

The impact of customer experience quality on product design quality: an analytical study of the opinions of a sample of mobile phone customers in Iraq

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Abstract : The study mainly aims to determine the impact of the customer experience quality on the quality of designing the perception of mobile phone customers in Iraq, based on a major problem that was diagnosed with several questions, the extent of the perception of the interactive relationship between the variables in the field, and to form an expressive intellectual framework for the study, the customer experience quality was adopted as an independent variable, which consists of four Dimensions (interaction quality, results quality, access quality) and product design quality as a dependent variable that was one-dimensional.

For the purpose of achieving the objective of the study, the questionnaire was used to collect data related to the variables of the study for a sample of 350 customers, and then analyzed it by adopting some statistical methods such as such as the mean, standard deviation, Pearson correlation coefficient, and coefficient of variation The data analysis was conducted using statistical software programs, specifically SPSS (version 24) and Amos (version 24). The study's findings revealed a significant correlation and influential relationship between the two variables. The conclusions reached by the study showed that there is a statistically significant correlation and effect between the customer experience quality and the product design quality. The study resulted in a set of recommendations, the most important of which is that organizations should take into account the quality of design in all stages of product development, from planning to marketing.

Keywords: customer experience quality, product design quality

INTRODUCTION: Product design and the customer experience quality are critical factors in the success and continuity of any organization. A good product and a positive customer experience enhance trust between the organization and its customers, and increase the likelihood of repeat customer dealings with the organization again. Product design includes many important factors such as product aesthetics, durability, safety, multiple functions, ease of use, and more, all of which are related to CEQ. When the customer feels that the product is well designed and has smooth and easy-to-use interactions, this can improve the quality of their experience. Product design can also bring about more interaction between customers and the product, so customers can feel their participation in value creation through product design quality. Through the customer's participation in value creation, organizations can improve the quality of their customers' experience and achieve business success. This can be achieved by providing means to interact in product design, listening carefully to customer feedback, improving the design based on these feedback, providing customer reviews and ratings, and utilizing analytical tools, all of which can help organizations improve CEQ and achieve business success. commercial.

the customer experience quality can also greatly affect the brand's reputation and customer relationship management, because the customer experience represents the organization's image in the eyes of customers. If the customer experience is positive, this can lead to increased trust and loyalty among customers, thus increasing the organization's market share and generating more profits. Conversely, if the customer experience is bad, it can lead to loss of customers and low confidence in the brand, and in the long run, this can affect the profits and future growth of the organization. The organization's possession of an advanced model for customer experience management is of great importance as it works to build a base of loyal customers, in addition to its role in providing the organization with additional points of view and opinions that it works to benefit from in the process of building a customer base. The term (customer experience quality) is one of the most important basic terms found in studies related to the process of customer relationship management, as it works to portray the customer experience as an important element in the process of building a customer base. Therefore, effective management of customer experience is the main key in the process of building a customer base. of customers, which in turn is reflected in the competitive advantage of the organization. The link is between customer experience management and product design quality, hence the role of management appears by paying attention to analyzing the consumer in terms of his tendencies and desires and accessing his data for the purposes of organizing campaigns and marketing plans in the interest of the organization, serving its objectives and building a long-term relationship with him.

The first axis: the methodology of the study

First: the study problem

Business organizations in various production sectors are witnessing intense competition to attract and maintain customers in a highly competitive environment, since the customer is the beating heart and the main artery for the organization's continuation in competition. The study of CEQ is of great importance because it contributes to influencing the competitive advantage of the organization and contributes to enhancing its competitive capabilities, as the customer plays an important role in the product design process, as he is considered a consumer of the product. On the other hand, contemporary manufacturing organizations recognize product design as an important concept for survival. As the concept of product design quality has become a major concern for organizations around the world, due to the intense competition between organizations in the manufacturing environment.

