

## Application of Quality Function Deployment Method to Identify Housing Estate Consumer Preferences

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**Abstract:** The research investigates consumer preferences in the housing sector using the Quality Function Deployment (QFD) method. The objective is to assess consumer satisfaction levels and identify areas for improvement to provide valuable insights for researchers and business practitioners in the construction sector. The study also aims to understand consumer desires, enhance company positioning in the market, and offer recommendations for future projects. The study addresses a critical issue in the housing property market, where many entrepreneurs face challenges related to stagnant sales. The central research question is, "How can the QFD method be applied to determine housing estate consumer preferences?" Employing a mixed-method approach, the research focuses on consumer preferences in X Housing within Semarang City. Results indicate that key factors influencing housing preferences include tranquillity, social facilities, aesthetics, security, price, mortgage systems, investment value, and location. These findings have implications for improving consumer satisfaction and guiding strategic decisions in the housing property industry.

**Keywords:** Customer Satisfaction, Preferences, Quality Function Deployment.

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### INTRODUCTION

Housing is a collection of dwellings or other buildings built as a complex. Its form differs between countries (Firley & Deupi, 2023). Typically, a builder uses a limited number of architectural styles when constructing a house or structure, resulting in a consistent appearance. In general, housing is monotonous.

In several major Asian cities, including Singapore, Kuala Lumpur, Hong Kong, and Shenzhen, as well as Seoul, skyscrapers with or without commercial facilities are becoming housing stock (Al-Kodmany, 2018). In Semarang, several real estate developers provide houses. One of them is Housing X Semarang. Housing X is one of the real estate housing developments with a one-door system and cluster layout.

This residence has a high appreciation for art. The garden is shady, filled with flowers, and equipped with superior facilities. It is free from floods and landslides that often disrupt the lives of the people of Semarang. In the houses of the X Semarang residential complex, families can live peacefully and pleasantly (Jember, 2022). With such a charming appearance, the sales of houses in Housing X deserve a thumbs up. However, home sales in Housing X have not looked as strong recently as in previous years what Semarang residents want.

This research examines the use of the Quality Function Deployment (QFD) technique, which seeks to recognize user needs so that each function and level in the organization can respond effectively to the current service (Hasibuan et al., 2019). Given what has been said about the role of houses, the rate of population growth in Semarang that continues to increase every year, and the need for good design in building houses in the city, a QFD approach was used, which might also be used to conceptualize houses that customers want.

Meeting customer satisfaction can be achieved through the provision of superior quality. For this, the Quality Function Deployment (QFD) approach is used, which is oriented towards customer satisfaction, so as to provide services that are in line with customer expectations and desires. The QFD technique takes a methodical approach by identifying customer expectations or requests and then correctly converting these wishes into a suitable development plan (Ginting et al., 2020).

The objective of this research is to analyze and apply the QFD method in the management of the X Housing developer company to identify and address strategic shortcomings, enabling the company to enhance its sales performance and achieve a significant improvement in sales levels.

This research is expected to provide practical insights for the X Housing developer in refining their strategies through the application of the QFD method (Kamvysi et al., 2024). By addressing past deficiencies, the company can optimize its management practices and increase sales, thereby contributing to its overall growth and sustainability in the housing market.

## MATERIALS AND METHODS

The approach used in this research on the application of the QFD method to consumer preferences in X Housing is a mixed approach. This method is used to overcome research problems that cannot be handled properly with qualitative or quantitative methods alone. In practical application, it may be difficult to distinguish between the two strategies.

Mixed research methods refer to approaches that combine different techniques in data collection and analysis. This approach may include qualitative and quantitative data collection methods through techniques that link the two, including the use of questionnaires and in-depth interviews (Jain, 2021). In addition, the method applied in this study belongs to the middle-level strategy; data collection was conducted through in-depth interviews with informants as well as a questionnaire survey administered to other informants.

In this research, the object of study is the people who live in Housing X and Housing Y in Semarang. The number of family heads in both housing estates is approximately 1500, so using the Slovin formula (2019) quoted by Sevilla (2024) as follows (Umar, 1997: 49):

$$n = \frac{N}{1 + ne^2}$$

Description:

n = Sample size

N = Population size

e = The percentage level of allowance for inaccuracy due to sampling errors that can still be tolerated or desired.

And using a percentage of leeway of 12.4%, the number of respondents was 60 respondents.

