

The Effect of quality deployment Matrix Technique on The customer relationship quality

Mohammed M.H. Al-Ardhy⁽¹⁾, Aseel Ali Mezher⁽²⁾

¹ University of Al-Qadisiyah / College of Administration and Economics / Business Administration
Department(admin.mang21.25@qu.edu.iq)

² University of Al-Qadisiyah / College of Administration and Economics / Business Administration
Department(aseel.mezher@qu.edu.iq)

Corresponding Author: Mohammed M.H. Al-Ardhy affiliation: University of Al-Qadisiyah Email: admin.mang21.25@qu.edu.iq

ABSTRACT: The Present research aims to shed light on the Effect of quality deployment matrix technology on The quality customer relationship for a sample of board members and workers in the Quality Department, the Production Department, and the Marketing Department in the Rubber Industries Company / Diwaniyah Tire Factory in the city of Diwaniyah. whose strength reached (100) factors were returned (93) for use and analysis, which resulted in a response rate (93%). Thus, the research problem was formulated in (Is there a correlation and impact relationship between the quality deployment matrix technology and the quality of customer relations) The technology variable of the quality deployment matrix includes four main dimensions: product planning, part deployment, process planning and production planning. As for the quality customer relationship variable, it includes Three main dimensions are trust, satisfaction and commitment. The research adopted the questionnaire as a basic measurement tool for data collection that was employed to test the main and subsidiary hypotheses of the study by using a number of statistical methods, most notably (Pearson's simple correlation coefficient, regression analysis, and path analysis, SPSS vr 20) The results showed a correlation correlation and effect between relationship quality deployment matrix and quality customer relationship. The study reached a set of conclusions, and recommendations the most prominent of which was the results of the research showing a slight decrease in the factory's tendency to use environmentally friendly machines and machines, and this indicates a decrease or lack of orientation to social responsibility in preserving environmental pollution, so it requires the factory management to abide by social responsibility, Legal, and ethical requirements are imposed on all organizations to preserve the environment because it is the property of all. The research recommends that in order to obtain the full potential of quality deployment matrix Technique It is necessary that the management of the factory, the research community, possess sufficient awareness of its role in protecting the environment, and not harm it, and that it have effective programs to achieve sustainable production and the benefits that accrue to the factory and the environment, based on its legal and moral responsibility.

Keywords - quality deployment matrix Technique , customer relationship quality

يهدف البحث الحالي إلى تسليط الضوء على تأثير تقنية مصفوفة نشر الجودة في جودة علاقات الزبون لعينة من السادة أعضاء مجلس الإدارة والعاملين في قسم الجودة ، وقسم الإنتاج ، وقسم التسويق في شركة الصناعات المطاطية / معمل إطارات الديوانية في مدينة الديوانية والتي بلغ قوامها (100) عامل تم ارجاع (93) للاستخدام والتحليل ، وبالتالي صيغت مشكلة البحث في (هل توجد علاقة ارتباط وتأثير بين تقنية مصفوفة نشر الجودة وجودة علاقات الزبون) ما أدى إلى معدل استجابة (93%). يضم متغير تقنية مصفوفة نشر الجودة أربعة أبعاد رئيسية هي تخطيط المنتج ونشر الجزء وتخطيط العملية وتخطيط الإنتاج ، أما متغير جودة علاقات الزبون فيضم ثلاثة أبعاد رئيسية هي الثقة و الرضا و الالتزام . وقد تبني البحث الاستبانة كأداة قياس أساسية لجمع البيانات التي وظفت لاختبار فرضيات الدراسة الرئيسية والفرعية عن طريق استخدام عدد من الوسائل الإحصائية أبرزها (معامل الارتباط البسيط بيرسون ، وتحليل الانحدار ، وتحليل المسار ، SPSS vr 20) وأظهرت نتائج البحث الحالي وجود علاقة ارتباط وتأثير بين تقنية مصفوفة نشر الجودة وجودة علاقات الزبون. وتوصل البحث إلى مجموعة من الاستنتاجات والتوصيات كان أبرزها وجود انخفاض بسيط في توجه المصنع إلى استخدام المكينات والألات الصديقة للبيئة ، وهذا يشير إلى انخفاض أو عدم التوجه إلى المسؤولية الاجتماعية في الحفاظ على تلوث البيئة ، لذلك يتطلب من إدارة المصنع الالتزام بالمسؤولية الاجتماعية ، والقانونية ، والأخلاقية التي تفرض على جميع المنظمات الحفاظ على البيئة لأنها ملك الجميع. يوصي البحث بضرورة إن تمتلك إدارة المصنع مجتمع الدراسة الوعي الكافي تجاه دورها في حماية البيئة ، وعدم إلحاق الضرر بها ، وإن يكون لديها برامج فعالة لتحقيق الإنتاج المستدام وبما يعود على المصنع والبيئة من مزايا انطلاقاً من مسؤوليتها القانونية والأخلاقية.

الكلمات المفتاحية: تقنية مصفوفة نشر الجودة ، جودة علاقات الزبون.

I. INTRODUCTION

Organizations in the past few years to this day have experienced a period of great change in their markets and operations. Therefore, the environment today is a highly competitive environment. So Organizations of all kinds seek to provide the best product/service to customers or communities, as the customer's acceptance of the organization's products and services is the essence of the basis for its survival and continuity in the business

The Effect of quality deployment Matrix Technique on The quality customer relationship

world. Therefore, the main challenge that organizations face is how to provide products and services at a level that satisfies and delights their customers. and the quality required by them, with the low cost of producing the product, Therefore, the Quality matrix Deployment (QMD) technology is one of the contemporary technologies that helps organizations listen to the customer's voice in order to know the desires and needs of customers in accordance with the voice of the engineer and competing organizations. Therefore, the customers are considered the center of attention by the organizations, through them they focus on producing products according to the required specifications, and the product may be exposed to failure if it does not meet these standards, due to its inability to meet the desires and needs of the customer, so the organizations compete to attract the largest possible number of customers and maintain them, and this is done through the quality of the relationship with them and more documented, Within the framework of these challenges, the current study seeks to shed light on the role of quality deployment matrix technology in reducing costs, time and product design and its impact on the quality of the relationship with customers for a sample of workers in the Rubber Industries Company / Diwaniyah Tires Factory.

II. RESEARCH METHODOLOGY

1) THE RESEARCH PROBLEM

Organizations in the past few years to this day have experienced a period of great change in their markets and operations. As the competition at the present time is great in the global market due to the presence of great contacts and interdependence between global markets and the impact of this on global competition on the local markets in our country, Iraq, especially after the openness of the Iraqi markets in recent years. Through the entry of many and diverse products from different global origins, which led to the emergence of a problem that the local Iraqi products suffer from, represented by the low product characteristics and the high costs of manufacturing these products, where the customer's point of view does not affect the Iraqi product. The local market has to compete with other imported products and its inability to achieve high profits And in our country, Iraq, which has suffered and continues to suffer in which organizations and factories suffer from neglect and many difficulties and challenges, as we note the lack of adoption of the concepts associated with the quality deployment matrix technology and the value engineering technique and their application in organizations, which leads to a lack of improvement in performance and also invaded the Iraqi local markets a lot of imported products without An officer for those products and the failure to protect the national product led to a near-stop to Iraqi factories, due to their inability to compete with imported products. Therefore, this study came to know the challenges facing the industry sector in general and the organization under study in particular.

In short, the research problem can be summarized in several questions:-

A - What is the availability of quality deployment matrix technology in Al-Diwaniyah tire factory the case of the study?

B – What is the quality level of customer relationship in Al-Diwaniyah tire factory, the case of the study?

C - Does the quality deployment matrix technology affect the customer relationship quality?

