



**Tikrit Journal of Administrative
and Economics Sciences**

مجلة تكريت للعلوم الإدارية والاقتصادية

EISSN: 3006-9149

PISSN: 1813-1719



The Effect of Value Stream Costing Technique on Improving Product Quality: An Analytical study on a sample of administrative and financial staff in industrial companies in the Kurdistan Region of Iraq

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Keywords:

VSC Technique, Lean Accounting, Operational Efficiency.

ARTICLE INFO

Article history:

Received	26 Jul. 2025
Received in revised form	13 Aug. 2025
Accepted	13 Aug. 2025
Available online	30 Jun. 2026

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Abstract: This study aims to analyze the impact of applying the Value Stream Costing (VSC) technique on improving product quality in industrial companies within the Kurdistan Region of Iraq, focusing on the quality dimensions of performance, durability, serviceability, features, and perceived quality. This paper relies on a structured questionnaire distributed to 70 industrial enterprises in the governorates of Erbil, Sulaymaniyah, and Duhok, from which 215 valid responses were collected out of 271 distributed surveys. The data were analyzed using correlation and regression techniques to measure the relationship between VSC components and the targeted quality dimensions. The results reveal a positive and statistically significant impact of VSC application on improving product quality. The present paper concludes that VSC is not merely a financial tool, but also a strategic mechanism for continuous improvement. It also recommends its broader implementation to enhance competitiveness, improve operational efficiency, and achieve customer satisfaction.

أثر تقنية احتساب تكلفة سلسلة القيمة في تحسين جودة المنتج: دراسة تحليلية على عينة من العاملين الإداريين والماليين في الشركات الصناعية في إقليم كردستان العراق

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المستخلص

تهدف البحث إلى تحليل أثر تطبيق تقنية تكلفة سلسلة القيمة (VSC) في تحسين جودة المنتج في الشركات الصناعية في إقليم كردستان العراق، مع التركيز على أبعاد الجودة المتمثلة في الأداء، والمتانة، وقابلية الخدمة، والخصائص (المزايا)، والجودة المدركة. اعتمد البحث على استبانة منظمة وُرعت على 70 منشأة صناعية في محافظات أربيل والسليمانية ودهوك، وتم الحصول على 215 استبانة صالحة للتحليل من أصل 271 استبانة موزعة. وقد جرى تحليل البيانات باستخدام أسلوب الارتباط والانحدار لقياس العلاقة بين مكونات تقنية احتساب تكلفة سلسلة القيمة والأبعاد المستهدفة لجودة المنتج. أظهرت النتائج وجود أثر إيجابي ومعنوي إحصائياً لتطبيق تقنية احتساب تكلفة سلسلة القيمة في تحسين جودة المنتج. وتخلص الدراسة إلى أن هذه التقنية لا تُعد مجرد أداة مالية، بل تمثل أيضاً آلية استراتيجية للتحسين المستمر، وتوصي بتوسيع نطاق تطبيقها بما يسهم في تعزيز القدرة التنافسية، وتحسين الكفاءة التشغيلية، وتحقيق رضا الزبائن. **الكلمات المفتاحية:** تقنية احتساب تكلفة سلسلة القيمة، المحاسبة الرشيقة، الكفاءة التشغيلية.

1. Introduction

In the face of rapid transformations in the global business environment and intensifying competition in the industrial sector, traditional cost accounting systems have become increasingly inadequate for supporting effective managerial decision-making. These outdated approaches often result in inaccurate performance assessments and flawed cost allocation, which can hinder the ability of manufacturing firms to respond efficiently to dynamic market demands (Al-Shammar et al, 2022).

According to (Aubid & Mohammad, 2019), applying the value stream method has a significant role in improving product cost accuracy and generating actionable data for decision -makers, ultimately contributing to the delivery of competitive, value-enhanced products. Similarly, (Al-Zameli et al, 2019) affirm that VSC, when integrated with lean manufacturing and accounting principles, plays a crucial role in enhancing operational effectiveness and aligning cost structures with customer -perceived value.

In this context, this study aims to investigate the impact of Value Stream Costing on product quality enhancement in lean manufacturing environments. It seeks to explore how VSC can optimize production processes, eliminate inefficiencies, and improve product outcomes by aligning cost structures with customer value expectations. This research contributes to the growing body of knowledge by emphasizing the dual goals of cost efficiency and product quality in achieving competitive advantage in the manufacturing landscape (Suseno et al, 2024).

Given the shortcomings of traditional costing techniques in today's dynamic industrial environment, the researcher believes that Value Stream Costing (VSC) offers a promising approach for achieving both cost efficiency and product quality enhancement. By focusing on value -adding activities and eliminating waste, VSC enables manufacturing firms to align their cost structures with customer expectancies. Therefore, investigating the relationship between VSC and product quality is crucial, especially in lean manufacturing environments where continuous improvement and customer satisfaction are key to competitiveness (Wahba, 2023).

