

THE ROLE OF THE HOLONIC MANUFACTURING SYSTEM IN ACHIEVING PRODUCT QUALITY: AN EXPLORATORY STUDY IN THE GENERAL COMPANY FOR THE AUTOMOTIVE INDUSTRY OF ALEXANDRIA

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ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received 20 February 2023</p> <p>Accepted 08 May 2023</p>	<p>Purpose: The aim of this study is deals with the methods that preserve the natural products and offer them at a cost while maintaining the quality of the products, which leads to the company’s production of profits.</p>
<p>Keywords:</p> <p>Holonc Manufacturing System; Product Quality.</p> 	<p>Theoretical framework: This aspect has been prepared by referring to sources and references specialized in production management and total quality management, such as books, theses, research and studies, including what is available in the library and others from the international information network, the Internet.</p> <p>Methodology: The project was implemented in the implementation of a set of computer programs: (SPSS V25) / (Amos V25) / (Microsoft Excel 2010). The systematic literature review was built from the content analysis of papers from the Web of Science and Scopus database. The papers were analyzed from descriptive.</p> <p>Findings: The results of the research bear the thinking of the departments about the most important element of production, represented by the labor force, as the success of the administrative teams Which represents the basic idea of the component (Holon employees).</p> <p>Research, Practical & Social implications: The study is the departments must adopt scientific and systematic mechanisms and methods in consolidating the culture of modern systems and adopting them according to what is scientific, even in preliminary and steps simplified.</p> <p>Originality/value: A model was proposed to clarify the relationship between holographic manufacturing requirements and product quality through the use of statistical methods such as the Pearson correlation coefficient and the regression coefficient to clarify the correlation and effect relationship between these two variables.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i5.1734</p>

O PAPEL DO SISTEMA DE MANUFATURA HOLONIC NA OBTENÇÃO DA QUALIDADE DO PRODUTO: UM ESTUDO EXPLORATÓRIO NA COMPANHIA GERAL DA INDÚSTRIA AUTOMOTIVA DE ALEXANDRIA

RESUMO

Objetivo: O objetivo deste estudo é lidar com os métodos que preservam os produtos naturais e os oferecem a um custo, mantendo a qualidade dos produtos, o que leva à produção de lucros da empresa.

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Referencial teórico: Este aspecto foi elaborado consultando fontes e referências especializadas em gestão da produção e gestão da qualidade total, como livros, teses, teses, pesquisas e estudos, incluindo o que está disponível na biblioteca e outros da rede internacional de informação, a Internet.

Metodologia: O projeto foi concretizado na implementação de um conjunto de programas informáticos: (SPSS V25) / (Amos V25) / (Microsoft Excel 2010). A revisão sistemática da literatura foi construída a partir da análise de conteúdo de artigos da base de dados Web of Science e Scopus. Os artigos foram analisados a partir do descritivo.

Resultados: Os resultados da pesquisa trazem o pensamento dos departamentos sobre o elemento mais importante da produção, representado pela força de trabalho, como o sucesso das equipes administrativas que representa a ideia básica do componente (funcionários da Holon).

Pesquisa, implicações práticas e sociais: O estudo é que os departamentos devem adotar mecanismos e métodos científicos e sistemáticos para consolidar a cultura de sistemas modernos e adotá-los de acordo com o que é científico, mesmo em etapas preliminares e simplificadas.

Originalidade/valor: Um modelo foi proposto para esclarecer a relação entre os requisitos de fabricação holográfica e a qualidade do produto por meio do uso de métodos estatísticos como o coeficiente de correlação de Pearson e o coeficiente de regressão para esclarecer a correlação e a relação de efeito entre essas duas variáveis.

Palavras-chave: Sistema Holônico de Manufatura, Qualidade do Produto.

EL PAPEL DEL SISTEMA DE FABRICACIÓN HOLONIC EN EL LOGRO DE LA CALIDAD DEL PRODUCTO: UN ESTUDIO EXPLORATORIO EN LA COMPAÑÍA GENERAL PARA LA INDUSTRIA AUTOMOTRIZ DE ALEJANDRÍA

RESUMEN

Propósito: El objetivo de este estudio es tratar los métodos que preservan los productos naturales y ofrecerlos a un costo manteniendo la calidad de los productos, lo que lleva a la producción de ganancias de la empresa.

Marco teórico: Este aspecto ha sido elaborado tomando como referencia fuentes y referencias especializadas en gestión de la producción y gestión de la calidad total, tales como libros, tesis, tesis, investigaciones y estudios, incluyendo lo disponible en la biblioteca y otros de la red internacional de información, La Internet.

Metodología: El proyecto se implementó en la implementación de un conjunto de programas informáticos: (SPSS V25) / (Amos V25) / (Microsoft Excel 2010). La revisión sistemática de la literatura se construyó a partir del análisis de contenido de artículos de la base de datos Web of Science y Scopus. Los trabajos fueron analizados desde lo descriptivo.

Hallazgos: Los resultados de la investigación dan cuenta del pensamiento de los departamentos sobre el elemento más importante de la producción, representado por la mano de obra, como el éxito de los equipos administrativos que representa la idea básica del componente (empleados de Holon).

Implicaciones de investigación, prácticas y sociales: el estudio es que los departamentos deben adoptar mecanismos y métodos científicos y sistemáticos para consolidar la cultura de los sistemas modernos y adoptarlos de acuerdo con lo que es científico, incluso en pasos preliminares y simplificados.

