EXAMINING THE INFLUENCE OF STRATEGIC SUPPLIER ALLIANCE ON THE PERFORMANCE OF MANUFACTURING FIRMS

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Abstract

This study examines the influence of strategic supplier alliances on the performance of manufacturing firms. Kannan and Tah (2004) and Sambasivan and Yen (2010) in their studies pointed out the impact of the strategic supplier alliance on firm performance, showing that there exists a gap in determining how multidimensional indicators of strategic supplier alliance influence firm performance, hence the need for the current study. The study utilized a cross-sectional survey design, which is an appropriate method to determine if there is a significant relationship among the study variables. The study targeted manufacturing firms, which were 518 in number, whereby only 457 were well-filled, resulting in a response rate of 88.2 percent. The study findings indicate that 30.4 percent (at the variable level) and 49.5 percent (at the indicator level) of the differences in firm performance are influenced by strategic alliances with suppliers. The study results enhance the knowledge of strategic supplier alliances and their impact on firm performance.

Keywords: Strategic Supplier Alliance, Performance, Manufacturing Firms

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1. INTRODUCTION

A strategic supplier alliance is a collaboration of two or more firms that maintain their legal independence following the formation of the alliance (Yoshino & Rangan, 1995). A strategic supplier alliance is a buyer-supplier relationship that is created to offer solutions to problems and mutually share the benefits that come because of joint efforts of working together (Yoshino & Rangan, 1995). Some of the indicators to measure strategic supplier alliance in the proposed study included trust and coordination, commitment, mutual problem-solving, information quality, information participation, information sharing, continuous communication, cooperation, and better material forecasting.

Lebans and Euske (2007) have defined firm performance as the fulfillment of firm objectives and outcomes measured by a set of financial and non-financial indicators. They affirm that performance is subject to change over time and hence necessitates both evaluation and interpretation.

Based on the resource-based view (RBV) theory and social capital theory, this study explores management principles. The RBV theory states that the resources owned by an organization are very important factors that determine firm performance (Mweru & Muya, 2016). The social capital theory is characterized by trust and mutual interconnectedness over time through positive collaboration (Putnam, 1995; Adler & Kwon, 2002). Celestini et al. (2014) assert that a sustainable supplier alliance leads to better firm performance.

The study adopted the measurement dimensions by Bonomi Santos and Ledur Brito (2012), which include financial performance (growth and profitability), and non-financial performance measures (market price, employee and customer satisfaction, and environmental and social performance). From the foregoing studies, the proposed study also employed profitability, market value, shareholding/growth, customer satisfaction, employee satisfaction, environmental performance, and social performance. This variable, being an impact indicator, qualifies it to be used as a dependent variable that is relevant within the manufacturing sector.

The findings by Cousins et al. (2008) were based on collaboration amongst measures of seller performance, socialization mechanism, and firm performance, however, they did not take into account how strategic supplier alliances may influence firm performance. Further, the conclusions by Qian et al. (2008) reveal that local diversification influences firm performance positively or negatively, however, it does not bring out clearly how strategic supplier alliance influences firm performance. Thus, the motivation for this study to to empirically determine how strategic supplier alliance influences firm performance.

Rajab et al. (2021) analyzed the impact of supplier relationship management on the performance of manufacturing firms. Their findings revealed a significant positive effect, with supplier relationship management influencing performance at a 5% significance level ($\beta = 0.295$, p-value < 0.05). This indicates an increase in supplier relationship management, and the firm's performance increases. This study used a very narrow view where a strategic supplier alliance was one of the indicators of supplier relationship management.

The manufacturing sector has demonstrated resilience to the global economic crisis and charts a post-corona recovery trajectory despite a recent decline in its contribution to the gross domestic product (GDP), which calls for concerted efforts to spur the sector's growth and its contribution to the manufacturing pillar of the Big Four Agenda for an industrialized economy. This justifies the choice of investigating the manufacturing firms' performance in the proposed study. Musili and Deya (2023), in their study, focused on (technology, marketing, financial, and distribution) alliances on tourism sector firm performance. Unfortunately, the indicators used to operationalize strategic alliances with the recommendations cannot be applied in the operationalization of strategic supplier alliances.

