

The Effect of Modern Production Management Techniques on Enhancing the Requirements of Technical Innovation

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The research aims to explain the impact of modern production management techniques in enhancing the requirements of technical innovation in light of the philosophy of optimal production technology in a manner that is appropriate to the rapid and successive changes and developments accompanying the business environment. A basic hypothesis has been put forward that: modern production management techniques can help in strengthening the requirements of technical innovation in light of the philosophy of optimal production technology, and the following sub-assumptions emerge from this hypothesis: (1) Concurrent engineering technology helps to enhance the requirements of technical innovation; (2) Production technology reinforces the requirements of technical innovation; (3) TQM technology helps in enhancing the requirements of technical innovation; and (4) The value analysis technology helps in enhancing the requirements of technical innovation. The research sample is represented by a group of workers in Iraqi industrial companies, including administrators, accountants, engineers, and technicians, for the financial year data ending on 31/12/2018. For the purpose of achieving the goals of the research and testing its hypotheses, a questionnaire was designed and a set of appropriate statistical methods were used. Finally, the research reached a set of conclusions, the most important of which is that modern production management techniques can enhance the requirements of technical innovation in the light of the philosophy of optimum production technology.

Key words: *Production Management, Changes, Innovation, Statistical, Production Technology.*

Introduction

In light of the rapid and successive developments accompanying the business environment, modern technologies for production management have emerged as a result of the need to respond to environmental factors that have become a prominent characteristic of the business environment and which have presented challenges, pressures and threats to the future of economic units. The most important of these are the changes in the business environment and the use of modern design and manufacturing systems, the globalisation of markets and the intensification of competition between economic units as well as the focus on the customer, in addition to the incompatibility of the traditional approach to cost management to the requirements of the business environment, and modern technologies for managing production. It is a source of revenue and strength for economic unity as it is a competitive weapon in the competition process and the basis for survival in the business environment, as the concept of technical innovation has emerged, which indicates a set of important and key factors to ensure long-term success for all companies, and it indicates changes in the physical appearance of the product or in production processes or in performance, and thus technical innovation means the process by which the company can use its resources to present new products or use new processes to satisfy the needs and desires of customers, which is translating new ideas into a new product or a new process, and for the importance of the topic then address the issue The current urged the effect of modern production management techniques in enhancing the requirements of technical innovation in light of the philosophy of optimal production technology in a manner that is compatible with various environmental variables.

Research problem

Companies are found to provide products that can meet the needs of customers, therefore they must find the necessary means and processes that enable them to introduce new products and improve existing products so that they can provide products and services that meet the needs of customers and have sufficient capacity to meet and outrun competitors, and a problem can be expressed Research through the following question: What is the effect of modern production management techniques in enhancing the requirements of technical innovation in light of the philosophy of optimal production technology?

Research Objectives

The research aims to show the impact of modern production management techniques on enhancing the requirements of technical innovation in light of the philosophy of optimal production technology in a manner that is appropriate to the rapid and successive changes and developments accompanying the business environment as well as maintaining existing customers and gaining new customers.

The Importance of Research

The importance of research comes from the importance of its basic variables. Modern technologies for production management are a source of revenue and strength for economic unity. They are a competitive weapon in the process of competition and the basis of survival in the business environment. Either technical innovation is a group of important and major factors to ensure long-term success for all companies, and the work is more efficient and effective if it is under the concept of optimisation production technology philosophy.

Research Hypotheses

The research is based on a basic hypothesis that: (Modern production management techniques can help in strengthening the requirements of technical innovation in light of the philosophy of optimal production technology), and the following sub-hypotheses emerge: (1) The concurrent engineering technology helps in enhancing the requirements of technical innovation, (2) Production technology helps on time to enhance the requirements of technical innovation, (3) TQM technology helps enhance the requirements of technical innovation, (4) Value analysis technology helps enhance the requirements of technical innovation.

The Research Sample

The research sample is represented by a group of workers in the Iraqi industrial companies, such as administrators, accountants, engineers and technicians, for the data for the fiscal year ending on 31/12/2018, and from these companies: General Company for Electrical Industries, General Company for Battery Industry, General Company for Textile Industries, Light Industry Company, and Baghdad Company for Soft Drinks.