Originalidad/valor: Se propuso un modelo para aclarar la relación entre los requisitos de fabricación holográfica y la calidad del producto mediante el uso de métodos estadísticos como el coeficiente de correlación de Pearson y el coeficiente de regresión para aclarar la relación de correlación y efecto entre estas dos variables.

Palabras clave: Sistema de Fabricación Holónico, Calidad del Producto.

INTRODUCTION

Manufacturing systems, in their various models and forms, are viewed as synergistic structures of ideas, processes and treatments that aim primarily to create outputs that achieve response to the needs and desires of the target segments while ensuring the reduction of deadlines, financial costs and efforts and meeting the desired quality standards. Manufacturing systems developed over different periods of time, starting with the Taylor system, passing

through the Toyota system, then the agile and accelerating manufacturing systems, and reaching the most recent aspect of these systems, which is the Holonic manufacturing system, which constitutes the explanatory variable in this research. On a related level, there is a belief among specialists that the development of consumer awareness among all segments of society due to the tremendous technical developments can be expressed mainly through the adoption of the purchase decision of any individual on the level of quality achieved in any product. The consumer is no longer satisfied with the acquisition of what achieves the minimum level of satiation. Rather, everyone began to demand higher levels of quality and the features that each product carries, which represents the responsive variable in the current research. The research problem is crystallized in the decline in the levels of industrial performance in Iraq after a history of excellence and decades ago. In the event that organizations in this sector, especially those operating in the automotive industry, want to regain a leadership position, it is inevitable to adopt modern manufacturing systems, which are prominent in the forefront of the (Holonic manufacturing system).

The research aims to present a set of ideas expressed in the form of recommendations that could constitute solutions that contribute to achieving a systematic scientific adoption of the Holonic manufacturing system in order to ensure the provision of a product characterized by quality features and specifications in the General Company for the Automotive Industry (Alexandria). The research sample was represented by (85) views from the departments operating in the mentioned company and at different administrative levels. Their views were surveyed through a questionnaire prepared for this purpose and analyzed through the appropriate statistical tools. The research included four topics, the first of which represented the methodology, while the second topic included the theoretical framework for the research variables. The third topic included the field aspect, and finally the fourth topic included the most prominent conclusions and suggestions.

The problem can be embodied by raising the following main question: * To what extent does the administrations operating in the General Company for the Automotive Industry in Iraq affect the implementation of the holonic manufacturing system in achieving the quality conditions and specifications for the product? The following sub-questions emerge from this question:

1- What is the type of philosophical, cognitive and intellectual debate that previous researchers and writers dealt with, and where did their intellectual propositions reach, and what did they enrich the global, Arab and local offices for the research variables? 2- What is the level

of awareness of the departments operating in the General Company for the Automotive Industry of the nature of the holonic manufacturing system? 3- To what extent are the quality processes and standards applied in the research sample company?

The importance of the research can be summarized in the following: 1- The importance of studying the theoretical relationship that governs the broad frameworks of the research variables and the most significant contributions of researchers in these fields, as well as the importance of defining the researched organization with the theoretical aspect of the value of these variables and their impact on organizational performance in general, are what give theory its importance; 2-The significance is demonstrated in practice by focusing on one of the key economic sectors in Iraq, which, with the right investments, has the potential to spur an actual industrial renaissance and yield numerous economic benefits, including the creation of jobs and the correction of a number of structural imbalances in the country's economy; 3- Providing a useful framework for an integrated model that dealt with its variables with an integrated and comprehensive perspective that extended from the causes and was reflected in the results, as well as through the use of trustworthy global standards and tools and tested in the organization and the dissemination of these concepts intellectually and practically to achieve the efficiency and effectiveness of carrying out the tasks entrusted to its departments.

The objectives of the research can be stated in the following points:

- 1- Building a theoretical framework that gives a clear vision of the main and subsidiary research variables by following the cognitive and intellectual efforts made by writers and researchers to identify the exact concepts of these variables and knowing the type and nature of intellectual and cognitive overlap between them.
- 2- Access to the presentation, analysis and interpretation of measurement models related to the research variables (Holonic manufacturing / product quality) and choosing the most appropriate ones.
- 3- Presenting a set of ideas expressed in the form of recommendations that could contribute to achieving a systematic scientific adoption of the Holonic manufacturing system in a way that ensures the stipulation of a product that has the character traits and quality specifications in the General Company for the Auto Industry (Alexandria) to stabilize and succeed the researched organization and its continuity.
- 4 - Presenting a framework of conclusions that are the basis for future research on the production management approach.

