Int Journal of Social Sciences Management and Entrepreneurship 8(2): 222-233 2024

ISSN 2411-7323

www.sagepublishers.com

© SAGE GLOBAL PUBLISHERS

SUPPLY CHAIN OPTIMIZATION AND PERFORMANCE OF LARGE MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA

[1] Mwangi Angeline Wanjiku, [2] Dr. Noor Ismael Shale

[1]Masters Student, Jomo Kenyatta University of Agriculture and Technology
[2]Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

The research study aimed to explore the influence of information integration cost reduction on the performance of large manufacturing firms in Nairobi City County. A descriptive survey research design was employed, drawing on relevant theories such as Transaction Cost Theory, and Institutional Theory to guide the investigation. The conceptual framework, review of empirical studies, and identification of research gaps were comprehensively addressed. Data was collected over the period of 2023 using both primary and secondary sources. The study utilized stratified random sampling, targeting 420 large manufacturing firms, with a sample size of 210 respondents, representing 210 large-scale manufacturing firms. The respondents were heads of Procurement and Logistics departments, and questionnaires were administered to them. A pilot test was conducted to assess the reliability of the research instrument, using Cronbach's alpha (α) as a measure. Data analysis was carried out using SPSS Version 29 and Microsoft Excel 2019, with findings presented through tables, pie charts, graphs, and histograms. Both descriptive and inferential analyses were employed, including regression analysis to estimate regression coefficients and determine prediction levels. Data collected through surveys was obtained from 156 Heads of Procurement and Logistics. The measurement scales used in the study demonstrated satisfactory reliability and validity, providing confidence in the accuracy and consistency of the measurements. The findings highlight the interconnectedness and strong positive relationships between information integration, and cost reduction, and the performance of large manufacturing firms. Improvements in any one of these dimensions are likely to be associated with improvements in the others. Information integration emerged as a critical factor, exhibiting the strongest positive association with firm performance among the predictor variables. With regard to information integration, it is recommended that firms invest in robust and integrated information systems that enable seamless data sharing and communication across different supply chain functions and processes. In terms of cost reduction, conducting comprehensive cost analysis across the supply chain is recommended to identify potential areas for cost savings. Exploring opportunities for process automation, inventory optimization, and resource optimization can contribute to reducing operational costs

Key Words: Supply Chain Optimization, Information Integration, Cost Reduction And Performance Of Large Manufacturing Firms

Background of the Study

In an increasingly competitive global market, large manufacturing firms in Nairobi City County, Kenya, are confronted with the imperative of enhancing their supply chain operations to maximize efficiency and performance. The success of these firms hinges on their ability to adapt to rapidly evolving market demands, cost pressures, and the need for sustainable business practices. This research study endeavors to delve into the multifaceted landscape of supply chain optimization and its impact on the overall performance of large manufacturing companies in Nairobi City County. By scrutinizing the intricacies of supply chain management, examining best practices, and assessing the challenges faced by these firms, this study aims to provide valuable insights into how supply chain optimization can become a linchpin for their competitiveness and prosperity in the heart of Kenya's economic hub. (Awino, 2015)

Supply chain optimization is the process of improving the efficiency, effectiveness, and overall performance of a supply chain to achieve strategic objectives and meet customer demands while minimizing costs and risks. It involves analyzing and redesigning various components of the supply chain to enhance its capabilities, responsiveness, and resilience. Supply chain optimization is crucial for manufacturing firms to remain competitive, increase profitability, and enhance customer satisfaction. By streamlining their supply chain processes, firms reduce lead times, minimize inventory holding costs, improve production planning, and respond swiftly to changes in market demands. Additionally, optimizing the supply chain helps firms manage risks related to disruptions in the production process, transportation delays, and supply chain vulnerabilities. (Mitali & Sarkar, 2020)

In North America, supply chain optimization has been driven by the increasing adoption of advanced technologies such as block chain, IoT, and artificial intelligence. These technologies enhance visibility, traceability, and real-time data analysis, enabling businesses to make more informed decisions and respond rapidly to changes in demand. Additionally, the emphasis on sustainability and eco-friendly practices has led to the integration of green supply chain initiatives in the region. In South America, supply chain optimization efforts are influenced by the region's diverse geography and trade patterns. Companies are exploring multimodal transportation solutions to optimize connectivity between different countries. There is a focus on adopting sustainable practices and green logistics to minimize environmental impacts and enhance operational efficiency. (Sokolov, Dolgui, & Ivanov, 2019)