The motivation of strategic supplier alliance is to satisfy the customer's needs, while maintaining firm competitiveness through long-term relationships (Tan et al., 2002). The research concluded that the relationship between strategic supplier alliance and firm performance gives conflicting results. Many past studies have shown a significant effect of strategic supplier alliance on firm performance (Baum & Wally, 2003; Chakravarthy, 1986; Cho & Pucik, 2005; Fornell et al., 1996; Venkatraman & Ramanujam, 1986). These studies were contradicted by the results of Kale (2010) and Cousins et al. (2008), who concluded that the influence of strategic supplier alliances on firm performance is not significant. These contradicting findings may have influenced the use of a few operational indicators in the strategic supplier alliance. The study by Baum and Wally (2003) focused on how quick decision-making by management affects firm performance, but did not focus on how strategic supplier alliances may influence firm performance. This necessitated the need to find out how firm performance is influenced by strategic supplier alliances.

Therefore, there is a need to conduct a study to clear the contradicting results using multi-dimensional indicators, including coordination and trust, interdependence, the quality and participation of information, information exchange, and collaborative problem-solving, among others. Based on the background described above, the research question raised in this study is:

RQ: What is the influence of strategic supplier alliances on the performance of manufacturing firms?

The study findings are vital to the management of manufacturing firms in several ways. Firstly, the study shall guide managers to embrace strategic supplier alliances to gain a competitive edge. The study findings are important for academicians and researchers since they enrich the body of knowledge by introducing strategic supplier alliance research into the manufacturing firms' performance. The study is also adding to the policy framework under which the government of Kenya aims to achieve better performance of its manufacturing firms. The study shall guide the government in developing policy guidelines for manufacturing firms.

This paper is henceforth organized as follows. Section 2 reviews the literature. Section 3 focuses on the methodology of empirical research on strategic supplier alliances and firm performance. Section 4 presents the results of the hypothesis testing and descriptives, and evaluates the regression model in relation to already done and past studies. Section 5 concludes the paper.

2. LITERATURE REVIEW

The Section deals with the theoretical underpinning, empirical literature review, conceptual framework, and research hypothesis.

Social capital theory may explain the strong relationship, which is characterized by information sharing and mutual trust, dependency among others, between different firms. This relationship may contribute to sustainable competitive advantage through the reduction of time of delivery time to the market (Celestini et al., 2014). Lin and Len (2010) argue that the major objective of firms joining strategic supplier alliances is to pull together resources that are complementary the creating synergy among the alliance partner firms. Strategic supplier alliance demands that the buying firms establish long-term cooperation rather than competition, and increases buyer-supplier long-term relationships. Strategic supplier alliance encourages cooperation, sharing of information, materials, and joint forecasting (Funk, 1993; Nakamura et al., 1998).

These studies focused on strategic supplier alliance sharing of information, materials, and joint forecasting with a view to reducing costs and time to market, meeting the demand of the customers and value addition, and eventually attaining the competitive advantage of an organization, but did not make it clear how strategic supplier alliance influences performance. The current study set out to directly link how strategic supplier alliance affects the performance of the firm in a well-documented model.

Choi et al. (2002) argue that either the supplier or the buyer views relationships differently. From the buyer's perspective, a relationship with a competitive supplier network is preferred due to the increase in bargaining power. On the other hand, from the supplier perspective, a cooperative supplier-supplier association is preferred since it increases the bargaining power against the buyer while reducing competition amongst suppliers. Strategic supplier alliance encourages cooperation, sharing of information, adoption of just-in-time (JIT) principles, materials, and joint forecasting (Cousins et al., 2008; Funk, 1993; Kannan & Tah, 2004; Nakamura et al., 1998). Organizational culture plays a major part in strategic alliance formation and preservation (Sambasivan & Yen, 2010). The increasing strategic role that suppliers play for firms to achieve good firm performance has henceforth called for virtuous buyer-supplier associations (Tan et al., 2002).

The studies connecting strategic supplier alliance to performance and the results have not been consistent and conclusive. The majority of these studies used a very narrow perspective in determining the impact of strategic supplier alliances on performance. For instance, studies by Funk (1993), Kannan and Tah (2004), Nakamura et al. (1998), and Rich and Hines (1997) reveal that strategic supplier alliance influences firm performance. Although all these studies used very few indicators of strategic supplier alliance, they found that they influence firm performance. Additionally, an effective strategic supplier alliance is a strong tool that may help a firm maintain a business atmosphere that is competitive through promoting market control, efficiencies, entering fresh markets, and accessing key resources (Kale, 2010).