In light of the, foregoing, the, current study, attempts to bridge the knowledge and application gap to understand and interpret this relationship, by formulating, a main question (Is it possible to explain the relationship between CEQ and product design quality) and the following sub-questions emerge from it:

1. What are the intellectual foundations of the variable of customer experience quality and its dimensions?
2. What are the intellectual foundations of the product design quality and dimensions variable?
3. What is the nature of the relationship, between CEQ and product design quality?
4. Is there an effect of the customer experience quality on the quality of the design?
5. What is the level of customer awareness in the study sample organizations of the quality of their experiences?

Second: the importance of the study for mobile phone companies and customers

1. The importance, of the study comes from the importance, of the variables it deals with, as it deals with one of the most important contemporary issues in administrative thought during the last few years.
2. Contribute to providing new data and information in the field of customer experience quality and product design quality through the study's conclusions and recommendations.
3. Shedding light on the most important variables affecting the performance of organizations, which is the customer being the actor and the main focus of the development process and trying to win his loyalty and commitment.
4. Determine the nature and type of relationship, between, the quality, of customer experience and the quality, of product design, which, enables future, studies to measure, the nature and, type of this relationship on other samples.
5. Through practical application, this study can provide solutions to the problems that many mobile phone companies suffer from.
6. The behaviors of the customer experience quality and the quality of the design represent one of the important means to achieve the success of organizations in the business environment, which is characterized by the increasing volume of competition in the labor market.

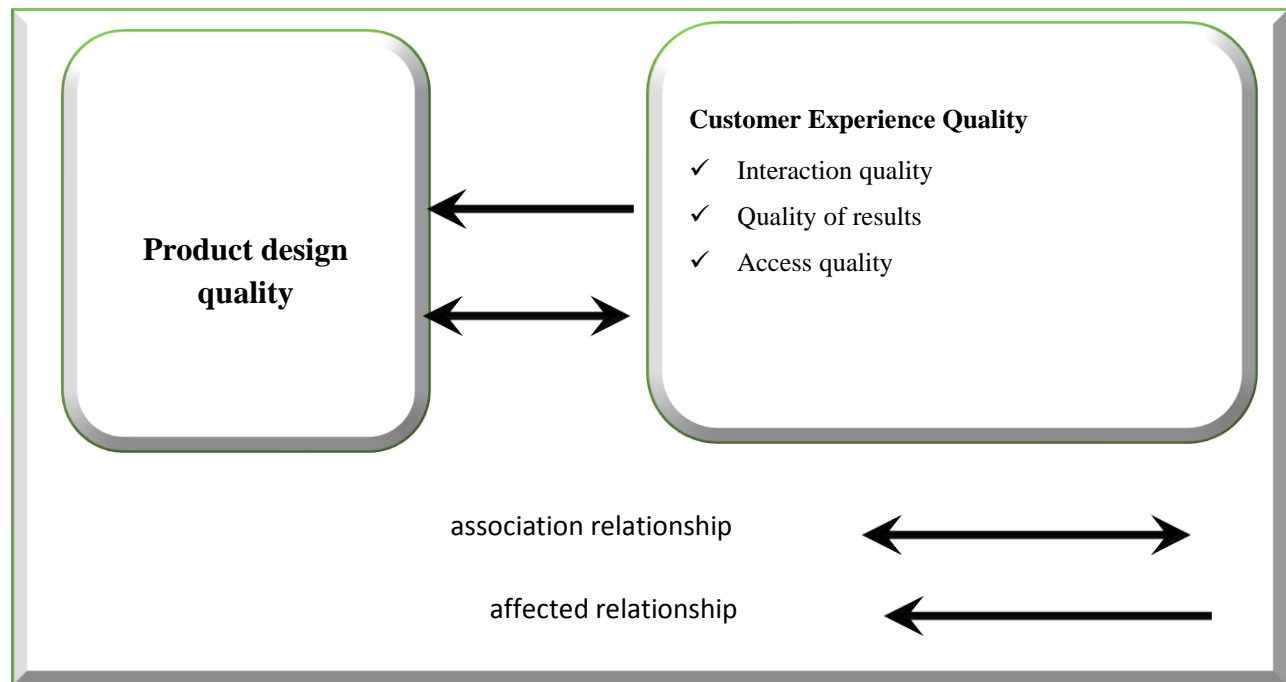
Third: Study Objectives:

The main objective, of the study is to investigate, the correlation and effect relationship, between (CEQ and product design quality). Within the context of the study problem and its importance, the objectives of the study can be summarized as follows:

1. Determine the level of interest of the sample in the quality of their experiences.
2. Identifying CEQ and its impact on product design quality in its various dimensions
3. Provide a special conceptual framework for the customer experience quality, as it is a recent topic

Fourth: The hypothetical plan for the study:

In the light of the study methodology and objectives, a hypothetical study plan was prepared, see Figure (1), to express the relationship between the study variables.



Source: prepared by the researcher

Fifth: Research Hypotheses:

The first main hypothesis:

The meaning of this hypothesis (the existence of a statistically, significant, correlation between CEQ and product design, quality)

The second main, hypothesis:

According to this hypothesis (there is a statistically significant effect of CEQ on product design quality)

Sixth: - Scope of the study

1. **Human limits:** The human limits were the customers of mobile phone companies in Iraq

2. **Temporal limits:** The field study covered the period from 1/5/2023 to 1/11/2023, and this period is the basis for collecting data and information on the practical side, as well as the period of distributing questionnaires to the study sample.

Eighth: Methods of collecting data and information

1- **Theoretical side tools: -**

In order to enrich the theoretical aspect of the research, books, magazines, and periodicals were relied upon, as well as the World Wide Web (Internet).

2- **Practical side tools:**

This paragraph revolves around the tools that have been classified in the practical aspect in order to collect private data in the studied sample, which was represented by the questionnaire as a main tool for data collection.

Seventh: - The study population and sample

The study population is represented by customers of mobile phone brands in Iraq, while the study sample consisted of a sample of (350) customers of mobile phone brands in Iraq.

The second axis: the theoretical aspect

First: the concept of customer experience

In the most general and broadest use of the term, an experience is simply a state of mind that occurs in any individual, at any conscious moment. The Cambridge Advanced Learner's Dictionary defines experience as "something that happens to you and affects the way you feel." If this definition were extended to the commercial realm, every purchase and consumption would be an experience. In order to better appreciate and define the concept, a distinction must be made between commercial experience and other types of consumption (Poullsson & Kale, 2004:270). The customer experience is defined as part of the personal experience, which results from the reflection of

individual customer experiences (Gentile et al., 2007:1). According to Palmer (2010:198), customer experience development may be a combination of three factors that help shape the consumer's attitude towards an event:

1. Stimulus properties – People, perceive a stimulus, differently according, to its sensory properties and information content. Stimuli that differ from others around them are likely to be more susceptible
2. Context - In perceiving. stimuli with. a given set of characteristics, individuals. will also be affected by the context of the stimulus.
3. Situational variables in which information, is received, including social, cultural and/or, personal characteristics Perceptions are greatly influenced by individual characteristics, including previous experience of offering a particular product or service The role of emotions has been noted as a defining feature of the customer experience, And a stimulus that, has a positive emotional outcome for one consumer might have.

The customer experience can be defined as the internal and subjective response of customers to any direct or indirect contact with the organization through multiple touch points. That: “Customer experience arises from a set of interactions between the customer and a product, organization or part thereof, which elicit a reaction. This experience is entirely personal and involves the customer on different levels (mental, emotional, sensory, physical and spiritual) (Lemke et al., 2011:5).) .

