2 | 1 |
| Minimal design | 5 | 7 | 0.333 | 1 | 7 | 7 | 1 | 3 | 7 |
| Being in geometric form | 5 | 5 | 0.333 | 0.333 | 5 | 5 | 0.333 | 1 | 7 |
| Containing different surface patterns | 0.333 | 0.333 | 0.143 | 0.143 | 0.2 | 1 | 0.143 | 0.143 | 1 |

AHP; begins with the calculation of column sums. The aggregated status of these columns forms the "Total" line. Next, the value in each cell is divided by the column sum and the AHP Eigenvector Matrix is obtained. In the AHP Core Vector Matrix, rows are summed for each customer request and row totals are found. When the sum of each row is divided by the sum of the row totals, the normalized significance levels of each group are determined as percentages. An example eigenvector matrix is given in Table 2.

Table 2. Eigenvector Matrix Example

| Requests | Brightness | Have color options | The theme of the design | Affordable price Combination of multiple parts (hybrid product) | Containing stones | Minimal design | Being in geometric form | Containing different surface patterns | Importance Degree | Normalized Importance Degree |
|------------------------------------------------|------------|--------------------|-------------------------|-----------------------------------------------------------------|-------------------|----------------|-------------------------|---------------------------------------|-------------------|------------------------------|
| | Brightness | Have color options | The theme of the design | Affordable price Combination of multiple parts (hybrid product) | Containing stones | Minimal design | Being in geometric form | Containing different surface patterns | Importance Degree | Normalized Importance Degree |
| Brightness | 0.043 | 0.103 | 0.058 | 0.042 | 0.033 | 0.091 | 0.033 | 0.018 | 0.073 | 0.495 |
| Have color options | 0.014 | 0.034 | 0.035 | 0.042 | 0.099 | 0.091 | 0.023 | 0.018 | 0.073 | 0.431 |
| The theme of the design | 0.130 | 0.172 | 0.174 | 0.098 | 0.166 | 0.152 | 0.491 | 0.274 | 0.171 | 1.829 |
| Affordable price | 0.304 | 0.241 | 0.522 | 0.296 | 0.232 | 0.212 | 0.164 | 0.274 | 0.171 | 2.417 |
| Combination of multiple parts (hybrid product) | 0.043 | 0.011 | 0.035 | 0.042 | 0.033 | 0.030 | 0.023 | 0.018 | 0.122 | 0.359 |
| Containing stones | 0.014 | 0.011 | 0.035 | 0.042 | 0.033 | 0.030 | 0.023 | 0.018 | 0.024 | 0.233 |
| Minimal design | 0.217 | 0.241 | 0.058 | 0.296 | 0.232 | 0.212 | 0.164 | 0.274 | 0.171 | 1.865 |
| Being in geometric form | 0.217 | 0.172 | 0.058 | 0.098 | 0.166 | 0.152 | 0.055 | 0.091 | 0.171 | 1.180 |
| Containing different surface patterns | 0.014 | 0.011 | 0.025 | 0.042 | 0.007 | 0.030 | 0.023 | 0.013 | 0.024 | 0.191 |
| TOTAL | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

In order to check whether the survey data is consistent or not, Consistency Analysis is performed with the Eigenvector Method. An example is given in Figure 2. Column C is obtained by multiplying $(A * B)$ matrix, such that A (table 1) is the Severity Column B found in the result of AHP. Column D is obtained by dividing the obtained Column C into the column B "Severity". The mean of the values in column D is substituted in the consistency index formula so that it is λ_{\max} . The n in the formula represents the number of customer requests. For this study, n = 9 in line with the requests specified in section 3.1.3.