Kannan and Tah (2004) articulate that a strategic supplier alliance is more responsive to changes in demand, highly committed to quality and the continuous improvement of products, and subsequently influences firm performance. A strategic supplier alliance is characterized by a strong collaboration among the partner firms, leading to improved firm performance under different environments and cultures (Sambasivan & Yen, 2010; Siew-Phaik et al., 2013). This study adopts efficiency measures for firm performance and the share of overall revenue of new products with or without precursor products. According to Sambasivan and Yen (2010), this addresses the impact the strategic supplier alliance has on firm performance. This study adopts this view of the influence of strategic supplier alliance on firm performance. Thus, there exists a gap determine determining how multidimensional indicators of strategic supplier alliance influence firm performance.

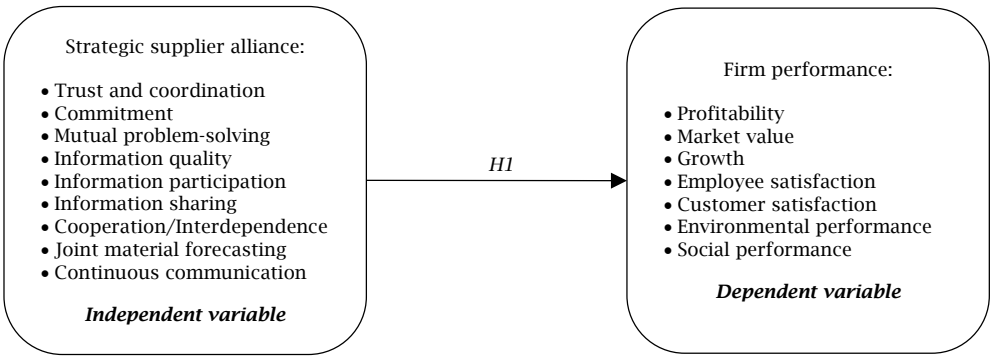
Rajab (2024) analyzes the influence of marketing, innovation, technical, and cost and risk-sharing alliances in supply chains on the manufacturing firms' performance. Further, the study tested the business environment for its moderating effect on the manufacturing firms' performance. The indicators used to measure supply chain strategic alliances are different from those used in this current study to operationalize the strategic supplier alliance.

Based on the various studies reviewed, a hypothesis was formulated:

H1: Strategic supplier alliance has no significant influence on firm performance.

The relationships are outlined in the conceptual framework shown below in Figure 1.

Figure 1. Conceptual model



Source: Authors' elaboration.

3. RESEARCH METHODOLOGY

Positivist philosophy was adopted as it deals with the collection of data and interpretation. Easterby-Smith et al. (2002) indicate that in positivism, the hypothesis is formulated and tested in a deductive approach. In addition, positivism allows for the use of a large sample of data, and identifying cause and effect relationships from the data, which allows the researcher to create law-like generalizations (Gill & Johnson, 2010). Therefore, positivism was the most suitable philosophy for this study. Data used in this study was quantitative, hence closely associated with positivism (Easterby-Smith et al., 2002).

This study used questionnaires for data collection. The data was then analyzed, and the results were compared with the earlier relationships to enable theory testing. This is because the hypothesis is confirmed to enable the formulation of conclusions based on the findings.

The study adopted the cross-sectional survey design, which is preferred to clarify if a significant relationship exists among the study variables (Mugenda & Mugenda, 2003). Additionally, since the data collection entailed many manufacturing firms in Kenya, the cross-sectional design was the most appropriate. Primarily, the study focused on inferring to determine whether strategic supplier alliance significantly influences the performance of manufacturing firms.

According to the Kenya Association of Manufacturers (KAM, 2021) business guide, there are 971 manufacturing firms classified under 12 sub-

sectors. The population of study in this research covers all the manufacturing firms from which the findings can be applied in a similar context. The study considered many manufacturing firms since they reveal more profound perspectives on the study objective.

