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THE ROLE OF AGILE MANUFACTURING IN NEW PRODUCTS DEVELOPMENT – ANALYTICAL RESEARCH IN THE LEATHER FACTORY

Tabarek Mahmood Shukur
Assistant Lecturer, University of Baghdad – College of Law
tabark.m@colaw.uobaghdad.edu.iq

Abstract
The research aims to study the extent of the impact of agile manufacturing, which represents the company's ability to lead production in new products developing, which is the main reason for the company's continuity in order to keep pace with the competitive environment that caused clear problems for Iraqi companies, especially the Leather Factory, in which the research was applied through a survey of a sample of (64) employees. In order to analyze the sample's answers about the content of the questionnaire, a number of statistical methods were relied upon, represented by measures of central tendency and measures of dispersion, in addition to testing hypotheses using the linear regression equation, simple and multiple, which was implemented using the statistical program (STATA). The results of the relationship test between the dimensions of agile manufacturing and the variable of new product development showed the significance of the effect of three dimensions, which are the Core Competence (β=.444, P=0.001) with the strongest effect, the Knowledge-Driven Enterprise with a value of the beta coefficient (β=.243, P=0.011) and the dimension of the Capability for Reconfiguration (β=.263, P=0.036) in the variable of new product development, while the results of the effect were not significant in this relationship for the dimension of the Virtual Enterprise (β=.714, P>0.05). The most important conclusion was reached, which is the presence of a variance in the variable of new product development according to the variance of the dimensions of the accelerated manufacturing variable.

Keywords: Agile Manufacturing, New Product Development, Competition.

Introduction

The requirements for survival in the market have changed due to competitive pressures, so a new technology has been developed in the field of manufacturing in a system that responds to the multiple and rapidly changing needs of customers due to this competition that has pushed the global trend, especially the manufacturing sector, towards low-volume production and high diversity, which requires more flexible and collaborative production solutions and systems. Therefore, Iraqi companies, especially the State Company for Textile and Leather Industries - Leather Factory, have begun to suffer from intense competition, which may be due to changing customer preferences or competing goods. Hence, the need to quickly move from one product to another using flexible production facilities began. The complexity of the various factors that contribute to the development of new products has increased the need to

understand the processes used by organizations to facilitate product development. New methods for product development that integrate understanding new customers in real time replace traditional development processes. The success of the application of agile manufacturing in the company depends primarily on the commitment of top management. The most important question is: Does agile manufacturing have an impact on the new products development? The normal distribution of the data of the dimensions of the variables was tested to determine the extent of their conformity with the normal distribution. Based on the results of these tests, the results related to the statistical description of the dimensions of the research variables were presented and discussed using statistical tools. Each dimension of the research was calculated separately, with the results presented and analyzed based on the data and details shown in sequence to ensure the provide a comprehensive and precise vision of the nature of the data and its interpretation in a way that serves the objectives of the study. Agile manufacturing represents an independent variable through four dimensions, which are (Core Competence, Knowledge-Driven Enterprise, Capability for Reconfiguration, Virtual Enterprise), while new product development represented a dependent variable represented by ten items as shown in Table No. (6).

1- Theoretical Background

1) Agile Manufacturing

1-1 Agile Manufacturing Concept

Business-level thinking that focuses on adaptable structures and infrastructures and enhancing access to competencies as a means of achieving greater responsiveness to changing customer requirements (Gunasekaran et al., 2018: 2). It is a business strategy that aims to provide an organization operating in a changing environment with the capabilities to succeed and overcome traditional manufacturing approaches that are often inflexible and expensive (Chikwendu et al., 2020: 11762) (Jadoon et al., 2020: 1). It focuses on the speed changing between product models or production lines to respond to the customer in a timely manner in terms of product mix and volume (Ding et al., 2021: 444). It represents the ability to survive and thrive in a competitive environment characterized by continuous and unpredictable change and thus includes a greater focus on providing a rapid response to changing customer requirements (Banas and Chovanova, 2023: 59). Agile manufacturing has been proposed as an operations strategy that aims to match resources, processes, and capabilities, effectively and quickly, with the dynamic needs of the market by helping the organization adapt to sudden changes in the market (Mohaghegh et al., 2023: 1).

1-2 Enablers of Agile Manufacturing

Figure No. (1) illustrates the Enablers of agile manufacturing that achieve flexibility in manufacturing, as distributed resource management systems must be integrated and managed effectively so that the system can adapt to changing market conditions. Agility is applied at every stage of manufacturing; starting from the design stage to the production stage. In the design stage, customer feedback is reviewed and taken for innovation purposes, in a similar manner to the planning stage. Finally, the main function is to model, monitor, diagnose, control, check and assemble the processes. Thus, the agility of agile manufacturing is

achieved through the integration of three basic resources in a coordinated and independent system, which are (1) an organized administrative structure, (2) a trained workforce base, and (3) advanced, flexible, and intelligent technologies.

