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Research Article

The impact of the product life cycle in achieving the overall flexibility of the product

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ABSTRACT

This research aims to study the impact of using product lifecycle technology to measure costs within the framework of green innovation accounting. and to explain its role, which seeks to integrate environmental considerations under the accounting systems of economic units. Green innovation accounting focuses on identifying and measuring costs associated with environmental impacts such as consumption of Natural Resources and harmful emissions in order to motivate economic units to adopt more sustainable practices. The research also discusses the most prominent accounting methods used to determine the costs of activities that affect the environment and their role in improving the strategic decision-making process of economic units. The research also addresses the importance of employing green innovation accounting in improving the efficiency of resource use, reducing unnecessary costs, and balancing financial profits and environmental responsibility. The research found that integrating the life cycle cost approach with green innovation accounting contributes to reducing overall product costs, improving environmental performance and supporting long-term strategic decisions.

Keywords: Product life cycle, cost measurement, green innovation accounting

INTRODUCTION

The contemporary business environment has undergone fundamental transformations as a result of increasing global attention to environmental and sustainability issues, which prompted industrial enterprises to reconsider traditional cost management methods that were focused only on the production stage, without attention to other stages of product life or environmental costs associated with it. This orientation has led to the emergence of modern concepts such as green innovation accounting and product life cycle costing, which seek to integrate economic and environmental goals..The success of enterprises in modern markets has become highly dependent on their ability to green innovation and efficient use of resources, which requires the provision of accurate accounting information reflecting the real costs of products during their entire life cycle. Hence, it is important to study the impact of the product life cycle in measuring costs within the framework of green innovation accounting.Green innovation is a necessary shift in a world where there is increasing awareness of the environmental challenges that threaten the planet, such as climate change, depletion of Natural Resources and environmental pollution. As the need to achieve a balance between environmental sustainability and economic growth has grown, green innovation has emerged as an effective strategy that integrates economic development and environmental responsibility. Green innovation goes beyond improving environmental performance, but seeks to achieve long-term sustainable results through

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improvements in products, processes and operational models that are environmentally friendly, reduce resource consumption and reduce harmful emissions. Green innovation is a modern concept concerned with the development and use of technologies and processes that reduce environmental impact and promote sustainability. This type of innovation aims to achieve a balance between economic growth and environmental conservation through the adoption of sustainable technological solutions based on the efficient use of resources and the reduction of harmful emissions. With the ever-increasing global environmental challenges such as climate change and lack of resources, green innovation has become an urgent necessity for companies and governments.

RESEARCH METHODOLOGY

THE SEARCH PROBLEM

The factors of competition influence of the contemporary business environment is increasing, which forces the company to keep up with its products to technological developments, and hence the research problem appears: the neglect of Iraqi economic units of modern cost technologies to evaluate their products and achieve comprehensive flexibility. The research problem consists in the following main question:

To what extent do the stages of the product life cycle affect the overall flexibility of the product within the organization

A set of sub - questions of the study:

- A. Does the degree of flexibility vary with the stage of the life cycle?
- B. What is the most influential stage in enhancing flexibility?
- C. Is there a statistically significant relationship between the product life cycle and overall flexibility?

THE IMPORTANCE OF RESEARCH

The importance of the research comes from the increasing competition in the design and development of products witnessed by industries at the local and global levels, and it was necessary to keep abreast of developments for each new production processes in a way that achieves production flexibility in the contemporary business environment and the need to find harmonious management integrations in an attempt to link Product Life Cycle Technologies with overall production flexibility.

RESEARCH OBJECTIVES

The main objective is to identify the evaluation of the product life cycle technology and the overall production flexibility in strengthening the product for companies by:

- A. Introduction to the technical literature of the product life cycle in its various stages (before, during and after production).
- B. Get acquainted with the comprehensive production flexibility literature and modern approaches to production flexibility.

RESEARCH HYPOTHESES

The research is based on the main hypotheses and sub-hypotheses, namely

- A. The main hypothesis :There is a statistically significant relationship between the product life cycle and the achievement of overall product flexibility.
- B. Sub-hypotheses:
 - ❖ There is a relationship between the submission stage and the flexibility of the design.
 - ❖ There is a relationship between the growth phase and the flexibility of production.
 - ❖ There is a relationship between maturity and pricing flexibility.

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- ❖ There is a relationship between the stage of regression and the flexibility of development.