2. Research Problem

Q1. What is the relationship between applying the Value Stream Costing (VSC) technique which focuses on customer-perceived value, simplifying pricing and operational decisions — and improving product value measured by dimensions (performance, durability, serviceability, features, perceived quality) in industrial companies in the Kurdistan Region?

Q2. What is the impact of applying the Value Stream Costing (VSC) technique which focuses on customer-perceived value, simplifying pricing and operational decisions — in improving product value measured by dimensions (performance, durability, serviceability, features, perceived quality) in industrial companies in the Kurdistan Region?

3. Research Objectives: The following objectives have been formulated from the main objective:

- A. statement of the knowledge foundation of value stream costing technique application.
- B. statement of the knowledge foundations of improving product quality.
- C. The impact of applying value stream costing technique and influence on improving product quality.

4. Significance of the Research

Scientific significant: This study addresses a contemporary gap in cost management and quality enhancement research by investigating the role of the Value Stream Costing (VSC) technique in improving product quality within industrial companies in the Kurdistan Region of Iraq. While VSC has been widely discussed in lean manufacturing contexts, its specific influence on distinct quality dimensions—performance, durability, serviceability, features, and perceived quality—has not been thoroughly examined in prior literature.

practical importance: The practical significance of this study lies in providing a clear applied framework that helps industrial companies in the Kurdistan Region of Iraq improve their product quality by adopting the Value Stream Costing (VSC) technique. The study offers valuable insights and actionable information that enable managers and decision-makers to use managerial accounting tools more effectively to optimize pricing processes, simplify operational decisions, and achieve continuous product quality improvement aligned with customer expectations.

5. Hypotheses: The following are the main hypotheses of this study:

H1. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the value stream costing technique by (Focus on Customer-Perceived Value, Simplifying and Improves Pricing and Operational Decisions) and Improve value measured by dimension performance in industrial companies in the Kurdistan Region.

H2. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the value stream costing technique (Focus on Customer-Perceived Value has an impact on Improve Value measured by dimension performance at industrial company in Kurdistan region.

H3. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the value stream costing technique Simplifying and Improves Pricing and Operational Decisions and Improve Value measured by dimension S Durability at industrial company in Kurdistan region?

H4. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the value stream costing technique by (Simplifying and Improves Pricing and Operational Decisions has an impact on Improve Value measured by dimension Durability at industrial company in Kurdistan region.

H5. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the value stream costing technique Simplifying and Improves Pricing and Operational Decisions and Improve Value measured by dimension Serviceability at industrial company in Kurdistan region?

H6. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the value stream costing technique by (Simplifying and Improves Pricing and Operational Decisions has an impact on Improve Value measured by dimension Serviceability at industrial company in Kurdistan region.

H7. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the value stream costing technique Simplifying and Improves Pricing and Operational Decisions and Improve Value measured by dimension Features at industrial company in Kurdistan region.

H8. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the value stream costing technique by (Simplifying and Improves Pricing and Operational Decisions has an impact on Improve Value measured by dimension Features at industrial company in Kurdistan region.

H9. There is a statistically significant relationship at the level of ($\alpha \leq 0.05$) between the value stream costing technique Simplifying and Improves Pricing and Operational Decisions and Improve Value measured by dimension Perceived Quality at industrial company in Kurdistan region.

H10. There is statistically significant impact at the level of ($\alpha \leq 0.05$) of applying the value stream costing technique by (Simplifying and Improves Pricing and Operational Decisions has an impact on Improve Value measured by dimension Perceived Quality at industrial company in Kurdistan region.

6. Research Methodology and Approach

- A. The descriptive theoretical (deductive) approach was adopted to address the theoretical aspects of the study, relying on available sources such as books, scientific journals, theses, and relevant websites.
- B. The descriptive analytical statistical (inductive) approach was employed for the field research, where the study variables were examined within the corporate environment of the sample companies. A structured questionnaire was prepared and used as the primary tool for collecting data related to the field study.

7. Population and Sample: The population of this study consists of industrial companies operating within the Kurdistan Region of Iraq, specifically in the governorates of Erbil, Sulaymaniyah, and Duhok. These governorates were selected to represent the industrial and economic diversity of the region.

The study sample was determined using a stratified random sampling method, selecting 70 industrial enterprises from various sectors including food and beverage manufacturing, detergents and soap production, cement, packaging, plastic materials, and chemicals.

The study participants consisted of administrative and financial employees within these companies. A total of 271 questionnaires were distributed, with 215 valid and completed questionnaires returned, representing an effective response rate of approximately 79.3%. This sample adequately represents the research population, enhancing the validity and reliability of the study's findings.