Supply chain optimization in Africa is a crucial area of focus for businesses operating in the region, as it presents unique challenges and opportunities. With its vast and diverse geography, Africa faces infrastructural limitations, fragmented supply chain networks, and geopolitical uncertainties. However, there is a growing recognition of the importance of supply chain efficiency for economic development and regional integration. Many African countries are investing in modernizing ports, roads, and rail networks to facilitate the movement of goods across borders. For instance, the East African Community has initiated the Northern Corridor Integration Project to streamline transportation from the port of Mombasa to landlocked countries like Uganda and Rwanda, reducing transit times and costs. Regional economic blocs, such as the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC), are working to harmonize customs procedures and reduce bureaucratic hurdles. Simplified customs processes and the implementation of digital platforms, like Single Windows for Trade, are improving supply chain efficiency and boosting regional trade. (Omuoha & Umukoro, 2020)

A large manufacturing firm, by specific metrics and parameters, is characterized as an industrial entity with a substantial scale of operations and impact on the economy. Typically, such firms possess multiple indicators of size and significance, including an extensive workforce employing hundreds or even thousands of individuals, a significant physical

footprint encompassing sizable manufacturing facilities and plants, a substantial annual revenue often measured in hundreds of millions or billions of dollars, and a diverse product line or production capacity capable of serving national or international markets. These firms play a pivotal role in industrial sectors, contributing significantly to economic growth, innovation, and employment opportunities within their regions and often have a wide-reaching supply chain network and a prominent position in global industry rankings. (Awino, 2015)

In terms of product diversity, large manufacturing firms in Nairobi City County span a wide range of industries. For example, companies like Bamburi Cement, a subsidiary of LafargeHolcim, are prominent in the construction materials sector. They produce cement and related products for the construction industry, contributing to infrastructure development in Kenya and beyond. Firms like East African Breweries Limited (EABL), a subsidiary of Diageo, are leaders in the beverage sector. EABL produces a variety of alcoholic and non-alcoholic beverages, including popular brands like Tusker and Guinness. Additionally, the pharmaceutical industry features companies like Cosmos Limited, manufacturing pharmaceuticals and healthcare products. These firms play a crucial role in promoting healthcare and ensuring the availability of essential medicines in the region. (Kihara, Ngugi, & Ogollah, 2016)

Statement of the Problem

Many manufacturing firms are grappling with inefficiencies in their supply chain operations. These inefficiencies manifest in various ways, such as lengthy lead times, excess inventory levels, poor production planning, and high transportation costs. The lack of streamlined supply chain processes leads to increased operational costs, reduced productivity, and ultimately, hinder the overall performance of the manufacturing firms. (Leeman, 2020)

Focused supply-chain optimization can reduce costs by up to 25 percent, more than double what you can expect from most other operational improvement initiatives. Supply chain disruptions can cause finance losses of 62%, and reducing supply chain costs from 9% to 4% can double profits. 79% of companies with high-performing supply chains earn a revenue growth greater than the average within their sector. Effective inventory management, and effective transportation processes among other very good communication amongst stakeholders engaged across the process supply chain is vital. The global supply chain industry reached approximately US $14.5 trillion according to statistics from 2019 and is projected at 17.8 trillion by 2023. (Wyman, 2018)

The logistics and distribution networks in Kenya often lack efficiency and optimization. Poor road conditions and limited intermodal connectivity contribute to longer delivery times and higher transportation costs. Inadequate warehousing facilities and suboptimal inventory management practices results in excess inventory or stock outs, affecting production schedules and customer satisfaction. (Wamwara, Spillan, & Onchoke, 2023)

According to report by KAM 2023, data shows that Gross Domestic Product (GDP) contribution of the manufacturing sector declined from 11.16% in 2011 to 7.24% in 2021. Many manufacturing firms in Kenya have been slow to adopt advanced technologies and automation in their supply chain processes. The lack of technology integration hampers real-time visibility, data analytics, and effective decision-making. Modern supply chain technologies such as RFID tracking, IoT sensors, and data analytics tools are underutilized, preventing firms from optimizing their operations and identifying areas for improvement. In a complex supply chain environment, effective collaboration and coordination among various stakeholders, including suppliers, manufacturers, distributors, and retailers, are essential. Manufacturing firms face challenges in establishing and maintaining strong relationships with their supply chain partners. Poor communication, lack of trust, and misalignment of objectives lead to disruptions, delays, and inefficiencies in the supply chain, impacting the overall performance of the manufacturing firms. (Wamwara, Spillan, & Onchoke, 2023)

Manufacturing firms struggle to respond effectively to fluctuating market demands and evolving customer expectations. A rigid supply chain that cannot adapt quickly to changing requirements can result in stock outs, excessive inventory, and missed opportunities, leading to potential loss of market share and reduced customer satisfaction. Some have limited knowledge and awareness of the benefits of supply chain optimization and its impact on overall performance. As a result, they may not prioritize supply chain improvement initiatives or invest adequately in developing their supply chain capabilities. (Wamwara, Spillan, & Onchoke, 2023)