THEORETICAL FRAMEWORK

First - Holonic Manufacturing System:

1- Concept: Supply chain management (SCM) is defined as managing and controlling the transformation process of raw resources into valuable products that can create value for the organization is difference of Holonic manufacturing (Baqleh&Alateeq,2023:4) In his work published more than three decades ago, the philosopher (Koestier) introduced the term Holon for the first time (The Ghost in the Machine). It likened the industrial organization's fundamental unit to the life and social systems. This phrase sought to describe the nature, structure, and dynamics of biological and social systems that are independent of one another. In addition, it has been noted that the name (Holon) refers to an indefinable particle having an endless number of sequential systems or units. The first two syllables (Hol) signify all, whereas the second syllable (on) refers to the component or molecule. It is a combination derived from the name of physical particles, as is the case in the proton, neutron and electron (Al-Ta'i and Al-Barzanji, 2016: 70). (Dewa et al, 2014: 4) defines the Holonic system as a new methodology in which the characteristics of the manufacturing system are integrated through a number of current technologies that easily adapt to changing business goals and that form the framework that provides a unified description of separate and continuous manufacturing environments). Whereas (Amin, 2020: 395) defined it as a structure that integrates an integrated set of manufacturing activities, from order booking to design, production and marketing to achieve an agile manufacturing organization. What was characterized by (Al-Taie and Al-Khaqani, 2018: 273) as (the framework in light of adaptability in assembling and reconfiguring creation processes in a dynamic and dynamic manner, engrossing ecological changes and meeting client prerequisites). The procedural meaning of the holonic fabricating framework is (the coordinated construction of exercises, practices and medicines remembered for the creation cycle, what begins from the beginning phases of the plan, creation and advertising instruments and is reliable with the structure and content of ecological changes and to guarantee the accomplishment of a lithe picture of the delivering association).

2- Requirements: After analyzing a variety of literature on the concept of the holonic manufacturing system, the most critical conditions that must be accomplished to implement this system are outlined below (Nuno Silva al, 2020: 45).

A- Holonic control systems: they include (Holon stock control/ Holon purchase/ Holon stock level/ Holon break-even point).

B- Holon Capacity Management: It includes (Holon resource planning / Holon process planning / Holon work scheduling).

C- Holon Maintenance Department: It includes (networking/decentralization of operations/ human integration/training and motivation/sustainability).

3- Dimensions: There are several models that depict the features and dimensions of the Holonic manufacturing system as one of the relatively new techniques; hence, these models are still susceptible to change, modernization, and extension. In this context, the Intellectual Processing Model, which consists of four components, was chosen and is described in several scientific publications as follows (Doru Panescu and Carlos Pascal, 2011: 129; Silva et al., 2020: 48).

A- Product holon: This holon describes the relevant procedures and information for the product in order to ensure accuracy in the product's production processes and achieve the appropriate quality standards. To do this, the product comprises standard, up-to-date information about the product's life cycle, including information about the product's customers, design, technical composition, and quality assurance techniques, among others. The product is the general model that is built in Holon, Israel, in line with the customer's requirements and within the framework of databases that are scattered over many server locations. It operates the Holon Product Information server and holds the whole production database in order to assist other Holon. As a result, the product's holon contains the execution of operations that were in the conventional systems represented by (product design, process planning, quality assurance).

B- Request holon Request holon plays an essential role in the production system. As he is responsible for completing the tasks allocated to him accurately and on time, as well as dealing with the physical product condition model that is being developed and all the logistical information processing associated with this job, he is tasked with executing these duties. In addition, the order holon may represent client orders, manufacturing orders for storage, prototype work orders, and requests for material maintenance and repair. Naturally, the request Holon provides a portion of the supervisory function during talks with multiple parties in order to produce components in accordance with the demand and within the constraints of the available resources.

C- Resources Holon: This component consists of the physical vocabulary represented by production resources in the manufacturing system and a section for processing data pertaining to the control of resources. Holon resources supply production energy to other holons through scientific techniques for energy allocation and the provision of information and

processes for understanding, utilizing, and regulating these resources. Holon presents the resources as an overview of the production means, including (manufacturing, machine workshop, furnaces, pipelines, conveying platforms, components and raw materials, tool holders for energy personnel, production lines). In contrast to the majority of conventional techniques for regulating production lines, such as controlling production activities, the Holonic manufacturing system integrates the manufacturing system and control system. Within the constraints of available resources, there exist manufacturing facilities (producing facilities).

D- Employees Holon: One of the most essential factors in obtaining high performance in contemporary businesses is the capacity to effectively utilize the human resources and manage the different mix of employees in their various activities. An organization's ability to minimize expenses, save time and effort, and enhance the quality of its outputs is made possible by its effective utilization of human resources. Efficiency is a significant factor for evaluating the quality of any organization's performance, as it is essential for the timely delivery of high-quality products.

With the escalation of the curve of intellectual development accompanied by the field application of the various manufacturing systems in the world, it can be concluded that the Iraqi organizations in general and the industrial ones in particular cannot stand on the edge of influence while observing this movement of development without adopting what is modern among them. Thus, it is no longer an option, but rather a requirement imposed by regional and worldwide environment data, as well as the pressures of introducing products from a variety of sources, given that the Iraqi market is accessible to a number of enterprises. Thus, the operational divisions must implement all contemporary production and manufacturing systems.

Second - product quality:

1- The concept: TQM is one of the philosophical concepts and recent trends that have attracted the attention of researchers and specialists who are interested in developing and improving processes. It is one of the concepts about which ideas differ according to the viewpoint of researchers, but it is centered on the same goal: customer satisfaction. Bahia et al. (2023) in the context of clarifying the concept of quality, the definitions that it dealt with have varied according to the different approaches of its researchers and pioneers, and one of these approaches is the degree of preference. Heizer & Rerder, 2010 defines quality under this approach as (the set of characteristics and features that qualify a product or service to respond to explicit and implicit needs). As for quality from the point of view of the conformity

approach to use, it was defined (Juran, 2011) as (the ability of the product to provide the best performance). Whereas (Feigenbaum, 2013) expressed it (the total sum of product characteristics that meet consumer needs). Finally, quality from the point of view of the customer focus approach was expressed by (Besterfeld, 2014) as (product features that meet the expectations of the customer).