8. Model Structure: The structure model of the dissertation model component is as follows

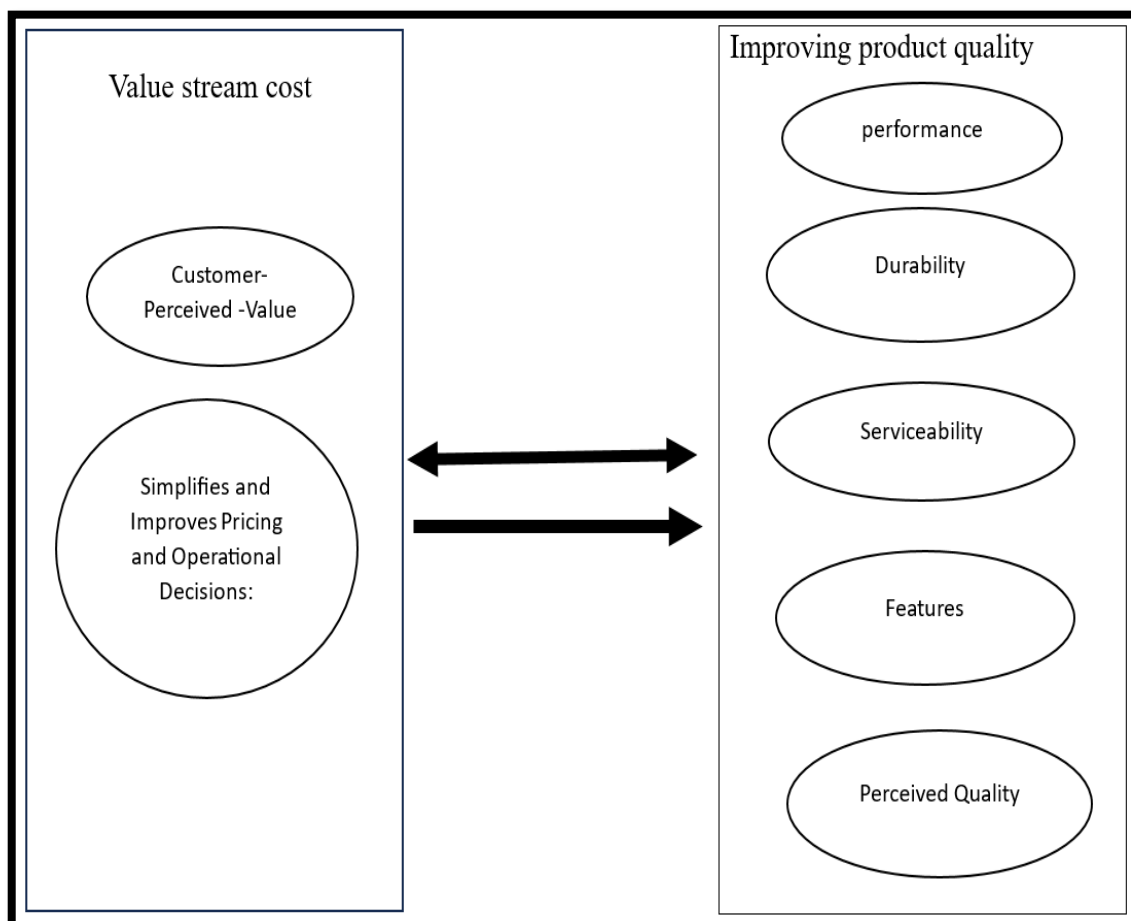


Figure (1): Model Structure

7. Literature Review

7-1. Value Stream Costing and Its Contribution to Product Quality and Operational Efficiency:

Value Stream Costing (VSC) has become an increasingly relevant tool within lean accounting due to its ability to enhance both operational efficiency and product quality (Dhar & Nouri, 2024), in their study published in the Journal of Economics and Administrative Sciences in Baghdad, explored the role of value stream techniques in managing environmental costs and improving cost control. Their findings emphasized the importance of identifying and eliminating non-value-adding activities to enhance efficiency. They also noted that VSC improves financial transparency and fosters alignment between financial operations and production functions. The study linked the adoption of lean principles with higher product quality, shorter lead times, and improved customer satisfaction.

(Kathem et al, 2023) investigated the impact of Value Stream Mapping (VSM) in the leather shoe manufacturing sector, as presented in the Baghdad Engineering and Technology Journal. Through the application of a hybrid push/pull production model, the study achieved significant reductions in both lead time and non-value-added activities. These improvements enhanced resource utilization and productiveness, reinforcing the effectiveness of VSM and its connection to VSC in optimizing manufacturing systems.