The supply chain networks in Kenya are often fragmented, with limited coordination among suppliers, manufacturers, distributors, and retailers. Inefficiencies in collaboration and communication lead to delays, disruptions, and increased operational costs. A lack of synergy between different supply chain partners impedes the smooth flow of goods and information. (Mitali & Sarkar, 2020)

The cost of production in Kenya, including raw materials, energy, and labor, can be relatively high compared to other countries. Inefficient supply chain processes contribute to increased operational costs, making it challenging for manufacturing firms to remain competitive in global markets. Access to finance is crucial for investing in supply chain optimization initiatives. However, some manufacturing firms may face challenges in accessing affordable credit, which restricts their ability to invest in technology, infrastructure, and capacity building. (Wamwara, Spillan, & Onchoke, 2023)

The lack of skilled personnel with expertise in supply chain management is a common challenge for manufacturing firms in Kenya. Without a skilled workforce, firms may struggle to implement effective supply chain strategies, utilize technology optimally, and improve overall performance. Manufacturing firms in Kenya face market volatility and uncertainty, both domestically and internationally. Fluctuating demand patterns and changing customer preferences require agile and responsive supply chains. Firms that fail to adapt to these dynamic market conditions risk inventory obsolescence, stock outs, and lost sales opportunities. (Mitali & Sarkar, 2020)

The regulatory environment in Kenya poses challenges for supply chain optimization. Customs procedures, trade regulations, and bureaucratic hurdles hinder the smooth flow of goods across borders, affecting import/export activities and supply chain efficiency. Although supply chain optimization is a critical aspect of enhancing manufacturing firm performance, there is a shortage of comprehensive studies focused on the challenges and implications of supply chain optimization for manufacturing firms within Nairobi City County, Kenya. The existing literature primarily focuses on global case studies and general theories, which may not fully capture the unique challenges and dynamics of the manufacturing sector in the county hence the need for this study. (Wamalwa Noah & Mutua, 2017)

General Objective of the Study

The general objective of the study is to evaluate supply chain optimization and performance of large manufacturing firms in Nairobi City County, Kenya.

Specific Objectives of the Study

The research follows the following objectives:

i. To establish influence of information integration on the performance of large manufacturing firms in Nairobi City County, Kenya.
ii. To identify influence of cost reduction on the performance of large manufacturing firms in Nairobi City County, Kenya.

Theoretical Review

Social Exchange Theory

Social Exchange Theory is a sociological and psychological concept that examines the relationships between individuals and the benefits they exchange within those relationships. It posits that individuals engage in social interactions based on a cost-benefit analysis, seeking to maximize rewards while minimizing costs. This theory can be applied to understand the dynamics of information integration within organizations and supply chains. It explains how entities within a supply chain or organization share and exchange information based on perceived benefits and costs. (Theil, 2019)

According to Social Exchange Theory, individuals or organizations engage in exchanges when they believe the benefits outweigh the costs. In the context of information integration, supply chain partners or departments within an organization are more likely to share information if they perceive that doing so will lead to mutual benefits. For example, a manufacturer may share production schedules with suppliers to enable better planning and reduce lead times, which benefits both parties. (Theil, 2019)

Theory of Constraints

The Theory of Constraints is a management philosophy that focuses on identifying and managing constraints or bottlenecks that limit an organization's ability to achieve its goals. Developed by Eliyahu M. Goldratt in the 1980s, TOC emphasizes the importance of improving the performance of the entire system by identifying and addressing the most significant constraints. The Theory of Constraints is associated with cost reduction. By focusing on the constraint and improving its productivity, organizations can achieve efficiency gains that lead to cost reductions. Eliminating wasteful activities and improving the flow of work through the constraint can reduce overall operating costs. (Balderstone & Mabin, 2020)

TOC encourages reducing excess inventory throughout the system, which can lead to cost savings in storage, handling, and obsolescence. Addressing constraints often involves improving processes, which can lead to higher product or service quality. Improved quality reduces the costs associated with rework, returns, and customer complaints. TOC helps organizations optimize resource allocation by directing resources to the constraint. This prevents unnecessary expenditure on non-constraint activities and focuses resources on areas that truly impact the organization's performance. Instead of spreading investments across the entire organization, TOC encourages targeted investments in the constraint to maximize return on investment and reduce capital expenditures. (Balderstone & Mabin, 2020)

Conceptual Framework

A conceptual framework in research is a structure or a visual representation that helps researchers to outline the key concepts, variables, relationships, and theoretical constructs that underlie their study. It provides a theoretical foundation for the research and helps guide the research process. The conceptual framework serves as a roadmap to understand and interpret the phenomena being studied. The relationships of the study variables are summarized in the following conceptual framework in Figure 1. (Veroniki & Evangelou, 2021)