2)THE RESEARCH IMPORTANCE

The importance of the research can be determined by the following:

- The importance of the research is that it used modern and important variables for all organizations, whether industrial or service.
- The importance of the current research appears in that it was applied in an organization that requires that more than other organizations use the quality deployment matrix technology, because of their significant role in developing products and increasing profits.
- The Present research would help bridge the gap between the reality of the industrial sector in our country, Iraq, and what it should be like other research neighboring countries that have made great strides in this field.
- We look forward that the Present research will benefit the organizations and factories in our country, Iraq, especially the researched factory, in finding an integrated work plan that can be relied upon in determining the method of dealing with the products/services provided and their impact on the quality of customer relations.

3) RESEARCH OBJECTIVES

The Effect of quality deployment Matrix Technique on The quality customer relationship

The research aims to indicate or clarify the relationship between the quality deployment matrix technology its stages (product planning, part deployment, process planning, production planning) and the quality customer relationship its Dimensions (Trust, Satisfaction, Commitment) . It has a number of sub-objectives:-

- Disclosure of the nature of the adoption of the quality deployment matrix technology by the Diwaniyah tire lab.
- To identify the extent of the interest of the different departments in the Diwaniyah tire factory in managing the quality customer relationship.
- Determining the level and nature of the impact that the quality deployment matrix technique exerts in achieving or crystallizing the quality customer relationship.
- Diagnosing the extent to which the employees of the Diwaniyah Tire Factory provide products and services of high value to customers, which is reflected in the quality of the relationship with them.

4) THE RESEARCH MODEL AND ITS HYPOTHESES

The Research dealt with two variables

A. explanatory variable : quality deployment Matrix Technique : can be defined as A tool used by organizations to develop new products according to the technical specifications requested by customers, taking into account what is known as the customer's voice when designing the product at each stage of its development in order to achieve their satisfaction. It consists of the following dimensions (product planning, part deployment, process planning and production planning).

B. Dependent variable : quality customer relationship : can be defined as A high-ranking building that reflects the high positive relationship that obtains between the organization and its customers by providing products and services of high quality to the customer through which he feels that he is of interest and a partner with this organization. It consists of the following dimensions(trust, satisfaction and commitment). Figure (1) shows the hypothetical scheme of the Research .

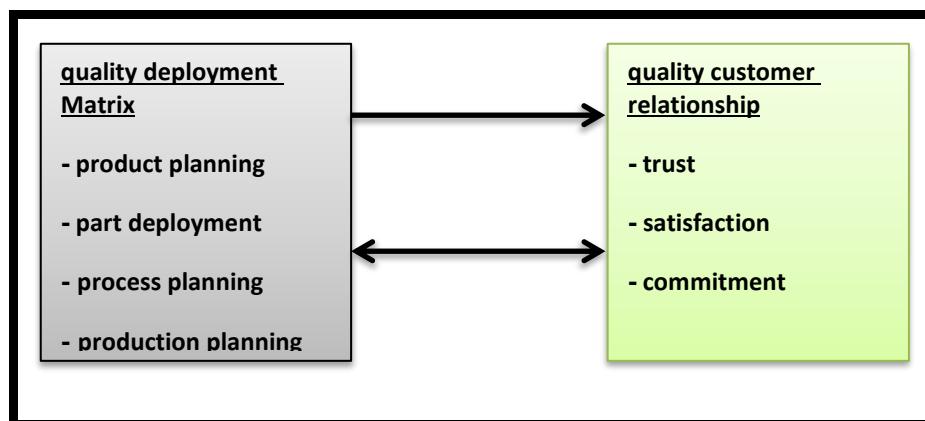


Figure (1)

The hypothetical model of the Research

Source : Prepared by The Researcher

III. PREPARED BY THE RESEARCHER

Based on the above hypothesis, the Research hypotheses can be formulated as follows :

The First Main Hypothesis : There is a statistically significant correlation between the quality deployment matrix and the quality customer relationship, and several hypotheses are branched from it :

A- There is a statistically significant correlation between product planning and quality customer relationship.

The Effect of quality deployment Matrix Technique on The quality customer relationship

B- There is a statistically significant correlation between part deployment and quality customer relationship.

C- There is a statistically significant correlation between process planning and quality customer relationship.

D- There is a statistically significant correlation between production planning and quality customer relationship.

The Second Main Hypothesis : There is an effect of the variable quality deployment matrix on the variable the quality of customer relations, and several hypotheses are branched from it :

A- There is an effect of the dimension of product planning (PTP) on the variable, the quality of customer relations.

B- There is an effect of the dimension of the publication of the part deployment (DD) on the variable, quality customer relationship.

C- There is an effect of the process planning dimension(PSP) on the variable, quality customer relationship.

D- There is an effect of the dimension of production planning (PGP) in the variable quality customer relationship.

First: quality deployment Matrix Technique

Most researchers point out that quality has been around since the beginning of the human race. Since that time, different models of quality and quality assurance have been proposed and used in various disciplines of commerce, industry and the service sector and it seems that each model has emphasized one or a few aspects of management, operations or technology (Matorera, 2015: 145). The Quality Function Deployment (QFD) technology is a multidisciplinary process that must be performed by teams as diverse as marketing department, design engineering, manufacturing engineering, etc. (Haktanır&Kahraman,2019:362). The Quality deployment Matrix (QFD) technology was designed in Japan in the late 1960s, during an era when Japanese industries broke away from the post-WWII situation of product development through imitation and copying and moved to product development based on originality. QFD has emerged in this environment as a method or concept for developing a new product under the umbrella of total quality control (Maritan, 2015:7). The Quality Deployment Matrix is a practice used to design processes in response to customer needs. It translates what customers want into what the organization produces and thus allows the organization to identify the priorities and needs of customers, obtain innovative responses to those needs, and improve operations to achieve maximum effectiveness (Albarracin, 2018:842). The Quality deployment Matrix has become a methodology that helps translate customer needs into design requirements to ensure the quality of outputs, whether this is a product or a process in order to meet these needs. before its manufacture (Erdil&. Arani, 2019:1). As QFD has been widely applied in various sectors, it also suffers from some drawbacks, and traditional QFD cannot be used to solve multi-criteria decision-making (MCDM) problems (Vinodh&Chintha, 2011:344). The methodology was introduced in Japan and developed at a Mitsubishi shipyard in 1972 (Karanjekar et al, 2019:2). The Quality deployment Matrix (QFD) has been implemented to meet customer needs and improve customer satisfaction (Avika et al., 2020:272). Within the limits of their current capabilities and resources, the core of QFD is the House of Quality (HOQ) matrix that bridges the engineering characteristics and customer requirements (Yazdani et al., 2019:475). However, this matrix used in the product development process has been published to the West by a paper entitled deployment of Quality (hinshitsu tenkai) (Osiro et al., 2018:12). So Quality Function Deployment (QFD) is a technique for translating the plain language used to describe customer needs into an engineering language used to set product and process design parameters, using (QFD) a cross-functional team identifies all major customer requirements for a particular product perhaps through customer voice effort and assesses how well the process is met Existing product and process design for those requirements or their excess (Swink et al., 2020: 128). So the purpose is to ensure that customer requirements are considered in every aspect of the process. Listening to and understanding the customer is a key feature of the Quality Deployment Matrix (QFD) (Stevenson, 2021:158). The ability of a product or service to efficiently meet the needs and requirements of customers before being released to the market is a key point in design and development activities. One of the most powerful design methods for achieving this goal is the Quality deployment Matrix (QFD) (Fargoli & Sakao, 2017:2). Implementation of the QFD matrix in organizations can meet customer demands, increase product quality, reduce product cost, improve design specifications, and significantly reduce development cycle time (Liu et al., 2019:1).and There are many definitions Quality deployment Matrix Technology. While he (AKAO, 1972:5) defined it as a Practice leads to improvements and in the process allows the organization to exceed the expectations of its customers. As for (Cohen, 1995:2) considers(QFD) it as a A method of product planning, development, and organization, which enables the development team to understand the current needs and wants of customers.While (Akao&Mszur,2003:20) look at (QFD) A useful tool for designing innovative products and services in pursuit of high quality.and The American Institute of Suppliers defined it as a system for translating customer requirements

The Effect of quality deployment Matrix Technique on The quality customer relationship

into appropriate requirements for the organization at every stage from research to production design and development to manufacturing, distribution and marketing (Vinayak & Kodali, 2013:825). As for (Chen *et al.*, 2017:3) he believes that Quality Function Deployment is the A useful planning tool to facilitate the process of planning a new product in order to maximize customer satisfaction. so he defined it (Sireli *et al* & Sakao 2007) It is a systematic tool for customer-driven quality assurance and product planning that converts qualitative demand into quantitative standards integrating the customer's voice into technical characteristics (Singh & Kumar, 2021:1).

