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Strategic Development of Online Business Platform Using AHP and QFD: A Case Study of Manado City, Indonesia

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Abstract: Despite the extensive discussions among researchers about online buying business platforms, there remains a significant gap in research focusing on the design of online purchasing platforms. Specifically, there is a lack of studies utilizing the Analytic Hierarchy Process (AHP) and Quality Function Deployment (QFD) methodologies, while also incorporating the perspectives and feedback of customers. The primary objective of this study was to design an online business platform using the AHP and QFD with a specific emphasis on considering consumer desires and incorporating input from professionals. Questionnaires were distributed to fifty respondents in order to collect data. To begin this study, initially the factors influencing customers' desires and motivations for utilising online platforms in their business transactions were identified, as documented in existing literature and previous studies. Subsequently, several criteria were established, defined, and subdivided into sub-criteria. Then the AHP was employed to ascertain the ranking of both criteria and sub-criteria. The Consistency Ratio was calculated to validate the findings, ensuring that the obtained results remained below 0.1. The outcomes of the AHP ranking provided insights into consumer desires and preferences concerning online buying platforms. Subsequently, technical specifications necessary to address these consumer desires using the QFD and House of Quality were examined, considering the input from professionals. Combining consumer desires and technical requirements recommended by professionals gives a significant rating, which served as a crucial guideline for designing an online buying platform. The key findings revealed that warranties, product licenses, and company legality are the primary factors when designing online buying platforms. The significance of this research lies in its contribution to guiding businesses in designing their online platforms, focusing on incorporating warranties, product licenses, and company legality. The practical outcome of this study is to instill trust in customers to make the online purchases due to the presence of legal assurance as well as to encourage businesses to be more innovative in offering warranties, thereby intensifying market competition.

Keywords: online platform, QFD, AHP, transaction, warranty, Internet, strategy, legality.

Introduction

The fourth industrial revolution, often referred to as Industry 4.0, has been a significant milestone in the evolution of global communication and technology. This period, which emerged in the late 1990s and early 2000s, marked a drastic departure from conventional modes of communication, ushering in an era of digitalisation and advanced communication methods. This advancement enables numerous individuals to have access to the internet (Tran & Nguyen, 2022). In Indonesia, by the start of 2023, 212.9 million out of the population of 270 million become active Internet users. The predominance of young people in the online sphere is a noteworthy trend in Indonesia. It has been observed that 80 percent of internet users in the country are between the ages of 15 and 19. Young individuals perceive social media as a sanctuary where they can freely express themselves, explore, and creatively from their identities. They view the online space as a third environment, separate from home and school, where they can relax and escape restrictions (Bibizadeh et al., 2023).

This demographic trend underscores the pivotal role that digital platforms play in the lives of Indonesian youth, and it also suggests the potential for significant societal and economic impacts as these individuals continue to engage with and shape the online world. Indonesia is ranked 4th in the world for Facebook users.

The business world has been revolutionised by Internet technology. With the rise of e-commerce, businesses are now operating online, leading to unprecedented growth in both size and quality within the industry (Tran & Nguyen, 2022).

Online marketing continues to grow at a rapid pace. Online technology and service quality are the primary requirements to remain existing and competitive in the business world (Qalati et al., 2021).

The fast advancement of technology, particularly in the realm of the internet, has significantly transformed the landscape of commerce. It has created a platform where consumers can acquire goods and services without traditional constraints of physical shopping. This digital revolution eliminates the need for consumers to spend time and money traveling to brick-and-mortar stores. Instead, they can browse, compare, and purchase products from the comfort of their own homes, or anywhere they have an internet connection. This not only makes shopping more convenient, but also streamlines the process, making it more efficient, as consumers can access a wide range of products from different suppliers at the click of a button. Technological advances also help sellers or suppliers present their products efficiently online, which can be accessed anytime and anywhere (Zeqiri et al., 2023).

Online transactions have advanced in mediating consumer and producer relationships, creating effective communication between buyers and sellers, providing more efficient services, and improving consumer shopping convenience (Räsänen et al., 2021).

Meanwhile, according to the Bank Indonesia (BI), throughout 2022, the value of national e-commerce transactions only reached US\$ 30.5 billion, lower than BI's initial target of US\$ 31.2 billion. It is worth noting the impressive 78% increase in the value of electronic commerce in the country. This figure stands as the highest globally, demonstrating the country's robust digital economy and its successful adaptation to the evolving technological landscape.

Many factors cause consumers to switch to online shopping, such as the convenience of buying, the convenience of transactions, the belief that the transaction process will not be problematic, reducing transportation costs to the store, transactions can be effectuated anytime and anywhere with and no geographical boundaries, the information about the product provided completely and diversely, and consumers can easily compare the prices offered by various suppliers (Roos & Kazemi, 2022).

Risk factors are a crucial influence on consumers' decisions when shopping online. With the rise in online scams, privacy issues, and doubts about product quality, shoppers are becoming more vigilant and hesitant when making purchases on the internet.

This risk can significantly influence a buyer's behaviour, making them more meticulous in their decision-making process (Pentz et al., 2020). It is disheartening to learn about the unethical practices that some online retailers partake in. Misleading advertising substandard product quality, and misuse of personal data are indeed severe issues. These practices not only betray consumer trust but also discourage potential customers from engaging in online shopping (Yuniarti et al., 2022). Therefore, Tran et al. (2022) emphasise the aspects of consumer trust guaranteed in online trading. Research by Qalati et al. (2021) emphasises the aspects of web quality and reputation that potential customers feel. It will increase the trust for potential online buying users. Consumers pay attention to the trust factor (Qalati et al., 2021).