(Qin & Liu, 2022) examined the use of VSM in an e-commerce setting, focusing on an Amazon-based retailer. Their study highlighted how lean tools, including VSM and root cause analysis, reduced inefficiencies across the supply chain. The outcome was improved delivery speed, customer satisfaction, and cost savings, demonstrating the adaptability of value stream approaches in digital environments.

7-2. Improving Product Quality: Improving quality in operational and product processes is essential for business success, especially in competitive markets (Jaf & Xinping, 2011). Key strategies include (like, 2005; Fatah & Jaf, 2023; Dulaimi & Kadhim 2017).

- A. Adapting to environmental and market changes.
- B. Addressing customer feedback effectively.
- C. Investing in R&D for performance improvement.
- D. Integrating quality into training and development.

It's viewed from the customer's perspective and is a major factor in boosting sales, market share, and profitability. Techniques like concurrent engineering help improve product quality by reducing production time, costs, and time to market (Mahmood & Sabir, 2023: 128).

Ultimately, focusing on quality—through improved design, technology, and customer alignment—drives continuous improvement, competitive advantage, and long-term success. (Ishak & Malik, 2020; Sabir & Mahmood, 2023).

7-2-1. The Importance of Product Quality: Product quality is crucial across industries for improving operational performance, increasing revenue, and reducing costs (Zrar Hamad & Sabir Jaf, 2024: 1236).

High-quality products enhance efficiency customer satisfaction, and company reputation. Quality also plays a strategic role, influencing demand, market share, and global competitiveness (Slack, 2010).

Value analysis supports quality by identifying and removing unnecessary product components, cutting costs without compromising value (Jaf (2015). Quality control ensures consistent products, enhancing customer loyalty, brand image, and long-term business sustainability—especially for online businesses (Suseno et al, 2024).

7-2-3. Dimensions of Improving Product Quality:

Performance: Refers to how well a product or business achieves its intended purpose, including profitability, customer satisfaction, and efficiency. (Hoe & Mansori, 2018; Kumar et al., 2009; Sabino Rua et al., 2020)

Durability: Durable products perform longer with less maintenance, enhancing efficiency and reducing costs. (Amaral et al., 2020)

Serviceability: A major factor in customer satisfaction and loyalty; relates to ease of maintenance and repair. (Hoe & Mansori, 2018; Sabir Jaf, 2020.)

Features: Additional product attributes that enhance appeal and may influence perceived quality and pricing. (Hoe & Mansori, 2018; Yoon & Kijewski, 1997)

Perceived Quality: A customer's overall judgment of a product's excellence or superiority. (Stylidis & Söderberg, 2020; (Hamad & Sabir, 2023).)

Reliability: The ability of a product to function without failure over time, influenced by quality control during assembly. (Duan & Li, 2019)

Matching: Optimizing raw material and process combinations to enhance yield and efficiency. (Plante et al., 1999; Flammer, 2015)

Aesthetics: Involves design, form, and style, affecting consumer perception. (Forker et al., 1996; Menezes Amaral et al., 2020)

Safety: Ensures products do not pose harm and comply with safety standards. (Li & Lau, 2017)

8. Methodology

8-1. Data Collection: The primary data source for this study was obtained directly from industrial companies operating within the Kurdistan Region of Iraq. A structured, closed-ended questionnaire was designed and utilized as the principal data collection instrument to examine the extent to which Value Stream Costing (VSC) is applied and its impact on product quality improvement. The questionnaire focused on key dimensions such as customer-perceived value, pricing and operational decision-making, and product value indicators—namely performance, durability, serviceability, features, and perceived quality.

The survey was personally distributed to seventy selected industrial firms located in the governorates of Duhok, Erbil, and Sulaymaniyah. Out of 271 distributed questionnaires, 215 were correctly completed and returned, representing an effective response rate of approximately 79.3%. The selected enterprises represented a diverse range of industries, including food and beverage manufacturing, detergent and soap production, cement, packaging, plastic material, and chemicals. The collected data were statistically analyzed using the Statistical Package for the Social Sciences (SPSS) software to ensure accuracy, reliability, and robust interpretation of findings.

8-2. Reliability Analysis Using Cronbach's Alpha: To verify the reliability of the research instrument, Cronbach's Alpha was used as one of the most widely adopted statistical indicators for measuring the internal consistency among the items of the scale. This analysis is essential to ensure that the questionnaire items coherently and consistently measure the intended constructs.

The table below presents the Cronbach's Alpha values if each dimension were deleted individually, in addition to the overall alpha coefficient for all 30 items combined:

Table (1): Cronbach's Alpha if Item Deleted

Item	No. of Items	Cronbach's Alpha if Item Deleted
Focuses on Customer-Perceived Value	5	0.778
Simplifying Pricing and Operational Decisions	5	0.776
Improving Product Value – Performance	5	0.814
Improving Product Value – Durability	5	0.811
Improving Product Value – Serviceability	5	0.788
Improving Product Value – Features	5	0.781
Improving Product Value – Perceived Quality	5	0.778
Total	35	0.814

Source: Prepared by the researcher based on the SPSS results.