$$* \text{Consistency Index (CI)} = (\lambda_{\max} - n) / (n-1)$$

$$\text{Consistency Index (CI)} = (10.0251 - 9) / (9-1) = 0.0884$$

Figure 2. Consistency ratio calculation example

| MATRIX B | MATRIX C | MATRIX D |
|----------------------------------|--------------------------|--------------------------------------|
| Normalized Severity Rating | Matrix Multiplication | C/R |
| 0.042756 | 0.403112 | 9.428251 |
| 0.082786 | 0.846293 | 10.22267 |
| 0.248856 | 2.659749 | 10.68792 |
| 0.282165 | 3.141768 | 11.1345 |
| 0.01825 | 0.171443 | 9.394289 |
| 0.019304 | 0.179407 | 9.293975 |
| 0.183589 | 2.076398 | 11.31002 |
| 0.089214 | 0.86282 | 9.6713 |
| <u>0.033081</u> | <u>0.30047</u> | <u>9.082965</u> |
| | | $\Lambda_{max} = \frac{10.0251}{10}$ |

If the consistency ratio is ($0.0884 < 0.10$), the data is called "Consistent". Using the data of the questionnaire conducted with 30 people, their importance levels were calculated with AHP and their consistency was checked. Inconsistent questionnaires were not included in the analysis. 8 out of 10 Generation X surveys, 6 out of 9 Generation Y surveys and 8 out of 11 Generation Z surveys were found to be consistent. The importance of each customer request in the eyes of the customer has been obtained as a result of AHP, which is made by taking the geometric average of the surveys that are consistent for each generation. The importance of each customer request in the eyes of the customer has been obtained as a result of AHP, which is made by taking the geometric average of the surveys that are consistent for each generation. Thus, it was found that which generation attaches more importance to which request, and what is the first feature they pay attention to when choosing a pendant.

From this stage on, the QFD process has continued on a generation basis. Requests for each generation are listed in ascending order according to their importance. Then, the evaluation was made according to the ratio of the importance difference between the requests, and the most insignificant requests for the generation were excluded from the process. The survey data are divided into generation categories. It has been applied for each generation and their importance has been determined. In the table 4, how different the purchasing preferences of the X, Y and Z generation gold pendants can be. The "minimal design" factor, which is the least important for the X generation, is the most important for the Y generation. While there is no concern for the "affordable price" of the pendant for the X generation, it is one of the most important factors for the Z generation. From this stage on, the establishment of the quality house will continue for each generation. As a result, 3 different quality houses will be created. For this reason, requests have been narrowed specifically for the generations.

3.2. Creation and Analysis of the House of Quality (Stage 2 and 3)

3.2.1. Creating and analysis of planning matrix

The planning matrix shows the importance of customer requests out of the sight of competitors, firm and customer. The fields to be filled in the matrix are:

Table 4. Comparing generations importance degree

| GENERATION Z CUSTOMER REQUESTS | Normalized Importance Degree | GENERATION Y CUSTOMER REQUESTS | Normalized Importance Degree | GENERATION X CUSTOMER REQUESTS | Normalized Importance Degree |
|------------------------------------------------|------------------------------------|------------------------------------------------|------------------------------------|------------------------------------------------|------------------------------------|
| The theme of the design | 0.2342 | Minimal design | 0.2331 | Containing stones | 0.2639 |
| Affordable price | 0.2109 | Have color options | 0.1964 | Combination of multiple parts (hybrid product) | 0.2152 |
| Minimal design | 0.2086 | The theme of the design | 0.0876 | Containing different surface patterns | 0.1783 |
| Being in geometric form | 0.1349 | Containing different surface patterns | 0.0801 | Brightness | 0.1543 |
| Have color options | 0.0603 | Containing stones | 0.0771 | Have color options | 0.0539 |
| Brightness | 0.0551 | Affordable price | 0.0583 | The theme of the design | 0.0459 |
| Containing different surface patterns | 0.0311 | Combination of multiple parts (hybrid product) | 0.0468 | Being in geometric form | 0.0308 |
| Combination of multiple parts (hybrid product) | 0.0252 | Brightness | 0.0332 | Affordable price | 0.0270 |
| Containing stones | 0.021212 | Being in geometric form | 0.0307 | Minimal design | 0.0190 |