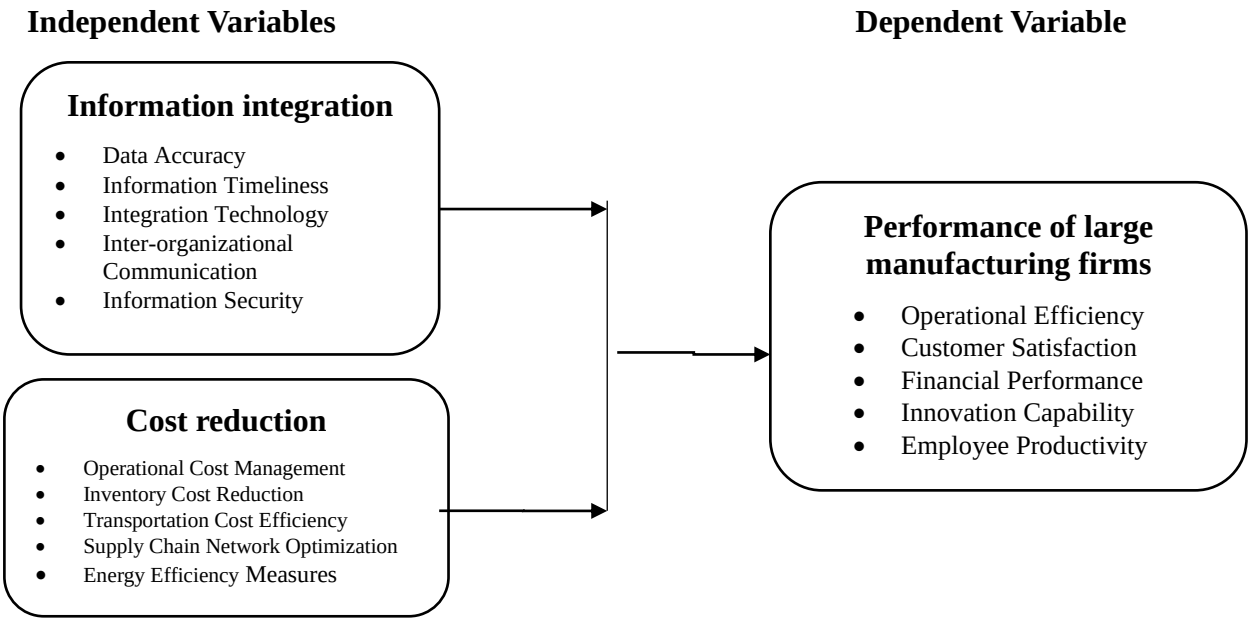

Figure 1: Conceptual Framework

Information Integration

In the realm of information integration, state corporations recognize the pivotal role of accurate data in optimizing their supply chains. Leveraging advanced data analytics tools ensures not only the precision of the information but also its real-time availability. This timely and accurate data serves as the backbone for decision-making processes throughout the supply chain. The implementation of cutting-edge technologies facilitates seamless communication between different departments, promoting a holistic and interconnected approach. Integrated systems enhance inter-organizational communication, ensuring that each entity within the supply chain is well-informed. This, in turn, fosters a collaborative environment where stakeholders work cohesively towards shared goals. Moreover, robust information security measures are deployed to safeguard sensitive data, cultivating trust among stakeholders and bolstering the integrity of the entire supply chain. (Vafaei-Zadeh, Ramayah, Hanifah, Kurnia, & Mahmud, 2020)

Cost Reduction

Cost reduction is a paramount consideration for state corporations. Operational cost management is a focal point, with rigorous optimization strategies implemented throughout the supply chain. Inventory cost reduction is achieved by adopting just-in-time practices, minimizing holding costs, and ensuring that products are readily available when needed. Transportation cost efficiency is realized through route optimization and the utilization of technology to monitor and streamline logistics. Energy efficiency measures are seamlessly integrated into operations, promoting sustainability and concurrently reducing operational costs. The continuous optimization of the supply chain network ensures a delicate balance between minimizing costs and maintaining resilience, creating a lean and agile operational model. (Akeem, 2017)

Empirical Review

Information Integration

Vafaei-Zadeh, Ramayah, Hanifah, Kurnia and Mahmud (2020) investigated the impact of Supply Chain Information Integration (SCII) on the Operational Performance of manufacturing firms in Malaysia considering the role of information leakage. To test the model developed, we conducted an online questionnaire survey with Malaysian manufacturing companies drawn from the Federation of Malaysian Manufacturers directory of 2018. Out of the 400 questionnaires sent out to the manufacturing companies, 144 useable responses were received giving a response rate of 36 %. The data were analyzed using