From the research outlined above, it is evident that a myriad of factors play a role in influencing consumers to utilise online applications in purchasing goods and products. These factors are multi-complex. However, there is still a lack of research concerning online platforms considering users' feelings, beliefs, and opinions. Existing research has given minimal attention to the process of formulating strategies for creating online business platforms that cater to user needs. Regular server maintenance, continuous technical support, and resource availability are essential to meet customer requirements and maintain a high-quality and dependable platform. Moreover, improving the usability of the user interface and ensuring it can seamlessly manage immediate customer inquiries is essential for expediting transactions and ultimately boosting the company's bottom line (Kurniawan et al., 2024).

Despite the surge in online retail transactions, online retail platforms continue to struggle with low profitability. There are several platforms experiencing losses. These losses will affect its long-term sustainability.

Research Problem

The intense competition between platform companies forces online businesses to redesign their platforms according to consumer needs. The goal of this study was to determine the most effective approach for developing an online platform strategy in Manado City, Indonesia that is tailored to meet the demands and preferences of consumers. This online strategy design is essential to help online business people so that their businesses can be sought after by consumers and survive amidst today's tight competition. This research can help scientists to enrich their knowledge and insight about online business. There is still limited research on developing online business platform strategy designs using a combination of Analytic Hierarchy Process (AHP) and Quality Function Deployment (QFD) methods. New things obtained from this study include designing an online business platform by paying attention to customers' requirements. Change. This research emphasizes the importance of considering customer preferences for business success and lower maintenance costs in the long run.

The research structure goes as follows:

1. Introduction and research background: This section provides an overview of the research topic, including the formulation of the problem, the objective of the research, and the limitations of the study. It sets the stage for the research, providing context and background information.

2. Literature Review: This part of the research examines and synthesised literature on online buying platform. It identifies and discusses critical theories and findings from previous research that are relevant to the study.

3. Methodology: This section describes the research methods used in the study. It explains the reasons for choosing these methods and discusses the benefits of using them. It provides details about the data collection and analysis procedures, ensuring that the research process is transparent and can be replicated by other researchers.

4. Data Analytic and Results: This part of the research presents the results of the data analysis, using both Analytical Hierarchy Process (AHP) and Quality Function Deployment (QFD). The results are presented in the form of a House of Quality, which provides a visual representation of the data and helps to identify key findings and insights.

5. Discussion and Conclusion: This final section interprets the results of the study in the context of the research objectives and the existing literature. It discusses the implication of the findings for the theory and practice, suggests areas for future research, and provides a conclusion that summarise the key findings of the study.

Research Focus

This research focused on designing online business platforms using AHP and QFD methods. The AHP method was applied to determine customer requirements. Fifty respondents answered the questionnaire regarding the consumer needs. The respondents were online buyers and were assumed to understand consumer needs related to the product service, price, and convenience in online shopping. Compared to other methods, AHP is primarily deterministic, making it more straightforward for professionals to assign the relative importance of one criterion to another (Raut, 2023), at a time, making it easier to determine the preferred option in each pair (Raco et al., 2022).

The QFD method was applied to determine an online buying platform development strategy that suits consumer needs. QFD was indeed a structured methodology that was designed to effectively translate customer requirements into comprehensive design specifications. This was achieved by

adopting a systematic approach in order to understand customer needs and expectations, and then integrating these insights into the design process. QFD served as a valuable tool in fostering the effective communication between the customer and the company. It helped ensuring that the design process was customer-centric and that the final product of service aligned with the customer's needs and expectations.

With the rise of online shopping and increased engagement on social media platforms, the younger generation is leading the way in digital consumer behaviour. As a result, they are constantly bombarded with Internet marketing and are highly influenced by their peers and the societal norms portrayed within social media. Our research specifically focused on individuals in the 18-25 age group (Nyrhinen et al., 2024).

Research Aim and Research Questions

The objective of the study was to answer the problematic question how can a combination of AHP and QFD methods help online business entrepreneurs determine the best course of action to meet consumer expectations on their platforms?

Investigators hope that this study will fill the gap in the literature on internet purchases by utilising a combination of AHP and QFD methods.

Literature Review

Explanation of the Theory of Planned Behaviour

The theory above, formulated by Ajzen (1991), is a psychological model that underscores the impact of attitudes, societal expectations, and individual perceptions on a person's intent to act (Li & Kang, 2024).

The aforementioned theory is an advancement of the reason action theory, initially introduced by Ajzen and Fishbein in 1980. The theory emphasises that their interests and intentions determine an individual's actions that influenced by their attitudes and the social norms they adhere to.

The basic assumption of TRA is that humans behave intentionally and consider all available information. However, the desire to behave is determined first by attitudes and subjective standards (Sutisna & Handra, 2022).

Not all behaviour can be expressed due to conditions beyond one's control. The theory of planned behaviour incorporates the concept of perceived behaviour control, which accounts for factors such as the individual's perceived ability to perform the behaviour and external factors that may affect their control over it (Sutisna & Handra, 2022).

Essentially, the theory of planned behaviour, in contrast to the theory of reasoned action and other psychological and social interpretations of human conduct, considers personality traits and their interplay with the environment. It emphasises the importance of cognitive self-regulation in human behaviour.

The theory of Planned behaviour persists that a person's actions are primarily influenced by their intentions, which are molded by three key factors: their attitude towards the behaviour, their subjective norms, and their perception of control over the behaviour (Kurniawati et al., 2023).

It is evident that there must be a clear intention to start with. Intention indicates an individual's tendency to carry out a behaviour and is a direct antecedent of that behaviour. However, in TPB, there is another addition, namely perception.

Ajzen's (1991) assumption is that individuals are logical enough to utilise accessible information and deliberate on their actions before deciding to adhere to a particular behaviour. Previously, it was reasonable.

Like reasoned action, the TPB also emphasises the attitude aspect towards a behaviour. However, the difference is that there is an additional individual perception. This perception determines whether an action is easy or difficult to do. Li and Kang (2024) further expounded that the Theory of Planned behaviour, is a progression from the theory of reasoned action, has been broadly employed to investigate individuals' inclinations and conduct in the realms of online shopping.