Second: the concept of customer experience quality

Customers have moved from being attracted to new product developments to customer-oriented developments that emphasize quality, personalized experiences. Quality of experience extends beyond the traditional service quality dimension (Amoah et al., 2016:3).. Where the concept of customer experience quality was developed to identify the most important features that are compatible with customer loyalty, satisfaction, and recommendations related to relationship marketing and customer experience programs. as built around peace of mind (including experience, ease of process, comfort, and relationships); focus on results (including focus on results, innovation and previous experience); moments of truth (flexibility, perceived risk, interpersonal skills, quality of service); And product experience (freedom of choice, comparisons, and worker experience (Bennett & Molisani, 2020: 2). Based on the opinion of (Bagasworo & (Hardiani, 2019:111), CEQ is the final understanding through a direct relationship to the methods provided by the organization. Experience is a personal event Occurs in response to many stimuli An experience or experience includes all life events that have occurred In other words, as a marketer, you must organize the right environment for customers and what customers really want An experience or experience is generally not self-created or artificial, but is directly based on experience Without the element of intent, the use of experience is part of the customer experience, where the customer experience is everything that happens at each stage of the customer life cycle from before purchase to post purchase and may include interactions that go beyond the product itself.

Third: the importance of CEQ

(Lemke, et al., 2011:5) expects that customer experience quality contributes to a broader, understanding, of shared value creation, and thus is more strongly associated with customer relationship outcomes than product and service quality alone. Customer experience quality does not lead to results like direct purchase, but indirectly through value perception. (Eskiler & Safak, 2022:22) suggest the importance of CEQ in that it determines the perceived value of the service, and researchers have found that CEQ has a significant, impact on consumers' cognitive and emotional buying behavior. Some studies indicate that providing a superior customer experience is one way to achieve successful, marketing results and competitive, advantages. However, no study has been conducted to empirically test, precursors and outcomes of customer- experience, quality in fitness services. In this context, customer experience, quality is likely to determine the perceived value, of a service, and researchers have found that customer experience, quality has a significant impact on consumers' cognitive, and emotional buying behavior. Some studies, indicate that providing, a superior customer, experience is one, way to achieve successful marketing results and competitive advantages.

Fourth: Customer Experience Quality Objectives

Organizations aim from the viewpoint of (Bell et al., 2005:1) when understanding CEQs to conduct a survey of their customers and measure their perceptions about the quality of technical and functional service, perceived switching costs and investment experiences, and their loyalty to the organization. How the customer's experience affects the method of evaluating the service. Organizations aim to monitor past consumer experience to determine the strategies to be followed to evaluate current experiences, in addition to achieving good management of future experiences,

which enables them to develop profitable marketing strategies (Ailawadi et al., 2009:25). **Fifth: dimensions of customer experience quality**

1- quality of the interaction

Interaction quality refers to customers' perceptions of the superiority of the manner in which service is provided. From initial contact through service delivery, customers interact with service providers across multiple touch points, and if workers demonstrate good interaction skills (Kim & Choi, 2013:356).

2- quality of the results

Outcome quality refers to customers' perceptions of the superiority of what they receive while experiencing a service. Also assume that the outcome of the service is critical in evaluating service-meeting quality. Provided that the customer experience is viewed as a subjective response of the customer to the overall direct and indirect confrontation with the organization. (Kim & Choi, 2013:356)

3- Quality of access

Quality of access refers to the ease and speed with which visitors can get to their desired location. Four sub-dimensions that make up access quality have been identified in the literature: (a) convenience (b) information (c) place (d) destination (Kim & Choi, 2013:356).

Sixth: the concept of quality within the design

Defining the key parameters of a product during the planning stage is crucial for ensuring its quality and competitiveness. Mistakes or miscalculations in these parameters can lead to higher costs due to redesign efforts or even product failure. The process of determining these parameters is time-consuming and involves collaboration among various teams, including engineers, marketing staff, and managers. Having a simple and intuitive method for managing product development resources and ensuring product quality can greatly enhance the team's ability to adapt to environmental changes (Reich & Levy, 2004:2).