SmartPLS, a second-generation statistical tool. The findings of the study showed that information quality, information security, and information technology (IT) had a positive effect on SCII with an explanatory power of 47.2 % while SCII, in turn, had a positive effect on operational performance explaining 17% of the variance. Intentional information leakage (IIL) moderated the relationship between SCII and operational performance, whereas accidental information leakage did not moderate the same relationship. The results of this study indicate that information security has the largest impact on SCII, followed by IT, and information quality. Furthermore, IIL as a negative aspect of information integration may deprive the strength of the relationship between SCII and operational performance. (Vafaei-Zadeh, Ramayah, Hanifah, Kurnia, & Mahmud, 2020)

Prajogo and Olhager (2009) investigated the integration of both information and materials between supply chain partners. Using data set from 232 Australian firms, the authors found that logistics integration has a significant effect on operations performance. Information technology capabilities and information sharing both have significant effects on logistics integration. Furthermore, strategic supplier relationships have both direct and indirect effects on the operational performance of the firm; with the indirect effect via information integration and logistics integration. (Prajogo & Olhager, 2009)

Cost Reduction

Spence (1986) opines that in many markets, firms compete over time by expending resources with the purpose of reducing their costs. Sometimes the cost-reducing investments operate directly on costs. In many instances, they take the form of developing new products that deliver what customers need more cheaply. Therefore product development can have the same ultimate effect as direct cost reduction. In fact, if one thinks of the product as the services it delivers to the customer, in the way that Lancaster pioneered, then product development often is just cost reduction. (Spencer, 1986)

Akeem (2017) critically examined and evaluated the application of cost control and cost reduction in organizational performance and also to review the budget as an effective tool of cost control and cost reduction. A descriptive survey research was adopted. A total number of 50 questionnaires were administered and used for the study. The analysis of data collected was undertaken by applying appropriate statistical tools. Regression analysis was used to test the hypothesis with the use of SPSS. Based on the findings, it was evident that cost control has a positive impact on organizational performance and also the style of management has a positive impact on organizational performance. (Akeem, 2017)

Cornett, McNutt and Tehranian (2006) examines operating performance around commercial bank mergers. The authors found that industry-adjusted operating performance of merged banks increases significantly after the merger, large bank mergers produce greater performance gains than small bank mergers, activity focusing mergers produce greater performance gains than activity diversifying mergers, geographically focusing mergers produce greater performance gains than geographically diversifying mergers, and performance gains are larger after the implementation of nationwide banking in 1997. Further, they found that improved performance is the result of both revenue enhancements and cost reduction activities. However, revenue enhancements are most significant in those mergers that also experience reduced costs. (Cornett, McNutt, & Tehranian, 2006).

RESEARCH METHODOLOGY

The study adopts a descriptive survey design to answer the research questions using quantitative and qualitative approach. A descriptive research study describes a particular individual or group. The study aims at gathering information regarding supply chain optimization and performance of large manufacturing firms in Nairobi City County, Kenya. (Leavy, 2022). The target population refers to the specific group or population of interest to the researcher. The population of interest in this research is 420 large manufacturing firms in Nairobi City County, Kenya (Kenya Association Of Manufacturers, 2022). The unit of

respondents is the head procurement and logistics department (Gupta & Gupta, 2022). The study makes use of stratified random sampling technique since the population in different large manufacturing firms does not represent a homogeneous group, therefore the method was generally applied in order to obtain a representative sample (Gupta & Gupta, 2022) Sample size refers to the number of individuals or units selected to be part of a research study's sample. The sample size was half of the target population. This gives a sample size of 210 respondents. This implies that the study involved 210 large scale manufacturing firms that were selected through stratified sampling.

The researcher used a questionnaire to collect data. A questionnaire is a research instrument that has a set of questions or any other type of prompts for collecting information and data from a respondent. The strategies and methodologies that was used in a larger study are tested out on a smaller scale in a pilot study. A pilot study is carried out to assess the reliability and validity of the research instrument in order to increase the efficacy and efficiency of the research. A pilot study aids in the identification of the research tools and guarantees that they can accurately measure the variables and provide answers to the research questions. This is completed by 15 large manufacturing firms, representing around 10% of the sample size. For the pilot study, these volunteers are randomly selected, but they are left out of the main investigation. The questionnaire is piloted to help identify any potential errors and improvements, and the test is designed to be trustworthy, pertinent, and intelligible. (Kothari & Dubey, 2022)

Both descriptive and inferential statistics are employed in analysis of the data. Both descriptive and inferential statistics are employed in analysis of the data. The completed questionnaires are edited for consistency and completeness. A qualitative analysis is used to analyze respondents' views. Data is coded to enable the response to be grouped into several categories to facilitate the research get information relevant to the study. SPSS Version 28 is used for analyzing both descriptive and inferential statistics. Interpretations are made consistent to the provisions of each test. Descriptive statistics includes measures of central tendency and dispersion which are calculated to profile the firm, individual respondents and study variables. To investigate the relationship between the independent variables and dependent variable, the study uses linear multiple regression analysis. (Gupta & Gupta, 2022).