LITERATURE REVIEW

THE FIRST AXIS: THE THEORETICAL FRAMEWORK OF THE PRODUCT LIFE CYCLE.

THE CONCEPT OF PRODUCT LIFE CYCLE COSTS

Product lifecycle costing, as illustrated in the figure below, offers a more illustrative strategic perspective of the costs and profitability of the product or service. For instance, a product that is designed quickly and carelessly with little investment in design costs can have much higher marketing and service costs later in the product life cycle, so managers should pay attention to total costs throughout the product life cycle rather than just production or manufacturing costs. In contrast, product or service costs are typically measured and reported for relatively short periods of time, such as a month or a year [1]. The emergence of the cost of the product life cycle technology is attributed to the sixties of the last century, where it was used by the US Department of Defense for its high production cost for its military industry or the services it provides, which influenced manufacturing and marketing decisions, and the emergence of the cost of the product life cycle can also be traced back to the emergence of to improve the understanding of cost distribution across different activities within the product life cycle, the pioneers Works such as Frederick W. Taylor, Frank and L. N. Gilbreth, who introduced him in their book the principles of scientific management, showed how this technique works from the perspective of the stages that the product goes through with its concept, introduction, growth, maturation and regression [2]. Introductory and final costs are managed in a number of ways including improving relationships with suppliers and distributors, the most important way is product design and manufacturing process, as well as value chain analysis which can also provide a useful way to identify correlations between both introductory and final costs [3]. The concept of product life cycle cost (CLCC) has emerged as an important aspect of cost management and decision-making in modern business environments, and with the introduction of products through their life cycle, the costs associated with development, production, maintenance and exhaust disposal are subject to changes, so this academic exploration delves into the origins and evolution of the concept of product life cycle cost, and its development stems from its founding theories to its contemporary importance in strategic decision-making [4].

THE IMPORTANCE OF PRODUCT LIFE CYCLE COSTS

The analysis of product life cycle costs includes many advantages for all interested parties, and manufacturers are interested in manufacturing costs from the beginning of the production process until the moment Until the product is delivered to customers, hence the importance of product lifecycle costs [5] as follows:

- The process of analyzing the costs of the product life cycle at any stage provides necessary information that serves as an important input to the decision maker.
- Product lifecycle cost analysis helps managers estimate revenues and costs from the earliest to the final stages of the product lifecycle, from research and development to providing logistical support to customers.
- A technique for assessing the planning function's efficacy is product lifecycle cost analysis, which compares the actual and projected expenses of a product during its life cycle.
- A better understanding of a product's long-term profitability and relevant pricing information can be obtained through product lifetime cost analysis.

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STAGES OF THE PRODUCT LIFE CYCLE

The concept of product lifecycle cost carries strategic importance with significant impact, and economic units are well aware that understanding and managing costs throughout the product lifecycle can influence pricing strategies, resource allocation decisions, or product development processes. The integration of the stages of the comprehensive product life cycle CLCC in strategic decision-making processes enables companies to anticipate cost changes, improve profitability and enhance competitiveness by aligning their offers with the prevailing market dynamics, so those units should differentiate between the concept of the product life cycle from the point of view of the market, production and customer and have a clear vision of the mechanism:

- The stage of the product life cycle from a market perspective: The product life cycle consists of several stages that a product goes through from its introduction to its final decay on the market [7].
 - A. The introduction phase: This phase is considered crucial for the product, and therefore the market is characterized by slow growth as the product is presented to customers so that marketing efforts focus on creating awareness and generating interest for the newcomer [6, 7].
 - B. Growth phase: at this stage, demand begins to increase rapidly as more customers realize the benefits of the product and competition begins to increase, and economic units may expand their presence in the market [7].
 - C. Maturity stage: at this stage, the market reaches the peak of saturation and growth begins to slow down. Competition is also at its highest level, and in this case economic units are focused on differentiation and maintaining their market share [7].
 - D. Decay stage: it is the last stage where demand begins to decline as customer preferences change or new technologies appear. Economic units may choose to discontinue the product or target a niche market [7].