The factors of attitude, subjective norms, and perceived behavioural control can potentially instigate online consumers to indulge in impulsive buying activities. Specifically, the attitude towards impulsive buying pertains to the extent to which an online consumers holds a favourable or unfavourable appraisal of the purchasing behaviour. The subjective norm towards impulsive buying corresponds to an online consumer's perceived societal pressure either to enact or to abstain from impulsive buying. The perceived control is an online consumer's perception of the ease or difficulty associated with making impulsive purchase (Li & Kang, 2024).

Technology Acceptance Model

This theory clarifies the reasons individuals opt for a specific technology. It suggests that their choices are influenced by the technology's practicality and simplicity of use.

The aforementioned theory is a constructed model designed to examine and comprehend the elements that impact the adoption of computer technology. It was formulated by Fred Davis in the year 1986 (Rodríguez-López et al., 2024).

The mentioned theory is a modified version of a behaviour prediction model known as the theory of reasoned action, which was adapted from an earlier iteration.

There are certain factors that impact the technology acceptance model. One of these factors is the perceived ease to use, which refers to how user-friendly the technology is and how effectively it facilitates job performance. Users are more likely to embrace technology if they believe it will enhance their job performance and productivity. Conversely, if a technology is deemed difficult to understand or operate, users may develop a negative perception towards it (Wang et al., 2023).

The second is the attitude toward the use. The influence of the application and the desire to use the application arises. Then, it influences the intention to use continuously. If individuals perceive a technology system as valuable and user-friendly, they are more likely to have the intention to use it

The third is the influence of external factors, that is, the availability of reliable support mechanisms.

The objective of the acceptance model theory is to elucidate and evaluate the acceptance and utilisation of an information system. This theory offers a conceptual foundation for understanding the factors that influence an organisation's acceptance of technology. The theory clarifies the cause and effect relationship between the belief in the usefulness and ease of use of an information system, and the user's actual usage and intended behaviour.

The aforementioned theory highlights the idea that the utilisation of technology can enhance user productivity, optimise user performance, and enhance the efficiency of user-driven processes.

So, the steps in TAM start with perceived usefulness. The perceived usefulness encourages attitudes or desires to use the technology. The perceived usefulness and encouragement to use the technology will ultimately be realised in actualising its use (Putri et al., 2023).

Perceived Risks

The perceived risk is a person's subjective or personal assessment regarding the dangers that cannot be predicted or expected to occur when acting. Concerning purchasing an online product, the perceived risk is understood as the potential loss felt by consumers when they carry out purchasing

behaviour. Perceptions like this will curb consumers' intentions to conduct transactions (Raco et al., 2023).

Consumers who are engaged in online shopping often experience a perceived risk, which involves feelings of uncertainty, such as the potential loss of money or goods, as well as concerns about the confidentiality of personal information, such as credit card detail, being exposed or disclosed to unauthorised parties.

Research in the field has shown that increased perception of risk leads to a decrease in consumers' willingness to make online purchases. Worries about the security and privacy of personal and transactional information often deter online shoppers from sharing such details. Multiple studies have delved into the effects of perceived risk on the e-commerce industry.

According to their findings, the greater the perceived risk, the less likely individuals are to have the intention to make a purchase or utilise online stores (Raco et al., 2023).

The perceived risk refers to an individual's belief in the potential for gain or loss without considering the specific trustworthiness of the party involved. In the context of online shopping, the perceived risk is seen as a factor that can impede successful transactions, as customers are consistently mindful of potential risks when evaluating products or services from online retailers. Recent studies examines risks and uncertainties have shown that if this situation arises, customers' attitudes toward online shopping may deteriorate (Tran & Nguyen, 2022).

The assessment of the perceived risk in online shopping involves the subjective evaluation of customers' expectations regarding financial risks, performance, psychological factors, time, and convenience associated with the online shopping process. The perceived risk entails the uncertainty surrounding the anticipated outcome of a transaction which subsequently gives rise to discomfort for customers. Furthermore, the perceived risk also encompasses the apprehension surrounding potential losses (Tran et al., 2022).

In the realm of online shopping, consumers are deprived of the chance to physically examine products or avail themselves of services prior to making a purchase. Consequently, they harbour apprehensions and concern regarding potential disparities between their expectations and the actual quality of the product or service received. This phenomenon gives rise to the significance of perceived risk as a determinant factor. Recent studies have unveiled a negative association between perceived risk and purchase. However, the research conducted by Ventre and Kolbe has shed light on the fact that the perceived risk does not serve as an absolute barrier in the decision-making process when it comes to purchasing (Tran & Nguyen, 2022).

The perceived risk in the context of online shopping refers to the assessment made by consumers regarding the trade-off between costs and benefits, encompassing their overall evaluation of the utility derived from a product or service relative to these prices. The perceived risk holds substantial influence over the intention to make online purchases. Empirical evidence consistently demonstrates that the perceived risk exerts a negative effect on the inclination to purchase items through online channels (Qalati et al., 2021).

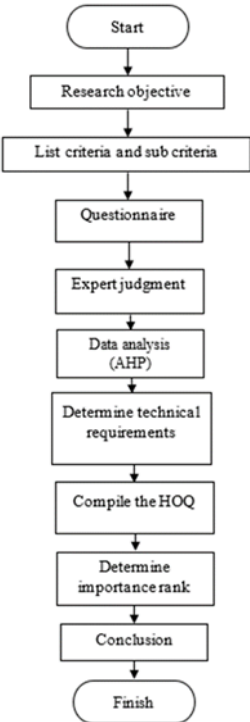
Research Methodology

In the methodology, the first step involved conducting a literature review to identify consumers' requirements, known as 'the Whats.' Then five criteria and their sub-criteria, arranged hierarchically were established. The second step was to create a questionnaire using the AHP method. Next, data analysis was conducted to determine consistency ratios, ensuring the validity of the findings. This critical process helped verify the accuracy of the results. The subsequent step involved determining the technical requirements, known as 'the Hows,' through interviews with professionals or experts. A House

of Quality was then compiled to establish the relationship between what and how. Finally, the importance rank was determined.