Collaboration in product quality design typically involves interactions within product design teams, as well as cross-departmental interactions with functions like marketing and manufacturing. Concurrent development, where tasks are performed in parallel and depend on initial information from other tasks/units, is common in new product development projects. However, this concurrent approach often leads to significant changes in design quality and rework, consuming a considerable portion of engineering capacity and development budget (Banker et al., 2006:10).

Design quality should be an integral part of the product development process, ensuring that quality is designed into the system from the beginning. This involves creating a comprehensive understanding of how system quality responds to different parameters, ultimately establishing a design space for the method (Awotwe-Otoo et al., 2012:62). Design quality emphasizes that product and process performance characteristics should be scientifically designed to meet specific objectives, rather than being empirically derived from test batches. Thus, good product quality should present a low risk of failure in achieving desired attributes (Awotwe-Otoo et al., 2012:168). The concept of design quality was pioneered by Dr. Joseph M. Juran, who believed that most quality problems can be attributed to the way a product is designed in the first place (Yu et al., 2014:771).

Rathore (2016:6) identified four pillars of product design quality, which encompass the following areas:

1. Product Design Objective: Defining the target product quality profile involves identifying the key quality attributes that should be present in the product.
2. Process Design Space: The design space refers to a well-established combination of physical attributes and process parameters that have been proven to ensure quality assurance in the product.
3. Control Space: The control space is determined based on the process design space. It enables a comprehensive understanding of the production processes, allowing for better control over the multifaceted aspects of production and ensuring product quality

Operating space: The best set of statistically defined parameters, which can readily accommodate any naturally occurring variance, is called the operating space.

He believes (Niu et al., 2018: 4). In the product design stages, quality control is one of the most important activities as it ensures that the design goal is achieved. The objective of product design quality control is to check key aspects of design quality against a set of standards or specifications. Thus finding a middle ground between cost and

product quality. In reality, quality control is a process aimed at determining, by appropriate means, whether or not a controlled product complies with its predetermined specifications or requirements, and includes a decision of acceptance, rejection or revision. It comes at the end of production or result to see if the product produced conforms to predetermined specifications and standards. This can constitute a guarantee for the manufacturer and the customer (Omba et al., 2020:256). By applying scientific and risk-based principles, design quality provides a proactive platform for comprehensive support and control of quality metrics at every stage of the product development cycle without relying on periodic final testing (Beg et al., 2019:4).

Seventh: The stages and steps of applying the quality system in the design process:

Building the application of the quality system includes several stages, (Ibrahim et al., 2022: 265):

A- Product planning:

(Bacciotti et al., 2016:370) assert that the main purpose of product planning is to translate specific customer desires into technical requirements, for the product, using quality function deployment. The main objective of product planning is to evaluate and select alternative product concepts. which defines product planning as a process of conceiving, developing, producing, testing, marketing, sustaining and disposing of organizational offerings i.e. it considers the entire product life cycle.

B- Product Design:

This stage takes place through the design team, as the design of the product requires innovation and creativity from the ideas of the team, and at this stage the problem is identified and monitored, analyzed, data classified and executive drawings developed according to the required technical specifications. The design that has been reached is important for achieving the requirements of customers on the one hand, and using them in the production planning stage on the other hand (Ibrahim et al., 2022: 265).

c- Planning the manufacturing process

Manufacturing process planning needs special attention in the context of a new manufacturing strategy, as the main task is to choose the appropriate manufacturing processes, machinery and related tools for a specific product design. Manufacturing process planning creates process plans flexibly based on the current capacity of the workspace and the health of the machine tool, part being processed, and materials. The manufacturing resources available are often decentralized and manufacturing vendors, who provide these resources as cloud-based services, often express their capabilities and business conditions in different formats. The selection of the appropriate manufacturing process and related configuration is also specific for each field and manufacturing method. The planning of the manufacturing process takes place through the production team, through which the production methods are classified and determined, and the implementation packages are distributed to their manufacturing sites (Šormaz & Sarkar, 2019:183).