The values in the table 1 indicate that the overall Cronbach's Alpha coefficient for the instrument is 0.814, which falls within the statistically acceptable range. According to common standards, a value of 0.70 or higher is considered the minimum threshold for acceptable reliability in social and behavioral sciences.

The individual alpha values when each dimension is deleted range between 0.776 and 0.814. This suggests that each dimension contributes similarly to the overall reliability, and removing any item would not lead to a significant improvement in the alpha value. Thus, all items are deemed valid and contribute effectively to the construct being measured.

Based on the above, it can be concluded that the instrument demonstrates a good level of internal consistency and statistical reliability, making it suitable for testing the study's hypotheses and achieving its objectives.

8-3. Testing hypothesis Research

8-3-1. Testing first hypothesis:

Table (2) Pearson Correlation Between Independent and Dependent Variables

Variables	Customer-Perceived Value	Simplifying Pricing & Operations	Product Performance
Customer-Perceived Value	1.000	0.591**	0.346**
Simplifying Pricing & Operational Decisions	0.591**	1.000	0.340**

Variables	Customer-Perceived Value	Simplifying Pricing & Operations	Product Performance
Improving Product Value (Performance)	0.346**	0.340**	1.000
Sig. (2-tailed)	0.000	0.000	0.000
N	215	215	215

Source: Prepared by the researcher based on the SPSS results.

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

The results of the Pearson correlation test revealed statistically significant positive relationships at the 0.01 level between the application of Value Stream Costing (VSC) dimensions and the improvement of product performance in industrial companies in the Kurdistan Region.

A moderate correlation (0.346) was found between Customer-Perceived Value and product performance, indicating that focusing on what customers perceive as valuable contributes to enhancing product quality and performance.

Similarly, a moderate correlation (0.340) was observed between Simplifying Pricing and Operational Decisions and product performance, reflecting the role of VSC in providing accurate accounting information that supports effective decision-making and improves operational efficiency. From an accounting perspective, these findings emphasize the importance of adopting modern managerial accounting techniques such as VSC, which support operational improvements and align internal processes with customer expectations, ultimately enhancing product performance.

8-3-2. Testing sconded hypothesis:

Table (3): Multiple Regression Analysis of the Effect of Value Stream Costing Dimensions on Improving Product Value (Performance)

Dependent variable Improving Product Value (Performance)						
Independent Variable	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	T	Sig.	VIF
(Constant)	1.561	0.386		4.044	.000	—
Customer-Perceived Value (VSC)	0.302	0.107	0.222	2.825	.005	1.536
Simplifying Pricing & Operational Decisions (VSC)	0.311	0.117	0.209	2.664	.008	1.536
R Square	0.148					
Adjusted R Square	0.140					
Durbin-Watson	1.845					

Source: Prepared by the researcher based on the SPSS results.

The results of the multiple regression analysis indicate that two dimensions of the Value Stream Costing (VSC) technique—Customer-Perceived Value and Simplifying Pricing and Operational Decisions—have a significant and positive impact on improving product value in terms of performance in industrial companies.

The standardized coefficients show that focusing on meeting customer-perceived value ($\beta = 0.222$) directly enhances product performance. Likewise, simplifying data-driven decision-making in pricing and operations ($\beta = 0.209$) improves operational efficiency, positively influencing product quality.

The statistical significance ($p < 0.01$) confirms the reliability of these effects, suggesting a causal relationship. Additionally, the absence of multicollinearity ($VIF \approx 1.5$) and the Durbin–Watson statistic (1.845) confirming residual independence both support the validity of the regression model.

In conclusion, applying the VSC technique—particularly focusing on these two dimensions—leads to a tangible improvement in product performance, which enhances both competitiveness and customer satisfaction.

8-3-3. Testing third hypothesis:

Table (4): Pearson Correlation Between Independent and Improving Product Value (Durability) Dependent Variable

Variables	Customer-Perceived Value	Simplifying Pricing & Operations	Product Durability
Customer-Perceived Value	1.000	0.591**	0.332**
Simplifying Pricing & Operational Decisions	0.591**	1.000	0.331**
Improving Product Value (Durability)	0.332**	0.331**	1.000
Sig. (2-tailed)	0.000	0.000	0.000
N	215	215	215

Source: Prepared by the researcher based on the SPSS results.

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

The results of the Pearson correlation analysis indicate statistically significant positive relationships at the 0.01 level between the application of

Value Stream Costing (VSC) dimensions and product value in terms of durability in industrial companies within the Kurdistan Region.