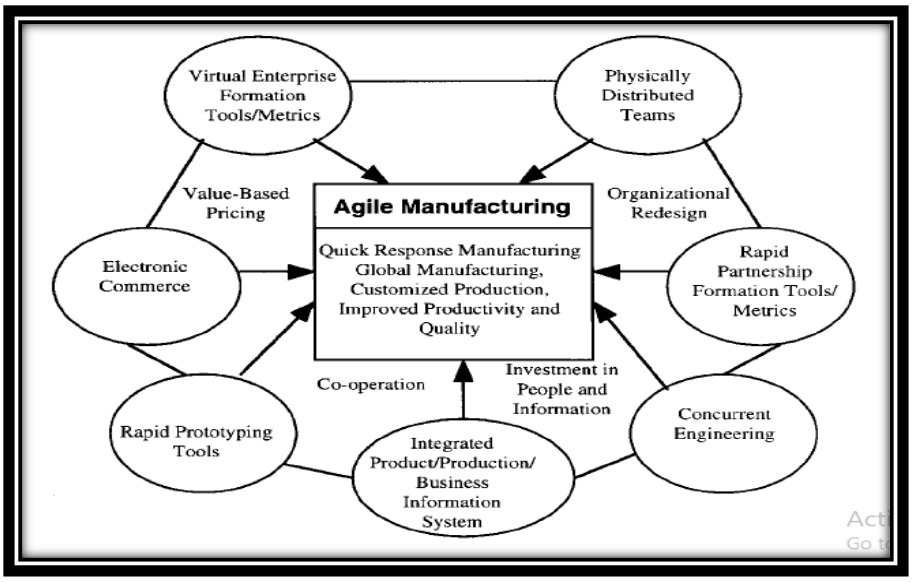

Figure No. (1) Enablers Agile Manufacturing

Source:
- Gunasekaran, A., 1998, Agile Manufacturing: Enablers and an Implementation Framework, Journal of Production Research, Vol. (36), No. (5), P. 1227.
- Chikwendu, Okpala Charles, Constance, Nwankwo Obiuto and Chiedu, Ezeanyim Okechukwu, 2020, Agile Manufacturing System: Benefits, Challenges, and Critical Success Factors, Journal of Multidisciplinary Engineering Science and Technology, Vol. (7), Issue (5), p. 11763.

1-3 Agile Manufacturing Framework

Figure No. (2) illustrate the framework of agile manufacturing, which begins with a study of market demand, in which market opportunities and threats are identified. The essence of agile manufacturing includes the ability to respond quickly and effectively to current market requirements, i.e. making the organization capable of facing challenges, adapting to the dynamic environment, and being able to compete in the face of continuous changes by having capable management, modern technology, and smart workers. Thus, the organization will be able to meet customer requirements quickly and be a market leader, and even discover a new market before competitors.

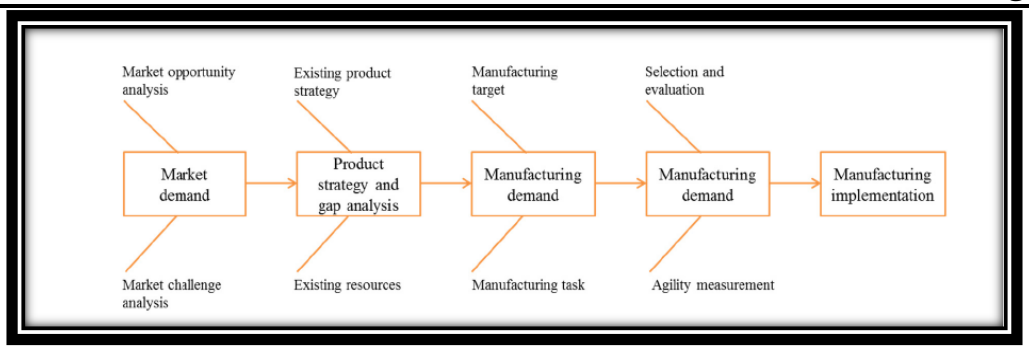

Figure No. (2) Agile Manufacturing Framework

Source: Liao, Zitian, 2019, Design Research on Information Coding System under the Concept of Agile Manufacturing, Journal of Physics: Conf. Ser. (1187) 032092, p. 2.

1-4 Agile Manufacturing Principles

(Gunasekaran, 1998: 1223), (Qamar, 2017: 52), and (Sultan and Bamarni, 2022: 175) indicated that agile manufacturing consists of four basic principles:

a. Core Competence: It is related to the strength of the work and product in the organization, which can be identified at two independent but related levels: the individual and the organization. The Core Competence of individuals relate to skills, knowledge, attitude and experience, and can be developed through investment in training and education. At the organization level, they relate to the integration of diverse skills, the delivery of value, the organization of work, and the ability to cooperate between organizations.

b. Knowledge-Driven Enterprise: Knowledge-Driven Enterprise are fully aware that the development of knowledge and information is a key factor for business success. Agility companies must be aware of all the solutions they need when they encounter problems with customers, including pricing of goods, which sometimes depends on the value of the work proposed by the customer, taking into consideration that it is one of the manufacturing costs.

c. Capability for Reconfiguration: It is the ability of the organization to organize itself in a way that makes it able to combat the trend of change and the state of uncertainty, as well as the ability to rearrange its material and human resources to quickly adapt to the changing environment to expand its capabilities in seizing available opportunities.

d. Virtual Enterprise: Internal cooperation between organizations in a specific sector and even companies in the fields of support for the concerned organization such as transportation organizations, which represents a feature of agility companies at the strategic and implementation level, which is considered the first choice. The aim of cooperation is to launch the product to the market as quickly as possible while exploiting resources and capabilities. Cooperation here means that it extends in partnership with organizations in the same sector in which it operates, even if it is a competitor.