As for The Present Research it focused on four main stages and which Agreed Most writers and researchers such as (Desrianty *et al.*, 2018: Shu, 2017: Garg & Kumar, 2014: Okonta *et al.*, 2013: Kumar *et al.*, 2006) agreed that the QFD system consists of four interrelated stages: (product planning, part deployment, process planning and production planning):.

1. product planning

Product planning is usually the first stage of the product design process (Shu, 2017:19). And that the purpose of the planning stage is to analyze, identify, and translate customer requirements into technical requirements for the product to meet them (Garg & Kumar, 2014:159). The first stage documents customer requirements, competitive opportunities, product measurement compared to the competing product, and the organization's technical ability to meet each customer's requirements, as obtaining good customer data in the first stage is critical to the success of the entire (QFD) process (Albarracin, 2018:843). This stage is usually led by the marketing department. (Okonta *et al.*, 2013:51).

2. part deployment

Design is a number of features that have an impact on the look, feel, and functionality of a product for customers. That is, design is a plan of assembling the best elements that are used to perfect something for a specific purpose. Design is understood as a powerful competitive tool to increase product value (Ahyadi & Ahmad, 2018:48). In this stage, the characteristics of the product are compared with the requirements of the most important components (sub-systems) into which the product can be divided (characteristics of critical parts). (Vinayak & Kodali, 2013:830) This stage is usually led by the production department. (Okonta *et al.*, 2013: 52). Creativity and innovative ideas related to the product as well as the creation of product concepts are expressed during this stage with the identification and documentation of product specifications and then the requirements that have been identified as most important to meet the customer's needs are implemented in this process (Albarracin, 2018:843).

3. process planning

This step is related to the characteristics of the individual subsystems of their respective production processes (critical process steps) (Vinayak & Kodali, 2013:830). That is, identifying the main process steps needed to achieve the characteristics of the main part, and this stage is led by the Department of Production Engineering (Abu Shahla, 2014:26). During process planning, production flow charts, critical quantities and process parameters (or reference values) are determined (Albarracin, 2018:844).

4. production planning

At this stage, details are examined (Vinayak & Kodali, 2013: 830). Process control and control plans, maintenance plans and training plans for process control and control are developed (Garg & Kumar, 2014: 159). In addition, at this stage, the flow of decisions related to the process that represents a high risk is identified, to be fixed, and controls are applied to avoid failure and prevent its recurrence (Albarracin, 2018:844). The controls are set by the Quality Assurance Department in coordination with the production lines (Okonta *et al.*, 2013:52). The final stage ensures that the operations are doing exactly what they were expected or intended to do. This stage is the main place where it is ensured that the customer's needs are actually met, that is, the customer's voice is actually heard (Kumar, *et al.*, 2006:297; Hamid, *et al.*, 2015:596).

Second : customer relationship quality

The concept of quality customer relationship arose from theory and research in the field of relationship marketing, where the ultimate goal is to strengthen already strong relationships and transform indifferent customers into loyal customers (Rauyruen & Miller, 2007:23). As the organizations see that marketing relationships as the heart of business operations, and that the organizations are aware of the connection of this philosophy with their other operations, and they move optimally towards making broad transformations of the organization's work in its relations with customers (Saleh, 2017: 102). In today's highly competitive environment characterized by rapidly

The Effect of quality deployment Matrix Technique on The quality customer relationship

changing customer needs, developing and maintaining strong, sustainable and beneficial relationships with customers lies at the heart of the contemporary marketing model and is a significant competitive advantage for organizations (Athanasopoulou & Giovannis, 2015:332). Therefore, most researchers point out that the quality customer relationship appeared as an emerging concept in the literature related to marketing relations with customers because maintaining this relationship is an essential activity for every organization (Alves, 2019: 187). and prepare Customer relationship quality is a concept introduced to marketing practitioners and researchers in the context of the Ericsson Quality Program (1985) to increasingly attract the interest of researchers and practitioners by highlighting the importance of relationships as part of customer perceived quality (Vieira et al., 2008:3). Over the past two decades, the quality customer relationship has become one of the pillars of relationship marketing (Hennig-Thurau et al., 2001:334). And the quality of the relationship with the customer has gained importance as a measure of successful business relations (Palmatier et al., 2006: 136). Indeed, the importance attached to the quality of customer relations parallels the growing reservations about the role of customer satisfaction and the quality of service provided, despite the increasing amount of literature on the quality of customer relations. The customer There is still a high degree of ambiguity about its nature, limitations and dimensions, and calls for clarification are still numerous (Vieira et al., 2008:4). The different levels at which trade relations seem to develop, such as the structural, economic and social levels, contribute to a part of this ambiguity (Holmlund & Tornroos, 1997:304). There is an emerging view that traditional methods of conducting business interactions, which have traditionally focused on discrete transaction exchanges, will increasingly be replaced by a new model based on stable long-term relationships with customers (Galbreath, 2002:8). Against the background of these developments, the concept of relationship quality has been attracting increasing research interest as a meaningful construct that attempts to capture the essential features of the relationship between an organization and its customers (Qin & Yi, 2009:392). However, there is no real consensus regarding the concept of relationship quality although there is agreement that relationship quality is a higher order structure consisting of several distinct dimensions (Hennig-Thurau et al., 2001:334). Despite the criticism that this purely positive approach is insufficient, the results of recent comparative research have confirmed that the quality of the relationship is better positioned as a detailed construct rather than a complex construct (Santouridis & Veraki, 2017:1125). Relationship quality refers to the proximity or strength of the relationship, and it is one of the determining factors for customer loyalty, and it is a key concept in the marketing relationship that gives customers the freedom to evaluate the products and services provided by organizations and gives a message that customers will buy the organization's products, and they will ask whether the products provided meet their needs, or whether there are Any damage to the product, in the event that the product purchased by the customer is damaged or suffers from a manufacturing defect, the product can be replaced with a new product and here the customer will feel confident in the organization and then feel satisfied and then will continue to shop permanently from this organization (Tungadi, 2018: 2). The researchers look at the definition of the quality of customer Relationship from different angles, While he (Smith,1998:4) defined it as a higher-order construct comprised of a variety of positive relationship outcomes that reflect the overall strength of a relationship and the extent to which it meets the needs and expectations of the parties. As for (Holmlund,2001:15) considers quality customer Relationship Cognitive assessment of business interactions by key individuals in a duo compared to potential alternative interactions. While (Crosby et al.,1990:70) look at (QCR) as a structure of a higher order consisting of several different but related components or dimensions. As for (Japutra et al.,2018:193) he believes that quality Relationship it is The strength of the customer-brand relationship, including satisfaction, trust, commitment and social benefit. like that defined (Huntley,2006) It as the degree to which customers are satisfied with the additional work of the overall partnership as reflected in product quality, service quality and value (TRAN,2020:168_169).