Most of the definitions have centered around two basic theories of (the product/organization) and (the customer). In both circumstances, quality may be viewed as a collection of overlapping goals at the level of the organization, appropriateness for use, and conformance to the specifications given in it in order to deliver the best performance to meet the wishes, requirements, and personal expectations of its users. Hence, product quality may be operationally defined as (the sum of the attributes and characteristics contained in the product, whether a good or a service, which achieves the state of saturation for the consumer and qualifies that product to achieve the purpose for which it was prepared).

2- Dimensions: The administrative literature is replete with propositions that form models for classifying the dimensions of quality, which vary according to the researchers' backgrounds or fields of adoption, but they all agree that the only way to promote products with the desired quality is to pursue these dimensions in order to satisfy the customer's wants and needs. The more important dimensions of the product required by the customer, the more attractive it was in his priorities. The most prominent dimensions can be stated in the following points (Starr, 2014: 24):

A- Quality of design: The quality of design can be achieved through the availability of (quality of market research / quality of design idea / quality of required specifications). Accordingly, this dimension takes great importance in the thought and work of the senior management of industrial companies.

B- Quality of conformity: The degree to which the finished product complies to the design requirements produced for the product and authorized by the administration in their final form represents this dimension. That is, matching the design to the previously established requirements. The higher the degree of symmetry between the design and compliance, the higher the quality. This dimension can be achieved through the availability of (appropriate technology to manufacture the product / availability of qualified workers for its manufacture / management with a high ability to direct the work).

C- Price suitability: This dimension expresses the value of the product in relation to the price spent to get it. According to experts in this industry, there is a considerable link and

effect between the price and the customer's assessment of the product's quality. And that the client is willing to pay a greater price when he is convinced that the value he receives from using the product is commensurate with its cost. Despite the fact that some organizations differentiate their products based on their high price, the logical relationship between price and delivered benefit remains the deciding criterion.

D- Form and aesthetic art: This dimension conveys the satisfaction of customers' wants, tastes, wishes, and inclinations through the product's apparent features, such as color, design, attractiveness, and modernism. Some consider this a personal dimension that has little to do with the product's functional characteristics. Nonetheless, this aspect plays a significant part in product promotion. As a result of its dependence on the customer's preferences, taste, and pleasure with the product's form and attractiveness, the product's external appearance is an attractive factor and an aid in the purchasing decision-making process.

Regarding the Iraqi environment, it can be said that factors such as the growth of consumer awareness, the intensity of competition, economic openness, and technological advancements have a significant impact on society as a whole, with quality standards becoming a top priority for working departments. No longer is it possible for any organization's items to be devoid of the most prominent standards and specifications that can be categorized within the indicators and worldwide quality frameworks. Hence, it is the job of any of these departments to build a culture of excellence among all the joints, personnel, and components of the manufacturing process, so that this culture serves as the fundamental engine for all areas of the business.

METHODOLOGY

The strategy that outlines and explains the processes and methods for gathering and evaluating data is referred to as the research method. The research methodologies and design come next. As it is characterized by a holistic viewpoint and is the most appropriate for the researched phenomena in administrative sciences, the researchers chose the descriptive analytical approach based on a survey of the opinions of the respondents in the company, the research sample, about the variables under study.

Sources and methods of data and information collection: The researchers relied on a number of sources for the purpose of collecting the necessary data and information that contribute to achieving the desired goals, including the following:

1- Theoretical framework: This section was prepared with reference to sources and references specializing in production management, total quality management, and manufacturing systems, such as books, letters, theses, research, and studies, some of which can be found in the library and others on the Internet.

2- The operational structure: To collect the essential field knowledge and data to complete the practical element, the following resources were utilized:

A - Questionnaire: it was used to gather data and information pertaining to the independent variable (the Holonic manufacturing system) and the dependent variable (the Holonic manufacturing system) (product quality). The design was based on research and studies that dealt with factors.

B- Records and data from the firm, the study site: to gather administrative data on the nature of the job as well as a variety of administrative, technical, and specific information that is useful for the research.

C- Field visits: Researchers are expected to conduct many, continuous trips to the company's headquarters in order to complete the field component, determine the nature of the company's work, gather data, and monitor the various performance processes.

D- Interviews: In order to gain a deeper knowledge of the subject of the research and identify difficulties, several interviews were held with the managers and officials of the relevant company's units.

Tools of analysis and statistical treatment: The findings can assess the validity of the hypothesis primarily via the application of analytical and statistical techniques. This necessitates the selection of proper statistical tools for data analysis, processing, and hypothesis testing. In light of this, the investigation necessitates the employment of the following statistical tools: (Azzam, 2015).

A - Tools of honesty and constancy: They are represented by

- Stability coefficient: (Alpha Cronbach) to verify the stability and accuracy of scales in measuring variables in the field without complexity or overlap.

B- Descriptive statistical tools: They are represented by

- Arithmetic mean: to determine the level of the answer about the paragraphs and to know the level of the variables in the field.

- Standard deviation: to find out the level of dispersion of the sample answers around the arithmetic mean.

- Relative coefficient of variation: to determine the homogeneity of the sample answers.

- Relative importance: to determine the severity of the answers and the level of their relative importance in the field.