According to Mugenda and Mugenda (2003) and Fawcett and Magnan (2001), at least 10% of the population sample is adequate in selecting the sample size in cross-sectional surveys. However, Cowles (2006) denotes that 10% gives an adequate size, but not a sufficient sample size. Thus, this study calculated the sample size using a simplified formula by Yamane (1967) as below:

$$n = N/[1 + N(e)^2] \quad (1)$$

where,

- n = the sample size;
- N = the population size (971);
- e = the level of precision (a 95% confidence level and p-value = 0.03, although 5% is a common choice).

The amount of error that was tolerated was set at 0.03% although 5% is a common choice, a lower margin of error is required for a larger sample size in a population of 971 to accommodate the sectors with very few players, which might be translated into decimal representation. Hence:

$$\begin{gathered} n = 971/[1 + 971(0.03)^2] \\ n = 971/[1 + 971 * 0.0009] \\ n = 971/[1 + 0.8739] \\ n = 971/1.8739 \\ n = 518.17 \end{gathered} \quad (2)$$

Therefore, the sample size was 518 manufacturing firms. This was sufficient since it considered all the sub-sectors depending on several firms and the representation sub-sector where the firm operates. Using proportionate random sampling across the 12 sub-sectors (strata), the sample distribution is given as follows in Table 1.

Table 1. Manufacturing proportionate sample sizes

Manufacturing sub-sectors	*Pop. (N) – (PN)*	*Proportionate sample Pn = PN / TP * n*
Building, construction, and mining	47	25
Chemical and allied sector	93	50
Electricals and electronics	60	32
Fresh produce and edible oils sector	32	17
Food and beverages	233	124
Leather and footwear	33	18
Metal and allied sector	105	56
Motor vehicle and accessories	64	34
Paper and board	89	47
Pharmaceutical and medical equipment	39	21
Plastics and rubber	99	53
Textiles and apparel	77	41
Total (TP)	**971**	N = 518

Source: Authors' research data.

Semi-structured questionnaires from 971 firms were used for data collection. Questionnaires were used to collect primary data, which was done by dropping and then picking up by a trained research assistant. The questionnaire was administered to Procurement/Supply chain directors or managers from each firm and chief finance officers. Collecting data from a single respondent in a firm will avoid the duplication of information from many different respondents within the same firm (Odock, 2016). These respondents are expected to have great knowledge of the area of study (Saunders et al., 2009).

The data was analyzed using descriptive statistics with measures of dispersion employed to examine the underlying characteristics of the data (Mugenda & Mugenda, 2003). Multiple and stepwise regression models were used to analyze the linear relationships among the various study variables. Thus, the first computation for firm performance may be written as shown in Eqs. (4), (5), and (6). The firm performance was computed for individual actual outcome measures for each domain and design capacity for each of the five years as in Eq. (4) below.

1. *Step 1.* Average firm performance for the seven domains (profitability, market value, growth, employee satisfaction, customer satisfaction, environmental performance, and social performance).

$$AFDP = (Domain\ indicator\ achievement\ of\ Y_1 + Y_2 + Y_3 + Y_4 + Y_5)/5 \quad (3)$$

where, $AFDP$ = average firm domain performance; Y_i = year, and i = 1-to-5 years.

Simple linear regression (variable level analysis):

$$FP = \beta_0 + \beta_1 SSA + \varepsilon \quad (4)$$

where, FP is firm performance; SSA is strategic supplier alliance; $\beta_{i's}$ are parameters; and ε is the error term.

Multiple regression analysis (indicator level analysis):

$$FP(Y) = f(SSA) \quad (5)$$

$$FP(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i \quad (6)$$

where,

- Y = firm performance;
- β_0 = intercept;
- β_{1-8} = coefficients, change induced in Y by each X_i;
- X_1 = trust and coordination;
- X_2 = commitment;
- X_3 = mutual problem-solving;
- X_4 = information quality and participation;
- X_5 = information sharing;
- X_6 = continuous communication;
- X_7 = cooperation/interdependence;
- X_8 = joint material forecasting
- ε = error term.

R^2 depicts model fitness and explains the changes in the dependent variable. β_1 is the coefficient

explaining the influence of a unit change in each of the strategic supplier alliance constructs on firm performance. P-value, F-ratio, and t-statistic explain the significance of the model constructs.