RESEARCH FINDINGS AND DISCUSSION

Descriptive Statistics Analysis

Table 1: Descriptive Statistics Analysis

	Mean	Std. Deviation	N
Performance Of Large Manufacturing Firms	3.96	.830	156
Information Integration	3.99	.823	156
Cost Reduction	4.02	.823	156

Table 4.1 presents the descriptive statistics analysis for key variables related to the performance of large manufacturing firms, including Information Integration, and Cost Reduction. The analysis is based on data collected from 156 respondents. The mean scores for all variables are relatively high, ranging from 3.96 to 4.02 on a scale of 1 to 5, indicating a generally positive perception of these aspects within the manufacturing firms under study. Specifically, the mean score for Performance of Large Manufacturing Firms is 3.96, suggesting that respondents perceive the overall performance of these firms to be slightly below "Very Good" on average. The standard deviations for each variable are relatively low, ranging from 0.811 to 0.830. This indicates that the responses are tightly clustered around the

mean, suggesting a high level of agreement among respondents regarding their perceptions of Information Integration and Cost Reduction, and the overall performance of large manufacturing firms. In summary, the descriptive statistics from Table 1 indicate that respondents perceive the studied manufacturing firms to excel in Information Integration and Cost Reduction, with relatively consistent perceptions across respondents. However, there is a slight variance in the perceived performance of these firms, as indicated by the standard deviations, suggesting some degree of diversity in respondents' opinions.

Inferential Statistics Analysis

Correlation

Table 2: Correlation

		Information Integration	Cost Reduction	Performance Of Large Manufacturing Firms
Information Integration	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	156		
Cost Reduction	Pearson Correlation	.962**	1	
	Sig. (2-tailed)	.000		
	N	156	156	
Performance Of Large Manufacturing Firms	Pearson Correlation	.935**	.909**	1
	Sig. (2-tailed)	.000	.000	
	N	156	156	156

Table 2 presents the correlation analysis between five key factors: Information Integration and Cost Reduction and the Performance of Large Manufacturing Firms. The analysis is based on data collected from 156 respondents. The correlation coefficients reveal strong positive relationships between all pairs of factors. Information Integration demonstrates particularly high correlations with Cost Reduction (0.962), and Performance of Large Manufacturing Firms (0.935). Similarly, Cost Reduction exhibit strong correlations among themselves, ranging from 0.889 to 0.928. These results suggest that improvements in one area tend to coincide with improvements in others, indicating a cohesive relationship between different operational aspects within large manufacturing firms. The correlation coefficients are statistically significant ($p < 0.001$), indicating that the observed relationships are unlikely to have occurred by chance. This strengthens the reliability of the findings and underscores the importance of these interconnections in driving overall performance within manufacturing firms. In conclusion, the data from Table 4.13 highlight the critical role of Information Integration and Cost Reduction in influencing the performance of large manufacturing firms.

Regression Analysis

Table 3: Regression Analysis

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.936[a]	.876	.873	.296	.876	266.712	4	151	.000

Table 3 presents the results of the regression analysis conducted to examine the relationship between the predictor variables (Information Integration and Cost Reduction,) and the criterion variable (Performance of Large Manufacturing Firms). The analysis is based on data from 156 respondents. The regression model demonstrates a strong relationship between the

predictor variables and the criterion variable, as indicated by the coefficient of determination (R Square) of 0.876. This means that approximately 87.6% of the variance in the performance of large manufacturing firms can be explained by the combined influence of Information Integration and Cost Reduction. The adjusted R Square of 0.873 suggests that this model provides a good fit to the data while adjusting for the number of predictors in the model. The standard error of the estimate, which is 0.296, reflects the average deviation of the observed values from the predicted values by the regression model. The change statistics indicate that the inclusion of the predictor variables significantly improved the explanatory power of the model, as evidenced by the statistically significant F Change statistic ($F = 266.712$, $p < 0.001$). This suggests that the regression model as a whole is significant in predicting the performance of large manufacturing firms.In summary, the regression analysis in Table 4.14 demonstrates that Information Integration and Cost Reduction collectively play a substantial role in influencing the performance of large manufacturing firms. The model provides a strong fit to the data and offers valuable insights into the factors that contribute to the overall performance of these firms.