- Severity Column: It shows the importance level of each customer request in the eyes of the customer. Significance levels obtained at the end of AHP were placed in this column.
- Firm Today Column: It shows how the firm's product is perceived by customers in relation to each customer request. For the data at this stage, a scoring survey was conducted with the customers of Goldenline company.
- "Competitor A" and "Competitor B" Column: Results of the survey conducted with the two closest competitors to Goldenline company are placed in these columns.
- "Firm Target" Column: In this column, the place of the firm in the customer's eye on the basis of criteria and the location of the competitors are included.
- "Progress Rate" Column; It is calculated by dividing the value in the "Target" column by the value in the "Today" column.

- "Point of Sale Point" Column: The KFY team met with the sales representatives in the sales department one by one. The effect of a one-unit improvement in the criteria on sales was asked. They were asked to give 1.5 points if there is going to be a big improvement, 1.2 if there will be a moderate improvement, and 1 point if there will be no effect on sales.
- "Importance Score" Column: It is formed by multiplying the Importance Level values with the relative importance determined by the customers and the progress rate and point of sale points.

If attention is paid; While calculating the percentage importance levels, the value of both the customers' evaluations and the customer requests for the company are taken into consideration. In this way, the scores of some customer requests increase. This increase in scores will later be used to prioritize activities to meet and exceed these customer requests. There is a planning matrix of generation Z in Table 3. All criteria are calculated according to the methods described and placed in the planning matrix.

Table 5. Planning matrix of generation Z

| GENERATION Z | | Today | Competitor A | Competitor B | Target | Progress Rate | Point of Sale | Importance Score | Percent Importance |
|-------------------------|------------------|-------|--------------|--------------|--------|---------------|---------------|------------------|--------------------|
| Customer Requests | Importance Level | | | | | | | | |
| 3. Level | | | | | | | | | |
| The theme of the design | 0.234189 | 7 | 9 | 5 | 8 | 1.14 | 1.00 | 0.268 | 21 |
| Affordable price | 0.210856 | 10 | 8 | 9 | 10 | 1.00 | 1.00 | 0.211 | 17 |
| Minimal design | 0.208643 | 6 | 8 | 5 | 8 | 1.33 | 1.20 | 0.334 | 27 |
| Being in geometric form | 0.134930 | 7 | 8 | 6 | 9 | 1.29 | 1.20 | 0.208 | 17 |
| Have color options | 0.060330 | 5 | 10 | 5 | 8 | 1.60 | 1.50 | 0.145 | 12 |
| Brightness | 0.055103 | 8 | 9 | 8 | 9 | 1.13 | 1.50 | 0.093 | 7 |
| Total | 1 | | | | | | | 1.26 | 100 |

3.2.2. Determination and analysis of quality characteristics

Quality Characteristic is an expression that shows how any customer request will be met. The expression of customer requests in technical language is translated into engineering language. These are the parts / processes that need to be improved in order to meet the customer request. At the stage of determining the quality characteristics, other department employees and managers were included in the KFY team, and the technical characteristics for customer requests were determined as follows at the end of the meetings:

- Be bright; Make-up process, supply of electropolishing machine,
- Have color options; Different running-in bath, Different alloy mixing ratios, Enamel process

- Having the theme of the design; Different theme ideas, sending designers to fairs
- Affordable price; Press production technology, Coating process over the mine
- Combination of multiple parts (hybrid): Assembly and welding process, Surface area,
- Containing stones; Casting production technology, Increasing stone classes, Stone slot adjustment
- Minimal design; Threshold of the mold, Surface area, Shape of the model
- It is in geometric form; Tube production technology, Arbor types, Annealing process
- It contains different surface patterns; Surface area, Shape of the model, Pen throwing process

3.2.3. Creating and analysis of relationship matrix

The next step after determining the technical characteristics is to determine the level of relationship between customer requests and technical characteristics. What is meant by relationship here; it is the effect of technical characteristics in each column on meeting the customer request in each row. While creating the matrix; By focusing on each column (technical characteristic) one by one, the extent of their contribution in meeting customer requests was determined as a result of the brainstorming meetings held by the KFY team members. The degrees used in defining the relationships are given in Table 6.