2. *Step 2.* Weighted score: Each domain indicators were computed by multiplying the achievements from every indicator by the average firm domain performance in Step 1 above. For example:

$$Weighted\ score\ for\ return\ on\ assets\ (Profitability\ domain) = Weight\ (12) * Average\ achievement\ for\ return\ on\ asssets\ (Profitability\ domain) \quad (7)$$

This was done for all indicators in all seven domains of firm performance.

3. *Step 3.* Firm performance index: This was computed from the summation of the weighted scores for each of the seven domains as follows:

$$Firm\ performance\ index = Weighted\ score\ for\ profitability + Weighted\ score\ for\ market\ value + Weighted\ score\ for\ growth + Weighted\ score\ for\ employee\ satisfaction + Weighted\ score\ for\ customer\ satisfaction + Weighted\ score\ for\ environmental\ performance + Weighted\ score\ for\ social\ performance \quad (8)$$

4. RESULTS AND DISCUSSION

4.1. Response rate

The response rate refers to a metric that represents the proportion of participants who take part in a study compared to the total number of eligible individuals invited to participate (Bowers, 2008). It serves as an indicator of the effectiveness of efforts made to conduct research and achieve the study's objectives.

The study was carried out among 518 manufacturing firms, out of which 491 were returned, whereby only 457 were filled and 34 were poorly filled or blank, especially on supply chain and firm performance, thereby removed after sorting.

Table 2. Response rate

Questionnaires	*Number*
Total questionnaires distributed	518
Total questionnaires filled and returned	491
Questionnaires removed after sorting (poorly filled and blank	34
Questionnaires well filled	457
Total response rate for the study	88.2%

Source: Authors' research data.

The high response rate of 88.2% was achieved due to effective engagement strategies, clear communication of the study's objectives, well-designed survey tools, and timely follow-up reminders to encourage participation. The NACOSTI license (Application Identification Number 849208), and the University of Nairobi's introductory letters were also used to ensure compliance with research standards and encourage participant involvement. Therefore, the 88.2% response rate is considered highly satisfactory for survey research. According to Mellahi and Harris (2015), a response rate greater than 50% is regarded as satisfactory for such studies.

Twenty-four firms, two from each of the 12 sectors, participated in the pilot study, however, they were not included in the final study.

4.2. Reliability of the instrument

Reliability helps to confirm the consistency and stability of the measurement tools used in this study. It pertains to the degree to which the instrument yields consistent and reliable results across multiple instances (Taherdoost, 2016). This analysis is vital for ensuring that the data collected is both valid and dependable, thereby supporting robust conclusions. Table 3 shows the outlines of the reliability results.

Table 3. Summary of reliability statistics

Variable	*Number of items*	*Cronbach's alpha*	*Decision*
SSA	9	0.918	Accepted
FP	7	0.748	Accepted
Overall reliability coefficient		0.833	Accepted

Source: Authors' research data.

For this study, a reliability score of 0.70 or higher was considered acceptable. The Cronbach's alpha for *SSA* (0.918) and *FP* (0.748) both exceed the acceptable threshold of 0.7, with the former demonstrating excellent reliability. The overall reliability coefficient of 0.833 further supports the consistency of the measures, confirming their suitability for the analysis and ensuring the credibility of the findings.

4.3. Validity test

The Kaiser-Meyer-Olkin (KMO) test was applied to evaluate the sampling adequacy, and Bartlett's test was applied to determine the appropriateness of the data for factor analysis. The KMO statistic ranges from 0 to 1, with values above 0.6 typically being acceptable (Hair et al., 2013). The findings are as below in Table 4.

Table 4. Strategic supplier alliance

Kaiser-Meyer-Olkin measure of sampling adequacy		0.875
Bartlett's test of sphericity	Approx. Chi-square	58654.817
	df	7503
	Sig.	0.000

Source: Authors' research data.

The KMO and Bartlett's test for *SSA* indicated that the data was highly suitable for factor analysis. The KMO value of 0.875 exceeded the threshold of 0.6, confirming excellent sampling adequacy. Bartlett's test of sphericity, with a Chi-square value of 58654.817 and a significance of 0.000, indicated significant correlations among the variables, further supporting the appropriateness of the data for factor analysis. These results validate the data for conducting further statistical analysis.