PRODUCT LIFE CYCLE FROM A PRODUCTION PERSPECTIVE

The product life cycle from the production perspective includes the limited time period between R & D activities to after-sales services ,and here the cost of production is tracked from the beginning to the end of the production process, and includes the cost of starting before the production process, which is the start of design and consists of five stages : [8]

First: research and development phase:

Which consists of sub-stages:

- A. Product design: at this point, the items' technical requirements are established.
- B. Market research: evaluation of the market, rivals, and clients
- C. Product development: during this phase, the business identifies the key features of the product that result in customer satisfaction, designs the product prototype, decides on the production procedures, and identifies any tools required for those procedures.

Second: product design

This is a stage where engineers develop the final model of the form of the product or service to be provided by the economic unit, which expects to achieve customer satisfaction, and also includes raw materials and other details of the production process

Third: the stage of manufacture

This stage comes after the research and development stage of disbursement of raw materials, wages, machinery and indirect industrial costs for the purpose of producing the cost target . At this stage, engineering decisions may be made to reduce production costs due to product redesign decisions.

Fourth: the marketing phase

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It includes advertising, promotion, market research and planning, providing support to the buyer/distributor and also includes packaging and storage.

Fifth: distribution phase

At this stage, the new product is marketed to customers through distribution outlets, whether these outlets belong to the same company or not, and it requires the economic unit to support the distribution activity of transporting the product and delivering goods and services to the customer

Sixth: the stage of providing after-sales services

This is the stage where the units bear the costs of providing after-sales services and product disposal. Maintenance and repair costs are determined in advance during the research and development phase. This stage effectively begins when a unit of the product is presented to the customer.

PRODUCT LIFE CYCLE FROM THE CUSTOMER'S POINT OF VIEW [9]

This point of view includes four stages and two agencies:

- A. The stage of purchasing or acquiring the product
- B. The stage of use of the product
- C. Product support stage
- D. Phase of disposal of the product

Fourth: product life cycle benefits

The benefits of the product life cycle have many advantages and agencies [10]:

- A. C-product management: provides insights on the most profitable products or services that may lead to a decrease in overall profitability, which helps this information in making strategic decisions on which products to invest in or phase out.
- B. H-measuring performance in the economic unit : by comparing the actual costs with the costs included in the planned budget, companies can evaluate the performance of various departments or operations within them and this can lead to improvements in operations and cost-saving initiatives.
- C. Risk assessment and mitigation: understanding the overall cost of a time-driven product lifecycle allows for better risk assessment. Companies can identify potential cost overruns or revenue shortfalls early and take proactive measures to mitigate them.
- D. D-resource allocation and prioritization: companies can allocate resources based on the phases of the product life cycle that have the greatest impact on overall profitability. This helps in identifying or tweaking investments and how to manage resources .
- E. Y-continuous improvement and innovation: using accurate cost data, companies can identify opportunities for Process Improvement and innovation. This can lead to more efficient operations and potentially lower future costs .
- F. T-transparency and control: the overall cost of the time-oriented product lifecycle provides a transparent view of how costs are incurred across different activities and the time of each activity . This enhances control within the unit and fosters a culture of cost and time awareness .

Fifth: comparison of product life cycle cost and traditional cost systems

This indicates that a range of differences can be identified between the product lifecycle and traditional costs [11].

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Table 1. Comparison of product life cycle and traditional costs

No	Traditional cost systems	Product life cycle
1	Research and development costs and logistics support costs are term costs.	The production is charged R & D costs and logistics support costs.
2	Only the costs associated with the product are taken into account.	It takes into account all costs, including the duration costs associated with the product.
3	She is interested in controlling only costs in production processes.	It is concerned with the control of cost elements in all production processes.
4	It relies directly on periodic reports.	It is directly based on product lifecycle reports.

Sixth: Production Flexibility

The concept of productive flexibility dates back to the period of the eighties and nineties, where this term was used to describe the changes in the style of work in that period, and flexibility was seen as a solution to the economic challenges faced by countries such as Australia and others [12]. The concept of productive flexibility is not a contemporary concept, it has ancient historical roots that stretch back to the most ancient times. The concept of flexibility was previously used in various uses before being applied in production. In the Seventies, flexibility was an important feature of production systems in the industries of producing assembly products in small or medium batches in these industries, there was a tendency to increase flexibility to achieve efficiency improvement cost reduction in that period, work in the process stages was significantly expensive and the use of machines was low, and tasks were time-consuming waiting for their transfer and preparing the machine to complete other tasks, as flexible production management systems should become suitable for industries that produce assembly products in small to medium batches, these systems will contribute to improving production efficiency and reducing costs, enable better distribution of work and use resources harmoniously bigger. Which will enable companies to adapt to changes in the market and more effectively meet the needs of customers, can also lead to increased automation control and automation, improved working conditions and increased quality [13].