Some look that the quality customer relationship is a superstructure consisting of three basic interrelated variables of trust, commitment and satisfaction, as customer loyalty is directly affected by trust and commitment and Satisfaction that the level of customer loyalty will be higher when the customer has a positive perception of trust. There are many previous studies on the quality of the relationship with the customer, indicating that one of the most important determinants of customer loyalty is the quality of the relationship (Datta & Lebcir, 2018:23_24). So Most researchers emphasize these dimensions, such as (Smith, 1998; De Wulf, 2001; Jaafar, 2006; Grégoire & Fisher, 2006; Nadeem et al. 2020; Tajvidi et al, 2021) and point out that it is important in measuring the quality customer relationships These dimensions are:.

1. trust

Trust is one of the dimensions that has been extensively touched upon in the administrative literature, and trust is defined as the reliability that believes to one party that the other party will meet its needs and consists of two aspects: perceived credibility and benevolence. There are two levels of trust, first, the customer trusts a particular

The Effect of quality deployment Matrix Technique on The quality customer relationship

sales representative while at the second level, the customer trusts the organization (Liu et al., 2011:72). Many researchers view trust as a behavioral intent or behavior that reflects dependence on a partner and involves uncertainty (Barry & Doney, 2011:308). Previous research shows that trust is directly and positively related to behavioral intentions as well as self-reported behaviors. Here, trust is conceptualized as the customer's trust in the quality and reliability of the product/service provided by the organization (Nyadzayo&Khajehzadeh, 2016:263). Confidence behaviors are associated with a willingness to engage in risk-taking behavior (De Wulf, 2001:36). And trust in general is an essential component of successful relationships and is an important element in most economic and social transactions. When there is no trust, customers stay away from the organization (Hajli et al, 2017: 2). It is also defined as "the willingness to rely on trusted mutual exchange." (Lucy, 2007:42).

2. Satisfaction

Due to some of the difficulties associated with establishing unambiguous links between customer satisfaction and organization performance, the 1990s saw many managers increasingly turn to customer retention as a long-term goal (Kumar & Reinartz, 2006:21). So Relationship satisfaction represents customer evaluation based on personal experience across all service cycles, often measured by the degree to which a business transaction meets customer performance expectations and is a widely accepted indicator of repurchase intentions and loyalty (Barry&Doney, 2011:308). Prepare Satisfaction is a psychological concept that includes the feeling of pleasure and well-being as a result of obtaining what the customer hopes and expects from the product or service, that is, it represents the customer's perception of the value that he obtains, since satisfied customers tend to remain loyal to the brand (Hajli et al, 2017:3) & (Rojas,2010:228). And that general satisfaction has a direct impact on the likelihood of the customer returning to use the product/service (Jen et al., 2011:321), while it was found (Murray & Howat, 2002:25). Customer satisfaction appears to prevail because customers are likely to recommend a product/service to others, then customers find a higher quality of the product or service, which will result in meeting or exceeding customer expectations and desires from the product/service. On their positive experience with the organization.

3. commitment

Commitment represents the customer's psychological attachment to the organization along with his desire to maintain this relationship (Akrouit & Nagy, 2018:10). The concept of commitment plays a central role, as it is a major feature of relationship quality models. Research indicates that relationship commitment is the core of all successful business relationships and that it is an essential component of successful long-term relationships. Relationship commitment refers to an implicit or explicit commitment to the continuity of the relationship between the customer and the organization (Alrubaiee, 2012:10). Commitment is defined as the parties' intentions to act and their attitude toward interacting with each other (Storbacka et al, 1994:25). Commitment is also an important variable in distinguishing between loyal and unfaithful customers. Commitment expresses the desire to continue the relationship and work to ensure its continuation (Rafiq et al., 2013:501).

IV. RESEARCH DESIGN

1. The Research sample

The sample of the Research is Gentlemen, members of the Board of Directors and workers in the Quality Department, the Production Department, and the Marketing Department in the Rubber Industries Company / Al-Diwaniyah Tire Factory in the city of Al-Diwaniyah, which numbered (100) workers.

2. Research Measurement

The researcher relied on the field study in collecting data on the sample by adopting the questionnaire as the main means of collecting data and information because it is the most consistent method with the nature and dimensions of the current study represented by (quality deployment Matrix Technique, quality customer relationship). As shown in Table (1). It is noted that all variables are of a five-scale (strongly agree, agree, neutral, disagree, strongly disagree).

Table (1) Study variables, paragraphs and measures

main variables	sub-variables	paragraphs	approved scale
quality deployment Matrix Technique	product planning	8	(Ocampo <i>et al.</i> ,2020)
	part deployment	6	
	process planning	7	

The Effect of quality deployment Matrix Technique on The quality customer relationship

	production planning	6	
customer relationship quality	trust	5	(Clark <i>et al.</i> ,2017)
	Satisfaction	5	(Dorai <i>et al.</i> ,2021)
	commitment	5	

V. Descriptive Statistics for the Study Variables

1- relationship quality deployment matrix

A. product planning (PTP)

It is evident from the results of the table (2) that the general average level of agreement of workers in the Diwaniyah tire factory trend after product planning reached (86%) and with an arithmetic mean (4.32) which is at a high agreement level and standard deviation equal to (0.510), which indicates the interest of the organization. The respondents were directed towards the paragraph (PTP2), which states (we use safe raw materials in the tire production) with an arithmetic mean of (4.53) and a standard deviation (0.636) and a relative importance of (91%), on the other hand, the management of Al-Diwaniyah tire factory should pay attention to the requirements of the eighth paragraph (PTP8), which states (we use efficient and friendly machines and machines environment) with a mean value of (4.13) and a standard deviation of (0.947) and a relative importance of (83%), which indicates that the factory management's interest in providing environmentally friendly machines and equipment contributes to providing a safe environment for its employees and helps in improving product planning.

table (2)

General statistics for product planning dimension

Paragraph	Arithmetic mean	standard deviation	Variation coefficient	Relative importance	order of importance
PTP1	4.26	0.846	20	85	6
PTP2	4.53	0.636	14	91	1
PTP3	4.34	0.651	15	87	4
PTP4	4.39	0.708	16	88	3
PTP5	4.20	0.891	21	84	7
PTP6	4.40	0.662	15	88	2
PTP7	4.31	0.794	18	86	5
PTP8	4.13	0.947	23	83	8
product planning	4.32	0.510	12	86	****

B- part deployment (DD)

The results of the table (3) show that the general average level of agreement of workers in the Diwaniyah tire factory trend after publishing the part deployment to (86%) and with an arithmetic mean (4.28), which is a high agreement level and a standard deviation equal to (0.615), which indicates the interest of the researched organization towards the paragraph The first (DD1) which states (we follow the weight, dimensions, components, procedures and standard processes of the produced tire) with an arithmetic mean of (4.41) and a standard deviation (0.837) and a relative importance of (88%). On the other hand, the management of the Diwaniyah tire factory should pay attention to the requirements of the sixth paragraph (DD6), which states (we are constantly aware of competitors' prices) with an arithmetic mean of (4.15) and a standard deviation (0.884) and a relative importance of (83%), which requires the Factory management takes into account everything related to competitors' prices and keeps a close eye on them on an ongoing basis.

table (3)

The Effect of quality deployment Matrix Technique on The quality customer relationship

General statistics for the deployment part dimension (DD)

DD1	4.41	0.837	19	88	1
DD2	4.38	0.846	19	88	2
DD3	4.19	0.824	20	84	5
DD4	4.30	0.791	18	86	3
DD5	4.23	0.861	20	85	4
DD6	4.15	0.884	21	83	6
part deployment	4.28	0.615	14	86	***

C- process planning (PSP)