Figure 1

The Flow of Methodology



Source: Author's development.

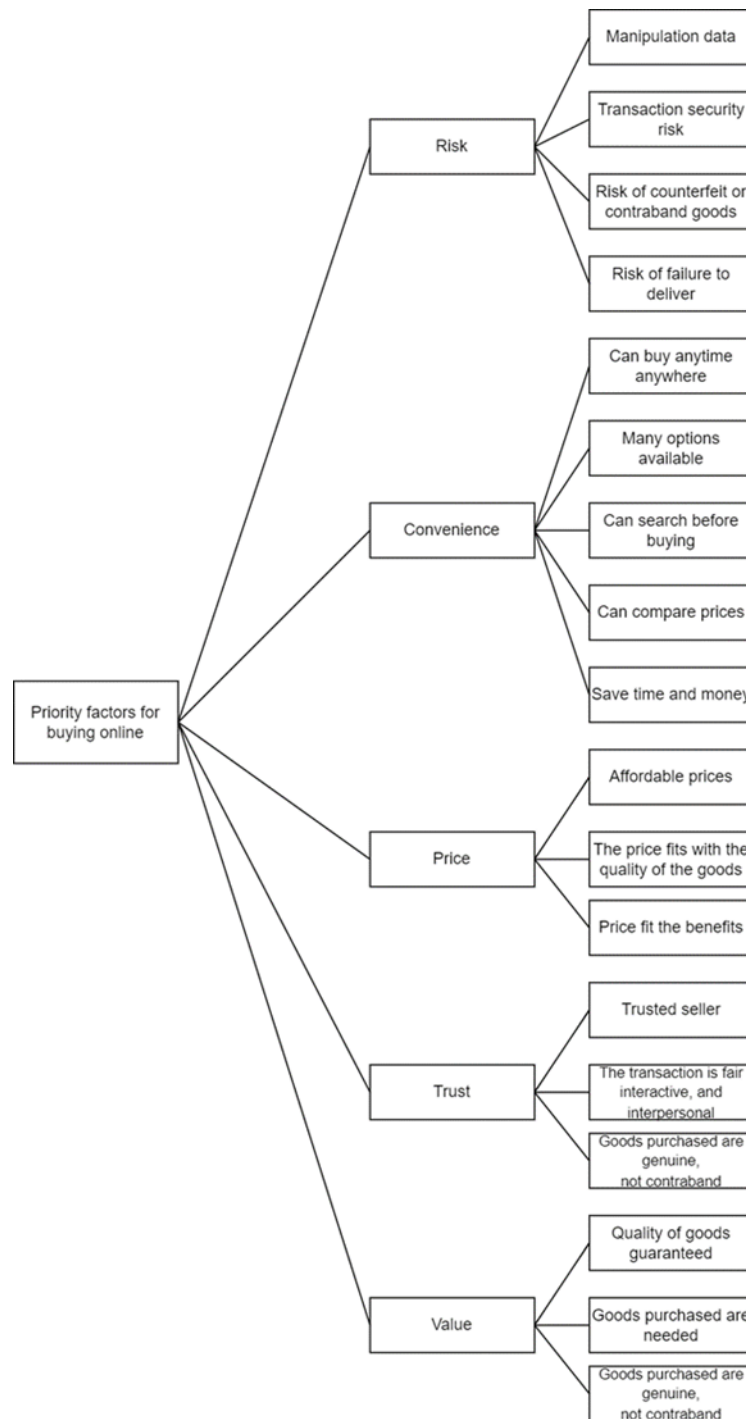
In the second step, the criteria and sub-criteria were set. The identification of criteria and sub-criteria was undertaken by the researchers, drawing upon the insights gleaned from prior studies conducted on related subjects. Five criteria from the literature review results were determined: risk, convenience, price, trust, and value. It was defined that:

- The risk factors include the possibility of misusing personal data, insecure online transactions, counterfeit goods or smuggled goods, and failure to deliver the product purchased.
- Convenience factors include the ease of buying goods anywhere and anytime and the availability of many product choices; buyers can browse products and their conditions before buying, compare the prices of the products they want, and save time and money.
- The price is affordable, according to the goods' perceived quality and benefits.
- The trust is honest and trustworthy sales; there are genuine and honest transactions, interactive and interpersonal, and the balance between price and the goods purchased.
- The value factor guarantees the quality of the goods, that the goods purchased are needed, and that the goods purchased are genuine, not smuggled.

The criteria and sub-criteria are subsequently organised in a hierarchical structure, as depicted in Figure 1.

Figure 1

Hierarchy Structure



Source: Author's development.

Then the AHP model questionnaire through pairwise comparisons in the third step was compiled. This questionnaire offered respondents two options to fill out. This questionnaire was convenient for respondents because they only had two options for each question. The respondents exclusively employed Saaty and Vargas (1987) comparative scale for their choices as demonstrated in Table 1.

Table 1

The Comparative Scale Developed by Saaty and Vargas

The level of importance	Explanation	Description
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assessed on an absolute scale		
1	Same level of Importance	Both actions contribute the same amount toward the goal.
3	Moderate degree of importance attributed to one thing in comparison to another	Based on experience and evaluation, one activity is highly preferred over the other.
5	Great significance.	Experience and judgement significantly lean towards one activity over the other.
7	Extremely high significance	The activity is highly preferred, and its superiority is proven in implementation
9	Utmost significance	The support for one activity over the other is at the utmost level of confirmation.
2, 4, 6, 8	Values that fall between the two neighboring assessment	When a middle ground is necessary.

Source: Saaty and Vargas (1987).