Seventh: The Importance of Production Flexibility

Production flexibility is of great importance in the modern production environment flexibility helps to achieve compatibility and harmony with environmental changes and new process requirements, by achieving compatibility and harmony, the production system can adapt to new conditions effectively and quickly. Moreover, production flexibility allows the possibility of reconfiguring production resources in a way that enables them to produce different products efficiently and with high quality [14]. Flexibility also allows making changes in the internal operating environment, such as controlling the amount of production and making product developments, while saving time and cost, thanks to production flexibility, companies can easily change their competitive priorities, business and strategic plans, enabling them to enter the market in a new way and meet customer expectations better and finally, the ability to eliminate the holidays that occur during production operations by replacing some used machines enhances the continuity of production processes and achieve production goals effectively [15]. Development in an uncertain environment is more important in fast-paced industries or competitive environments where technological change is rapid and product life cycles are short.

1. The increase in competitiveness and global competition make productive flexibility an essential characteristic of companies
2. Production companies need degrees of flexibility to deal with extreme fluctuations in demand and customization requirements in the production environment.

Eighth: Operations to Improve Production Flexibility

Enhancing productive flexibility represents the company's efforts in improving its organizational ability to adapt to expected and unexpected changes in its processes and procedures, such as demand changes and the

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likelihood of internal failures, flexibility can be classified into three levels: operational flexibility, productive flexibility, strategic flexibility there are also three criteria for improving productive flexibility, namely strategic goals, flexibility pattern, and degree of improvement [16].

1. Strategic objectives: strategic objectives include improving customer satisfaction, increasing competitiveness, improving operational performance, and reducing uncertainties in manufacturing and the supply chain.
2. Resilience mode: ways to enhance resilience include adaptation, redefinition, provision of banking services and minimization.
3. Degree of optimization: the degree of optimization includes structural investment, process optimization, Resource Development, Resource Planning.

Companies can enhance their production flexibility to keep up with the diversity of market demands by focusing on external flexibility, this is an effective strategy to reach a degree of flexibility that contributes to providing competitive advantages. External flexibility, as defined by D'souza and William in 2000, goes beyond the familiar concept of mix flexibility to include both design modifications and the development of new products with the aim of creating a management system that manages to respond to fluctuations in demand effectively, both in terms of volume and diversity. There is a set of strategies, such as production as needed, that contribute to improving the smooth flow of production and reducing waste, thereby intensifying the flexibility and adaptability of the company to market changes [17]

Ninth: Dimensions of Production Flexibility

The academic literature on production flexibility has grown over the past three decades, focusing on understanding the nature of flexibility and the development of measures and standards for flexible production systems, production flexibility refers to the ability of companies to adapt and cope with the challenges and variables they face in the market and production processes [18]

There is a general agreement among researchers that productivity resilience is a multidimensional concept, however, they disagree about the basic dimensions that it should be, where (D'souza& Williams) classified the dimensions of productive resilience to. [19]:

1. Strategic Flexibility: Researchers have identified several strategic dimensions, such as product line diversification, product innovation, responsiveness to customer needs, and strategic adaptability.
2. Tactical Flexibility: Some aspects of this flexibility are tactical in nature, such as adjusting workflow to avoid machine or procedure breakdowns, or to accommodate variations or shortages in components or raw materials.

Terkaj oriented the classification of the dimensions of productive flexibility to [20]:

1. Horizontal dimensions or stages: depend on the development of material and human resources and capabilities in successive stages the production process is divided into several stages, where each stage is carried out independently and integrated with the other.
2. Vertical or hierarchical dimensions: refers to the organization structure in which the vertical flow of information and decisions is carried out from the top of the administrative pyramid to the bottom and vice versa.