A moderate positive correlation (0.332) was found between Customer-Perceived Value and product durability, indicating that understanding what customers perceive as valuable helps companies design more durable products.

Similarly, a moderate positive correlation (0.331) was observed between Simplifying Pricing and Operational Decisions and product durability, suggesting that the use of accurate accounting data enhances production processes and, consequently, product longevity.

From an accounting perspective, these findings emphasize the essential role of the VSC technique in supporting both strategic and operational decision-making. By linking production activities to customer-perceived value—particularly durability—VSC contributes to improving product competitiveness, customer satisfaction, and overall market value.

8-3-4. Testing forth hypothesis:

Table (5): Multiple Regression Analysis of the Effect of Value Stream Costing Dimensions on Improving Product Value (Durability)

Dependent variable Improving Product Value (Durability)						
Independent Variable	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	T	Sig.	VIF
(Constant)	1.687	.376		4.480	.000	—
Customer-Perceived Value (VSC)	0.276	0.104	0.209	2.647	0.009	1.536
Simplifying Pricing & Operational Decisions (VSC)	0.300	0.114	0.208	2.631	0.009	1.536
R Square	0.138					
Adjusted R Square	0.130					
Durbin-Watson	1.940					

Source: Prepared by the researcher based on the SPSS results.

The multiple regression analysis reveals that the Value Stream Costing (VSC) dimensions—Customer-Perceived Value and Simplifying Pricing and Operational Decisions—have a significant positive effect on improving product durability in industrial companies in the Kurdistan Region. These factors explain about 13.8% of the variance in product durability, indicating a meaningful and statistically significant relationship.

Focusing on Customer-Perceived Value ($\beta = 0.209$, $p = 0.009$) strongly contributes to enhancing product durability by integrating customer insights into manufacturing processes. Likewise, simplifying pricing and operational decisions ($\beta = 0.208$, $p = 0.009$) improves product durability through more efficient, data-driven operations.

The analysis confirms no multicollinearity issues ($VIF = 1.536$) and validates the model assumptions ($Durbin-Watson = 1.940$), ensuring reliability of the findings.

From a managerial and accounting perspective, these results underscore the importance of adopting VSC as an effective tool to support decision-making related to customer value and operational efficiency, ultimately leading to improved product durability and increased market competitiveness.

8-3-5. Testing fifth hypothesis:

Table (6): Pearson Correlation Between Independent and Improving Product Value (Durability) Dependent Variable

Variables	Customer-Perceived Value	Simplifying Pricing & Operational Decisions	Improving Product Value (Serviceability)
Customer-Perceived Value	1.000	0.591**	0.483**
Simplifying Pricing & Operational Decisions	0.591**	1.000	0.517**
Improving Product Value (Serviceability)	0.483**	0.517**	1.000
Sig. (2-tailed)	0.000	0.000	0.000
N	215	215	215

Source: Prepared by the researcher based on the SPSS results.

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

The correlation analysis showed a moderate, positive, and statistically significant relationship ($p < 0.01$) between the two key dimensions of the Value Stream Costing (VSC) technique—focusing on customer-perceived value and simplifying and improving pricing and operational decisions—and the improvement of product serviceability.

Specifically, a positive correlation of 0.483 was found between focusing on customer-perceived value and enhanced serviceability,

indicating that companies prioritizing customer value achieve better product maintenance and repair ease, leading to greater customer satisfaction and product lifespan.

Similarly, a correlation of 0.517 between simplifying pricing/operations and serviceability highlights the role of accurate accounting data in supporting effective decisions that improve product quality and serviceability.

These findings emphasize the importance of these two VSC dimensions in enhancing the serviceability aspect of products within industrial firms.

8-3-6. Testing sixth hypothesis:

Table (7): Multiple Regression Analysis of the Effect of Value Stream Costing Dimensions on Improving Product Value (Serviceability)

Dependent variable Improving Product Value (Serviceability)						
Independent Variable	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	T	Sig.	VIF
(Constant)	1.297	.254		5.114	0.000	—
Customer-Perceived Value (VSC)	0.272	0.070	0.273	3.873	0.000	1.536
Simplifying Pricing & Operational Decisions (VSC)	0.388	0.077	0.356	5.056	0.000	1.536
R Square	0.316					
Adjusted R Square	0.309					
Durbin-Watson	1.715					

Source: Prepared by the researcher based on the SPSS results.

The multiple regression analysis examined the impact of two dimensions of Value Stream Costing (VSC)—customer-perceived value and simplifying pricing and operational decisions—on improving product serviceability. The results revealed a statistically significant and positive effect of both variables.

The model explained about 31.6% of the variance in product serviceability ($R^2 = 0.316$), indicating a strong explanatory power within the context of accounting and social research.