Sample and Participants

In the next step, 50 respondents who were online buying actors were selected. They understood people's shopping habits and always bought online during a pandemic. The respondents were residents of Manado, where this study was conducted.

Instrument and Procedure

The AHP has no prescribed number of respondents but requires at least two people to participate. The AHP values the quality of data and the respondent's expertise more than the number of responses. The respondents should have firsthand experience and a deep understanding of the examined issues. They are expected to be the decision-makers and should be open and competent to impart their knowledge on the issues, which are typically intricate and qualitative. Their input should be rooted in their perspectives, experiences, and intuition. The chosen respondents had those qualifications (Ohoitumur et al., 2019).

In the following steps, the data collected from the questionnaire using the AHP methods were processed. The questionnaire was distributed purposefully. Of the 95 individuals who received the questionnaire, 50 responded and completed it. The respondents included 35 females and 15 males. These respondents were regular users of online buying and had a good understanding of online purchasing.

The data analysis process using AHP is outlined below. The experts filled out the survey and compiled the results using Equation 1.

$$GM = \sqrt[n]{(x_1)(x_2) \dots (x_n)} \quad (1)$$

Data Analysis

The compiled results were subsequently organised into a matrix of pairwise comparisons using Equation 2.

$$A = [a_{ij}], a_{ij} = w_i/w_j, a_{ji} = 1/a_{ij}, a_{ii} = 1 \quad (2)$$

Normalise the matrix pairwise by making use of Formula 3 below.

$$b_{ij} = \frac{a_{ij}}{\sum_{i=1}^n a_{ij}} \quad (3)$$

The priority weight was determined using Formula 4.

$$w_i = \frac{\sum_{j=1}^n b_{ij}}{n} \quad (4)$$

The consistency index was identified as the fourth step :

- Formula 5 was used to determine the maximum eigenvalue.

$$\lambda_{max} = \sum_{i=1}^n \frac{(Aw)_i}{nw_i} \quad (5)$$

- The calculation of the consistency index applying Formula 6.

$$CI = \frac{\lambda_{max} - n}{n-1} \quad (6)$$

- Next Formula 7 was used to measure the ratio consistency.

$$CR = \frac{CI}{RI} \quad (7)$$

Table 2 displays the ratio index for every nth object:

Table 2

Index of Ratios

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

Source: Saaty and Vargas (1987).

In the next step, a sensitivity analysis calculation was performed. This step was intended to determine whether the obtained results were genuinely robust, stable, and consistent when there was a change in the value of a criterion. If the changes in the criteria caused changes in the dominant factors of online buying, it was concluded that the results of the sensitivity analysis calculations were not robust, stable, and consistent. However, if there was a change in a criterion that did not impact changes in the dominant factors, it was said that the sensitivity analysis results were robust, consistent, and stable. The sensitivity analysis is fundamental and must be performed before determining whether a criterion is dominant.

The following step was to determine technical requirements' the Hows'. Several experts were appointed to determine technical requirements. After that, the relationship between What and How by using the score below was determined:

Table 3

Weighting the Relationship System

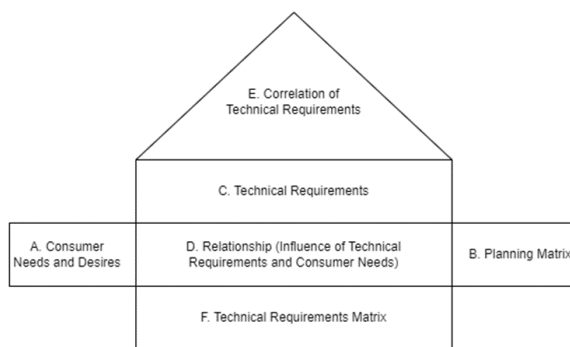
△	Low relationship	1
○	Moderate relationship	3
⊙	Strong relationship	9

Source: Das, Mukherjee (2008).

The results obtained were then arranged in a House of Quality matrix (figure 3)

Figure 3

House of Quality



Source: Felice and Petrillo (2010, p. 28).

Research Results

The first step in the methodology was to conduct a literature review to identify, analyse, and determine consumers' needs or 'the Whats.

In this research, the aim was to design a strategic online buying business platform in Manado City, Indonesia, by considering the customers' needs using AHP and QFD.

Five main criteria and eighteen sub-criteria were set up. These five main criteria included values, risk, price, convenience, and trust. Each of these criteria had several sub-criteria associated with it. Figure 2 presents the criteria and sub-criteria in a hierarchical structure.

The AHP and formulas 1 – 7 was used to compute the weights of the criteria and sub-criteria. Following this, a consistency test was carried out. Table 4 displays the outcomes of the pairwise comparison matrices along with the weights of the criteria and sub-criteria.

The outcome of the criteria

Table 4 below displays the weight of the criteria from the analysis results.

Table 4

Weight of Criteria

Criteria	Weight
A. Risk	0.186
B. Convenience	0.184
C. Price	0.215
D. Trust	0.251
E. Value	0.165

Source: From our analysis.

The calculation results of the criteria show that the trust is the highest, followed by price, risk, convenience, and finally, value.

Result of the Sub-criteria

Table 5 lists the weights of the risk sub-criteria derived from the analysis.

Table 5

Weight of the Risk Sub-criteria

Sub-criteria	Weight
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A1. Personal data and financial data will be misused	0.244
A2. Transaction security risk	0.228
A3. Risk of counterfeit or contraband goods	0.267
A4. Risk of failed delivery	0.261

Source: From our analysis.

The analysis results of the convenience sub-criteria weights are presented in Table 6.

Table 6

The Weight of Convenience Sub-criteria

Sub-criteria	Weight
B1: Can buy anywhere and anytime	0.229
B2: Many options available	0.220
B3: Can search before buying	0.160
B4: Can compare prices	0.222
B5: Save time and money	0.168

Source: From our analysis.

The analysis outcome for the weight of the price sub-criteria is outlined in Table 7.