Between it is the ability of new products to adapt and modify, allowing the possibility of adding new parts or replacing existing parts. this flexibility aims to change the existing product mix quickly and at an affordable cost. this flexibility allows the organization to respond to the market quickly by easily introducing new product designs without the high costs of switching from one product to another. in addition, new products do not adversely affect the performance of the production system in general [21]. Referred to the flexibility of a new product as the ability to change an existing product or produce a new one quickly and at the lowest possible cost [22]. The flexibility of a new product refers to the flexibility in new products that are introduced in the production system, as these products are characterized by heterogeneity and the production system does not bear high transportation costs when there is a product Switch, and it also

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does not affect the performance of the production system in general, the concept of a new product expresses a product that has different functional characteristics from existing products [23]. defined new product flexibility as the ability of a production system to manufacture a variety of product parts using the same equipment and this allows rapid response to market fluctuations and constant changes in the environment in which the system deals, including the rapid introduction of new products, sudden changes in demand for products and frequent modifications to existing products [24].

PRACTICAL FRAMEWORK

That the main tool that was used to collect the data of the current study is the questionnaire, which was based on the five-point Likert scale, which ranges from strongly disagree to strongly agree to be more responsive to the respondents and the most important that the measurement tool has in any study that takes the experimental method as a way to it, this requires conducting a quality test product life , In light of the answers of 166 respondents, the researchers adopted the arithmetic mean of their answers for the paragraphs of each variable, their percentages and standard deviation, as well as the relative weight and relative importance, for each paragraph of the questionnaire, whether at the sub-level or at the level of the dimensions or the main variables studied, and the researchers based on the five-year Likert graduations in the sample survey. Independent variable: x = product life cycle, intermediate variable Z = achieving overall flexibility, dependent variable $=y$ product flexibility, and depending on the SPSS program.V.25 the data was analyzed and the following results were obtained. :

First: the correlation and influence between the product life cycle and a high-quality product.

- ✓ (H0) there is no correlation and influence of the product life cycle variable on the achievement of product flexibility.
- ✓ Alternative hypothesis: (H1) the existence of a correlation and influence of the product life cycle variable on the achievement of the overall flexibility of the product.

Table 2. Correlation relationship and interpretation ratio between (product life cycle, achieving the overall flexibility of the product)

Model Summary b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.826 a	.683	.681	4.49022
a. Predictors: (Constant), x				
b. Dependent Variable: z				

From Table 2 it can be seen that the value of the R-Square coefficient of determination (product life cycle, achieving the overall flexibility of the product) has reached (.683), that is, the ratio of product life interpretation has reached 68.3, depending on the achievement of the overall flexibility of the product, as is the case with the corrected identification coefficient Adj R Square, and the value of the Pearson correlation coefficient (R) has reached (.826.) Implies a strong centrifugal correlation, the value of Std. Error of the Estimate has reached (4.49).

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Table 3. Analysis of variability between variables

ANOVA a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8105.500	1	8105.500	402.017	.000b
	Residual	3770.310	187	20.162		
	Total	11875.810	188			
a. Dependent Variable: z						
b. Predictors: (Constant), x						

From Table 3 it was shown that there are differences between the studied variables depending on the Fisher scale (F), where the meansig was less than (0.05). That is, the calculated value (F) (402.017) is greater than the tabular one, and this indicates the suitability of the model for testing hypotheses, i.e. there is an effect of the product life cycle on achieving the overall flexibility of the product.

Table 4. Statement of the impact of the product life cycle on achieving the overall flexibility of the

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.519	3.286		6.548	.000
	x	.843	.042	.826	20.050	.000
a. Dependent Variable: z						

Through (4) displays the values of the regression coefficient, using the constant value of 21.519 and the OFB_1 value of 843. The variable that depends on the overall product elasticity will increase by (843) each time the variable modifies the product's life cycle by one unit. This phenomenon is known as the slope of the regression. In other words, there is a clear relationship between overall resilience and product lifecycle. There is a relationship between product lifecycle and overall resilience, where the value (Sig = 0.00) is less than the expected value (0.05). Furthermore, the t-test shows a relationship between product lifecycle and overall resilience, where the significance value (Sig = 0.00) is less than the expected value (0.05). This supports the idea of an effect.