Table 6. Degrees of Relation

| Degree of Relation | Symbol | Point |
|--------------------|--------|-------|
| Strong | ◎ | 9 |
| Medium | ● | 3 |
| Weak | △ | 1 |

The purpose of determining the relationship between technical characteristics and customer requests; to determine the effect of each technical characteristic on meeting customer requests. Thus, it will be ensured that the technical characteristics need to be improved with priority will be determined. The way to determine this is to calculate the technical importance score for each technical characteristic. The technical significance level is calculated by finding the sum of the products of the "Percentage Importance" values calculated in the planning matrix for each technical characteristic and their associated scores. In Table 7, the relationship matrices established for the Z generation are given. To explain a relationship in Table 7; There is a strong link between the "affordable price" request and the "alloy mixing ratio" characteristic. The alloy ratio is related to the purity of gold. The higher the alloy ratio, the lower the price. There is a strong link

between the "have color options" request and the "running-in bath" and "enameling process" characteristic. Thanks to the enameling process, any desired color can be seen on the gold. And the running-in bath provides a variety of gold's own colors.

Table 7. Generation Z relationship matrix

| GENERATION Z | Customer Requests | Importance Level | % Importance | | | | | | | | | | |
|---------------------------------|----------------------|------------------|-----------------------|-----------------------|--------------|--------------------|-----------------------------|---------------|-------------------|-----------------|--------------------|-------------------|-----|
| | | | Different theme ideas | Production technology | Surface area | Shape of the model | Threshold value of the mold | Mandrel types | Annealing process | Running-in bath | Alloy mixing ratio | Enameling process | |
| The theme of the design | 0.234 | ◎ | | | | | | | | | | | 21 |
| Affordable price | 0.211 | ●● | ●● | | | | | ●● | ●● | △ | ●● | | 17 |
| Minimal design | 0.209 | ●● | ●● | ○ | ●● | ○ | ○ | | | △ | | | 27 |
| In geometric form | 0.135 | ○ | ●● | ●● | ●● | ●● | ○ | ○ | ○ | | | | 17 |
| Have color options | 0.060 | | △ | △ | | | | ○ | ○ | ○ | ○ | | 12 |
| Be bright | 0.055 | | | | | | | ○ | | | | ○ | 7 |
| Technical importance | Total: 2440 | 7.8 | 191 | 11.4 | 279 | 14.4 | 350 | 5.8 | 141 | 9.8 | 239 | 6.1 | 149 |
| Normalized technical importance | 100 | | | | | | | | | | | 6.1 | 149 |
| | | | | | | | | | | | | 9.0 | 220 |
| | | | | | | | | | | | | 10.4 | 254 |
| | | | | | | | | | | | | 6.0 | 147 |
| | | | | | | | | | | | | 10.4 | 254 |
| | | | | | | | | | | | | 2.7 | 67 |
| | | | | | | | | | | | | | |

3.2.4. Determination and analysis of technical correlations

There may be positive or negative interactions between the technical characteristics determined to meet customer demands. That is, improving one technical characteristic positively can affect another positively or negatively. "Correlation Matrix" is used to see such interactions. Each cell in this matrix; It represents the correlation between two different technical characteristics.

I. "When an improvement is made in a technical characteristic, if the other technical characteristic is definitely affected by this, it is said that there is a "Positive Strong" correlation between them, and a "Negative Strong" correlation if the other technical characteristic cannot be improved. Technical characteristics with strong relationships are as follows: "Surface area" and "Enamel process", "Surface area" and "Pencil throwing" process, "Production technology" with "Shape of the model", "Annealing process" and "Shape of the model".