Theoretical Framework for the Research

Modern Technologies for Production Management and their Importance in Light of the Modern Business Environment

Modern technologies for production management emerged as a result of the need to respond to environmental factors that have become a prominent characteristic of the business environment, which posed challenges, pressures, and threats to the future of economic units. Modern industrialisation, market globalisation and increased competition between economic units, as well as customer focus, in addition to the inadequacy of the traditional approach to cost management to the requirements of the business environment (Jovanovic, 2015: 144). Modern production management is a source of revenue and strength for economic unity, as it is a competitive weapon in the competition process and the basis for staying in the business environment. Also, modern production management technologies require identifying current and prospective customers and working to meet their product needs in terms of form,

components, functions, price, quality, and time they prefer to receive Those products, as well as analyzing the value chain of the economic unit and trying to identify activities that do not add value and work to exclude them or merge them with other activities in order to reduce unjustified costs associated with them, in addition to linking the value chain Economic value chain with Dah processors and customers in order to reduce the time and increase the effectiveness and efficiency of the activities that are directed to achieve customer satisfaction and loyalty (Al-Zameli, 2017: 23).

Table 1: *Modern Production management Technologies*

SOURCES	CONCEPT AND IMPORTANCE	TECHNIQUES	NO.
(Kumar,et.al., 2014:424) (Mani,et.al., 2015:128-129)	It is a technology concerned with designing, manufacturing and assembling products, so that the various stages are implemented in conjunction with each other instead of sequencing or sequencing, which ensures a reduction in the time taken for the idea to reach the market, in addition to achieving cost savings, then building a competitive advantage for economic unity, and importance comes This technique is through the following: 1. Concurrent engineering technology is a vital component of time-based management for low volume production.	Concurrent Engineering (CE)	1
(Williams,et.al., 2002:788) (Atkinson,et.al., 2004:203)	It is a technology that seeks to prevent losses by committing to a high level of quality and commitment to continuous improvement and excluding every activity that does not add value from the point of view of the economic unit and the customer, and this technology depends on the method of withdrawal rather than payment, and there are seven main elements of the production system at the appointed time, They are: on-time production, a limited number of suppliers, improving plant arrangement, reducing preparation and preparation time, using automated manufacturing systems, applying total quality management, and employing highly skilled	Production on time (JIT)	2

	<p>workers. The importance of this technology comes through the following:</p> <ol style="list-style-type: none"> 1. Excluding activities that do not add value from the customer's point of view. 2. Find zero defects, zero inventory, and pauses. 3. Deliver the product immediately (on .1 time) to the customer. 		
<p>(Kan, 2003:7-8)</p> <p>(Hilton, 2009:517)</p>	<p>It is a technology that aims to focus on providing products in the best shape, performance and specifications, in order to satisfy customers about the products that the economic unit offers to them and thus to obtain the loyalty of those customers, and this requires improving the quality of processes and products and attention to the human side by spreading a culture of quality in the economic unit, and comes The importance of this technology through the following:</p> <ol style="list-style-type: none"> 1. Reducing costs, increasing productivity, and improving profitability. 2. Obtaining international awards for quality, excellence and superiority over other competitors working in the same sector in the market. 3. Responding to customer requirements and doing business without errors from the first time, working to solve quality problems, and carrying out continuous quality improvement processes in relation to the operations of the economic unit or its products alike. <p>.1</p>	<p>Total quality management^s (TQM)</p>	<p>3</p>
<p>(Rashti & Zanjanchi, 2014:85-86)</p> <p>(Henriques,et.al., 2015:1-2)</p>	<p>In a technique whereby each element of the product is studied to know whether these elements add or not, and this technique is called on operations after the research and development stage and the design stage to ensure that the product elements represented by its components and functions are designed in a way that can satisfy the customer with</p>	<p>Value analysis (VA)</p>	<p>4</p>

	<p>regard to its job performance The quality, cost, and importance of this technology comes through the following:</p> <ol style="list-style-type: none"> 1. This technique is based on a unique method of job analysis. 2. The quality of coordination between the workers among themselves on the one hand, and between them and the suppliers and customers on the other hand. 3. Reducing costs and improving the .1 .functionality and quality of the product 		
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Source: Preparing the researcher based on the sources indicated above.

Concept, Importance, and Types of Technical Innovation

Technical innovation is seen as a set of important and key factors to ensure long-term success for all companies, and it refers to changes in the physical appearance of the product, in production processes, or in performance (Galanakis & Passey, 2001: 35). Thus, technical innovation means a process that Through which the company can use its resources to introduce new products or use new processes to satisfy the needs and desires of customers, which is translating new ideas into a new product or new process (Stoner, et.al, 1996: 426), and there are those who see technical innovation as development It introduces the production processes and products to meet the needs for customers in order for the company to be the best in the competition market, and this innovation indicates the company's behavior in its reliance on new methods in introducing a new product or using new production processes or introducing developments in a manner that is consistent with the needs and desires of customers (King & Kugler, 2000: 486).