Table 5. Capacity planning[a]

Kaiser-Meyer-Olkin measure of sampling adequacy		0.712
Bartlett's test of sphericity	Approx. Chi-square	100324.375
	df	11628
	Sig.	0.000

Note: [a] Based on correlations.
Source: Authors' research data.

The KMO value for capacity planning was 0.712, indicating adequate sampling adequacy, while Bartlett's test of sphericity showed a Chi-square value of 100324.375 and a significance of 0.000, confirming significant correlations among the variables. These results validate the data's suitability for factor analysis.

4.4. Test of normality

Normality is a vital assumption in statistical analysis, especially in regression models, as it ensures that the data approximates a bell-shaped distribution. This assumption is essential for the validity of parameter estimation and hypothesis testing, as deviations from normality can lead to biased results (Ghasemi & Zahediasl, 2012). In the context of this study, the normality of the data was assessed to confirm the appropriateness of regression analysis and to uphold the integrity of the findings.

The tests of normality for *SSA* indicated that the data approximated a normal distribution. The Kolmogorov-Smirnov test had a statistic and significance of 0.112 and 0.200, respectively, and the Shapiro-Wilk test reported a statistic and significance of 0.924 and 0.071, respectively, both of which are above the 0.05 threshold, suggesting that the data is normally distributed.

Table 6. Normality test

Variables	*Kolmogorov-Smirnov*[a]			*Shapiro-Wilk*		
	Statistic	*df*	*Sig.*	*Statistic*	*df*	*Sig.*
SSA	0.112	457	0.200*	0.924	457	0.071

*Note: [a] Lilliefors significance correction. * This is a lower bound of the true significance.*
Source: Authors' research data.

4.5. Number of employees in the firm

The total number of employees in a firm is crucial for determining the support needed for the implementation of strategic supplier alliances and the corresponding capacity planning, which directly impacts operational efficiency. Consequently, this study aimed to assess how manufacturing firms are represented in terms of their workforce. Respondents were asked to provide information on the total number of employees in their firms, and the results are summarized in the table below.

Table 7. Number of employees in the firm

Number of employees in the firm	*Descriptive*		*Rank*
	Frequency (N)	*Percentage (%)*	
1–10	28	6.1	3
11–20	43	8.4	2
21–30	20	4.4	5
31–40	8	1.8	6
41–50	23	5.0	4
Above 50	335	73.3	1
Total	457	100.0	

Source: Authors' research data.

From the above results, the majority, 73.3% of the manufacturing firms, the rest are fairly distributed, whereby 8.4% had between 11–20 employees; 6.1% had between 1–10 employees; 5.0% had between 41–50 employees; 4.4% had between 21–30 employees; 1.8% had between 31–40 employees. This depicts that manufacturing firms have the ideal number of employees (more than 10) to support the key functional areas in their organizations, which will, in turn, influence their supply chain performance and *FP*. Further, this shows that the manufacturing firms provide equal employment opportunities and support the national policy towards Vision 2030's pillar on manufacturing and industrialization.

4.6. Manufacturing sector of operation

The population targeted comprised all manufacturing firms, whereby the unit of analysis was manufacturing firms distributed across 12 sub-sectors, whereby 518 manufacturing firms were sampled. There was a need to check on the proportionate representation of the 12 sub-sectors (strata) from the collected data. In Table 8, the respondents identified the sector in which their manufacturing firm operated.

Table 8. Manufacturing sector of operation

Manufacturing sector of operation	*Population*	*Target*	*Response/Frequency*	*Percentage*	*Rank*
Food and beverages	233	124	120	26.3	1
Metal and allied sector	105	56	52	11.4	2
Plastics and rubber	99	53	52	11.4	3
Paper and board	89	47	46	10.0	4
Chemical and allied sector	93	50	42	9.2	5
Motor vehicle and accessories	64	34	32	7.0	6
Textiles and apparel	77	41	31	6.8	7
Building, construction, and mining	47	25	22	4.8	8
Pharmaceutical and medical equipment	39	21	17	3.7	9
Electricals and electronics	60	32	16	3.5	10
Fresh produce and edible oils sector	32	17	14	3.1	11
Leather and footwear	33	18	13	2.8	12
Total	971	518	457	100	

Source: Authors' research data.