Table 7

The Weight of Price Sub-criteria

Sub-criteria	Weight
C1: Affordable price	0.257
C2: Prices fit with the quality of goods	0.383
C3: Price fits with benefits	0.360

Source: From our analysis.

Table 8 shows the weight of the trust sub-criteria derived from the analysis.

Table 8

Weight of Trust Sub-criteria

Criteria	Weight
D1: The seller is honest and trustworthy	0.370
D2: Transactions are fair, interactive, and interpersonal	0.318
D3: The goods presented, and the price paid is appropriate/balanced	0.312

Source: From our analysis.

The analysis-derived weights for the values sub-criteria can found in Table 9.

Table 9

The Weight of Values Sub-criteria

Criteria	Weight
E1: The quality of goods is guaranteed	0.401
E2: The items purchased are needed	0.271
E3: Goods purchased are genuine, not contraband	0.328

Source: From our analysis.

Table 10 enumerates the global weights of the criteria and sub-criteria based on the AHP analysis results

Table 10*The Global Weight Results*

The Criteria and Sub Criteria		Local Weight	Global Weight
Risk	A		0.186
Convenience	B		0.184
Price	C		0.215
Trust	D		0.251
Value	E		0.165
	SUM		1.000
Manipulation data	A1	0.244	0.045
Transaction security risk	A2	0.228	0.042
Risk of counterfeit or contraband goods	A3	0.267	0.050
Risk of failed delivery	A4	0.261	0.049
	SUM	1.000	0.186
You can buy it anywhere, anytime	B1	0.229	0.042
Many options available	B2	0.220	0.040
Can search before buying	B3	0.160	0.029
Can compare prices	B4	0.222	0.041
Save time and money	B5	0.168	0.031
	SUM	1.000	0.184
Affordable prices	C1	0.257	0.055
The price fits with the quality of the goods	C2	0.383	0.082
The price fits with the benefits	C3	0.360	0.077
	SUM	1.000	0.215
The seller is honest and trustworthy	D1	0.370	0.093
The transaction is fair, interactive, and interpersonal	D2	0.318	0.080
Goods purchased are genuine, not contraband	D3	0.312	0.078
	SUM	1.000	0.251
Quality of goods guaranteed	E1	0.401	0.066
Goods are needed	E2	0.271	0.045
Goods purchased are genuine, not contraband	E3	0.328	0.054
	SUM	1.000	0.165

Source: From our analysis.

The global calculation results obtained the sequence of criteria starting from the largest, namely: Criterion D (trust) with a weight of 25.1%, Criterion C (price) with a weight of 21.5, Criterion A (risk) with a weight of 18.6%, Criterion B (convenience) with a weight of 18.4%, Criterion E (value) with a weight of 16.5%. Sub-criteria D1 is the largest, honest, and trustworthy seller, weighing 9.3%. The result portrays the consumers' requirements.

The results of Sensitivity Analysis

Sensitivity analysis was conducted by modifying the weight values of the criteria according to a predetermined scenario, and then monitoring the outcomes of the sub-criteria weights, as depicted in Table 11.

The actual result obtained the most significant sub-criteria weight, namely sub-criteria D1, honest and trustworthy sellers, with a weight of 9.3%.

In scenario 1, all criterion weights are equal to 0.200 each. The most significant sub-criterion change was to sub-criterion E1, guaranteed quality of goods with a weight of 8%.

Table 11

The Results of Sensitivity Analysis

The Criteria and Sub Criteria		Weight		
		Original	Scenario 1	Scenario 2
Risk	A	0.186	0.200	0.186
Convenience	B	0.184	0.200	0.184
Price	C	0.215	0.200	0.265
Trust	D	0.251	0.200	0.201
Value	E	0.165	0.200	0.165
Manipulation data	A1	0.045	0.049	0.045
Transaction security risk	A2	0.042	0.046	0.042
Risk of counterfeit or contraband goods	A3	0.050	0.053	0.050
Risk of failure to deliver	A4	0.049	0.052	0.049
You can buy it anytime, anywhere	B1	0.042	0.046	0.042
Many options available	B2	0.040	0.044	0.040
You can search before buying	B3	0.029	0.032	0.029
Can compare prices	B4	0.041	0.044	0.041
Save time and money	B5	0.031	0.034	0.031
Affordable prices	C1	0.055	0.051	0.068
The price fits with the quality of the goods	C2	0.082	0.077	0.101
Price fit with benefits	C3	0.077	0.072	0.095
The seller is honest and trustworthy	D1	0.093	0.074	0.074
The transaction is fair, interactive, and interpersonal	D2	0.080	0.064	0.064
Goods purchased are genuine, not contraband	D3	0.078	0.062	0.063
Quality of goods guaranteed	E1	0.066	0.080	0.066
Goods purchased are needed	E2	0.045	0.054	0.045
Goods purchased are genuine, not contraband	E3	0.054	0.066	0.054

Source: From our analysis.

In the second scenario, the weights of the two most significant criteria are swapped with a five percent variation. Here, the weight of criterion D, related to trust, is decreased by five percent while the weight of criterion A, associated with the price factor, is increased by five percent. As a result, the most significant sub-criteria weight is now allocated to sub-criterion C2 at 10.1%.

Then a QFD analysis was conducted by first determining and establishing technical requirements (the Hows). For this reason, researchers interviewed five experts and professionals in online buying. Experts and professionals convey several technical aspects that must be considered to answer consumer needs (table 12).

Table 12

The Technical requirements (the Hows)

Design requirements	Description
Product licence	Online businesses should sell legal products and be allowed to be sold according to price, quality, and authenticity to guarantee buyer benefits.