$$Z = 21.519 + 0.843x \quad (1)$$

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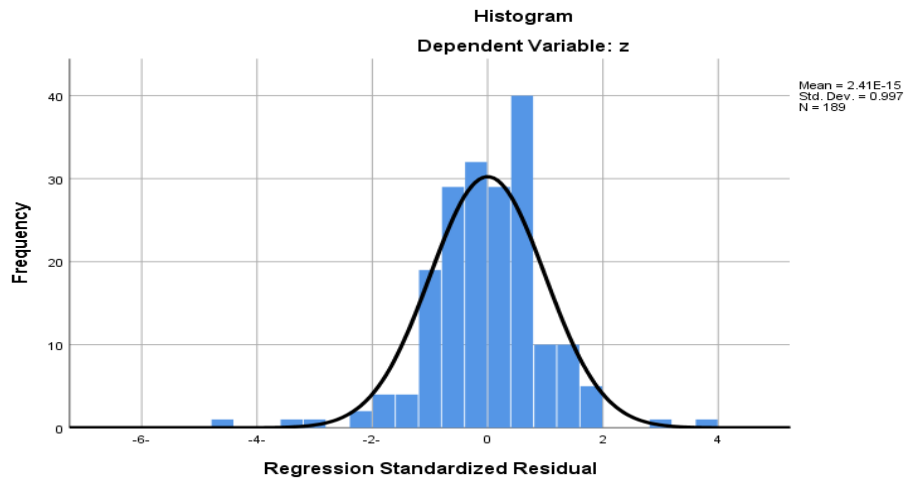


Figure 1. Distribution curve

The graph (1) shows that the majority of the data is under the normal distribution curve, and this proves that the remainder follows the normal distribution.



Figure 2. Format (2) views

Figure 2 shows the proximity of the observations to the regression line, that is, the difference between the real and expected observations according to the above equation.

Second: the correlation and impact between the product life cycle and overall flexibility.

The zero hypothesis (H0): the absence of a correlation relationship and the influence of the product life cycle variable on the overall flexibility.

Alternative hypothesis: (H1) the existence of a correlation relationship of the product life cycle variable on the overall flexibility of the product.

Table 5. Correlation relationship and interpretation ratio between product life cycle and overall flexibility.

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.854 ^a	.734	.734	5.55670
a. Predictors: (Constant), x				
b. Dependent Variable: y				

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From Table 5 it is shown that the value of the identification coefficient (product life cycle and overall flexibility of the product), which is R Square, has reached (34.7), that is, the ratio of interpretation of the product life cycle has reached 73.4, depending on the achievement of flexibility of the product, as is the case with the corrected identification coefficient Adj R Square, and the value of the Pearson correlation (R) between the two variables has reached (854.) Implies a strong centrifugal correlation and an Std value. Error of the Estimate has reached (5.55).

Table 6. Analysis of variability between variables

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15896.690	1	15896.690	514.841	.000 ^b
	Residual	5773.976	187	30.877		
	Total	21670.667	188			
a. Dependent Variable: y						
b. Predictors: (Constant), x						

Through Table 6, it was shown that there are differences between the studied variables of the product life cycle and the achievement of flexibility of the product depending on the Fisher scale (F), where SIG was less than (0.05). That is, the calculated value (F) (514.841) is greater than the tabular one, and this indicates the suitability of the model for testing hypotheses, i.e. there is an effect of the product life cycle on cost reduction.

Table 7. Statement of the impact of the product life cycle independent variable on the overall flexibility of the product

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.631	4.067		1.631	.105
	x	1.180	.052	.856	22.690	.000
a. Dependent Variable: y						

Through Table 7 The regression coefficients are listed. The constant term is 6.631, and B₁ is 18.1, representing the regression slope. This means that if the independent variable (product life cycle) changes by one unit, the dependent variable (actual product flexibility) will increase by 1.18. Therefore, there is a positive correlation between product life cycle and actual product flexibility. The t-test also shows that product life cycle has an impact on actual product flexibility, as the p-value (significance = 0.00) is smaller than the expected value (0.05). This confirms the hypothesis that the product life cycle variable affects actual product flexibility.