The response rate of 88.2% in Table 2 shows that the response rate didn't deviate from the sample size, which was proportionate to the population as given in column (2) to column (4) in Table 8 above. The distribution of the respondents across the 12 shows an equitable representation of all the sectors that definitely make up the manufacturing firms operating in Kenya.

The five basic sectors that tend to engage in strategic supplier alliances from the sector representation are food and beverages, metal and allied sector, plastics and rubber, paper and board, chemical and allied sector, motor vehicle and accessories, and textile and apparel, which in real operations requires several suppliers and capacity planning to deliver the best value to their customers

who will, in turn, affect their supply chain performance and firm performance as opposed to the others that might not need strategic alliances in the management of their suppliers, especially the sectors of pharmaceutical and medical equipment; electrical and electronics; fresh produce and edible oils sector; and leather and footwear.

The findings from this study can, therefore, be used to make generalizations about the manifestations of strategic supplier alliance, capacity planning, supply chain performance, and performance of manufacturing firms.

4.7. Number of years in operation

The number of years in operations can reflect experience, which has an impact on the ability to engage strategic supplier alliances. The duration of employees' firm operations is presented in Table 9.

Table 9. Number of years in operation

Number of years in operation	*Descriptive*		*Rank*
	Frequency (N)	*Percentage (%)*	
1–10	68	14.9	3
11–20	155	33.9	1
21–30	116	25.4	2
31–40	51	11.2	4
41–50	38	8.3	5
Above 50	27	5.9	6
Total	457	100	

Source: Authors' research data.

The results show the distribution of manufacturing firms based on their years in operation. The majority (33.9%) of firms have been in operation for 11–20 years, followed by 25.4% of firms operating for 21–30 years. Smaller percentages of firms have been operating for 1–10 years (14.9%), 31–40 years (11.2%), 41–50 years (8.3%), and above 50 years (5.9%). This indicates that most firms have significant operational experience, with the highest concentration in the 11–20 years range.

4.8. Ownership status of the firm

The ownership structure of the firm, whether locally, foreign, or both, determines the extent of supplier affiliation grouping and the intensity of strategic supplier alliance alongside capacity planning. The ownership status of their firms is presented in Table 10.

Table 10. Ownership status of the firm

Ownership status of the firm	*Descriptive*		*Rank*
	Frequency (N)	*Percentage (%)*	
Locally owned	380	83.2	1
Joint locally and foreign-owned	46	10.1	2
Owned foreign-owned	31	6.8	3
Total	457	100	

Source: Authors' research data.

From the study findings in Table 10 above, the majority of the manufacturing firms are locally owned, with a few either jointly owned locally or foreign. The market has a fair distribution of the ownership networks, and because of the local content requirements by the government of Kenya to protect local industries, this ownership characterization suits well in this study.

4.9. Market scope for the firm's products

The scope of the market is highly likely to influence the capacity planning for an organization. The access to the suppliers and delivery times are equally determined by the firm's market scope, which can be local, global, or both. The scope of the market for the firms' products is presented in Table 11.

Table 11. Market scope for the firm's products

Market scope for the firm's products	*Descriptive*		*Rank*
	Frequency (N)	*Percentage (%)*	
Local	327	71.6	1
Both local and global	117	25.6	2
Global	13	2.8	3
Total	457	100	

Source: Authors' research data.

From the study findings in Table 11, the majority of the manufacturing firms are serving the local markets (no exports), although they import materials. Their capacity planning might not be too complicated in terms of demand forecasting and joint materials forecasting, which will subsequently influence the scope of the strategic supplier alliance. These findings on the manufacturing firm's scope of market operation are in line with the findings on the ownership structure, which was found to be local.

4.10. Hypothesis testing and regression analysis

In this Section, the regression analysis and the hypothesis testing were conducted.

The hypothesis stated that *SSA* has no significant influence on *FP* (*H1*). To test this, regression analysis was employed, with interpretations based on R, R^2, F, and β. The hypothesis was tested at a 95% confidence level ($\alpha = 0.05$), with decisions to reject or fail to reject based on p-values. A p-value ≤ 0.05 provided strong evidence against *H1*, leading to its rejection, while a p-value > 0.05 suggested weak evidence, leading to the failure to reject *H1* (Rumsey, 2010).