II. When an improvement is made in a technical characteristic, if a moderate improvement is observed in another technical characteristic, it is said that there is a "Positive Moderate" relationship between them, and a "Negative Moderate" relationship between them if there is a moderate obstacle to application in another technical characteristic. The technical characteristics with medium relationships are as follows:

"Arbors" with "Shape of the model", "Threshold value of the mold" with "Shape of the model", "Different theme ideas" and "Shape of the model".

III. When an improvement is made in one technical characteristic, if there is a slight improvement in another technical characteristic, it is called "Positive Weak", if it creates a slight obstacle, it is said "There is a" Negative Weak "relationship between them. The technical characteristics with weak relationships are as follows: "Make-up process" with "Alloy mixing ratio", "Assembly and welding process" and "Stone slot adjustment", "Enamel process" and "Make-up process".

3.2.5. Making Technical Benchmarks and Setting Targets

In the technical comparisons section, for those who are higher in each technical characteristic or priority order, objective (objective) measurement values are compared with the measurement values of the same characteristics of competing products and placed on the floor of the quality house. The aim is to have data to see where product values are compared to competitors in terms of priority technical characteristics and to set targets.

However, the required data could not be obtained since this stage would be difficult to do for the existing situation, competitor data would not be obtained in a short time, and the privacy and security principles of the company policy could not be violated. For this reason, this stage of the QFD could not be fully realized in the project.

4. Results and Discussion

Quality houses created as a result of the relevant steps are given in figures 2, 3 and 4.

Figure 2. X generation "House of Quality"

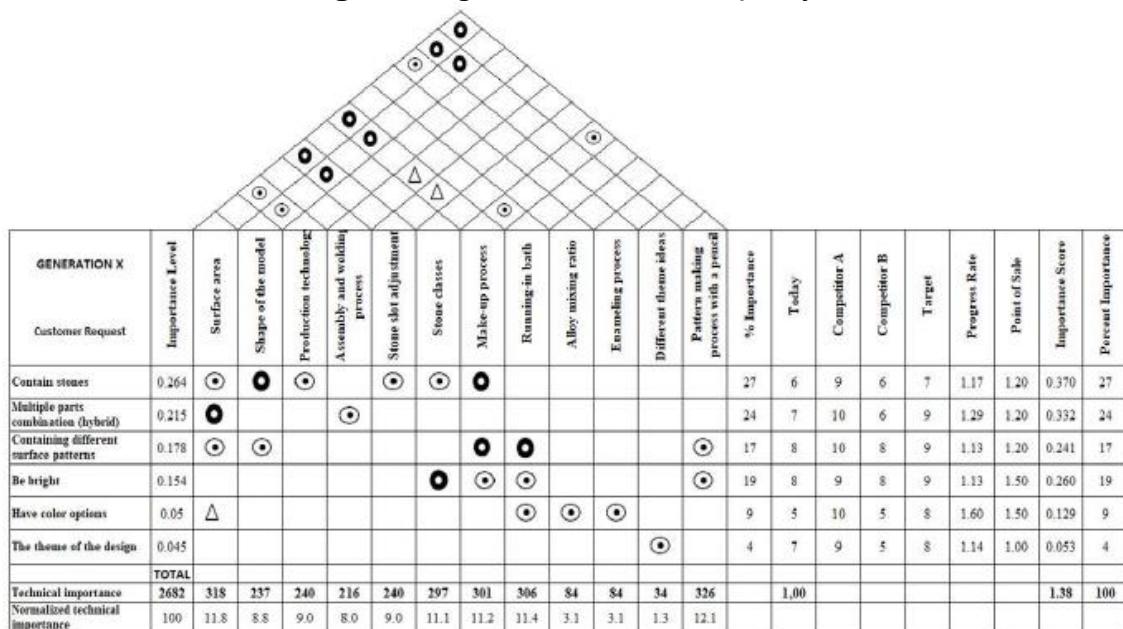


Figure 3. Y generation “House of Quality”