C - Analytical statistical tools: they include

- Pearson correlation coefficient: It is used to determine the strength and type of relationship between two variables.
- Structural Equation Modeling is used to measure the level of simple and multiple influence relationships between variables.

In implementing the above tools, some computer programs have been adopted:

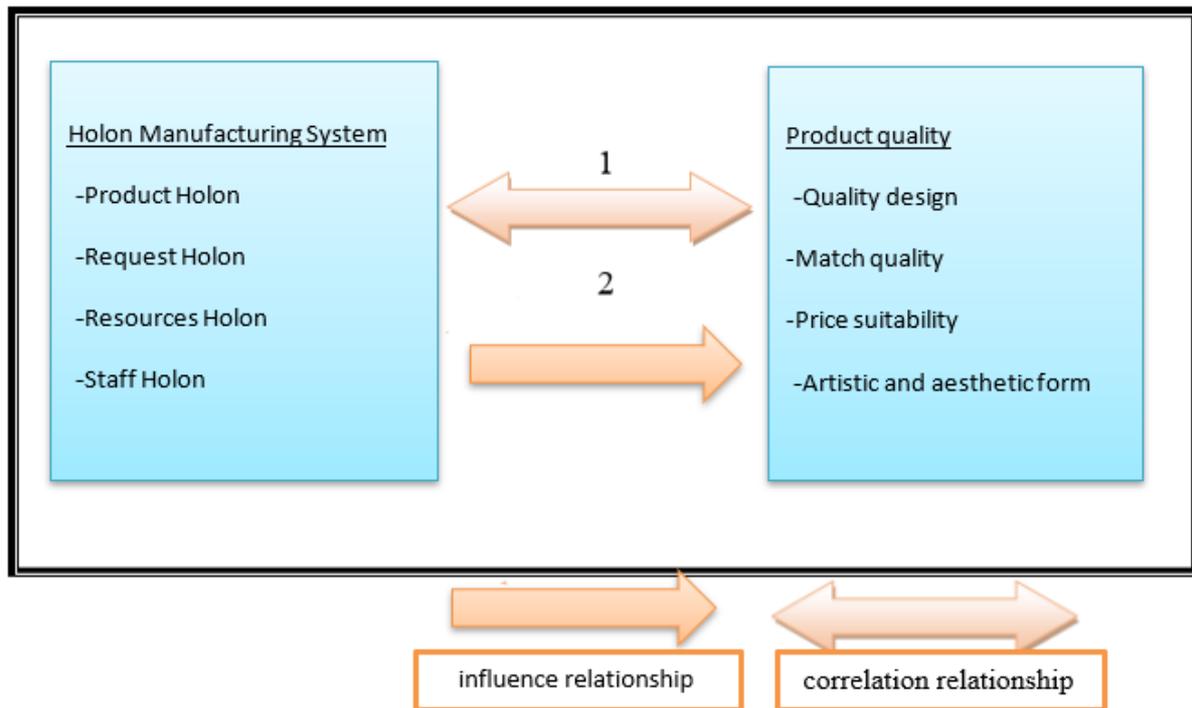
(SPSS V25) / (Amos V25) / (Microsoft Excel 2010).

The issue of selecting the sample from which the study will be conducted, the method for selecting it, and its size, which represents a portion of the whole and is concerned with selecting vocabulary from the research community, is likely one of the most significant challenges facing researchers in the field of administrative sciences. In order for the results to be accurate, the sample must be highly representative of all community features. The modern research community is represented by the General Corporation for the Automobile Industry, one of the most prominent bodies within the Ministry of Industry and Mines. In order to find the finest example, it was important to evaluate the real organizational structures of the company as a whole, as well as those of the many divisions and factories. People from the top, middle, and executive divisions were picked because they are the most capable of understanding. The sample for the statistical analysis consisted of eighty-five out of the ninety questionnaires that were distributed. This sample is deemed sufficient and representative of the composition and characteristics of the studied population.

In consideration of the nature of the issue at hand and the aforementioned goals, the research's hypothetical framework was created. Figure No. 1 below, which covers the following two variables, illustrates the chart's primary and sub-variables along with their correlations and influences.

- 1- The independent variable (Holonic manufacturing system) is represented in the following dimensions: product holon / request holon / resource holon/ employees holon.
- 2- The adopted variable (product quality), which is represented in the following sub-dimensions: design quality / conformity quality / price suitability / artistic and aesthetic form.

Figure No. (1) hypothesis of the research



Source: Figure prepared by researchers (2023).

Hypotheses. They are an educated assumption made by researchers and are retained momentarily. In terms of resolving the issue and responding to the research questions, it is more a matter of principle. It is not a random conclusion; rather, it is constructed using descriptive data about the factors and dimensions that contributed to the study topic. As a result, the following principal and supporting hypotheses were developed:

- 1- The first main hypothesis: There is a significant correlation between the holonic manufacturing system and the quality of the product in the General Company for the Automotive Industry (Alexandria).
- 2 - The second main hypothesis: There is a significant effect relationship between the holonic manufacturing system and product quality in the General Company for Automotive Industry (Alexandria).