2- New Products Development

2-1 New Products Development Concept

New products development is a powerful source of competitive advantage because of the pressure that imposes on the organization to work with a wide range of opportunities due to the short life cycle and diversity of products (Bessant and Francis, 1997: 189). Therefore, contemporary organizations face a dynamic and turbulent environment that requires high

flexibility to deal with changing needs, which necessitates them to continue searching for ways through which they can improve their efficiency to ensure continued survival and growth (Zahay et al., 2004: 657). Today's business environment tends to change rapidly, such as increasing competition in the market, changing customer needs and expectations, technological development, and short product life cycles (Kumar and Phrommathed, 2005: 3).

New product development is the development of existing products or the introduction of entirely new products, as well as the introduction of new brands through the organization's product development efforts (Armstrong et al., 2017: 283). It is also the integrated process of developing a new product from idea to market launch, i.e. transforming a market opportunity into a salable product, and may include incremental or radical innovation. The success of new product development is determined by three main factors: the cost of developing the product, the time it takes to launch the product, and the quality of the product (Eurenius and Teräväinen, 2020: 17). Innovations directly affect the organization's market share and are a source of differentiation through which it competes for the purpose of survival (Jawad and Al-Rabia'i, 2021: 5).

2-2 New Products Development Stage

New product development may arise from technology or from market opportunities, and regardless of the source of the opportunities, the customer is the ultimate judge of successful new products which requires the organization to gain a deep understanding "voice of the customer" through every essential stage of the new product development process (Kleef et al., 2005: 182).

The new product should be evaluated upon its introduction according to three levels: the basic level, which expresses the basic benefit when purchasing the product; the conformity level, which expresses the properties, quality and external appearance; and finally the support product level, which expresses additional services such as warranty and delivery (Al Kaabi, 2009: 122). Therefore, the performance of a successful new product is affected by a set of factors such as the parts that make up the product, the organization's strategy, competition in the market, the characteristics of the new product development process, as well as the speed of marketing, which is referred to as the development cycle time (McNally et al., 2011: 65). The new product development process is a process that is prone to failure, as it is not without risks, in addition to its high cost, which makes it extremely important (Dawoud and Abd Al Karim, 2016: 27).

The new item is developed through intensive processes that aim to generate the idea, initial evaluation, concept review, product development, prototype testing, trial sales, and product introduction (Bukhari, 2017: 20). In contrast, new products contribute to the success of the organization by understanding customer needs, which are priorities for success, especially in the early stages of the product development process (Al-Taie et al., 2017: 31). Product development not only determines the success of the product but also the future of the organization. Figure No. (3) shows the stages of product development that go through a series of steps, each with its own examination and evaluation criteria. Identifying products that are

expected to capture market share and are cost-effective and profitable, but are in fact difficult to produce, may lead to failure instead of success.

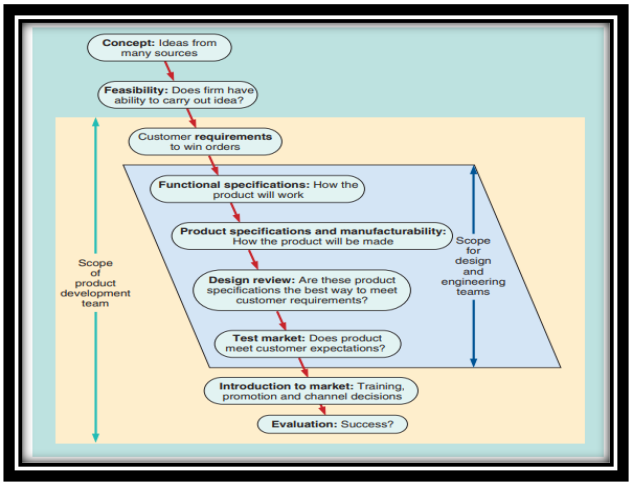

Figure No. (3) Product Development Stages

Source: Heizer, Jay, Render, Barry and Munson, Chuck, 2020, Sustainability and Supply Chain Management, 13th, Pearson Education, USA, p. 199.