Legal company	Business that adhere to the mandates of the government and associated bodies are safeguarded by legislation in executing their operations This ensures consumer protection as these companies market genuine, high-quality goods at fair prices.
WiFi broadband (connection)	Wireless data communication medium that can be used for communication or surfing (browsing website pages to search for various desired information) to transfer programs and data very quickly - has several functions, including Connecting devices such as laptops, smartphones, or other Internet-compatible devices; Share data without having to connect with cables; Connecting one device to another, for example from a smartphone to a smart TV.
Discount program	Online businesses must provide discounts or price cuts to customers while maintaining product quality.
Warranty	Warranty is a written and virtual interactive legal commitment to the quality and authenticity of the product (which is free from defective material) and a statement of the manufacturer's responsibility to repair and replace the product free of charge if problems with design and production are discovered.
Product knowledge	Consumers know and understand the products in terms of price, quality, and authenticity.
Usability apps	The application must guarantee effectiveness, efficiency, ease of use, and satisfaction. The app also helps consumers find relevant information quickly. It leads to increased downloads, positive reviews, and higher revenue generation for businesses.
Financing facilities	Online platforms must provide facilities that make it easy to access payments, such as QR codes, debit, credit, e-money, and e-wallets that are practical and guaranteed security.
Customer communication	Communication with consumers must be clear, honest, effective, efficient, and friendly in promoting products. The quality of communication is carried out both verbally and in writing.

Source: Primary data processed.

The overall results are from the House of Quality in the Table below 13

Table 13

House of Quality (HoQ)

9	Strong relationship	⊙
3	Moderate relationship	○
1	Low relationship	△

Criteria	GW	How's Whats Customer Requirements	Product License	Legal Company	WiFi broad band (Connection)	Discount Programs	Warranty	Product Knowledge	Usability Apps	Financing Facility	Customer Communication and Information	Delivery	Number of Product	Total	
															Risk
	0,042	Transaction security risk		⊙	○					△		○		0,672	
	0,05	Risk of counterfeit or contraband goods	⊙				⊙		△		○			1,1	
	0,049	Risk of failure to deliver												0	
Convenience	0,042	Can buy anytime anywhere			⊙				⊙		△			0,798	
	0,04	Many options available							○				⊙	0,48	
	0,029	Can search before buying							○		△		○	0,203	
	0,041	Can compare prices				○		△	△	△	△		△	0,328	
	0,031	Save time and money			△					△	△	△	○	0,217	
Price	0,055	Affordable prices	○			○								0,33	
	0,082	The price fits with the quality of the goods	△			○					△			0,41	
	0,077	Price fit the benefits	○								⊙			0,924	
Trust	0,093	The seller is honest and trustworthy	⊙	⊙			⊙		△		○			2,883	
	0,08	The transaction is fair interactive, and interpersonal	△	○			⊙			⊙				1,76	
	0,078	Goods purchased are genuine, not contraband	△					⊙			○			1,014	
Value	0,066	Quality of goods guaranteed	⊙	⊙			⊙	○						1,98	
	0,045	Goods purchased are needed						⊙	△		○		○	0,72	
	0,054	Goods purchased are genuine, not contraband	⊙				⊙	△			△			1,08	
			Total	3,003	2,454	0,58	0,534	3,087	1,400	0,859	0,834	1,77	0,157	0,716	15,394
			Importance %	20%	16%	4%	3%	20%	9%	6%	5%	11%	1%	5%	
			Priorities rank	2	3	9	10	1	5	6	7	4	11	8	

Source: From our analysis.

Discussion

As experts recommended, this research aimed to determine the right design for online business players that meets consumer desires and technical demands.

A combination of AHP and QFD methods was used in this research. The AHP method was implemented to determine the ranking of consumer desires with their importance values. In answers the Whats in HoQ. The QFD method with the House of Quality matrix determines the technical aspects of proposals from experts that will answer consumer needs. Experts use the HoQ matrix to evaluate the intensity of the relationship between the Whats and the Hows, whether low, medium, or strong.

The analysis results show that warranty is the highest (20%), then product license (20%) and legal company (16%). These three elements are essential to design an online business in line with consumer desires. The combined rating from positions 1 to 3 account for 56% of the total sum of the degree of interest.

As per Lou Cohen's study, the variables or factors ranking from 1 to 3 are prioritised for enhancement by management in an online business, as they account for 56% of the focus (Purba et al., 2018).

This research shows that consumers are concerned about ensuring security when conducting online business. There are complaints and dissatisfaction from online business consumers due to

excessive shopping expenditure (Jain et al., 2023). One of the violations commonly occurring on the part of online shopping is a refusal to provide replacement guarantee repair of goods.

Manurung et al. (2022) emphasise the importance of providing assurance, such as product return or exchange, in cases where received items do not align with the original order.

Mazhar et al. (2022) mentioned the importance of after-sales product warranty services that online companies must prepare.

In 2021 Puchkovska et al. observed that purchasers or third parties frequently ask the manufacturer's seller to address product defects without charge or reimburse the costs of repair. Moreover, they emphasised the request for the seller or manufacturer to replace faulty goods with a comparable product of acceptable quality or a different model of the same product at an appropriate price adjustment.

Dunković and Knežević (2023) supplemented that typically, consumers comprehend that a legal warranty, ensuring reliability, quality, and complimentary repairs, should be provided for at least two years following the purchase.

Certain individuals interpret the warranty as a manifestation of superior quality or a justification for a premium on the product's price. The theory elucidates that the warranty serves as a symbol of enhanced quality and reliability.

A product's warranty encompasses two principal roles for the retailer: promotional and defensive. The promotional role is designed to bolster the purchasing decision of the customer, as warranties customarily assure enhanced functionality and satisfaction throughout a significant portion of the product's life cycle. At the same time, a warranty contract plays a protective role in shielding the retailer from unwarranted customer complaints that may arise during the warranty period. The addition to advertising theory is that commercial warranties are regarded as a marketing expense meant to attract attention to the product and better position it within the competitive market.