RESULTS AND DISCUSSION

First - an overview of the General Company for the Automotive Industry (Alexandria)

A company affiliated with the Ministry of Industry and Minerals, the General Company for the Manufacturing of Cars and Equipment was established at the beginning of 2016 through the merger of three businesses (the General Company for the Automotive Industry, the General Company for Mechanical Industries, and the General Company for the Battery Industry). It is

currently focused on engineering industries, with the majority of its industrial and agricultural activities. Located 50 kilometers south of Baghdad in the Alexandria area of the Babil Governorate, the business is accessible via the Baghdad-Babil route. Via its four manufacturing facilities, the corporation has excellent technical and technological capabilities:

- Cars and wheels (speciality, mechanical industries, bodies and heavy equipment, batteries).

The prevailing technical sections include (technical, research and development, planning, and quality control).

- The organizational sections (administrative, financial, legal, commercial, control, marketing).

Among the most prominent activities are the approved investment projects at a total cost of (112.5) billion dinars, which is the company's rehabilitation project, the project of manufacturing 40% of the tractors, the rolling mill project, the sprinkler irrigation project, in addition to owning additional properties and yards as well as a combined residential complex for employees' housing that is situated on the company's land. With its production skills, the firm creates all of the high-quality, thoroughly scientifically specified goods that serve the transportation, agricultural, irrigation, services, and security sectors, and with a quality guarantee of the products, as the company obtained the ISO90001 certificate. It should be noted that all the above data are derived from the company's official website on the international network <https://scai.industry.gov.iq/>.

Second - Description and diagnosis of the variable of the Holonic manufacturing system

This passage incorporates the measurable depiction of the holonic fabricating framework variable and its sub-aspects. Table (5) shows the aftereffects of the expressive measurements of the Holonic producing variable, which is estimated in four field aspects. The absolute number-crunching mean of this variable was (4.206). The standard deviation was (0.397). The general coefficient of variety was (9.44 percent). The general significance was (84.12%). These outcomes demonstrate that the Dutch assembling variable has accomplished a serious level of significance as per the responses of the respondents and in everyday structures and not as per the strategic setting of the parts as a framework endorsed in its full structure, yet it means that the seed of interest in these pragmatic ways, which are the reason for assembling tasks in their cutting edge face steady with guidelines Globalism. Concerning the game plan of the sub-aspects, the aspect (the staff's holon) came in the primary position with a mean of

(4.399) and a coefficient of variety (11.65%), a marker that shows the organizations' pondering the main component of creation, which is the workforce. As the progress of the authoritative groups at their various levels and fields of movement relies chiefly upon their capacity to manage the human asset, which addresses the fundamental thought of the part (staff's Holon). The aspect (item holon) came in the last request, with a standard deviation of 0.594, and with a coefficient of variety (15.67%), a marker that the specialists see as emerging from the way that the idea of the action in the exploration test organization is fundamentally the get together of made and semi-produced pieces of vehicles. Subsequently, it is a reciprocal assembling process and doesn't manage unrefined components, so it is essentially made or without any preparation. Regardless of that, the working organizations should focus on this marker, as this part (item holon) addresses the total information base for assembling fully intent on serving other holons. Accordingly, it incorporates the exhibition of capabilities that were in the conventional frameworks (item configuration, process arranging, quality affirmation).

Table (1) describes and diagnoses the variable of the Holonic manufacturing system

No.	Dimensions	Arithmetic mean	Standard deviation	Variation coefficient	Relative importance %	Arrange dimensions according to coefficient of variation
1	Product Holon	3.794	.594	15.67	75.89	4
2	Demand Holon	4.283	.548	12.79	85.66	3
3	Resources Holon	4.349	.534	12.28	86.97	2
4	Staff Holon	4.399	.513	11.65	87.97	1
Holonic Manufacturing System.		4.206	.397	9.44	84.12	-

Source: Table prepared by researchers based on results of statistical program.

Third: Description and diagnosis of product quality variable.

This section incorporates the measurable depiction of the item quality variable and its sub-aspects overall. Table (1) shows the aftereffects of graphic insights for the item quality variable, which is estimated in four field aspects. The complete number-crunching mean of this variable was (4.221). The standard deviation was (0.376). The overall coefficient of variety was (8.90%). The overall significance was (84.42%). These measurable outcomes demonstrate that the item quality variable has obtained a fairly exceptionally serious level of significance, as indicated by the responses of the respondents. At the sub-aspects level, the aspect (reasonableness of cost) came in the lead position with an overall significance of (90.09%) and a coefficient of contrast (10.88%), which is a pointer predictable with the idea of the buying

conduct of people, and that cost is an essential support point in the buying choice cycles or medicines. Subsequently, the offices, as per this methodology, embrace an interest in this profoundly delicate marker or measure. While, the aspect (nature of similarity) came in the last position with a number-crunching mean (3.926) and a coefficient of variety (15.95%). This has a significant importance that ought to be offered more consideration as it connects with a significant and extraordinary hub in the quality writing. As the more prominent the evenness among plan and congruity, this prompts the accomplishment of the ideal item, particularly in a significant industry like the car business. Item determinations are an essential determinant of an association's outcome in addressing the necessities of its clients.

Table (2) Description and diagnosis of the product quality variable

No.	Dimensions	Arithmetic mean	standard deviation	Variation coefficient	Relative importance %	Arrange dimensions according to the coefficient of variation
1	design quality	4.269	0.646	15.13	85.37	3
2	Match quality	3.926	0.626	15.95	78.51	4
3	price match	4.504	0.490	10.88	90.09	1
4	Artistic and aesthetic form	4.186	0.586	14.01	83.71	2
	Product quality	4.221	0.376	8.90	84.42	-

Source: Table prepared by researchers based on the results of the statistical program.