## RESULTS AND DISCUSSION

### Data Validity and Reliability Test

#### Data Validity Test

The result of the calculation of the total correlation is 0.00, so it can be said that the correlation is very low or it can even be said that there is no correlation. The criteria for testing states that if the significance value (sig) is less than 0.05, then the item is considered valid. Most indicators show a sig value of 0.000, which is also less than 0.05, so all indicators or questions on each variable can be considered valid.

**Table 1. Reliability Test Results**

Number	Variables	Reliability Coefficient	Cronbach Alpha	Description
1	Price	3 Question points	0,679	Reliable
2	Facilities	3 Question points	0,83	Reliable
3	Location	4 Question points	0,682	Reliable
4	Environment	5 Question points	0,664	Reliable
5	Revenue	3 Question points	0,723	Reliable
6	Substitution	3 Question points	0,678	Reliable
7	Decision	4 Question points	0,678	Reliable
8	Investment	3 Question points	0,754	Reliable
9	Flowers	5 Question points	0,802	Reliable

Data source: SPSS output processed, 2022

Based on the information contained in the table above, it can be seen that each variable has a Cronbach Alpha value of more than 0.60. Therefore, all of these variables can be considered reliable.

#### **Creation of House of Quality Matrix**

Determining the degree of importance of each attribute This degree of significance is obtained through the average of the customer's perceptual assessment of each of the relevant quality aspects (Guo et al., 2017). This average was derived during the previous step of determining customer satisfaction.

**Table 2. QFD Stage Analysis Results First**

	Level Interests		
The housing location is very affordable, has good access, and is close to the city centre and work areas.	79	SP	4
Facilities that are adequate, aligned with needs, and can fulfil services for residents of residential areas.	73	P	3
Affordable house prices, in line with quality and benefits	70	P	3
An environment that has fresh air and clean water, is free from flooding, is protected, and is reasonably quiet.	69	P	3
The developer's offerings match the Income, have purchasing power, and	65	P	3

have multiple sources of income.			
Investment in X Housing is affordable, profitable, and easy to sell or rent out	64	P	3
Affordable down payment, monthly instalments and mortgage administration fees	61	P	3
Determining X Housing is caused by aspects of price, available facilities, strategic location, and supportive environmental conditions.	57	P	3
The decision to buy a house was made steadily and felt right, and it was the offer from the developer that caused the desire to buy.	52	P	3

Comparing the performance of Housing Developer X with that of its peers in other companies,

**Table 3. Second Stage QFD Analysis Results**

Service Attributes	PP	VT	Target
Affordable house prices, in line with quality and benefits	2,67	2,93	2,93
Facilities are adequate, appropriate to the needs, and can fulfil services for housing residents.	2,4	2,8	2,8
The location is easily accessible, well-travelled, and close to the city centre and employment areas.	2,76	3,13	3,13
Neighbourhoods that have clean air and clean water sources, avoid flooding, are safe, and are relatively quiet.	2,93	3,13	3,13
Developer's offerings match income, have purchasing power, and	2,46	2,86	2,86

have multiple sources of income			
Choosing X Housing because of price, facilities, location, and environmental factors	2,67	3,16	3,16
The decision to buy a house was a firm one; it felt right, and it was the developer's offer that led to that feeling.	2,67	2,86	2,86
Investment in X Housing is affordable, profitable, and easy to sell or rent out	2,43	3,1	3,1
Affordable down payment, monthly instalments, and mortgage administration fees	2,5	3,06	3,06

Source: Questionnaire

Some elements should be added to the product quality based on the results of calculations comparing the product with its competitors.

Third Stage House of Quality

In order for the products of Housing developer X to be competitive, it is necessary to identify and calculate the improvement objectives, as well as identify the client's wishes that must be improved and added.

**Table 4. Third Stage QFD Analysis Results**

	Level of Importance	Housing X	Housing Y	Target Value	Development Target	Weight	% Weight
1 Affordable house prices, in line with quality and benefits	2,86	2,67	2,93	2,93	1,09	3,11	11,25
2 Facilities that are adequate, appropriate to the needs, and able to fulfil services for housing residents.	2,93	2,4	2,8	2,8	1,17	3,43	12,4
3 The location of the housing is very accessible, with good transportation links, and close to the city centre and office areas.	3,16	2,76	3,13	3,13	1,13	3,57	12,92
4 An environment that has fresh air, clean water, no flooding, is safe, and fairly quiet	2,73	2,93	3,13	3,13	1,06	2,89	10,45