One of the researchers looks at technical innovation as a series of technical and industrial steps that contribute to introducing new products to the market, which is thus a new idea represented by the formula of a new product or a new process or a new method of work or a system that contributes to improving the company's efficiency towards achieving its goals, and that the process Creativity requires cooperation and coordination between a number of overlapping activities in the company in order to use and adopt new ideas and technical developments by adopting systematic scientific methods for the purpose of providing a new good or service for the company or improving it for the purpose of achieving the company's goals and making it more competitive by discovering Product development is the gateway to developing new knowledge and translating it into commercial applications (Willam, 2007: 228).

As for the types of technical innovation, technical innovation according to the output standard is classified into product creativity and process creativity, and there is a category of technical innovation according to its uses and its purpose is classified into two types: product creativity and process creativity (Schermerhorn, et.al, 1997: 407), and it can be clarified types of Technical innovation to the following:

1. Introducing a new product: The new product is the one that enters the market for the first time and may not be new to the market, but rather new for the company, which offers a new benefit to customers, just as the new product is all that is presented to the market to attract attention, consumption or meet An order or need that not only includes the tangible product but also all that meets the customers' desires and satisfies their needs (Sevege, 1989: 501).
2. Improving an existing product (existing product): The process of improving the product provides the opportunity for the company to carry out studies related to reducing the costs of producing the product and achieving distinctive quality, and that the improved product is that product that has been modified or improved to meet the needs of the customer by making an amendment and improvement on The product to present to the market in a new way (Willam, 2007: 229).

The Importance of Modern Production Management Techniques in Enhancing the Requirements of Technical Innovation In Light of the Philosophy of Optimal Production Technology

Despite the success achieved by the material needs planning system compared to the traditional systems and methods of stock control, it was unable to stand in front of the production system at the Japanese time, so the desire was generated by officials in the industry to follow the steps of the Japanese industry, so new philosophies have emerged that attracted management attention Operations, such as these are optimised production technology (Sysma, 2016: 1).

The philosophy of optimal production technology emerged in the mid-seventies of the last century at the hands of (Goldratt), who focused his efforts on managing restricted operations and improving performance through many of the researches and studies he presented in this regard, and the philosophy of optimal production technology is seen as a modern management approach aimed at Maximising the profits of the economic unit in the long term by addressing constrained resources and addressing organisational bottlenecks (Reid & Sander, 2010: 535). Thus, the philosophy of optimal production technology is a general philosophy that seeks to assist the company in re-examining and evaluating its activities in the event of a specific constraint that can Lead to The relationship of the continuous flow of production, where the dependence of the systems through which the system as a whole is treated in the economic unit as an integrated and continuous series of activities and processes instead of a fragmented view

of its components (Sysma, 2016: 5), and with regard to the importance of production technology philosophy Optimal, it can be clarified by a set of points, which are as follows:

1. The philosophy of optimal production technology helps in understanding the general goals of the company as a whole, and this understanding is based on the fact that the available resources are limited, and therefore these resources must be well directed to achieve specific goals effectively, efficiently and economically (Tollington, 2008: 46).
 2. The philosophy of optimal production technology has a positive impact on the performance of the company due to the holistic view of the system as a whole rather than the fragmented view of its components, as the system is treated as a continuous chain of operations instead of dealing with each processor resource separately (Dettmer, 2009: 3 -4).
 3. The philosophy of optimal production technology helps in solving problems related to production bottlenecks and scheduling in addition to reducing inventory by making continuous improvements in the company's system in the presence of constraints that can affect the required fluidity in the production process by relying on the time compatibility between both inventory and speed of resources Restricted (Sysma, 2016: 1-2).
 4. The philosophy of optimal production technology is a good method by which to achieve goals and obtain benefits after the end of improvement processes (Marton, et.al., 2010: 25).
- Through the above points, it is noted the importance of the philosophy of optimal production technology in achieving the goals of the company and solving its problems related to production bottlenecks, scheduling and stock reduction as well as obtaining results immediately, which makes the theory of restrictions more appropriate to the requirements of the modern manufacturing environment With regard to the importance of modern production management techniques in enhancing the requirements of technical innovation in light of the philosophy of optimal production technology, it can be clarified through the following:

Community and Sample of Research and Statistical Methods used

The research community consists of a group of workers in the Iraqi industrial companies including administrators, accountants, engineers and technicians for the data for the fiscal year ending on December 31, 2018, and from these companies: General Company for Electrical Industries, General Company for Battery Industry, General Company for Textile Industries, Light Industry Company and Baghdad Beverage Company Gaseous, either the research sample, a sample of those workers was chosen as one hundred questionnaires were distributed and ninety-four of them were retrieved valid for analysis, and the researcher relied on personal interviews with the members of the research sample, and the questionnaire was designed The questionnaire included a form that is consistent with the objectives of the research and its hypotheses. The questionnaire included an introductory introduction that showed the nature of the research and general questions specific to the research sample in addition to the questions

related to testing its hypotheses. I completely agree (5) degrees, I agree (4) degrees, neutral (3) degrees, I do not agree (2) degrees, I totally disagree (1) degrees.

Where 100 questionnaires were distributed to the individuals of the research sample, 94 forms were retrieved for analysis, as the proportion of these forms reached 94%, either the non-retrieved forms, they reached 6 forms by 6%, and after analyzing the demographic characteristics of the members of the research sample, it was found that 55% of The members of the research sample are between the ages of 45-55 years and 45% of them are over 56 years old, and the percentage of males for the members of the research sample reached 75%, either the percentage of females is 25%, and in addition to that, the percentage of diploma holders of the members of the research sample reached 20% and bachelors 70 The Master and 10%, which means that they are qualified to understand the idea of the topic, and finally, the years of experience for the individuals of a sample Search was the largest category of 25-35 years by 42%, and the remaining percentage ratio was the age group less than 25 years of actual service in the Iraqi industrial companies.

A set of statistical methods was used, including the arithmetic mean, attributed to the maximum value of the five-degree Likert scale. If the arithmetic mean exceeds three degrees of the area of the scale, the study is acceptable, that is, if it obtains a percentage higher than 60%, in addition to the use of percentages and standard deviation, In addition to the T-test, which aims to demonstrate that the relationships between the variables of the study are real and not due to chance, through inference about the arithmetic mean of the statistical community.

Test the Research Hypotheses

In this paragraph, we review the test of research hypotheses using both the arithmetic mean, percentage, and standard deviation, in addition to using the One-Sample T-test in order to prove or negate these hypotheses and to ensure that there is a relationship between the search variables.

Test the First Hypothesis

The first hypothesis states the following: (concurrent engineering technology helps in enhancing the requirements of technical innovation), and Table (2) shows the mean, percentage, and standard deviation of the variables of this hypothesis.

Table 2: Arithmetic mean, percentage, and standard deviation of the first hypothesis variables

Standard Deviation	Percentage	Arithmetic Mean	Variables	NO
			The concurrent engineering technology specified in:	
0.431	%84.04	4.202	New product design	X11
0.467	%88.72	4.436	Current product development	X12
0.427	%83.62	4.181	Design a new production process	X13
0.424	%83.18	4.159	Developing the current production process	X14
0.437	%84.90	4.245	Average year	

Source: prepared by the researcher.

Table 3: One Sample T-test results for the first hypothesis

Significance Level	Degree Of Freedom	T Tabular	Computed T	Variables
0.05	93	1.960	27.039	X11
0.05	93	1.960	29.812	X12
0.05	93	1.960	26.815	X13
0.05	93	1.960	26.502	X14
0.05	93	1.960	27.542	Overall average

Source: prepared by the researcher.

Through Table (3), it is noted that the calculated value of T for all paragraphs is greater than the tabular value, it ranged between (26.502) and (29.812), as the tabular value of T was 2.704 with a degree of freedom 93 and a significance level of 0.05, either the general average for all hypothesis variables First, the calculated value of T was greater than its tabular value with a freedom degree of 93 and a significance level of 0.05, which indicates acceptance of this hypothesis.

Test of the Second Hypothesis

The second hypothesis states the following: (Production technology helps on time to enhance the requirements of technical innovation), and Table (4) shows the arithmetic mean, percentage, and standard deviation of the variables of this hypothesis.

Table 4: Arithmetic mean, percentage, and standard deviation of the second hypothesis variables

STANDARD DEVIATION	PERCENTAGE	ARITHMETIC MEAN	VARIABLES	NO.
			Production technology helps on time at:	X2
0.391	%65.91	3.295	New product design	X21
0.418	%80.66	4.033	Current product development	X22
0.443	%67.02	3.351	Design a new production process	X23
0.452	%89.12	4.456	Developing the current production process	X24
0.426	%75.66	3.783	Overall average	

Source: Prepared by the researcher.