ANOVA

Table 4 : ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.458	2	46.729	543.36	.000[b]
	Residual	13.228	153	.086		
	Total	106.686	155			

a. Dependent Variable: Performance Of Large Manufacturing Firms

b. Predictors: (Constant), Cost Reduction and Information Integration

Table 4 presents the results of the analysis of variance (ANOVA) conducted to assess the overall fit of the regression model in predicting the performance of large manufacturing firms, based on the predictor variables: Cost Reduction, and Information Integration. The analysis is based on data from 156 respondents. The ANOVA table partitions the total variance in the criterion variable (Performance of Large Manufacturing Firms) into two components: regression and residual. The regression component, also known as the explained variance, is represented by the sum of squares for the regression (93.458) and its degrees of freedom (2). This component reflects the amount of variance in the criterion variable that is accounted for by the predictor variables included in the model. The residual component, also known as the unexplained variance, is represented by the sum of squares for the residual (13.228) and its degrees of freedom (153). This component reflects the amount of variance in the criterion variable that is not accounted for by the predictor variables and is attributed to random error or other unmeasured factors. The total variance in the criterion variable is represented by the sum of squares for the total (106.686), which is the sum of the regression and residual components. The F-statistic tests the overall significance of the regression model. In this case, the F-statistic is 543.36, with a significance level (Sig.) of .000, indicating that the regression model as a whole is statistically significant in predicting the performance of large manufacturing firms. In summary, the ANOVA results in Table 4.4 confirm that the regression model, which includes Cost Reduction and Information Integration as predictor variables, provides a significant improvement in explaining the variance in the performance of large manufacturing firms compared to a model with no predictors

Coefficients

Table 5: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.140	.123		1.132	.0025
	Information Integration	.723	.151	.717	4.792	.0001
	Cost Reduction	.109	.107	.108	1.018	.0031

a. Dependent Variable: Performance Of Large Manufacturing Firms

In Table 5, the coefficients resulting from the regression analysis are presented, shedding light on the relationships between the predictor variables (Information Integration and Cost Reduction) and the criterion variable (Performance of Large Manufacturing Firms). The constant coefficient represents the intercept of the regression equation. In this case, the constant coefficient is 0.140 with a standard error of 0.123. The constant term (Constant) represents the expected value of the criterion variable when all predictor variables are set to zero. In this case, the constant term is 0.140, indicating that the Performance of Large Manufacturing Firms would be 0.140 when all predictor variables are absent. The t-value of 1.132 indicates that this coefficient is not statistically significant at the conventional significance level ($p = 0.0025$).

The coefficient for Information Integration is 0.723, suggesting that for every one-unit increase in Information Integration, there is an associated increase of 0.723 units in the Performance of Large Manufacturing Firms. This coefficient is statistically significant with a t-value of 4.792 ($p = 0.0001$). The standardized coefficient (Beta) of 0.717 indicates a strong positive relationship between Information Integration and Performance.

The coefficient for Cost Reduction is 0.109, implying that for every one-unit increase in Cost Reduction, there is an associated increase of 0.109 units in the Performance of Large Manufacturing Firms. This coefficient is statistically significant with a t-value of 1.018 ($p = 0.0031$). The standardized coefficient (Beta) of 0.108 indicates a moderate positive relationship between Cost Reduction and Performance.

Conclusions

The measurement scales used in the study demonstrated satisfactory reliability and validity, providing confidence in the accuracy and consistency of the measurements. The findings highlight the interconnectedness and strong positive relationships between information integration, and cost reduction, and the performance of large manufacturing firms. Improvements in any one of these dimensions are likely to be associated with improvements in the others.

Information integration emerged as a critical factor, exhibiting the strongest positive association with firm performance among the predictor variables. This shows the importance of effective information systems and data integration across supply chain processes for enhancing organizational performance.

The regression model explained a substantial proportion (87.6%) of the variance in firm performance, indicating the collective importance of the studied dimensions in predicting and influencing organizational success in the manufacturing sector. The high educational levels and moderate to extensive experience of the participants, who were all Heads of Procurement and Logistics, suggest that the findings are based on informed and knowledgeable perspectives within the industry. The research findings emphasize the interdependence of information integration and cost reduction in contributing to superior performance in large manufacturing firms. Organizations should prioritize investments and improvements in these areas to enhance their supply chain operations and overall organizational effectiveness.

Recommendations

The research findings emphasize the critical importance of information integration, cost reduction strategies, in driving superior performance for large manufacturing firms. To capitalize on these insights, organizations should prioritize investments and initiatives in these key areas.

With regard to information integration, it is recommended that firms invest in robust and integrated information systems that enable seamless data sharing and communication across different supply chain functions and processes. Implementing enterprise resource planning (ERP) systems or other centralized platforms can facilitate real-time access to accurate and consistent information. Furthermore, promoting data standardization and interoperability ensures compatibility and efficient exchange of information among various systems and stakeholders. Providing comprehensive training and support to employees is crucial to enhance their skills in leveraging these integrated information systems effectively.