D - Production Process Control

A well-defined manufacturing process with associated, process controls ensures that an acceptable product, is produced on, a consistent basis. (Hourd et al., 2014:1039).

The third axis: the practical side

Characterization of the study variables

This paragraph introduces the reader to the variables of the study by describing the variables with a set of symbols, to overcome the difficulties for the reader to understand the level of interpretation and analysis in the aspect of (CEQ, product design quality), in addition to building a broad awareness of the importance of these variables.

Table (1) Description and coding of the variables of the study

Variables	Dimensions	Paragraphs	Code	Source
Customer experience quality QEC	Quality of interaction	5	INQ	(Chen & Chen ,2010) (Kim & Choi ,2013) (Wu et al.,2018)
	quality of results	5	REQ	

	quality of access	6	ACQ	
Total paragraphs of the dimension 16				
Product design quality QDP	One-Dimensional		(Swink,2000) (Gann <i>et al.</i> ,2003) (Jiao&Lu,2021)	
Total paragraphs of the dimension 14				

Descriptive statistics of CEQ variable (the independent variable)

The scale of this variable in its final form contains (16) items distributed on three dimensions, with (5) for the two dimensions of interaction quality and quality and results, and (6) items for the access quality dimension. The table below shows the obtained results:

After reviewing the statistical description of all dimensions of CEQ variable and what resulted from the responses of the study sample regarding its sub-dimensions, the table (2) shows the descriptive statistics and the general arrangement of the dimensions of the field variable, which reflects the interest of the studied sample in these dimensions, as it is arranged as follows (quality of interaction quality of outcomes, quality of access) respectively.

Table (2) descriptive statistics for CEQ variable

dimension	standard deviation	Relative importance	order of importance	Arithmetic mean
After Interaction Quality	4.04	0.372	%81	1
After Quality Results	4.03	0.437	%81	2
After Access Quality	4.01	0.386	%80	3
Overall Rate Of Customer Experience Quality Variable	4.00	0.191	%80	

2- Descriptive statistics of product design quality variable (dependent variable)

The scale for this variable in its final form contains (14) items. Table (35) shows the obtained results, as this variable obtained an overall significance of (67%), with an arithmetic mean of (3.36), with a moderate response level, and with a standard deviation of (0.238), and this is due to the contribution of the thirteenth paragraph in this dimension. Which states (the quality of the acoustics is suitable for use), as it achieved an arithmetic mean equal to (3.40) and a standard deviation of (0.897), with a relative importance of (68%). I obtained the lowest arithmetic mean of (3.16), a standard deviation of (0.999), and a relative importance of (63%).

Table (3) Distribution of descriptive statistics for product design quality variable

Paragraph	standard deviation	Relative importance	order of importance	Arithmetic mean
I find this phone to be flexible, easy to interact with and very easy to be adept at using.	3.1 8	1.3 40	%63	1 3

The features of this phone are reliable	9	3.2	89	0.7	%65	6
The quality of this phone is great and my phone is of great quality	0	3.3	30	1.3	%66	5
I find this phone attractive and has a unique look	6	3.2	89	0.9	%65	7
I see that this phone meets my needs and desires	6	3.2	95	0.8	%65	8
This phone has a huge audience.	4	3.2	51	0.9	%64	1 2
I think this phone is very modern	5	3.2	71	0.7	%65	9
I see that this phone is very serviceable	4	3.2	98	0.9	%64	1 1
This phone looks very technical	5	3.3	73	0.8	%67	3
This phone has an efficient phone body	6	3.3	27	0.8	%67	2
The specifications of the phone are robust	6	3.1	99	0.9	%63	1 4
The phone has good lighting	6	3.2	65	0.9	%65	1 0
The quality of the acoustics is suitable for use	0	3.4	97	0.8	%68	1
This phone produces a low number of complaints or errors reported by users	4	3.3	54	0.9	%66	4
Total product design quality variable	6	3.3	38	0.2	%67	

Source: prepared by the researcher based on the program (SPSS.V.24).