$$Y = 6.631 + 1.18x \quad (2)$$

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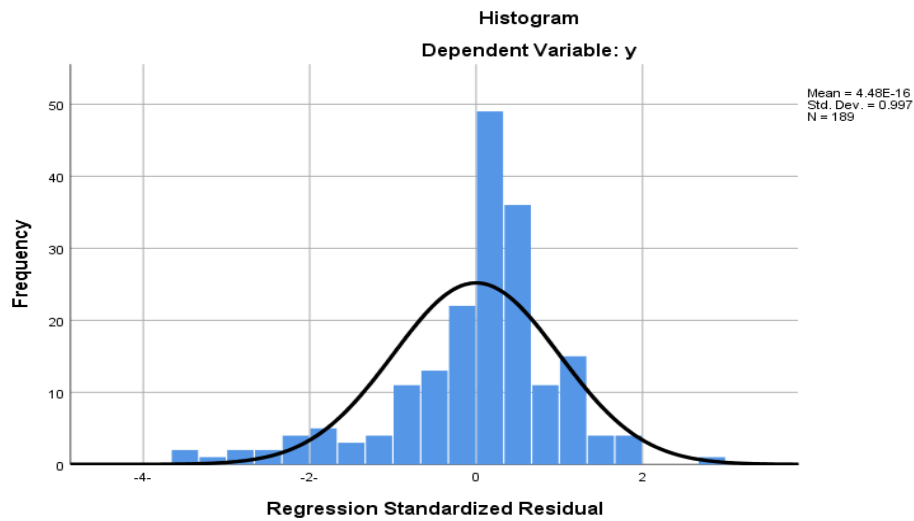


Figure 4. Distribution curve

Figure 4 shows that the majority of the data is under the normal distribution curve, and this proves that the remainder follows the normal distribution.

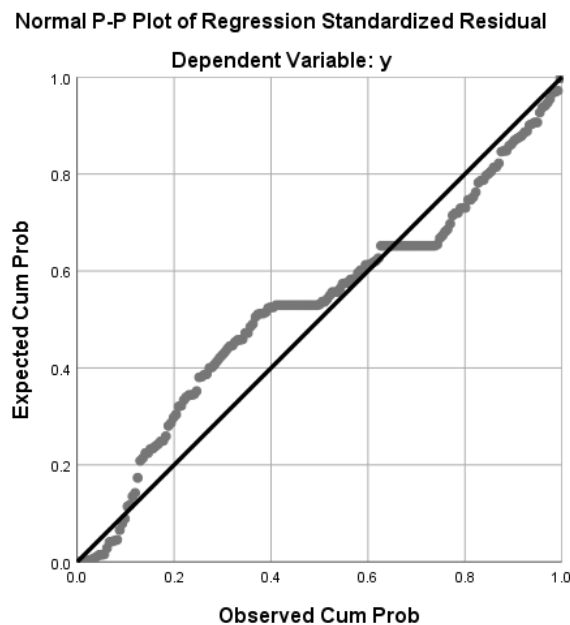


Figure 5. Format number (5) views

It shows how close the observations are to the regression line, that is, the difference between the real and expected observations according to the equation above.

Third: the link and impact between the product life cycle and achieving the overall flexibility of the product.

- ✓ Zero hypothesis: (H0) the absence of correlation relationship, the impact of the product life cycle and the overall flexibility of the product .
- ✓ Alternative hypothesis: (H1) the existence of a correlation relationship, the impact of the product life cycle and the achievement of flexibility of the product.

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Table 8. Correlation relationship and interpretation ratio between (product life and overall flexibility of the product)

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897 ^a	.805	.803	4.76353
a. Predictors: (Constant), z, x				
b. Dependent Variable: y				

From Table 8 it can be seen that the value of the coefficient of determination (product life cycle and overall flexibility of the product) R Square has reached (805). This shows the ratio of interpretation to achieve flexibility of the product based on the product life cycle and the overall flexibility of the product, as well as the case for the corrected selection coefficient Adj R Square, and the Pearson correlation value (R) has reached (897). Implies a strong direct correlation relationship between the studied variables and the Std value. Error of the Estimate has reached (4.76).

Table 9. Table of analysis of variance

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	17450.106	2	8725.053	384.513	.000 ^b
	Residual	4220.561	186	22.691		
	Total	21670.667	188			
a. Dependent Variable: y						
b. Predictors: (Constant), z, x						

Through (9), it was found that there were differences between the studied variables depending on the Fisher scale (F), where Sig was less than (0.05). That is, the calculated value (F) (384.513) is larger than the tabular one, and this indicates the suitability of the model for testing hypotheses, i.e., finding the effect of the product life cycle and the overall flexibility of the product.