Testing hypotheses of correlation

To test the principal and sub-relationship speculations, the scientist embraced the basic connection coefficient (Pearson), which expects to decide the connection between's the free factor (Holonic fabricating framework) and the reliant variable (item quality). The straightforward relationship coefficients between the momentum research factors and the degree of meaning of the connection coefficient will be shown. To pass judgment on the strength of the relationship coefficient, the assessment will be embraced by separating it into five classes, as displayed in the table underneath:

Table (3) Interpretation of the value of the correlation coefficient of correlation.

No.	Interpretation of correlation	Correlation coefficient value
1	There is no relationship	r=0
2	complete positive or negative	1 r = +
3	weak positive or negative	+ (0.00-0.30)
4	strong positive or negative	+ (0.31-0.70)
5	Very strong, positive or negative	+ (0.71-0.99)

Source : Saunders , M. , Lewis , P. , & Thornhill , A. (2009) " Research methods for business students " 5th ed , Pearson Education Limited : Prentice Hall , England , P.459.

Test the First Main Hypothesis and the Sub-Hypotheses that Emanate from it

The first main hypothesis: There is a huge connection between's the reception of the Holonic fabricating framework and the accomplishment of item quality in the General Organization for the Car Business (Alexandria). The consequences of Table (3) underneath show the presence of a solid positive huge connection between's the variable of the Holonic fabricating framework and the variable of item quality. The worth of the connection coefficient between them was (0.711**) and this worth demonstrates the strength of the immediate connection between these two factors at a degree of importance (0.01) and with a certainty level of (0.99). In view of the prior, this outcome can be made sense of by the interest of the organization's specialties being referred to embrace the Holonic fabricating approach and with starting strides by fortifying administration processes and various medicines inside the assembling framework and overseeing instances of progress from the conventional work culture to the way of life of present day producing frameworks that would raise the degrees of accomplishing quality items. At the level of the sub-aspects, the aftereffects of the relationships with the aspects (items holon/demand holon/assets holon/workers holon) were as per the following (268**/.575**/. 627 **/. 622 **). In light of the prior, it is feasible to acknowledge the primary principal speculation and the sub-speculations radiating from it.

Table (4) Matrix of correlation coefficients between the holonic manufacturing system and its dimensions and product quality.

Independent variable \ Dependent variable		product holon	holon demand	Holon Resources	Holon staff	Holonic Manufacturing System.
		Product quality	Pearson Correlation	.622**	.627**	.575**
	Sig. 2tailed	.000	.000	.000	.000	.000
	N	85	85	85	85	85

Source: Table prepared by researchers based on the results of the statistical program.

Third - testing hypotheses of influence.

To test the vitally immediate effect speculations and the sub-theories exuding from them, the analyst utilized the underlying condition displaying (SEM) strategy. It is a high level measurable strategy for building and testing factual models for information investigation, which are much of the time causal models. Subsequently, SEM is an extremely successful strategy as far as addressing the immediate and roundabout impacts of dormant factors on the elements estimated in the getting model (Alaloul et al, 2020:6). In this way, the degree of direct impact between the factors not entirely settled by it, as follows:

The second main hypothesis: There is a critical impact relationship for the reception of the holonic fabricating framework in accomplishing item quality in the General Organization for the Car Business (Alexandria). Table (5) underneath shows that there is a positive and tremendous impact of the holonic fabricating variable in accomplishing item quality. As we note that the aftereffects of the model matching markers were inside the acknowledgment base apportioned to them. It arrived at a worth of (RMR = 0.036), which is not exactly its OK scope of (0.08). It is additionally certain that the worth of the standard effect factor has reached (0.71). This implies that the variable of the Holonic fabricating framework influences the item quality variable by (71%) at the level of the examination test organization. This worth is thought of as huge, in light of the fact that the worth of the basic proportion (C.R.) displayed in Table (9) was (11.915), which is a critical worth at the degree of importance (P - esteem) displayed in a similar table. It is additionally apparent from the table that the worth of the coefficient of assurance (R²) has reached (0.51), and that implies that the variable of the Holonic fabricating framework can make sense of (51%) of the progressions that happen in the degree of item quality accomplished. The leftover rate (49%) is because of different factors excluded from the review model. In view of the prior, the second primary speculation is acknowledged.

Table (6) test paths and parameters of the impact of the Holonic manufacturing system in achieving product quality.

Tracks			Standard gradient weights	The nonparametric estimation	standard error	critical ratio	Significance level
Product quality	--->	Holonic Manufacturing System.	.711	.673	.056	11.915	***
product holon	--->	Holonic Manufacturing System.	.798	1.073	.069	15.613	***
Request holon	--->	Holonic Manufacturing System.	.515	.772	.109	7.090	***

Resources Holon	--->	Holonic Manufacturing System.	.771	.996	.070	14.279	***
Staff Holon	--->	Holonic Manufacturing System.	.841	1.169	.063	18.294	***
design quality	--->	Product quality	.733	1.260	.099	12.707	***
Match quality	--->	Product quality	.592	.987	.114	8.661	***
price match	--->	Product quality	.704	.919	.079	11.691	***
Artistic and aesthetic form	--->	Product quality	.535	.834	.112	7.458	***

Source: Table prepared by researchers based on the results of the statistical program.