The results of the table (4) show that the general average level of agreement of workers in the Diwaniyah tire factory trend after planning the process amounted to (86%) and with an arithmetic mean (4.29) which is a high agreement level and a standard deviation equal to (0.560), which indicates the interest of the researched organization towards the paragraph The second (PSP2), which states (we are working on a careful examination of raw materials) with an average value of (4.42) and a standard deviation of (0.812) and a relative importance of (88%), on the other hand, the management of Al-Diwaniyah Tire Factory should pay attention to the requirements of the seventh paragraph (PSP7) which states (We participate continuously in developing The instructions for our work, through which we seek to organize it according to what achieves our goal in completing the process) with an arithmetic mean of (4.14) and a standard deviation (0.855) and a relative importance of (83%), which the factory management must take into consideration the process of involving workers in setting instructions of their work through which they can achieve the goal in completing the process.

table (4)

General statistics for the process planning dimension (PSP)

PSP1	4.32	0.725	17	86	3
PSP2	4.42	0.812	18	88	1
PSP3	4.38	0.641	15	88	2
PSP4	4.24	0.865	20	85	5
PSP5	4.32	0.754	17	86	4
PSP6	4.22	0.858	20	84	6
PSP7	4.14	0.855	21	83	7
process planning	4.29	0.560	13	86	***

D- production planning(PGP)

The results of the table (5) confirm that the general average level of agreement of workers in the Diwaniyah tire factory trend after production planning was (85%) and with an arithmetic mean (4.25) which is a high agreement level and a standard deviation equal to (0.633), which indicates the interest of the researched organization towards the paragraph The second (PGP2), which states (we conduct a periodic maintenance process for all machines and equipment used in the work) With an arithmetic mean of (4.35), a standard deviation of (0.732), and a relative

The Effect of quality deployment Matrix Technique on The quality customer relationship

importance of (87%), On the other hand, the management of Al-Diwaniyah Tire Factory should pay attention to the requirements of the seventh paragraph (PGP1), which states (we conduct a daily and annual calibration process for the internal tools used in the work) with an arithmetic mean of (4.15) and a standard deviation (0.884) and a relative importance of (83%), which This means that the management of the Diwaniyah Tire Factory must conduct a daily and annual calibration process for the tools used in the work by the maintenance department.

table (5)

General statistics for production planning dimension (PGP)

PGP1	4.15	0.884	21	83	5
PGP2	4.35	0.732	17	87	1
PGP3	4.31	0.780	18	86	2
PGP4	4.28	0.743	17	86	3
PGP5	4.15	0.833	20	83	6
PGP6	4.24	0.826	20	85	4
production planning	4.25	0.633	15	85	***

2- customer relationship quality

A- trust (T)

The results of the table (6) confirm that the general average of the level of agreement of workers in the Diwaniyah tire factory trend after confidence was (88%) and with an arithmetic mean (4.38), which is a high agreement level and a standard deviation equal to (0.701), which indicates the interest of the researched organization towards the first paragraph (T1), which states (We are working hard to produce products with high reliability) with an arithmetic mean of (4.47), a standard deviation (0.842), and a relative importance of (89%). On the other hand, the management of the Diwaniyah Tire Factory should pay attention to the requirements of the fourth paragraph (T4), which states (the factory management seeks to serve its customers with high honesty) with a mean value of (4.32) and a standard deviation (0.874) and a relative importance of (86%), which requires From the factory management and the marketing department to serve its customers with high honesty in order to preserve them.

table (6)

General statistics for the dimension trust

T1	4.47	0.842	19	89	1
T2	4.34	0.840	19	87	4
T3	4.39	0.738	17	88	2
T4	4.32	0.874	20	86	5
T5	4.37	0.749	17	87	3
trust	4.38	0.701	16	88	***

B- Satisfaction (S)

The results of the table (7) show that the general average level of agreement of workers in the Diwaniyah tire factory trend after satisfaction was (87%) and with a mean of (4.35), which is a high agreement level and a standard deviation equal to (0.670), which indicates the interest of the researched organization towards the third paragraph. (S3), which states (We work with all available possibilities to achieve customer satisfaction at the level through which he feels that our products express all his aspirations) with an arithmetic mean of (4.45) and a standard deviation of (0.773) and a relative importance of (89%), On the other hand, the management of Al-Diwaniyah Tire Factory should pay attention to the requirements of the second paragraph (S2), which states (we work to

The Effect of quality deployment Matrix Technique on The quality customer relationship

make our products at a level that exceeds the expectations of customers and make him feel that his experiences with us are largely successful) with an arithmetic mean of (4.23) and a standard deviation (0.934) and the importance of A percentage of (85%), which requires the factory management and the marketing department to work continuously to make the customer feel that his experiences with us are largely successful.

table (7)

General Statistics for the Dimension of Satisfaction

S1	4.33	0.785	18	87	3
S2	4.23	0.934	22	85	5
S3	4.45	0.773	17	89	1
S4	4.29	0.842	20	86	4
S5	4.44	0.840	19	89	2
Satisfaction	4.35	0.670	15	87	***

C- commitment (L)

It is clear from the results of the table (8) that the general average level of agreement of workers in the Diwaniyah tire factory trend after commitment amounted to (85%) and with an arithmetic mean (4.28), which is a high agreement level and a standard deviation equal to (0.715), which indicates the interest of the researched organization in the direction of The first paragraph (L1) which states (we are keen to provide products through which we obtain an explicit or implicit commitment from the customer to continue the relationship with us) with an arithmetic mean of (4.37) and a standard deviation (0.894) and a relative importance of (87%), On the other hand, the management of the Diwaniyah Tire Factory should pay attention to the requirements of the fourth paragraph (L4), which states (we receive continuous messages from our customers confirming that they have a strong motivation to continue their relations with us through their keenness to show the reputation of the organization) with an arithmetic mean of (4.13) and a standard deviation (0.875) and a relative importance of (83%), which requires the factory management and the marketing department to work continuously to push the customer strongly to continue his relationship with us through his keenness to show the reputation of the organization among family and friends.

table (8)

General statistics of dimension commitment

L1	4.37	0.894	20	87	1
L2	4.37	0.791	18	87	2
L3	4.26	0.820	19	85	3
L4	4.13	0.875	21	83	5
L5	4.26	0.883	21	85	4
commitment	4.28	0.715	17	86	***

VI. The validity and reliability of the questionnaire

Among the conditions that must be met when collecting questionnaire data is the condition of its reliability and validity. This can be achieved by finding Cronbach's alpha coefficients whose value lies between zero and one. A value close to the correct one indicates greater reliability and vice versa. When the credibility and stability of the questionnaire is achieved, this leads us to accept the questionnaire and adopt its results. The researcher found Cronbach's alpha values and included the results in the following table:

The Effect of quality deployment Matrix Technique on The quality customer relationship

table (9)

Alpha-Cronbach coefficients

variable or dimension	number of paragraphs	Alpha- Cronbach
product planning	8	0.81
part deployment	6	0.83
process planning	7	0.84
production planning	6	0.88
relationship quality deployment matrix	27	0.93
trust	5	0.92
Satisfaction	5	0.86
commitment	5	0.89
customer relationship quality	15	0.95

VII. Hypothesis Test

1. Correlation hypothesis

(Test the correlation between the quality deployment matrix and customer relationship quality)

The correlations between the two variables were calculated using the quality deployment matrix technique and the quality customer relationship based on the statistical program (SPSS vr. 20). The results are presented in the following table:

table (10)

The correlations between the two variables, and their dimensions

Correlations						
		Product planning	part deployment	process planning	Production planning	quality deployment matrix
trust	Pearson Correlation	.432**	.565**	.728**	.742**	.750**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	93	93	93	93	93
Satisfaction	Pearson Correlation	.464**	.614**	.800**	.700**	.781**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	93	93	93	93	93
commitment	Pearson Correlation	.329**	.602**	.759**	.726**	.738**
	Sig. (2-tailed)	.001	.000	.000	.000	.000
	N	93	93	93	93	93
quality customer relations	Pearson Correlation	.444**	.647**	.831**	.789**	.824**
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	93	93	93	93	93

**. Correlation is significant at the 0.01 level (2-tailed).

The results of the above table indicate the possibility of testing the hypotheses related to the correlations, which were divided into two types: main and subsidiary. The main hypothesis can be formulated as follows:

(There is a statistically significant correlation between the quality deployment matrix and customer relationship quality)

Through the results of the table (10) it is clear that the value of the correlation between the two variables amounted to (0.824), which is a direct and significant value under the level of significance (5%) between the two variables, quality deployment matrix and the quality customer relationship. Significant positive correlation with a value of (0.824), Which indicates that the factory management's interest in the quality deployment matrix technology will

The Effect of quality deployment Matrix Technique on The quality customer relationship

lead to improving the quality of the relationship with customers, and these results support the acceptance of the main hypothesis.