To produce successful new products, the organization must understand customers, markets, and competitors. Instead of leaving new products to chance, it must implement effective new product planning and establish a systematic process for developing new products that is customer-oriented. Figure No. (4) illustrates the eight main steps in this process. New product development begins with generating ideas from multiple sources and then sorting or refining ideas and eliminating bad ideas. In the third stage, the concept is developed and tested, after which an initial marketing strategy for a new product is designed based on the product concept. In the business analysis stage, sales forecasts, costs, and profits for the new product are reviewed. Then, the product concept is developed into a physical product to ensure that the product idea can be transformed into a viable offering in the market. Test marketing is testing the product and the proposed marketing program in real market environments. Finally, the commercialization stage is where the new product is introduced to the market.

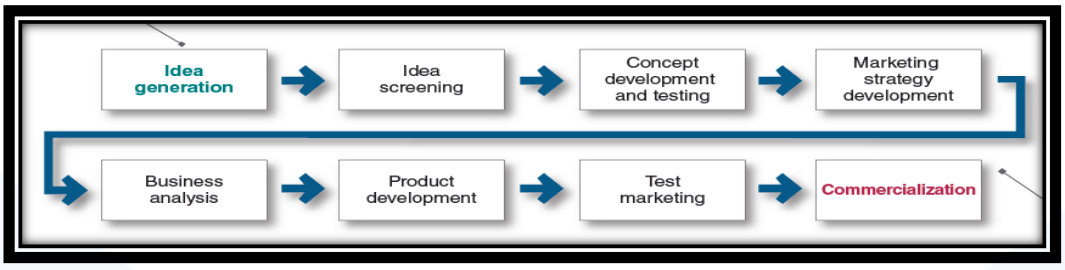

Figure No. (4) Main Stages in New Product Development

Source: Kotler, Philip, Armstrong, Gary and Opresnik, Marc Oliver, 2021, Principles of Marketing, 18th, Pearson Education, London, United Kingdom, p. 271.

New product development initiatives are sophisticated business processes that involve people from design, testing, manufacturing, and marketing. An organization must identify the most important initiatives and determine the timing and sequence of implementation (Idrees et al., 2023: 3). Product innovation is a key means of achieving product success and sustainable growth by exploring new ideas or improving existing products. The two most common innovation techniques are closed innovation, in which the organization is responsible for research, development, production, and marketing, and open innovation, which is the use of technology, resources, and ideas from outside the company to accelerate and expand the market (Purnama et al., 2023: 3). Organizations are increasingly realizing the potential of product development projects to contribute to their performance and profit growth, and as a result, the number of new product offerings introduced to global markets has increased (Chia, 2024: 29).

3- Methodology

3-1 Descriptive Statistics for the Variable Dimension of Research

A number of statistical tools were used to interpret the results of the study, including the arithmetic mean and the standard deviation to measure the differences in answers around the arithmetic mean, in addition to using the coefficient of variation to determine the percentage of dispersion in the sample's answers.

The relative importance of each paragraph was determined according to the value of the coefficient of variation to contribute to arranging the paragraphs according to importance. In addition to classifying the response levels according to five levels by calculating the difference between the upper limit of the scale (5) and the lower limit (1), then dividing the result (4) by the upper limit of the scale (5) to produce a value of (0.80) and then adding this value gradually to the lower limit of the scale to determine the response levels that came as in the following Table No. (1):

Table No. (1) Classification of Response Levels

Very Weak	**(1-1.80)**
Weak	**(1.81-2.6)**
Medium	**(2.61-3.40)**
Good	**(3.41-4.20)**
Very Good	**(4.21-5)**

The normal distribution of the data of the dimensions of the variables was tested to determine the extent of their conformity with the normal distribution. Based on the results of these tests, the results related to the statistical description of the dimensions of the research variables were presented and discussed using the statistical tools mentioned above. Each dimension of the research was also calculated separately, with the results presented and analyzed based on the data and details shown in sequence to ensure the presentation of a comprehensive and accurate picture of the nature of the data and its interpretation in a manner that serves the objectives of the study.

1) Agile Manufacturing: Agile manufacturing represents an independent variable through four dimensions, and the results of its statistical description and discussion are shown as follows:

a) Core Competence: The results of the descriptive analysis related to the dimension of core Competence, as shown in Table No. (2), showed that the third paragraph **(The Company made sure to bear the legal burdens towards society)** recorded the highest value of the arithmetic mean, which is (4.172) and the lowest value of the standard deviation, which is (0.656) compared to the rest of the paragraphs of the dimension. These values were reflected in reducing the coefficient of variation to reach (0.157), which indicates a high level of response that reflects a high degree of agreement between respondents on the content of the paragraph.

In contrast, the first paragraph **(The company made sure to continue training operations in order to improve the product)** obtained the lowest relative importance, as it came in fifth and last place, as it recorded an arithmetic mean of (3.313) with the highest value of the standard deviation, which is (1.220) and a dispersion coefficient of (368). That is, this paragraph achieved a moderate level of response. As for the rest of the paragraphs, their results ranged between these two limits according to the values of the coefficient of variation.