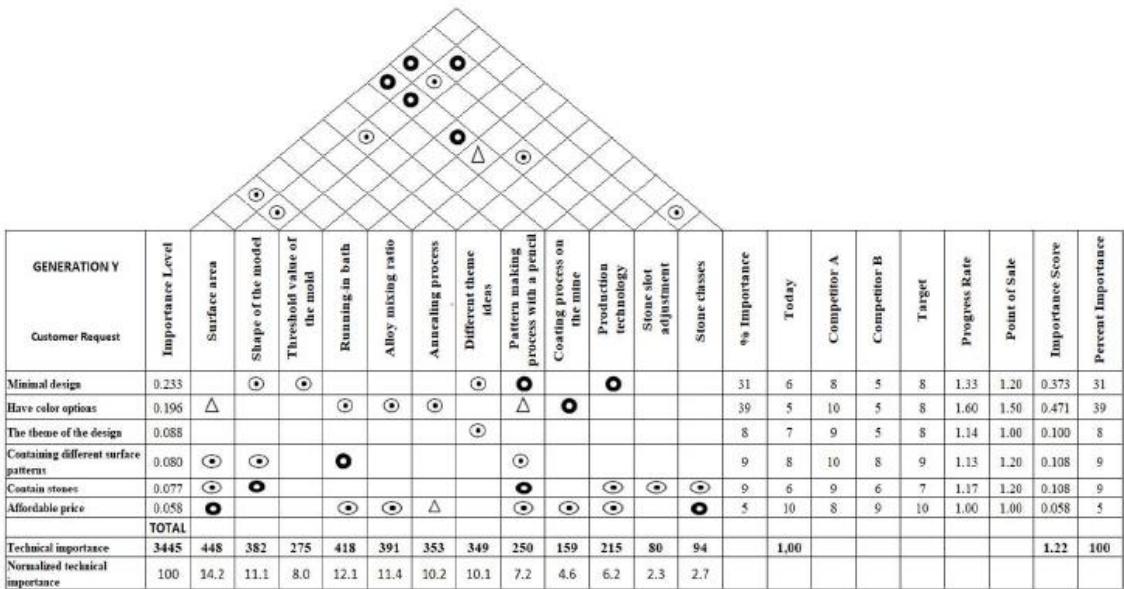
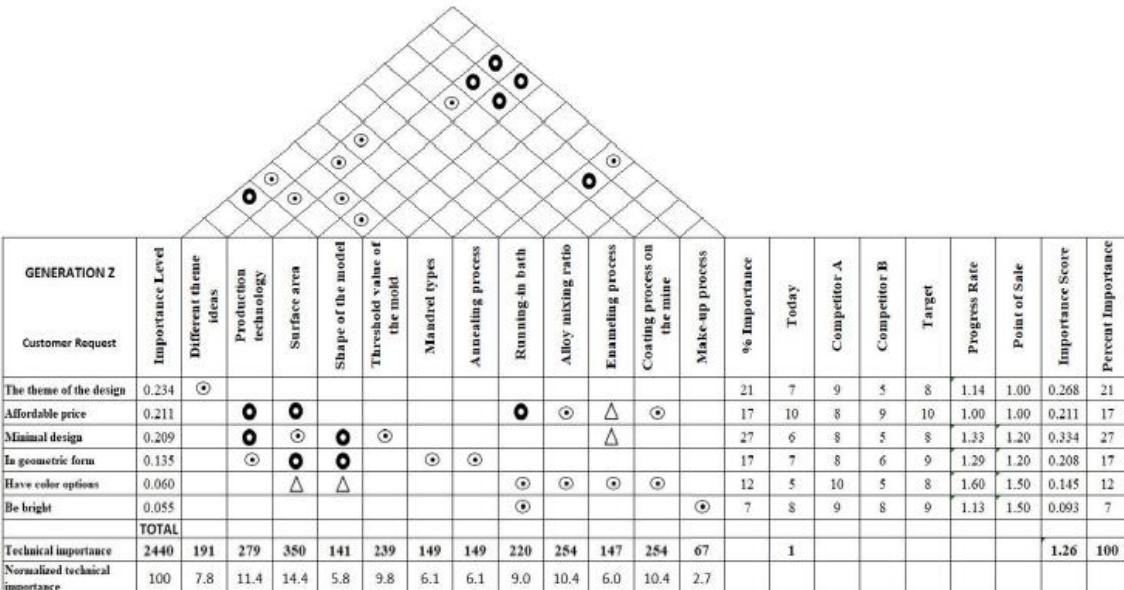