Table 5: One Sample T-test results for the second hypothesis

Significance Level	Degree Of Freedom	T Tabular	Computed T	Variables
0.05	93	1.960	03.131	X21
0.05	93	1.960	25.312	X22
0.05	93	1.960	07.681	X23
0.05	93	1.960	26.814	X24
0.05	93	1.960	15.735	Overall average

Source: Prepared by the researcher.

Through Table (5), it is noted that the calculated value of T for all paragraphs is greater than the tabular value, it ranged between (3.131) and (25.312), as the tabular value of T was 2.704 with a degree of freedom 93 and a significance level of 0.05, either the general average for all hypothesis variables Second, the calculated value of T was greater than its tabular value with a freedom degree of 93 and a significance level of 0.05, which indicates acceptance of this hypothesis.

Test of the Third Hypothesis

The third hypothesis states the following: (TQM technology helps in enhancing the requirements of technical innovation). Table (6) shows the arithmetic mean, percentage, and standard deviation for the variables of the third hypothesis.

Table 6: Arithmetic mean, percentage, and standard deviation of the third hypothesis variables

Standard Deviation	Percentage	Arithmetic Mean	Variables	NO.
			Total Quality Management technology helps in:	X3
0.431	%84.04	4.202	New product design	X31
0.334	%82.44	4.122	Current product development	X32
0.416	%84.00	4.200	Design a new production process	X33
0.443	%67.02	3.351	Developing the current production process	X34
0.406	%79.38	3.969	Average year	

Source: Prepared by the researcher.

Table 7: One Sample T-test results for the third hypothesis

SIGNIFICANCE LEVEL	DEGREE OF FREEDOM	T TABULAR	COMPUTED T	VARIABLES
0.05	93	1.960	27.039	X31
0.05	93	1.960	26.117	X32
0.05	93	1.960	27.005	X33
0.05	93	1.960	07.681	X34
0.05	93	1.960	21.961	Overall average

Source: Prepared by the researchers.

Through Table (7), it is observed that the calculated value of T for all paragraphs is greater than the tabular value, it ranged between (7.681) and (27,039), as the value of the tabular T was 2.704 with a degree of freedom 93 and a significance level of 0.05, either the general average for all hypothesis variables Third, the calculated value of T was greater than its tabular value with a freedom degree of 93 and a significance level of 0.05, which indicates acceptance of this hypothesis.

The Fourth Hypothesis Test

The fourth hypothesis states the following: (The technique of value analysis helps to reinforce the requirements of technical innovation), and Table (8) shows the mean, percentage, and standard deviation of the variables of the fourth hypothesis.

Table 8: The mean, percentage, and standard deviation of the fourth hypothesis variables

Standard Deviation	Percentage	Arithmetic Mean	Variables	NO.
			The value analysis technique helps in:	
0.398	%77.74	3.887	New product design	X41
0.436	%84.36	4.218	Current product development	X42
0.379	%68.50	3.425	Design a new production process	X43
0.463	%87.54	4.377	Developing the current production process	X44
0.419	%79.54	3.977	Overall average	

Source: Prepared by the researcher.

It is clear from Table (8) that the value analysis technique can help in enhancing the requirements of technical creativity, as the mean of all variables of the fourth hypothesis (3.977) has reached a percentage (79.54%) with a standard deviation (0.419), and paragraph (X44) has obtained The highest arithmetic mean is (4.377), with a percentage (87.54%) and a standard deviation (0.463), which means that this technology can further affect the development of the current process by introducing new jobs that can meet the needs, desires and requirements of customers, as the paragraph (X43) on the lowest arithmetic mean of (3.425) and with a percentage (68.50%) and standard deviation (0.379), and to verify that the arithmetic mean shown by a For respondents from the sample individuals, the paragraphs of this hypothesis are significantly greater than the mean of the measuring instrument, and that this difference is not due to chance. T-test was used, and Table (9) shows the results of the T-test for the fourth hypothesis variables.

Table 9: One Sample T-test results for the fourth hypothesis

Significance Level	Degree Of Freedom	T Tabular	Computed T	Variables
0.05	93	1.960	08.556	X41
0.05	93	1.960	26.824	X42
0.05	93	1.960	07.872	X43
0.05	93	1.960	29.455	X44
0.05	93	1.960	18.177	Overall average

Source: Prepared by the researcher.