Customer-perceived value showed a significant positive impact ($\beta = 0.273$), suggesting that enhancing value from the customer's perspective directly improves the service-related quality of products. Meanwhile, simplifying pricing and operational decisions had an even stronger effect (β

= 0.356), highlighting its key role in reducing operational complexity and increasing flexibility in cost and pricing management.

The Durbin–Watson statistic (1.715) confirmed no autocorrelation issues, ensuring the reliability of the findings.

From an accounting standpoint, these results emphasize the importance of VSC as a strategic tool that not only measures costs but also supports managerial decisions aimed at improving product quality and strengthening the competitive advantage of industrial firms.

8-3-7. Testing seventh hypothesis:

Table (8) Pearson Correlation Between Independent and Improving Product Value (Features) Dependent Variable

Variables	Customer-Perceived Value	Simplifying Pricing & Operational Decisions	Improving Product Value (Features)
Customer-Perceived Value	1.000	0.591**	0.501**
Simplifying Pricing & Operational Decisions	0.591**	1.000	0.509**
Improving Product Value (Features)	0.501**	0.509**	1.000
Sig. (2-tailed)	0.000	0.000	0.000
N	215	215	215

Source: Prepared by the researcher based on the SPSS results.

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

The correlation analysis revealed a moderate to strong positive and statistically significant relationship ($p < 0.01$) between the two independent variables—focusing on customer-perceived value and simplifying and improving pricing and operational decisions—and the dependent variable, improving product features.

Specifically, a positive correlation of 0.501 was found between focusing on customer-perceived value and product features, indicating that companies prioritizing customer value achieve notable enhancements in the product's appeal and functionality.

Similarly, a correlation of 0.509 was observed between simplifying pricing and operational decisions and product features, suggesting that

accurate accounting information supports better operational and pricing decisions, which in turn improve product quality and market competitiveness.

These findings underscore the importance of these two factors in effectively enhancing the technical and functional features of products within industrial firms.

8-3-8. Testing eighth hypothesis:

Table (9): Multiple Regression Analysis of the Effect of Value Stream Costing Dimensions on Improving Product Value (features)

Dependent variable Improving Product Value (features)						
Independent Variable	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	T	Sig.	VIF
(Constant)	0.714	0.311		2.291	0.023	—
Customer-Perceived Value (VSC)	0.378	0.086	0.308	4.391	0.000	1.536
Simplifying Pricing & Operational Decisions (VSC)	0.439	0.094	0.327	4.664	0.000	1.536
R Square	0.321					
Adjusted R Square	0.315					
Durbin-Watson	1.864					

Source: Prepared by the researcher based on the SPSS results.

The multiple regression analysis showed that the Value Stream Costing (VSC) dimensions—Customer-Perceived Value and Simplifying Pricing & Operational Decisions—have a significant and positive impact on improving product features. The model explained 32.1% of the variance in product features ($R^2 = 0.321$), and the Durbin-Watson value (1.864) confirmed the absence of autocorrelation.

Both dimensions were statistically significant:

- ❖ Customer-Perceived Value: $B = 0.378$, $\text{Sig.} = 0.000$
- ❖ Simplifying Pricing & Operational Decisions: $B = 0.439$, $\text{Sig.} = 0.000$

These findings highlight the role of VSC in enhancing product quality, design, and functionality by focusing on value-added activities and improving operational efficiency. The study concludes that integrating VSC into managerial accounting is an effective strategy to improve product features and strengthen the competitive position of industrial firms. Adopting VSC is recommended for better strategic and cost-related decision-making.

8-3-9. Testing ninth hypothesis:

Table (10): Pearson Correlation Between Independent and Improving Product Value (Perceived Quality) Dependent Variables

Variables	Customer-Perceived Value	Simplifying Pricing & Operational Decisions	Improving Product Value (Perceived Quality)
Customer-Perceived Value	1.000	0.591**	0.445**
Simplifying Pricing & Operational Decisions	0.591**	1.000	0.530**
Improving Product Value (Perceived Quality)	0.445**	0.530**	1.000
Sig. (2-tailed)	0.000	0.000	0.000
N	215	215	215

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

Source: Prepared by the researcher based on the SPSS results.

The Pearson correlation analysis revealed a moderate to strong positive relationship between the Value Stream Costing (VSC) dimensions and perceived product quality. A correlation of 0.445 was found between customer-perceived value and perceived quality, indicating that focusing on value from the customer's perspective enhances how quality is perceived. Similarly, a stronger correlation of 0.530 was observed between simplifying pricing and operational decisions and perceived quality, suggesting that effective use of accounting data supports better decision-making and improves quality perception.

These results emphasize the strategic importance of applying VSC in industrial firms, as it aligns internal processes with customer expectations and enhances competitive positioning. The study recommends greater integration of value-based accounting tools to improve perceived product quality and responsiveness to market demands.