5	Developer's offerings match Income, have purchasing power, and have multiple sources of income	2,36	2,46	2,86	2,86	1,15	2,71	9,9
6	Choosing X Housing because of price, facilities, location, and environmental factors	2,26	2,67	3,16	3,16	1,18	2,67	9,66
7	The decision to buy a house was a firm one; it felt right, and it was the developer's offer that led to that feeling.	2,07	2,67	2,86	2,86	1,07	2,21	7,99
8	Investment in X Housing is affordable, profitable, and easy to sell or rent out	2,67	2,43	3,1	3,1	1,27	3,39	12,26
9	Affordable down payment, monthly instalments, and mortgage administration fees	2,46	2,5	3,06	3,06	1,49	3,66	13,24
							27,64	

Target scores refer to numbers that Housing X wants to achieve and improve compared to existing scores. The researcher or resource person can determine these target values. Respondents chose the target value referred to in this study.

Methods for determining improvement factors, weight values, and weight percentages:

- a) Target Development = Target Value ÷ Housing value X Semarang
- b) Weight = Development Target × importance level
- c) Percentage weight = weight ÷ total weight × 100%

**Fourth Stage House of Quality**

Translate consumer expectations into technical specifications, often known as product specifications. Show how the client's preferences can be utilized. Technical parameters are the criteria offered by the company to meet consumer demand. These criteria are based on interviews conducted with internal company parties.

**Table 5. Results of Comparative Evaluation of Technical Parameters of Developer Product X**

Technical Parameters	Evaluation Results	
	PP	VT
MORTGAGE	B	SB
Location	B	SB
Facilities	B	B
Investment	B	SB
Price	B	SB

**Fifth Stage House of Quality**

Analyzing the relationship between client requirements and technology specifications. The purpose of the interaction matrix is to establish the relationship between consumer wishes and technical factors by conducting interviews with company employees (Jalilvand et al., 2017). Weights will be given to related criteria. Those who do not have a romantic partner will not be weighed. The weights offered range from 1 for the least to 9 for the most.

### Sixth Stage House of Quality

Calculating the strength of the relationship between technical parameters. In this section of the Correlation Matrix, we will study the relationships between technical indicators to determine whether they are connected or not. What is the nature of the relationship, whether it is strong, medium, or weak?

**Table 6. Relationship between Technical Parameters**

Relationship Type	Yes/No	Relationship Strength		
		I	S	K
Mortgage-Location	Yes		▲	
Mortgage-Facilities	Yes	▲		
Mortgage-Investment	Yes			●
Mortgage-Price	Yes			●
Location-Facilities	Yes	●	●	
Location-Invest	Yes		●	●
Location-Price	Yes			●
Facility-Investment	no			●
Facility-Price	no		▲	

### Seventh Stage House of Quality

Record the standard unit for each technical parameter. At this stage, computations will be carried out to determine the magnitude of the relationship in the interaction matrix by multiplying the size of the relationship by the % weight.

From the calculation results, the following results are obtained:

Priority Order for Immediate Improvement to Increase Home Sales:

- 1) Price (27.9%)
- 2) MORTGAGE (21.2%)
- 3) Investment (19%)
- 4) Location (17.2%)
- 5) Facilities (14.7%)

### Eighth Stage House of Quality

Determine the target value of the design as a service product or identify improvements achieved on technical parameters. The following objectives must be met to increase home sales in X housing estate:

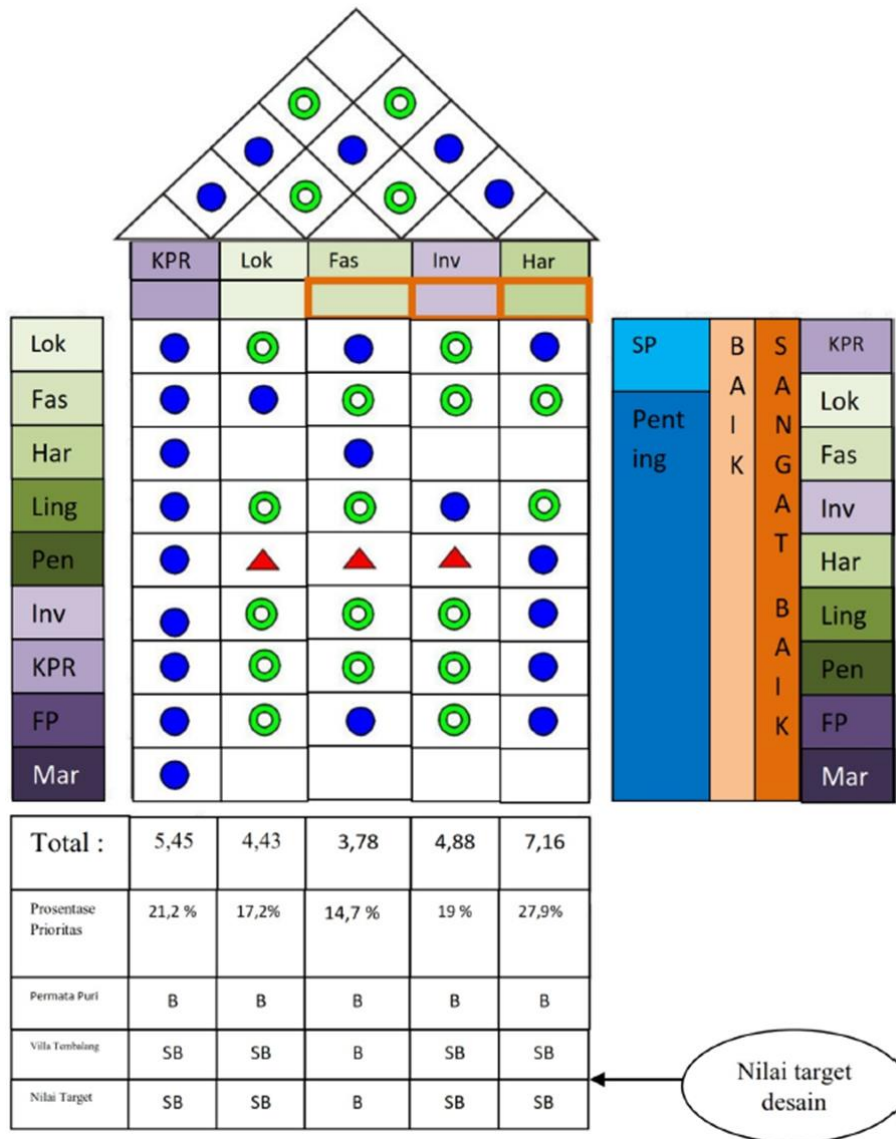


Figure 1. Final results of calculations using the House of Quality (Source: Calculation Result)

**Price**

Price can be defined as the amount of money charged for a product or service or the amount of consumer value received in return for benefiting from and owning or using something. Price indications can be communicated through consumer evaluations of the extent of financial sacrifices made in exchange for product quality criteria.

**Mortgage/Payment Method**

The payment method in Housing X is expected to be more affordable in terms of down payment, monthly installments, and mortgage administration fees. Mortgages are a long-standing government initiative, and in the past, only a handful of institutions accepted this payment option (Odinet, 2021). However, some banks have started to develop mortgage plans with variable down payments, loan repayment options, and monthly interest rates.

### Investment

It is expected that investment in X Housing will be cheaper, profitable, and easy to sell or rent. Home investment is one of the most promising and lucrative business opportunities in the real estate industry, especially in Indonesia, where the prospects are very good (Yusri & Syafiq, 2023).

### Location

The location of housing X is expected to be convenient, pleasant, and close to the city centre and leading business people. Location is the area or place where something is located. In this study, location refers to the location of the residence in relation to adjacent properties (Haque et al., 2020). Location is also related to accessibility factors such as cost and ease of access to the residential area.

### Facilities

Housing X facilities are expected to be more complete and able to serve residents according to their needs. The facility has physical equipment that allows people to carry out various activities easily so that their needs can be met (Heragu, 2018).

## CONCLUSION

Research on consumer preferences in Housing X in choosing a residential house resulted in the conclusion that the factors that are prioritized in choosing a residential house are tranquillity, social facilities, beauty and security. Based on this, it can be seen that residents of Housing X prioritize tranquillity first compared to other factors. When associated with the main priority factors of Maslow's theory, there are differences that become the needs with the highest value, in Maslow's hierarchy of needs, the highest needs are for self-actualization needs.

The tranquillity factor is the first priority factor for residents of Housing X in choosing a residential house, as indicated by the average value (mean) of 8.09. The need for tranquillity is the highest need. This is supported by Housing X, which has a distance of about 8.4 km from the main road, which has an impact on the tranquillity of the cluster. Furthermore, the second priority factor is the social facilities factor. The need for social facilities in the residential environment affects consumer preferences when choosing a residence.

The beauty factor is the third priority factor for residents of Housing X in choosing a residence. The self-actualization needs in question are the location of houses that offer beautiful views of mountains and lakes. Furthermore, the fourth priority factor is the security factor. A high security system with a security post equipped with 24-hour security officers makes the need for security a priority in choosing a residence.

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