Table No. (2) Results of Descriptive Statistics for the Core Competence Dimension

No.	Paragraphs / Descriptive Statistics	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Response Level	Relative Importance
1.	The company made sure to continue training operations with the aim of improving the product	3.313	1.220	0.368	Medium	5
2.	The company made sure to involve its employees in making decisions that contribute to solving problems	3.781	1.091	0.288	Good	4
3.	The company made sure to bear the legal burdens towards the community	4.172	0.656	0.157	Good	1
4.	The company made sure to adopt the requirements and needs of employees as they are internal customers	3.938	0.833	0.212	Good	2
5.	The presence of a quality control department and obtaining the ISO certificate	3.938	0.889	0.226	Good	3
	Average	3.828	0.721	0.188	Good	

b) Knowledge-Driven Enterprise: The statistical description results related to this dimension, as shown in Table (3), indicate that the first paragraph **(The management is working on preparing a periodic study of the market through marketing research to review customers' opinions and requirements)** recorded the highest arithmetic mean of (3.875) and the lowest standard deviation of (0.845). These values were positively reflected in reducing the coefficient of variation to the minimum of (0.218). In contrast, the fourth paragraph **(The company made sure to improve the quality of its operations to meet customer requirements)** had the lowest arithmetic mean of (2.688) with the highest standard deviation of (1.424). This led to raising the value of the coefficient of variation to (0.530), which placed it in the fifth and last place in terms of relative importance. As for the rest of

the paragraphs, their results ranged between these limits according to the statistical description tools used.

Table No. (3) Results of Descriptive Statistics for the Knowledge-Driven Enterprise Dimension

No.	Paragraphs / Descriptive Statistics	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Response Level	Relative Importance
1.	The management works on preparing a periodic study of the market through marketing research to learn about customers' opinions and requirements.	3.875	0.845	0.218	Good	1
2.	The company made sure to hold seminars and dialogue workshops between experts and employees	2.969	0.975	0.329	Medium	4
3.	Share customer opinions and include them in product design decisions.	3.109	0.978	0.314	Medium	3
4.	The company seeks to improve the quality of its operations to meet customer requirements.	2.688	1.424	0.530	Medium	5
5.	The company is committed to product delivery dates and provides a guarantee for them to increase customer value.	3.813	0.906	0.238	Good	2
	Average	3.291	0.533	0.162	Medium	

c) Capability for Reconfiguration: The results of the descriptive analysis related to the dimension of the ability to reshape, as shown in Table (4), showed that the third paragraph **(The company has the ability to change manufacturing systems to invest in new market opportunities)** recorded an arithmetic mean of (3.719) with the lowest standard deviation (0.723) compared to the rest of the paragraphs of the dimension. This was reflected in reducing the coefficient of variation to (0.194), which indicates a high level of response that expresses a great agreement among the sample members regarding the content of the paragraph, which gave this paragraph the first relative importance. On the other hand, the fourth paragraph **(the company made sure to use electronic means to predict the time of preparation and change)** recorded an arithmetic mean of (3.641), with a standard deviation of (0.861) and a coefficient of variation value of (0.237). Despite this, it also achieved a high level of response, but it came in fifth place in terms of relative importance based on the value of the coefficient of variation. As for the rest of the paragraphs, their statistical results ranged between these limits according to the tools used in the descriptive analysis.

Table No. (4) Results of Descriptive Statistics for the Dimension Capability for Reconfiguration

No.	Paragraphs / Descriptive Statistics	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Response Level	Relative Importance
1.	The company made sure to achieve zero setup time by relying on smart workers (who have knowledge, experience and skill)	3.984	0.845	0.212	Good	2
2.	The company made sure to eliminate waste of time when changing and preparing equipment when moving from one product to another	3.656	0.801	0.219	Good	3
3.	The company has the ability to change manufacturing systems to invest in new market opportunities	3.719	0.723	0.194	Good	1
4.	The company made sure to use electronic means to predict setup and change time	3.641	0.861	0.237	Good	5
5.	The management supports the idea of forming small work teams to accomplish work quickly to face diversity in the markets	3.875	0.882	0.228	Good	4
	Average	3.775	0.528	0.140	Good	

d) Virtual Enterprise: The results of the descriptive analysis of this dimension, as shown in Table (5), showed that the third paragraph **(the company works according to a joint mechanism with suppliers to design the product and develop operations)** achieved an arithmetic mean (3.297) with the lowest standard deviation (0.728) and a coefficient of variation (0.221), which reflects a moderate response level indicating a high agreement among respondents about the content of the paragraph, which gave it the first relative importance. In contrast, the fourth paragraph, which states (the company seeks to form strategic alliances based on core capabilities), recorded an arithmetic mean of (3.531), with the highest standard deviation (0.816) and a coefficient of variation (0.231). Despite achieving a high response level, it came in fifth and last place in terms of relative importance according to the analysis.