As for the sub-hypotheses, it tests the correlation relationship between the dimensions of the variable quality matrix and the variable the quality of customer relations and can be formulated as follows:

A- The first sub-hypothesis:

It is the hypothesis that tests the presence or absence of a correlation between the product planning dimension (PTP) and the variable quality customer relationship, and it can be formulated as follows:

(There is a statistically significant correlation between product planning (PTP) and customer relationship quality)

Through the results of the table (10) it is clear that the value of the correlation between the two variables amounted to (0.444), which is a direct and significant value below the level of significance (5%) between the product planning PTP and the quality of the customer relationship, and we conclude from this that the results presented in the table (10) which indicate the existence of a relationship Significant positive correlation with a value of (0.444), Which indicates that the factory management's interest in product planning so that this product is able to meet the requirements of customers will lead to an improvement in the quality of the relationship with customers, and these results support the acceptance of the first sub-hypothesis emanating from the first main hypothesis.

B- The second sub-hypothesis:

It is the hypothesis that tests the presence or absence of a correlation between the dimension of deployment part DD and the variable quality customer relationship and can be formulated as follows:

(There is a statistically significant correlation between the deployment Part (DD) and customer relationship quality)

Through the results of the table (10) it is clear that the value of the correlation between the two variables amounted to (0.647), which is a direct and significant value under the level of significance (5%) between the dimension of publishing part (product design) DD and the quality of customer relations, and we conclude from this that the results presented in the table (10) which indicates that there is a significant positive correlation with a value of (0.647), Which indicates that the factory management's interest in product design through the number of features that have an impact on the appearance of the product will lead to an improvement in the quality of the relationship with the customer, and these results support the acceptance of the second sub-hypothesis emanating from the first main hypothesis.

C- The third sub-hypothesis:

It is the hypothesis that tests the presence or absence of a correlation between the process planning PSP dimension and the variable, the quality customer relationship, and it can be formulated as follows:

(There is a statistically significant correlation between (PSP) process planning and customer relationship quality)

Through the results of the table (10) it is clear that the value of the correlation between the two variables amounted to (0.831), which is a direct and significant value below the level of significance (5%) between the PSP process planning and the quality of customer relations, and we conclude from this that the results presented in the table (10) which indicate the presence a significant positive correlation with a value of (0.831), Which indicates that the factory management's interest in planning the process by describing the processes required to complete them will improve the quality of the relationship with customers, and these results support the acceptance of the third sub-hypothesis emanating from the first main hypothesis.

D- The fourth sub-hypothesis:

It is the hypothesis that tests the presence or absence of a correlation between the production planning dimension PGP and the variable and quality customer relationship can be formulated as follows:

(There is a statistically significant correlation between production planning (PGP) and customer relationship quality)

The Effect of quality deployment Matrix Technique on The quality customer relationship

Through the results of the table (10) it is clear that the value of the correlation between the two variables amounted to (0.789), which is a direct and significant value below the level of significance (5%) between PGP production planning and the quality of customer relations. We conclude from this that the results presented in Table (10) which refer to a significant positive correlation with a value of (0.789), Which indicates that the factory management's interest in production planning through the establishment of plans and control to prevent failure will lead to improving the quality of the relationship with the customer, and these results support the acceptance of the fourth sub-hypothesis emanating from the first main hypothesis.

2. Impact hypotheses

The direct effect of the quality deployment matrix technology on the quality customer relationship variable by excluding the value engineering technique

Here, the direct impact of the variable quality deployment matrix technique will be analyzed on the variable the quality customer relationship, as the hypothesis to be tested is:

(There is an effect of the quality deployment matrix variable on the customer relationship quality variable)

The results of the table (11) indicate that there is a direct, significant, direct effect of the variable quality deployment matrix on the customer relationship quality variable is below the level of significance (5%), where the quality diffusion matrix technique contributed to the interpretation of (0.824) of the issues that limit the ability of Al-Diwaniyah Tires Factory pays attention to the quality customer relationship, which indicates that increasing the quality deployment matrix by one unit leads to an increase in the quality of customer relations by (0.824) and with a critical value of 7.369), which is a value with statistical significance. We present these results in support of the third main hypothesis.

As for the sub-hypotheses related to the variable dimensions of the quality deployment matrix, they were formulated as follows:

A-The first sub-hypothesis

(There is an effect of the of product planning (PTP) dimension on the quality customer relationship quality variable)

It is noted from the results of the table (11) that there is a significant direct effect under the level of significance (5%) for the dimension of product planning PTP in the customer relationship quality variable, where the value of the effect reached (0.444) with a critical value of (4.751), which is a value with significant statistical significance, and from it we conclude The increase in the value of the dimension of PTP product planning by one unit leads to a rise in the variable quality customer relationship by (0.444) by excluding the variable value engineering, and this in turn leads to the concern to maintain meeting the requirements of customers by listening to the customer's voice. We present these results in support of the first sub-hypothesis emanating from the second main hypothesis.

B-The second sub-hypothesis

(There is an effect of the deployment part (DD) dimension on the customer relationship quality variable)

The results of the table (11) show that there is a significant direct effect below the level of significance (5%) for the dimension of publishing part DD in the customer relationship quality variable, where the effect value reached (0.647) with a critical value of (8.135), which is a value with statistical significance, and from it we conclude that the high Dimension value Spreading the part DD by one unit leads to an increase in the variable quality customer relationship by (0.647) by excluding the variable value engineering, and this in turn leads to the concern to maintain the design of a product that has an impact on the customer through high quality and thus contributes to limiting the developments that affect their psychological state. We present these results in support of the second sub-hypothesis that emerges from the second main hypothesis.

C-The third sub-hypothesis

(There is an effect of the process planning(PSP) dimension on the customer relationship quality variable)

The results of the table (11) show that there is a significant direct effect under the level of significance (5%) for the PSP process planning dimension in the customer relationship quality variable, where the effect value reached (0.831) with a critical value of (14,323) which is a value with significant statistical significance, and from it we

The Effect of quality deployment Matrix Technique on The quality customer relationship

conclude that the high value of The dimension of PSP process planning in the amount of one unit leads to a rise in the variable quality customer relationship by (0.831) by excluding the variable value engineering, and this in turn leads to concern for describing and specifying the processes required to be accomplished by workers in the production department in the organization for the sustainability of the production process, and we present these Results in support of the third sub-hypothesis emanating from the second main hypothesis.

D- The fourth sub-hypothesis

(There is an effect of the of production planning (PGP) dimension on the customer relationship quality variable)

The results in the table (11) indicate that there is a direct and significant effect under the significance level of 5% for the production planning dimension PGP in the customer relationship quality variable, where the effect value amounted to 0.789 with a critical value of (12.313), which is a value with significant statistical significance, and from it we conclude that The increase in the value of the dimension of production planning (PGP) by one unit leads to a rise in the variable quality customer relationship by (0.789) by excluding the variable value engineering, and this in turn leads to the factory management's keenness to monitor and create plans in order to prevent and avoid failures that occur in the work, and we present these results in support The fourth sub-hypothesis emanating from the second main hypothesis.