Through Table (9) it is noted that the calculated value of T for all paragraphs is greater than the tabular value, it ranged between (7.872) and (29.455), as the tabular value of T was 2.704 with a degree of freedom 93 and a significance level of 0.05, either the general average for all hypothesis variables First, the calculated value of T was greater than its tabular value with a

freedom degree of 93 and a significance level of 0.05, which indicates acceptance of this hypothesis.

Test the Main Hypothesis

The main hypothesis states the following: (Modern production management techniques can help in strengthening the requirements of technical innovation in light of the philosophy of optimal production technology). Table (10) shows the arithmetic mean, percentage, and standard deviation of the variables of this hypothesis.

Table 10: The mean, percentage, and standard deviation of the major hypothesis variables

Standard Deviation	Percentage	Arithmetic Mean	Variables	NO.
0.437	%84.90	4.245	Concurrent engineering technology helps enhance technical innovation requirements	X1
0.426	%75.66	3.783	Concurrent engineering technology helps enhance technical innovation requirements	X2
0.406	%79.38	3.969	Concurrent engineering technology helps enhance technical innovation requirements	X3
0.419	%79.54	3.977	Concurrent engineering technology helps enhance technical innovation requirements	X4
0.422	%79.88	3.994	Overall average	

Source: prepared by the researcher.

It is clear from the above table that modern production management techniques can help in enhancing the requirements of technical creativity, as the mean for all the main hypothesis variables reached (3.994) with a percentage (79.88%) with a standard deviation (0.422), and paragraph (X1) got the highest Arithmetic mean of (4,245), with a percentage (84.90%) and standard deviation (0.437), and Paragraph (X2) got the lowest arithmetic mean of (3.783) and with a percentage (75.66%) and standard deviation (0.426), and this indicates that the engineering technique.

Table 11: One Sample T-test results for the main hypothesis variables

Significance Level	Degree Of Freedom	T Tabular	Computed T	Variables
0.05	93	1.960	27.542	X1
0.05	93	1.960	15.735	X2
0.05	93	1.960	21.961	X3
0.05	93	1.960	18.177	X4
0.05	93	1.960	20.854	Overall average

Source: Prepared by the researcher.

Through the above table, it is noted that the calculated value of T for all paragraphs is greater than the tabular value, which indicates acceptance of this hypothesis, as it can be said that modern production management techniques can help in strengthening the requirements of technical innovation in light of the philosophy of optimal production technology.

The fourth topic: conclusions and recommendations

Conclusions

During this research, a set of conclusions were reached, as follows:

1. Modern production management technologies are a source of revenue and strength for the company as it is a competitive weapon in the competition process and the basis for staying in the business environment. These technologies require identifying existing and prospective customers and working to meet their product needs in terms of ingredients, functions, price, and quality.
2. Modern production management technologies aim to improve strategic performance, enhance the company's competitive position and set it apart from others, as well as reduce costs and improve profitability.
3. Technical innovation is a set of important and key factors to ensure long-term success for all companies, as the company uses its resources to introduce new products or use new processes to satisfy the needs and desires of customers, which is translating new ideas into a new product or new process.
4. Optimal production technology philosophy is a general philosophy that seeks to assist the company in re-examining and evaluating its activities in the event of a specific restriction that could hinder the continuous flow of production.
5. The modern production management techniques can enhance the requirements of technical innovation in light of the philosophy of optimal production technology in a manner that is commensurate with the various environmental variables.

Recommendations

Based on the conclusions reached, the research recommends the following:

1. The need for Iraqi industrial companies to pay attention to technical innovation, as it is one of the basic tools that help them in introducing new products and improving existing products, as well as designing new processes and improving existing processes so that they can keep up with technological development and severe competition conditions.
2. The departments of Iraqi industrial companies should increase interest in the concept and types of technical innovation as well as pay attention to modern production management techniques because of the importance for the survival and growth of these companies.
3. Consolidating the strengths of the companies under research regarding the types of technical innovation and working to provide all the requirements necessary to achieve technical innovation in the areas of product and the production process, taking into account the requirements of the philosophy of optimal production technology in the presence of specific restrictions.
4. Increase the interest of the departments of the companies under research in the departments of research and development and give them the appropriate importance in order to introduce new products and improve existing (existing) products in order to suit the requirements of customers.
5. Encouraging the departments of the companies in question, who work for them in the departments of production and marketing, research and development, design and others, to present creative ideas in the areas of product creativity and creativity of the production process.



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