Customers recognise that an extended warranty ensures comprehensive coverage for repairing any malfunctions that may occur with the product over an extended period. However, there is a common perception that the inclusion of extended warranties in pricing may lead to the product appearing overpriced in relation to its value.

Qin et al. (2018) added that warranties signal quality and consumer protection.

Warranty is the company's moral and legal responsibility for selling products or services (Sujono et al., 2022).

Common violations committed by online stores often include refusal to offer product replacements or warranty repairs and failure to ensure that goods comply with regulatory standards (Padalka et al., 2021).

Online websites should deliver effective after-sales and increasing response time to customers' complaints and queries (Mazhar et al., 2022).

Effective handling of customers' warranty claims for product or service failures can greatly enhance (or harm) a company's reputation and customer loyalty. The price of losing customers far exceeds the cost of resolving a warranty issue (Shaw et al., 2017).

To maintain customer loyalty, the online platform should provide efficient services such as post-purchase assistance, product warranty support, and prompt response to customer complaints and inquiries. These measures will contribute to the website's ability to retain customers (Mazhar et al., 2022).

Shaw et al. (2017) supplemented that to transform their discontent into contentment and gain their trust, their warranty claim concern must be handled with utmost seriousness and resolved as swiftly as possible.

Indonesian law regarding consumer protection, as stated in Article 7, mandates that business entities must provide precise, comprehensive, and truthful information about the terms and conditions of warranties for goods and services, along with instructions for their use, repair, and upkeep (Wibowo, 2022).

Within the retail industry, warranties are consistently viewed as indicators of quality and safeguards for consumers. There are two kinds of warranties: basic and extended (Qin et al., 2018).

The Indonesian consumer protection law stipulates that all e-commerce businesses must possess a direct sales license and adhere to the regulations (Amin & Nor, 2013).

According to Article 4 of the Indonesian consumer protection law, consumers are entitled to comfort, security, and safety when utilising goods or services. This provision includes the freedom to choose products or services and to obtain them at the agreed upon price, terms, and warranties (Prematura, 2021).

The 2023 Indonesian trade regulation on business licensing and advertising, as outlined in Article 3, stipulates that business entities must obtain permits to engage in commercial activities within the trade sector (Ministerial Regulation, 2023).

Regarding products, article 5 stipulates that goods or services must adhere to Indonesian national standards.

Based on research findings, individuals engaged in online shopping tend to possess an open mindset, exhibit impulsive behaviour, and prefer pleasurable and enjoyable experiences. In light of these observations, several researchers propose that online platforms should prioritise providing delightful and thrilling experiences that align with the personality traits of online shoppers, characterised by their emotional, impulsive, and pleasure-seeking nature (Roos & Kazemi, 2022).

The novelty of this study has the potential to facilitate the development of a customer-centric online purchasing platform that prioritises customers' needs and preferences. This platform could encompass user-friendly interfaces, personalised recommendations, transparent information, and innovative warranties. It would also offer hassle-free returns, enhanced verification of legitimacy, and accurate information regarding product licenses, including relevant details such as expiration dates, authorised distributors, and any associated restrictions. Furthermore, a transparent feedback mechanism would effectively address any concerns or complaints.

The practical result of this research is to enhance customer confidence in online purchasing by implementing legal safeguards. This initiative also encourages businesses to offer innovative warranty options, thereby fostering greater competitiveness in the market.

Conclusions and Implications

Overall, it is essential for online commercial entities to utilize a combination of tools, such as AHP, QFD, and HoQ, to create a comprehensive and successful online business platform. By leveraging these methods, businesses can better understand customer preferences, technical requirements, and align their decisions with company goals. This approach will ultimately lead to a more structured decision-making process, prioritise customer needs, and ultimately drive success in the competitive online market.

The matrices created through the AHP and QFD methodologies aimed to distribute this complexity into smaller components, which can be addressed in phases.

The result of the study revealed that warranty was the highest, followed by product license and legal company. These three elements are required to be applied in designing strategies for online business development that are in line with consumer desires.

This research was conducted in Manado, Indonesia, with the context of Indonesia. The research results may differ in other cities or countries with different contexts. It is the limitation of the study.

Online businesses play a crucial role in service industries that constantly strive to improve service and reduce costs. By integrating AHP and QFD, it is important to consider customers' feedback as their opinions are valuable.

Suggestions for Future Research

For future studies, researchers recommend conducting a comparative analysis of different online business platforms that have integrated key elements such as warranties, product licenses, and company legality for future studies. Such an analysis could offer valuable insights into the effectiveness of varying implementation strategies and help identify best practices. Another suggestion is to conduct surveys or interviews with customers to get their perspectives and preferences. Alternative research methods could be employed to evaluate how these elements influence the operational effectiveness of digital platforms. It could include sales growth, customer retention, and customer satisfaction. Researchers recommend considering other influences on the design of an online business platform, in addition to warranties, product licenses, and company legality. Further investigation could examine factors like usability, security, and personalisation. Another idea is to conduct a longitudinal study to monitor the changing significance of these factors over time. This could offer valuable insights into evolving customer preferences and regulatory demands.

Research could investigate how these factors are interpreted and prioritized within various cultural settings. It could reveal exciting insights about cultural differences in online shopping behaviors and preferences.

Future research could also explore how emerging technologies, such as artificial intelligence, block chain, or virtual reality, could enhance warranties, product licenses, and company legality in online business platforms. It is also good to conduct a case study on companies that have successfully implemented these factors in their online business platforms.

These case studies could provide practical insights and lessons for other businesses.

Researchers propose to conduct a live stream shopping which has gained immense popularity in China and the US by seamlessly integrating live video, online shopping, and real-time interaction. This cutting-edge methodology encourages user engagement and cultivates a strong bond and dialogue between streamers and viewers, as well as among the viewers themselves. It can enhance users' overall quality of life and positively contribute to society (Ni & Ueichi, 2024).

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Conflict of Interest

The authors hereby confirm that no competing interests exist.

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