The direct effect was found, in addition to the critical ratios and their significant values, and were placed in the following table:

table (11)

Structural Modeling Equation Capabilities SEM

Path		Estimate	standard error	critical ratio	Sig.
quality customer relationship	<--- quality deployment matrix Technique	.824	0.042	7.369	0.00
quality customer relationship	<--- product planning	.444	0.117	4.751	0.00
quality customer relationship	<--- part deployment	.647	0.082	8.135	0.00
quality customer relationship	<--- process planning	.831	0.066	14.323	00.0
quality customer relationship	<--- production planning	.789	0.064	12.313	0.00

VIII. Conclusions and Recommendations

The results of the study I showed that there was a slight decrease in the factory's tendency to use environmentally friendly machines and hardware, and this indicates a decrease or lack of orientation to social responsibility in preserving environmental pollution, so it requires the factory management to abide by the social, legal, and ethical responsibility that is imposed on all organizations Protect the environment because it belongs to everyone. The results of the Research resulted in the existence of a correlation relationship between the two variables of the Research (quality deployment Matrix Technique, and quality customer relationship quality), and this indicates that the construction of the Research title and its hypotheses are healthy and logical, and thus the possibility of reaching possible solutions to the problem of the Research. The study recommends that in order to obtain the full potential of quality deployment matrix Technique It is necessary that the management of the factory, the study community, possess sufficient awareness of its role in protecting the environment, and not harm it, and that it have effective programs to achieve sustainable production and the benefits that accrue to the factory and the environment, based on its legal and moral responsibility.

REFERENCES

- 1.Cohen, L. (1995). "Quality function deployment: how to make QFD work for you". Prentice Hall.
- 2.Kumar,V., Reinartz,W. (2006). "Customer Relationship Management Concept, Strategy, and Tools ,Third Edition". Originally published by John Wiley & Sons, Inc, Germany.

The Effect of quality deployment Matrix Technique on The quality customer relationship

- 3.Stevenson, William.J., (2021). **Operations Management, FRTEENTH EDITION**, Published by McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
- 4.Swink,M., Melnyk,S.A., Hartley,J.L. (2020). “ **anaging Operations**” Published by McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.
- 5.Ahyadi, H., & Ahmad, R. S. M. (2018). "**DISAIN PRODUK GANTUNGAN BAJU DENGAN QUALITY FUNCTION DEPLOYMENT**". *Bina Teknika*, 14(1),pp. 47-54.
- 6.AKAO Y. (1972) "**New Product Development and Quality Assurance - Quality Deployment System**". (Japanese) Standardization and Quality Control, v. 25, n. 4, p. 4-14 .
- 7.Akao, Y, & Mazur, G.H .(2003). "**The leading edge in QFD: past, present and future**". International Journal of Quality & Reliability Management, 20(1),pp. 20–35 .
- 8.Akrout, H., & Nagy, G. (2018). "**Trust and commitment within a virtual brand community: The mediating role of brand relationship quality**". *Information & Management*, 55(8),pp. 1_57.
9. Albarracin, S. A. O. (2018). Total Quality Management in the biopharmaceutical industry:" **Planning and development of Quality Function Deployment (QFD) for the research and development of products and processes of human plasma derived products**". Independent Journal of Management & Production, 9(3),pp. 840-868.
- 10.Alrubaiee, L. (2012). "**Exploring the relationship between ethical sales behavior, relationship quality, and customer loyalty**". *International Journal of Marketing Studies*, Vol. 4, No. 1;pp. 7_25.
11. Alves, H., Campón-Cerro, A. M., & Hernández-Mogollón, J. M. (2019). "**Enhancing rural destinations' loyalty through relationship quality**". *Spanish Journal of Marketing-ESIC* , Vol. 23 No. 2,pp. 185-204.
- 12.Athanasopoulou, P., & Giovanis, A. (2015). "**Modelling the effect of respect and rapport on relationship quality and customer loyalty in high credence services**". *Journal of Customer Behaviour*, 14(4), Vol. 14, No. 4,pp. 331-351.
- 13.Avikal, S., Singh, R., & Rashmi, R. (2020). "**QFD and Fuzzy Kano model based approach for classification of aesthetic attributes of SUV car profile**". *Journal of Intelligent Manufacturing*, 31(2),pp. 271-284..
- 14.Barry, J. M., & Doney, P. M. (2011). "**Cross-cultural examination of relationship quality**". *Journal of Global Marketing*, 24(4),pp. 305-323.
- 15.Chen, L. H., Ko, W. C., & Yeh, F. T. (2017). "**Approach based on fuzzy goal programing and quality function deployment for new product planning**". *European Journal of Operational Research*, pp. 1_33 .
- 16.Crosby, L. A., Evans, K. R., & Cowles, D. (1990)."**Relationship quality in services selling: an interpersonal influence perspective**". *Journal of marketing*, Vol, 54(3),pp. 68-81.
- 17.De Wulf, K., Odekerken-Schröder, G., & Iacobucci, D. (2001)."**Investments in consumer relationships: A cross-country and cross-industry exploration**". *Journal of marketing*, 65(4),pp. 33-50.
- 18.Desrianty, A., Liansari, G. P., & Puspitaningsih, R.(2018)."**Usulan Perancangan Produk Dispenser Makanan dan Minuman Hewan Peliharaan Kucing Menggunakan Quality Function Deployment**". *Penelitian dan Aplikasi Sistem dan Teknik Industri*, 12(3),pp. 318-330.
- 19.Erdil, N. O., & Arani, O. M. (2019). "**Quality function deployment: more than a design tool**". International Journal of Quality and Service Sciences.
- 20.Fargnoli, M., & Sakao, T. (2017). "**Uncovering differences and similarities among quality function deployment-based methods in Design for X: Benchmarking in different domains**". *Quality Engineering*, 29(4),pp.1_54.
- 21.Galbreath, J. (2002). "**Success in the relationship age: building quality relationship assets for market value creation**". *The TQM magazine*, Vol. 14, Iss 1, pp. 8 – 24.
- 22.GARG,S.C., KUMAR,B. (2014). "**QUALITY FUNCTION DEPLOYMENT (QFD): A CASE STUDY**", International Journal of Scientific and Innovative Research; 2(1),pp. 158-168.
- 23.Grégoire, Y., & Fisher, R. J. (2006). "**The effects of relationship quality on customer retaliation**". *Marketing Letters*, 17(1),pp. 31-46.
- 24.Hajli, N., Shanmugam, M., Papagiannidis, S., Zahay, D., & Richard, M. O. (2017). "**Branding co-creation with members of online brand communities**". *Journal of Business Research*, 70, pp.136-144.