Third: hypothesis testing

1- The relationship between the independent variable (CEQ) and the dependent variable (product design quality)

of this hypothesis (the existence of a statistically significant correlation between CEQ and product design quality)

Table (4) indicates that there is a medium, positive, statistically significant correlation between CEQ and product design quality with an amount of (.3980). Based on the foregoing, it is possible to accept the validity of the first main hypothesis, which is (the existence of a statistically significant correlation between the customer experience quality in its dimensions and the quality of the product design),

Table 4: Correlation values between customer experience quality and product design quality

independent variable / dependent variable	Customer experience quality	Dimensions of customer experience quality		
		Quality of interaction	quality of results	quality of access
Product design quality	0.398**	0.330**	0.288**	0.412**
Sig. (2-tailed)	.001	.000	.001	.000
decision (outcome)	There is a strong correlation with positive significance at the level of significance of 0.01 between the customer experience quality with its dimensions and the quality of the product design			
** Correlation is significant, at the 0.01 level (2-tailed).				

Source: prepared by the researcher based on the program (SPSS.V.24).

1- Ether relationship between the independent variable (customer experience quality) and the dependent variable (product design quality)

The conclusion of this hypothesis (there is a statistically significant effect of CEQ on product design quality)

Table (5) shows that the more the respondent customers realize the importance of the quality of their experiences, the more this leads to improving product design quality for the organization, in other words Increasing CEQ by one standard weight leads to improving product design quality by (0.473) and with a standard error of (0.78).

Table (5) direct impact results

track		Stand ar d rating	stand ar d error	critical value	R2 value	Sig.	
Cust omer experience quality	--->	Prod uct design quality	0.473	0.78	5,4	0.322	0.002

Source: prepared by the researcher based on the outputs of (AMOS.V.24)

The fourth Axis

Conclusions and recommendations

First: conclusions

Based on the analysis and interpretation of the data and the results of hypothesis testing, the study reached the following conclusions:

1. The results of the study revealed a high awareness by the sample of the importance of their participation and thus enhancing the quality of their experiences, which contributes to product design quality,
2. The studied sample expressed the customers' feeling that the quality of their experiences works to improve the capabilities of the organization by developing the experience that the customer possesses. We tend to test the products, and this was manifested in the following form:

3. The results of the study revealed the development of the experience that the customer possesses as a result of his previous dealings with the service provider, and this came from the sample's realization of the importance of focusing on customer interaction, with service providers through multiple contact points.
4. The results of the study revealed that the studied sample expressed their feeling that the quality of their experiences improves the quality of customers' perceptions to outweigh what they receive during the service encounter.
5. The sample expressed its commitment to encouraging customers to participate in value creation through the development and improvement of the factors that affect the speed, accuracy and ease with which the user can obtain the required service.

Second: Recommendations

Based on the above conclusions and to complement the requirements of the current study, we present some recommendations and proposals that were put in place to address the conclusions reached by the current study:

1. The necessity of promoting marketing activities that would improve the confidence of customers in the credibility of the promises and commitments made by the organization, which magnifies the importance of distinguishing the mark by keeping its promises.
2. Organizations should consider design quality at all stages of product development, from planning to marketing.
3. Providing social platforms for customers to communicate with each other and talk about the quality of their experiences with the products they have previously tried.
4. Focusing on the quality of design and performance in products, so that it is suitable for the use that the customer desires.
5. Launching advertising campaigns that market the product effectively, using attractive and innovative methods to attract customers and convince them of the quality of the product.
6. Providing easy and convenient communication channels for customers to express complaints or suggestions about products, such as e-mail or customer service.
7. Improving the quality of design and manufacturing to ensure a satisfactory customer experience, by using the latest technologies and tools in the design and production process.
8. Training should be provided to employees to improve product design quality and better serve customers.

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