Table 10. Statement of the impact of independent variables of artificial intelligence and overall flexibility of the product)

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-7.182	3.865		-1.858	.065
	X	.639	.079	.464	8.078	.000
	Z	.642	.078	.475	8.274	.000
a. Dependent Variable: y						

Through Table 10, We can examine the values of the regression coefficients, where the constant term is -7.182, and $B_1 = 0.639$ and $B_2 = 0.642$ are both 0.639. This means that when the independent variable changes by one unit, the dependent variable also increases by the same amount. Therefore, there is a direct relationship between product lifecycle and overall product flexibility. Furthermore, the t-test on the tested variable shows a significant effect, as the p-value (significance = 0.00) is smaller than the expected value

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(0.05). This confirms the validity of the hypothesis that this variable affects both the product's artificial intelligence and overall flexibility.

$$y = -7.182 + 0.639x + 0.642z \quad (3)$$

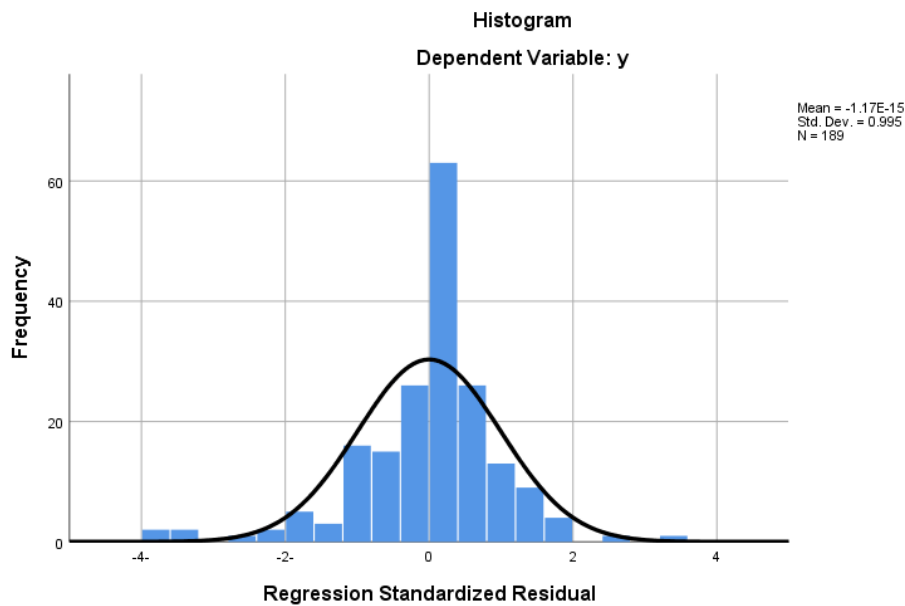


Figure 5. Distribution curve

Graph (5) shows that the majority of the data is under the normal distribution curve, and this proves that the remainder follows the normal distribution.

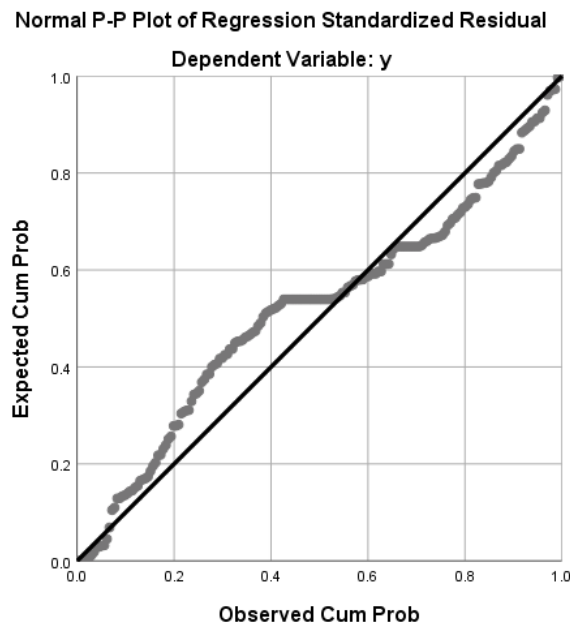


Figure 6. Format (6) views

It shows how close the observations are to the regression line, that is, the difference between the real and expected observations according to the equation above.

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Table 11. Correlation between variables

		Correlations		
		Z	x	Y
Z	Pearson Correlation	1	.826**	.858**
	Sig. (2-tailed)		.000	.000
	N	189	189	189
X	Pearson Correlation	.826**	1	.856**
	Sig. (2-tailed)	.000		.000
	N	189	189	189
Y	Pearson Correlation	.858**	.856**	1
	Sig. (2-tailed)	.000	.000	
	N	189	189	189
**. Correlation is significant at the 0.01 level (2-tailed).				

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