The Effect of quality deployment Matrix Technique on The quality customer relationship

25. Hamid, S. R., Chew, B. C., Abdullah, M. A., & Halim, S. (2015). **"Development of E-Saving Glass by Malaysia Overview using Quality Function Deployment Method for Market Transformation"**. In *Applied Mechanics and Materials* (Vol. 761, pp. 594-598). Trans Tech Publications Ltd.
26. Haktanır, E., & Kahraman, C. (2019). **"A novel interval-valued Pythagorean fuzzy QFD method and its application to solar photovoltaic technology development"**. *Computers & Industrial Engineering*, 132, pp.361-372.
27. Hennig-Thurau, T., Langer, M. F., & Hansen, U. (2001). **"Modeling and managing student loyalty: An approach based on the concept of relationship quality"**. *Journal of service research*, Volume 3, No. 4, pp. 331-344.
28. Holmlund, M. (2001). **"The D&D model-dimensions and domains of relationship quality perceptions"**. *Service Industries Journal*, 21(3), pp. 13-36.
29. Holmlund, M., & Törnroos, J. Å. (1997). **"What are relationships in business networks"?**. *Management decision*, 35/4, pp. 304–309.
30. Japutra, A., Molinillo, S., & Wang, S. (2018). **"Aesthetic or self-expressiveness? Linking brand logo benefits, brand stereotypes and relationship quality"**. *Journal of Retailing and Consumer Services*, 44, pp. 191-200.
31. Jen, W., Tu, R., & Lu, T. (2011). **"Managing Passenger Behavioral Intention: An Integrated Framework For Service Quality, Satisfaction ,Perceived Value, And Switching Barriers"**. *Transportation*. 38(2): 321 –342
32. Karanjekar, S. B., Lakhe, R. R., & Deshpande, V. S. (2019). **"A comprehensive quality function deployment model for improving academics of technical institutes"**. *The International Journal of Electrical Engineering & Education*, 24(1), pp.1-24.
33. Kumar, A., Antony, J., & Dhakar, T. S. (2006). **"Integrating quality function deployment and benchmarking to achieve greater profitability"**. *Benchmarking: An International Journal*, Vol. 13 No. 3, pp. 290-310.
34. Liu, C. T., Guo, Y. M., & Lee, C. H. (2011). **"The effects of relationship quality and switching barriers on customer loyalty"**. *International Journal of Information Management*, 31(1), pp. 71-79.
35. Liu, H. C., Wu, S. M., Wang, Z. L., & Li, X. Y. (2019). **"A new method for quality function deployment with extended prospect theory under hesitant linguistic environment"**. *IEEE Transactions on Engineering Management*, pp.1_10.
36. Lu, X. L. (2007). **"Relationship quality and customer loyalty in internet grocery shopping in the UK"** (Doctoral dissertation, © Xiaoming (Lucy) Lu).
37. Maritan, D. (2015). **"Practical manual of quality function deployment. Switzerland"**: Springer International Publishing.
38. Matorera, D. (2015). **"A Conceptual Analysis of Quality in Quality Function Deployment-Based Contexts of Higher Education"**. *Journal of Education and Practice*, 6(33), pp. 145-156.
39. Murray, D., & Howat, G. (2002). **"The relationships among service quality, value, satisfaction, and future intentions of customers at an Australian sports and leisure centre"**. *Sport Management Review*, 5(1), 25-43.
40. Nadeem, W., Juntunen, M., Shirazi, F., & Hajli, N. (2020). **"Consumers' value co-creation in sharing economy: The role of social support, consumers' ethical perceptions and relationship quality"**. *Technological Forecasting and Social Change*, 151, pp. 1_13.
41. Nyadzayo, M. W., & Khajehzadeh, S. (2016). **"The antecedents of customer loyalty: A moderated mediation model of customer relationship management quality and brand image"**. *Journal of retailing and consumer services*, 30, pp. 262-270.
42. Okonta, O. E., Ojugo, A. A., Wemembu, U. R., & Ajani, D. (2013). **"Embedding Quality Function Deployment In Software Development: A Novel Approach"**. *West African Journal of Industrial and Academic Research*, 6(1), pp. 50-64.
43. Osiro, L., Lima-Junior, F. R., & Carpinetti, L. C. R. (2018). **"A group decision model based on quality function deployment and hesitant fuzzy for selecting supply chain sustainability metrics"**. *Journal of Cleaner Production*, 183, pp.1_27.
44. Palmatier, R. W., Dant, R. P., Grewal, D., & Evans, K. R. (2006). **"Factors influencing the effectiveness of relationship marketing: A meta-analysis"**. *Journal of marketing*, 70(4), Vol. 70, pp. 136-153.
45. Qin, S., Zhao, L., & Yi, X. (2009). **"Impacts of customer service on relationship quality: an empirical study in China. Managing Service Quality"**. *An International Journal*, Vol. 19, Iss. 4 pp. 391 – 409.
46. Rafiq, M., Fulford, H., & Lu, X. (2013). **"Building customer loyalty in online retailing: The role of relationship quality"**. *Journal of Marketing Management*, 29(3-4), pp.494-517.

The Effect of quality deployment Matrix Technique on The quality customer relationship

47. Rauyruen, P., & Miller, K. E. (2007). **"Relationship quality as a predictor of B2B customer loyalty"**. *Journal of business research*, 60(1), pp. 21-31.
48. Rojas, M. (2010). **"Intra-Household Arrangements and Economic Satisfaction"**, *Journal of Happiness Studies*, 11(2), pp. 225-241.
49. Santouridis, I., & Veraki, A. (2017). **"Customer relationship management and customer satisfaction: the mediating role of relationship quality"**. *Total Quality Management & Business Excellence*, 28(9-10), Vol. 28, No. 10, pp. 1122-1133.
50. Singh, A., & Kumar, S. (2021). **"Picture fuzzy set and quality function deployment approach based novel framework for multi-criteria group decision making method"**. *Engineering Applications of Artificial Intelligence*, 104, 104395.
51. Smith, J. B. (1998). **"Buyer-seller relationships: similarity, relationship management, and quality"**. *Psychology & Marketing*, Vol. 15(1), pp. 3-21.
52. Storbacka, K., Strandvik, T., & Grönroos, C. (1994). **"Managing Customer Relationships for Profit: The Dynamics of Relationship Quality"**. *International Journal of Service Industry Management*, Vol. 5 No. 5, pp. 21-38.
53. Tajvidi, M., Wang, Y., Hajli, N., & Love, P. E. (2021). **"Brand value Co-creation in social commerce: The role of interactivity, social support, and relationship quality"**. *Computers in Human Behavior*, 115, pp. 1-31.
54. TRAN, V. D. (2020). **"Assessing the effects of service quality, experience value, relationship quality on behavioral intentions"**. *The Journal of Asian Finance, Economics, and Business*, 7(3), pp. 167-175.
55. Tungadi, L. (2018). **"Dampak Penerapan Customer Relationship Management Terhadap Relationship Quality Dan Customer Loyalty Toko X. Agora"**, 6(2). Vol. 6, No. 2.
56. Vieira, A. L., Winklhofer, H., & Ennew, C. T. (2008). **"Relationship quality: a literature review and research agenda"**. *Journal of Customer Behaviour*, vol7 (4), pp. 269-291.
57. Vinayak, K., & Kodali, R. (2013). **"Benchmarking the quality function deployment models. Benchmarking"**: *An International Journal*. Vol. 20 Iss 6 pp. 825 – 854.
58. Vinodh, S., & Chintha, S. K. (2011). **"Application of fuzzy QFD for enabling agility in a manufacturing organization"**: A case study. *The TQM Journal*, Vol. 23 No. 3, pp. 343-357.
59. Yazdani, M., Kahraman, C., Zarate, P., & Onar, S. C. (2019). **"A fuzzy multi attribute decision framework with integration of QFD and grey relational analysis"**. *Expert Systems with Applications*, 115, pp. 474-485.
60. Jaafar, H. S. (2006). **"Logistics service quality and relationship quality in third party relationships"** (Doctoral dissertation, © Harlina Suzana Jaafar).
61. Saleh, Haider, Hamza. (2017). **"Measuring the effect of the quality of customer banking relationships on his loyalty to the bank"**, *Al-Qadisiyah Journal for Administrative and Economic Sciences*, Al-Qadisiyah University / College of Administration and Economics, Volume, 19. Issue, 1.
62. Shahla, R. A. (2014). Polyethylene Terephthalate (PET) **"Preform Design: A Quality Function Deployment (QFD) Approach"** [Tesis]. *Gaza (PLE): The Islamic University–Gaza*.
63. Shu, M. (2017). **"Quality function deployment integration with design methodologies"** (Doctoral dissertation, Concordia University).