From the Second main Hypothesis, four Sub-Hypotheses Emerge as follows:

2-1- There is a tremendous impact of embracing holon item in accomplishing item quality in the General Organization for Car Industry (Alexandria). Table (7) beneath shows a positive and massive impact of (item holon) aspect on (item quality). As we note that the worth of the standard impact factor has reached around (0.36), and that implies that the component of the item's holon influences the item quality variable by (36%). This implies that transforming one unit of deviation from the holon of the item in the examination test organization will prompt an adjustment of the degree of value accomplished in the organization's items by (36%). This worth is huge on the grounds that the basic proportion (C.R.) displayed in the table is (4.712) a critical worth at a critical level (0.000), which affirms the acknowledgment of the speculation.

2-2- There is a tremendous impact relationship for the reception of the component of solicitation holon in accomplishing item quality in the General Organization for the Car Business (Alexandria). The table beneath shows a positive and massive impact of the (demand holon) aspect on (item quality). We note that the worth of the standard impact factor has reached around (0.21), and that implies that the component of the interest influences the item quality variable by (21%) at the level of the exploration test organization. This implies that transforming one deviation unit from the amount requested in the organization in the examination test will prompt an adjustment of the quality level accomplished in the items by (21%). This worth is considered huge on the grounds that the basic proportion (C.R.) displayed in the table is (2.327) a critical worth at a huge level (0.020), and hence the speculation can be acknowledged.

2-3- There is a huge effect relationship for the reception of the asset holon component in accomplishing item quality in the General Organization for the Auto Business (Alexandria).

The table underneath shows that there is a constructive outcome, with no critical importance, of the aspect (holon assets) on (item quality). As we note that the worth of the standard effect factor has reached (0.22) and this implies that the component of the asset holon influences the item quality variable by around (22%) at the level of the exploration test organization. This implies that transforming one deviation unit from how much assets in the organization will prompt an adjustment of the degree of value accomplished by (22%). This worth is considered huge in light of the fact that the basic proportion (C.R.) displayed in the table is (2.667) a critical worth at a huge level (0.008), and as needs be, the sub-speculation can be acknowledged.

2-4- There is a massive impact relationship for the reception of the worker holon component in accomplishing item quality in the General Organization for the Auto Business (Alexandria). The table underneath shows that there is a positive and huge impact of the aspect (worker holon) on (item quality). As we note that the worth of the standard effect factor has reached roughly (0.16), and that implies that the element of the workers' holon influences the item quality variable by (16%) at the level of the organization being referred to. This implies that transforming one deviation unit from the quantity of representatives in the organization in the examination test will prompt an adjustment of the degree of value accomplished in items by (16%). This worth is considered huge in light of the fact that the basic proportion (C.R.) displayed in the table underneath is (2.629) a critical worth at a critical degree of 0.009, and consequently the sub-speculation can be acknowledged.

Table (8) Test paths and parameters of the impact of Holon manufacturing on product quality.

Tracks		Standard gradient weights	The nonparametric estimation	standard error	critical ratio	Significance level	
Product quality	--->	Product holon	.361	.262	.056	4.712	***
Product quality	--->	Request holon	.211	.143	.062	2.327	.202
Product quality	--->	Resources Holon	.220	.153	.057	2.667	.008
Product quality	--->	Staff Holon	.155	.097	.037	2.629	.009

Source: Table prepared by researchers based on the results of the statistical program.

CONCLUSION

1 - The study's findings revealed how the administrations viewed labor, the most crucial component of production. The capacity of the administrative teams to manage the

human resource, which embodies the core notion of the component, determines their performance at many levels and domains of operation (Staff Holon).

2- From the analysis of the field side data, it was discovered that (product holon) came in last at the level of the independent variable. That is a sign that the researchers believe is caused by the fact that the study sample company's primary activity is the assembling of produced and semi-made auto components. As it doesn't work with raw materials, it is a supplementary manufacturing process and is generally created from scratch. Yet, given that this component (product holon) comprises the whole database for manufacturing with the intention of servicing other holons, the operational administrations must be aware of this signal. So, it comprises the execution of tasks that were represented by (product design, planning, quality assurance procedures) in the old systems.

3- The field investigation revealed the sample's interest in the component of price appropriateness at the level of the adopted variable. That is in line with how people often behave when making purchases, where price is a key factor in the decision-making process. As a result of this approach's great sensitivity, the administrations show interest in this indication or criteria.

The recommendations for this study are listed below:

1- In order to enhance the productive work, the administrations must adopt scientific and systematic mechanisms and methods in consolidating the culture of modern systems and adopting them in accordance with what is scientific, in a preliminary and step-by-step manner.

2- Strengthening mechanisms to allow individuals of all levels to present proposals and visions, and to raise various problems and initiatives through formal and informal channels. The human element is central to the success of any organization.

3- Paying attention to the vocabulary of the production process in a comprehensive way, especially the product component. This is done by working to follow up the production processes to avoid errors and to ensure that the product conforms to the specified specifications. As the product holon monitors the product as well as reduces time and financial costs and product control.

4- Intensifying efforts to spread the culture of quality at all administrative levels and in the mindset of the organization's members through interactive training policies, programs, educational workshops, quality workshops and other mechanisms and ways.

5- Activating partnerships and relations with research and academic institutions through which the company can be positioned as a field container for various research and studies that can contribute to solving problems and consolidating interconnection programs between academic institutions and their field counterparts in a manner that achieves the benefit of all parties.

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