Table No. (5) Results of Descriptive Statistics for the Virtual Enterprise Dimension

No.	Paragraphs / Descriptive Statistics	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Response Level	Relative Importance
1.	The company made sure on cooperation by using cross-functional teams as an important source of new ideas	3.906	0.830	0.213	Good	2
2.	The company made sure on sharing technical and commercial data and information with suppliers	3.453	0.958	0.278	Good	3
3.	The company works according to a joint mechanism with suppliers on product design and process development	3.297	0.728	0.221	Medium	1
4.	The company made sure form strategic alliances based on core capabilities	3.531	0.816	0.231	Good	5
5.	The company is made sure establishing and maintaining long-term relationships with customers and suppliers	2.938	0.924	0.314	Good	4
	Average	3.425	0.494	0.144	Good	

2) New Products Development: New product development was a dependent variable represented by ten paragraphs, the results of which will be presented and discussed in Table No. (6). It was confirmed that the eighth paragraph **(The company made sure to develop new production lines)** achieved an arithmetic mean of (3.922) with the lowest standard deviation of (0.741) compared to the rest of the paragraphs of this dimension. This was reflected in reducing the value of the coefficient of variation to (0.189), which reflects a high level of response that expresses high harmony among the respondents regarding the content of the paragraph, which gave it the first relative importance. On the other hand, the tenth paragraph **(the company has a plan to develop its products)** recorded an arithmetic mean of (3.469) with a standard deviation of (0.922) and a coefficient of variation of (0.286). Despite achieving a high level of response, it obtained the tenth and last relative importance. As for the rest of the paragraphs of the dimension, their statistical results varied according to the descriptive tools used in this analysis.

Table No. (6) Results of Descriptive Statistics for the New Product Development Variable

No.	Paragraphs / Descriptive Statistics	Arithmetic Mean	Standard Deviation	Coefficient of Variation	Response Level	Relative Importance
1.	The company has a plan to develop its products	3.469	0.992	0.286	Good	10
2.	The company made sure to describe its products in the new product development plan	3.266	0.930	0.285	Medium	9
3.	The company made sure to meet the requirements of the market and the user	3.563	0.852	0.239	Good	4

4.	**The company made sure influence the customer's purchasing decisions**	**3.938**	**0.794**	**0.202**	**Good**	**2**
5.	**The company made sure to increase the level of service to influence the customer's purchasing decision**	**3.547**	**0.853**	**0.241**	**Good**	**5**
6.	**The company made sure to increase the effectiveness of the design and manufacturing of the product with the aim of creating innovative products**	**3.468**	**0.975**	**0.281**	**Good**	**8**
7.	**The company made sure to contract with those with experience in operations and maintenance**	**3.484**	**0.854**	**0.245**	**Good**	**6**
8.	**The company made sure to create new production lines**	**3.922**	**0.741**	**0.189**	**Good**	**1**
9.	**The company made sure to expand the scope of existing production lines**	**3.813**	**0.906**	**0.238**	**Good**	**3**
10.	**The company made sure to establish and activate a system for delivering products**	**3.734**	**0.963**	**0.258**	**Good**	**7**
	Average	**3.620**	**0.545**	**0.151**	**Good**	

Before starting the procedures for testing the research hypotheses, it is necessary to first ensure the suitability of the data of the variables to the linear regression models by testing the normal distribution of the data as a main requirement for using linear regression models. Table No. (7) shows the results of the normal distribution of the variables and their dimensions studied in this study according to the (Kurtosis - Skewness) test, which is specific to testing this type of tests. Below are the two hypotheses of the normal distribution:

H_0: The data is normally distributed **(H_O: P=0)**

H_1: The sample data is not normally distributed **(H_1: P≠0)**

Table No. (7) Results of the Normal Distribution Test for Variables and their Dimensions

Metrics	Pr(Skewness)	Pr(Kurtosis)	adj Chi^2	Prob>chi^2
Core Competence	**0.5894**	**0.3415**	**1.24**	**0.5386**
Knowledge-Driven Enterprise	**0.3125**	**0.1814**	**2.93**	**0.2309**
Capability for Reconfiguration	**0.6273**	**0.1175**	**2.80**	**0.2460**
Virtual Enterprise	**0.1157**	**0.5655**	**2.93**	**0.2311**
Agile Manufacturing	**0.4031**	**0.7915**	**1.79**	**0.6736**
New Products Development	**0.6790**	**0.1962**	**1.92**	**0.3837**

The test results shown in Table No. (7) indicate that these tests are not significant, and therefore the first hypothesis can be accepted, i.e. the data are normally distributed. The alternative hypothesis can be rejected, which confirms the readiness of the data. Figure No. (5) shows the graphical representation of the normal distribution of the data.