Figure 4. Z generation “House of Quality”



Looking at these quality houses; The customer requests section is the part of what customers expect and requests from the company, and they are also survey questions. The importance of each customer request was found by the AHP method. It is seen that the most important criterion in the eyes of generation Z customers is “The theme of the design”. It is seen that the most important criterion in the eyes of the Y generation customers is “Minimal design”. It is seen that the most important criterion in the eyes of X generation customers is “Containing stones”. While the Z generation wanted the gold necklace, they would buy to make sense to them, the most important criterion for the Y generation was size. This generation is more focused on small and elegant designs. The X generation, on the other hand, preferred to use gold pendants with stones and eye-catching. Due to

the fact that Z is older than Y, he cares less about the material. For this reason, while the demand for "affordable price" is in the first place in the importance of the Z and Y generations, it is the last for the X generation. Regardless of the generation, it is important to see different color options and color combinations on the gold pendant.

In the Planning Matrix, the position of the firm in the eyes of the customer and its position relative to the competitors are seen for each customer request. Importance Score; severity is multiplied by the selling point score and the progress rate data. When a customer request with a high importance score improves, customer satisfaction will increase, the effect on sales will increase, and the goal of progress compared to competitors will be realized.

The Technical Characteristics section of each customer request "What should I improve to improve this customer request?" are the answers to the question. Sometimes a Technical characteristic can directly or indirectly affect more than one customer request. In the Relationship Matrix, the relationships of each technical characteristic with each customer request are determined. The technical importance rating is found by multiplying the relationship ratings by the importance score. Technical characteristics with a high level of technical importance are technical characteristics with a high importance score and are associated with more than one customer request. When these technical characteristics are improved, satisfaction is increased in more than one customer request, besides, sales increase, targets are achieved compared to competitors.

The Correlation Matrix shows the relationship of each technical characteristic with each other, and provides decision support when deciding on the positive or negative effects of each technical characteristic in practice, and the technical characteristic that needs improvement. Among the technical characteristics with a high degree of technical importance, priority should be given to improving the technical characteristics that have a positive relationship with more than one technical characteristic. Looking at the house of quality of generation Z, the technical characteristics that need improvement are of great technical importance are "Surface area" and "Alloy mixing ratio". For generation Y, "Surface area", "Running in-bath" and "Shape of the model" characteristics have great importance. And for generation X, "Make-up process", "Stone classes", and "Surface pattern making" characteristics are the most important ones.

5. Conclusion

In the QFD study; "What should I improve to improve this customer desire?" The question is answered by determining the technical characteristics. Technical characteristics are the translation of customer requests into engineering language, that is, processes. Considering the relationship of these technical characteristics with all customer requests when calculating the Normalized Severity degrees, improving a technical characteristic improves not only the customer request to which that characteristic is associated, but also all related customer requests.

Thanks to this study;

- How the studies for customer satisfaction can become more useful and effective by addressing the purchasing behaviours of different generations,
- Quality function deployment method can be developed with many understandings such as generational marketing,
- Involvement of people from different disciplines in solving complex and multi-element business problems contributes to teamwork in terms of looking at problems from different perspectives,
- How difficult it is to gather people speaking different languages under a common roof and achieve agreement understood.

Quality Function Deployment, which has a great contribution in the transformation of social events such as listening to the voice of the customer, into numerical data, in a short time; It will not be wrong to think that it will be seen as the number one method of providing customer satisfaction in all companies with competition concerns and it will be one of the indispensable techniques.

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