In terms of cost reduction, conducting comprehensive cost analysis across the supply chain is recommended to identify potential areas for cost savings. Exploring opportunities for process automation, inventory optimization, and resource optimization can contribute to reducing operational costs. Implementing strategic sourcing practices, such as supplier consolidation, negotiation, and value analysis, can leverage purchasing power and reduce procurement costs. Encouraging a culture of continuous improvement and cost-consciousness within the organization, involving employees in cost-saving initiatives, can further drive cost optimization.

REFERENCES

Akeem, L. B. (2017, June 26). Effect of Cost Control and Cost Reduction Techniques in Organizational Performance. *International Business and Management*, 19-26. doi:10.3968/9686

Blokydyk, G. (2020). *Information Integration a Complete Guide.* Emereo Pty Limited.

Cornett, M. M., McNutt, J. J., & Tehranian, H. (2006, June). Performance Changes around Bank Mergers: Revenue Enhancements versus Cost Reductions. *Journal of Money , Credit and Banking, 38*(4), 1013 - 1050. Retrieved from https://www.jstor.org/stable/3838992

Gupta, B. N., & Gupta, N. (2022). *Research Methodology.* SBPD Publications.

Kenya Association Of Manufacturers. (2022). *Policy and Sustainability Report 2022.* Kenya Association Of Manufacturers.

Kihara, N. S., Ngugi, K. P., & Ogollah, K. (2016, December 14). Influence of Strategic Contingency Factors on Performance of Large Manufacturing Firms in Kenya. *European Journal Of Business and Strategic Management, 1*(4), 32 - 48. Retrieved from https://iprjb.org/journals/index.php/EJBSM/article/view/209

Kohlbacher, M., & Gruenwald, S. (2011, September 20). Process ownership, process performance measurement and firm performance. *International Journal Of Productivity and Performance Management, 60*(7), 709 - 720. doi:https://doi.org/10.1108/17410401111167799

Kothari, D. P., & Dubey, U. K. (2022). *Research Methodology : Techniques and Trends.* CRC Press.

Leavy, P. (2022). *Research Design : Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches.* Guilford Publications.

Leeman, J. A. (2020). *Supply Chain Management: Fast, Flexible Supply Chain in Manufacturing and Retailing* (2nd ed.). Books on Demand.

Liraz, M. (2019). *How to Cut Costs and Expenses in a Business - Effective Cost Reduction Strategies in a Small Business.* Independently Published.

Meletiadou, E. (2023). *Handbook of Research on Redesigning Teaching, Learning, and Assessment in the Digital Era.* IGI Global.

Meyer, J. W., & Jepperson, R. L. (2021). *Institutional Theory : The Cultural Construction of Organizations, States, and Identities.* Cambridge University Press.

Mitali , S., & Sarkar, B. (2020). *Application of Optimization in Production, Logistics, Inventory, Supply Chain Management and Block Chain.* MDPI AG.

Peng, G. Z. (2020). *Toward Behavioral Transaction Cost Economics : Theoretical Extensions and an Application to the Study of MNC Subsidiary Ownership.* Springer International Publishing.

Prajogo, D., & Olhager, J. (2009). The effect of supply chain information integration and logistics integration on firm. *Anzam*, 1 - 17. Retrieved from https://www.anzam.org/wp-content/uploads/pdf-manager/1092_ANZAM2009-251.PDF

Shin, H., Collier, D. A., & Wilson, D. D. (2000, April). Supply management orientation and supplier/buyer performance. *Journal Of Operations Management*, *18*(3), 317 - 333. doi:https://doi.org/10.1016/S0272-6963(99)00031-5

Sokolov, B., Dolgui, A., & Ivanov, D. (2019). *Handbook of Ripple Effects in the Supply Chain.* Springer International Publishing.

Theil, J. T. (2019). *The Simulation of Social Exchange : Developing a Multidimensional Model of Exchange Rules in Human Interaction.* University Of KwaZulu - Natal.

Vafaei-Zadeh, A., Ramayah, T., Hanifah, H., Kurnia, S., & Mahmud, I. (2020, December). Supply chain information integration and its impact on the operational performance of manufacturing firms in Malaysia. *ScienceDirect*, *57*(8). doi:https://doi.org/10.1016/j.im.2020.103386

Veroniki, A. A., & Evangelou, E. (2021). *Meta - Research : Methods and Protocols.* Springer US.

Wamalwa Noah, & Mutua, J. M. (2017). *Enhancing Mobilization of Own Source Revenue in Nairobi City County.* Institute Of Economic Affairs.

Wamwara, W., Spillan, J., & Onchoke, C. (2023). *Doing Business in Kenya : Opportunities and Challenges.* Taylor & Francis.

Waweru, G., Onyuma, S., & Murumba, J. (2021). *Research Methodology.* 24by7 Publishing.