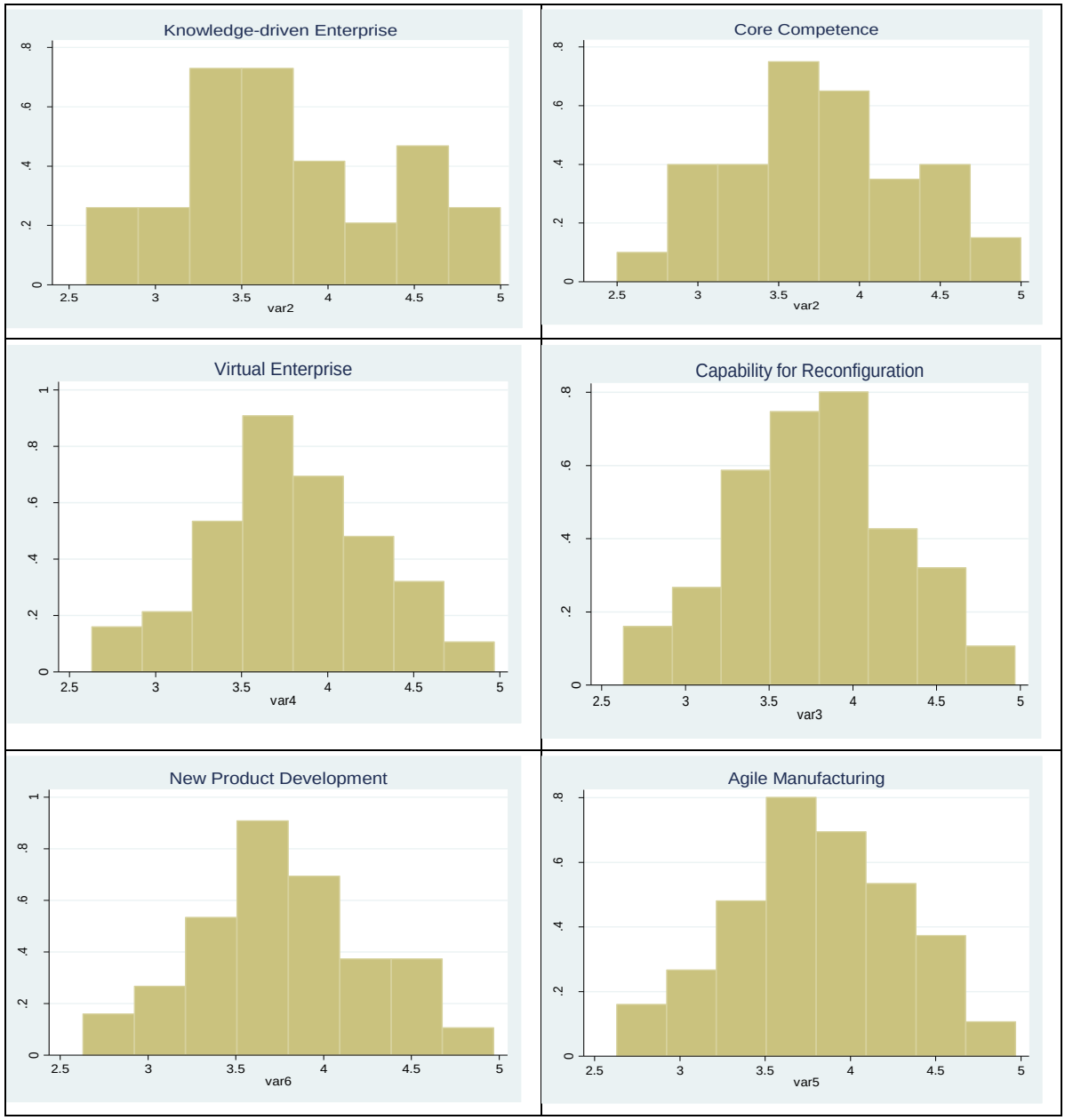

Figure No. (5) Graphical Representation of the Normal Distribution

3-2 Testing Hypotheses

This paragraph is devoted to testing the research hypotheses, including correlation hypotheses and regression hypotheses. The final judgment on the causal relationship between the variables requires building causal testing models, which are embodied in regression models. On this basis, Table No. (8) shows the results of testing the influence relationships between the independent variable represented by accelerated manufacturing and its four dimensions and the dependent variable represented by new product development according to the wording of each sub-hypothesis emanating from the first main hypothesis, as follows:

a) Core Competence and New Products Development: Table No. (8) shows the results of testing this hypothesis, which resulted in the significance of the regression coefficient or beta,

which reached (β= .490, P=0.000), to express that a change of one unit in the core capabilities is expected to lead to a corresponding change in the new product development direction, the value of the beta coefficient. As for the value of the coefficient of determination, which reached a percentage of (.42) with complete significance (P=0.000), explaining by the value of this percentage the variance in the development of the new product according to the variance in the ability of the company under study to enhance its core capabilities, which proves the validity of the first sub-hypothesis among the sub-hypotheses of the main hypothesis of the research.

b) Knowledge-Driven Enterprise and New Products Development: Table No. (8) shows the results of testing this sub-hypothesis, which resulted in the significance of the regression coefficient or beta, which reached (β=.341, P=0.007), to express that a change of one unit in the dimension of the knowledge-based organization leads to a corresponding change in the new product development, the value of the beta coefficient. As for the value of the coefficient of determination, which reached a percentage of (.120) with complete significance (P=0.007), explaining the value of this percentage the variance of the new product development variable according to the variance of the dimension of the knowledge-based organization, which proves the validity of the second sub-hypothesis.