8-3-10. Testing the tenth hypothesis:

Table (11): Multiple Regression Analysis of the Effect of Value Stream Costing Dimensions on Improving Product Value (Perceived Quality)

Dependent variable: Improving Product Value (Perceived Quality)						
Independent Variable	B (Unstandardized Coefficient)	SE (Standard Error)	β (Standardized Coefficient)	T	Sig.	VIF
(Constant)	1.486	0.247		6.014	0.000	—
Customer-Perceived Value (VSC)	0.195	0.068	0.202	2.856	0.005	1.536
Simplifying Pricing & Operational Decisions (VSC)	0.434	0.075	0.411	5.803	0.000	1.536
R Square	0.308					
Adjusted R Square	0.301					
Durbin-Watson	2.054					

Source: Prepared by the researcher based on the SPSS results.

The multiple regression analysis confirmed that the dimensions of Value Stream Costing (VSC)—Customer-Perceived Value and Simplifying Pricing & Operational Decisions—have a statistically significant and positive impact on improving Perceived Product Quality. The model explains 30.8% of the variance in perceived quality ($R^2 = 0.308$), with a good model fit and no autocorrelation issues (Durbin–Watson = 2.054).

Both variables contributed positively, with Simplifying Pricing & Operational Decisions having a stronger influence. These findings highlight the strategic value of VSC in aligning operational efficiency with customer expectations and improving product quality. The study reinforces the role of VSC as an effective accounting tool for enhancing decision-making and gaining competitive advantage.

9. Conclusions and Recommendations**9-1 Conclusions**

1. The correlation analysis revealed a moderate, statistically significant positive relationship between the implementation of Value Stream Costing (VSC) dimensions and product performance improvement in industrial companies in the Kurdistan Region. The findings highlight that focusing on customer-perceived value and using reliable accounting data for decision-making effectively enhances product quality and operational efficiency.

2. Regression analysis indicates that both customer-perceived value and the simplification of pricing and operational processes have a significant and positive impact on improving product performance. This confirms that focusing on these dimensions effectively contributes to enhancing product quality and strengthening market competitiveness.
3. There is a moderate positive relationship between customer-perceived value, simplified decisions, and product durability. This highlights the VSC technique's role in supporting improvements in product quality and competitive strength.
4. The results show that focusing on VSC dimensions significantly contributes to improving product durability. Emphasizing these areas leads to higher product quality and stronger market positioning.
5. Correlation results reveal a moderate, significant positive relationship between VSC dimensions and serviceability. This means focusing on real customer value and accurate information improves product maintainability and user satisfaction.
6. Regression results confirm that the dimensions of Value Stream Costing positively affect product serviceability, supporting the role of the technique in improving product performance and operational efficiency.
7. There is a moderate to strong statistically significant correlation between the dimensions of Value Stream Costing and the technical features of the product, indicating that value-based decision-making contributes to improving product design, quality, and market appeal.
8. The application of Value Stream Costing significantly enhances product features, encouraging industrial companies to adopt this technique to improve product quality and strengthen competitive advantage.
9. Correlation analysis shows a moderate, significant positive relationship between VSC dimensions and perceived quality. This indicates that customer-focused accounting helps boost product image and market success.
10. The analysis confirms that VSC dimensions significantly enhance perceived product quality. Together, they explain about 30.8% of the variation, highlighting VSC's role in aligning product features with customer expectations.

9-2. Recommendation:

1. Industrial companies in the Kurdistan Region should adopt the Value Stream Costing (VSC) technique by focusing on customer value and using accurate data to improve product performance and market competitiveness.
2. The industrial sector is encouraged to implement VSC, especially focusing on customer-perceived value and decision simplification, as these factors are statistically proven to enhance product performance and customer satisfaction.
3. Companies should systematically apply VSC by analyzing customer value and using reliable accounting information to enhance product quality and durability.
4. The adoption of VSC should prioritize understanding customer value before simplifying decisions, as this approach improves product durability and market success.
5. Industrial firms should strengthen the use of VSC, with a focus on customer feedback and accurate data, to improve pricing, operations, and product serviceability and competitiveness.
6. Achieving a competitive advantage depends on aligning strategic decisions with customer value and improving cost management and product operability.
7. Companies should expand VSC adoption, emphasizing customer value analysis and accurate accounting data to improve product features and competitive quality.
8. There is a need to adopt VSC as a management accounting tool, focusing on customer value and decision simplicity to improve product value through informed decision-making.
9. Firms should integrate VSC into their systems, analyzing activities from the customer perspective and using accounting data to improve product quality and customer satisfaction.
10. Industrial organizations should embed VSC into management accounting to enhance perceived product quality, meet customer needs, and boost competitiveness.

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