c) Capability for Reconfiguration and New Products Development: Table No. (8) shows the results of testing this sub-hypothesis, in which the significance of the regression coefficient or beta, which reached (β=.661, P=0.000), expresses that a one-unit change in the dimension of the ability to reshape leads to a corresponding change in the new product development, the value of the beta coefficient. As for the value of the coefficient of determination, which reached a percentage of (.409) with complete significance (P=0.000), the value of this percentage explains the variance of the new product development variable according to the variance of the dimension of the ability to reshape, which proves the validity of the third sub-hypothesis.

d) Virtual Enterprise and New Products Development: Table No. (8) shows the results of testing this sub-hypothesis, which resulted in the significance of the regression coefficient or beta, which reached (β=.636, P=0.000), indicating that a change of one unit in the virtual organization dimension leads to a corresponding change in the new product development, the value of the beta coefficient. As for the value of the coefficient of determination, which reached a percentage of (.333) with complete significance (P=0.000), explaining the value of this percentage the variance of the new product development variable according to the variance of the virtual organization dimension, which proves the validity of the fourth sub-hypothesis.

As for the results of the main hypothetical relationship between agile manufacturing and new product development, which is shown in Table No. (8), which resulted in the significance of the regression coefficient, which reached (β=.948, P=0.000), which means that a change of one unit in the dimension of the virtual organization leads to a different change in new product development, the value of the regression coefficient beta, as for the value of the

coefficient of determination, which reached a percentage of (.552) with complete significance (P=0.000), explaining the value of this percentage the variance of the new product development variable according to the variance of the accelerated manufacturing variable, which proves the validity of the main hypothesis.

Table No. (8) Results of Testing the Impact Hypotheses (Simple Regression)

	New Product Development						
Relationships / Parameters	**α**	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**R^2**	**Prob**
Core Competence	**1.742**	**.490**	**.0730**	**6.71**	**.000**	**.420**	**.000**
Knowledge-Driven Enterprise	**2.495**	**.341**	**.122**	**2.79**	**.007**	**.120**	**.007**
Capability for Reconfiguration	**1.123**	**.661**	**.101**	**6.56**	**.000**	**.409**	**.000**
Virtual Enterprise	**1.439**	**.636**	**.114**	**5.57**	**.000**	**.333**	**.000**
Agile Manufacturing	**.223**	**.948**	**.108**	**8.74**	**.000**	**.552**	**.000**

The second main hypothesis: Table No. (9) regarding the results of the relationship test between the dimensions of agile manufacturing and the variable of new product development shows the significance of the effect of three dimensions, which are the Core Competence (β=.444, P=0.001) with the strongest effect according to the value of the beta effect coefficient. The dimension of the Knowledge-Driven Enterprise with a value of the beta coefficient (β=.243, P=0.011) and the dimension of the Capability for Reconfiguration (β=.263, P=0.036) in the variable of new product development, while the results of the effect were not significant in this relationship for the dimension of the Virtual Enterprise (β=.714, P>0.05). As for the explanatory power of the model represented by the coefficient of determination, which reached a percentage of (R^2= .752) with complete significance (P=0.000), meaning that (75.2%) of the variance of the new product development variable is explained by both significant dimensions.

Table No. (9) Results of Testing the Impact Hypotheses (Multiple Regression)

	New Products Development						
Relationships / Parameters	**α**	**Coef.**	**Std. Err.**	**t**	**P>|t|**	**R^2**	**Prob**
Core Competence	**.309**	**.444**	**.099**	**3.384**	**.001**	**.752**	**.000**
Knowledge-Driven Enterprise		**.243**	**.094**	**2.629**	**.011**		
Capability for Reconfiguration		**.263**	**.127**	**2.141**	**.036**		
Virtual Enterprise		**.048**	**.144**	**.368**	**.714**		

Conclusions

1) The success of the agile manufacturing application requires the support of top management in the first place, as it includes somewhat large financial decisions in terms of flexible equipment as well as skilled workers, in addition to programmed information and its management mechanism.

2) Agile manufacturing enables the company to achieve the highest level of recommendation, and to produce individual quantities of goods that can be manufactured at the same speed as mass production.

3) Production and operations decisions are important means that can help the company achieve its goals, which requires defining these decisions effectively, because today's market requires the production of a low volume of goods but with high quality, and these goods must have a very short life cycle.

4) There are many areas for the company that decides to expand in the markets, as they vary according to the nature of the existing skills and the goals it seeks to achieve.

Recommendations

1. Educate employees about the concept of agile manufacturing through training courses, publications and advertisements to consolidate and enhance the concept.
2. Motivate and encourage employees to provide new ideas that will contribute to the competitiveness of the organization.
3. Activate a joint system with suppliers that enables two-way information sharing.
4. Form a specialized committee to establish and maintain relationships with external customers.
5. Share the process of designing products and operations with experts from similar companies, whether public or private.

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