4.10.1. Variable level analysis

The relationship is tested using simple linear regression analysis, and the results are presented in the table below.

Table 12. Variable level analysis

Model	*Variables entered*	*Variables removed*	*Method*
1	*SSA*[b]		Enter

Note: [a] Dependent variable: FP. [b] All requested variables entered.
Source: Authors' research data.

From the results on variables entered, *SSA* was the only variable entered as the most important contributor to the variability and changes in *FP*. The research results are in the table below.

Table 13. Model goodness-of-fit — Variable level analysis

Model	*R*	*R^2*	*Adjusted R^2*	*Std. err. of the estimate*
1	0.551[a]	0.304	0.302	20.15910

Note: [a] Predictors: (Constant), SSA.
Source: Authors' research data.

The model goodness-of-fit (GFI) was used to measure the strength of the association between the variables. The study used simple regression, hence, the interpretation is based on the strength of R^2 (not adjusted R^2), whereby the higher the R^2 value, the better the model, and guided by the rule of thumb that R^2 is always between 0% and 100%.

From the research findings in the GFI statistics in Table 13 above, the model fits the research data well with an R^2 value of 0.304, which indicates that 30.4% of the total variation in *FP* is explained by *SSA*.

The analysis of variance (ANOVA) of the regression model results provided a regression sum of squares of 80629.277 and a model residual of 184907.101 with a mean square of 406.389 for the residual. The ANOVA regression results produced an F-statistic of 198.404 with a p-value = 0.000. Further from the p-values in the GFI statistics and the coefficient tables, the p-value ≤ 0.05 since the p-values of the overall model and variables/indicators are less than the significance level, the study, therefore, shows that there is a statistically significant association between *SSA* and *FP*.

Table 14. Analysis of variance — Variable level analysis

Model		Sum of squares	R^2	df	Mean square	F	Sig.
1	Regression	80629.277	1	80629.277	198.404	0.000[a]	80629.277
	Residual	184907.101	455	406.389			184907.101
	Total	265536.378	456				265536.378

Note: [a] Predictors: (Constant), SSA. Dependent variable: FP.
Source: Authors' research data.

Table 15. Regression coefficients — Variable level analysis

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	-83.219	7.749		-10.740	0.000
	SSA	2.938	0.209	0.551	14.086	0.000

Note: Dependent variable: FP.
Source: Authors' research data.

Table 15 results revealed significant results. The unstandardized coefficient for *SSA* was 2.938 (Std. error = 0.209), with a standardized coefficient (Beta) of 0.551, indicating a strong positive relationship between the two variables. The t-value for this predictor was 14.086, and the significance level was 0.000, which is well below the 0.05 threshold, confirming that the influence of *SSA* on *FP* is statistically significant. The constant value was -83.219 (Std. error = 7.749), with a t-value of -10.740 and a significance of 0.000, reinforcing the model's statistical validity. Based on the regression analysis coefficients presented in the table, the model is expressed as follows further.

$$FP(Y) = f(SSA - X)$$
$$Y = f(X) \quad (9)$$
$$Y = 0.551X$$

This denotes that *SSA* has a high influence on performance, hence, the hypothesis that *SSA* has no significant influence on *FP* is rejected.

4.10.2. Indicator level analysis

The indicator level analysis results are presented in Table 16 below.

Table 16. Indicator level analysis

Model	Variables entered	Variables removed	Method
1	Joint material forecasting, Information participation, Trust and coordination, Information sharing, Cooperation/Interdependence, Commitment, Information quality, Continuous communication, Mutual problem-solving		Enter

Note: Dependent variable: FP. All requested variables were entered.
Source: Authors' research data.

The results in the table on variables entered, "Joint material forecasting", "Information participation", "Trust and coordination", "Information sharing", "Cooperation/Interdependence", "Commitment", "Information quality", "Continuous communication", and "Mutual problem-solving" were the only indicators of *SSA* entered as the most important contributors in the variability and changes *FP*.

The GFI model was used to measure the strength of the association between *SSA* indicators and *FP* (indicator level analysis). The study used multiple regression, hence the interpretation is based on the strength of adj R^2 (not just R^2), whereby the higher the adjusted R^2 value, the better the model. The adjusted R^2 was preferred to normal with R^2 as the model has different numbers of indicators for *SSA*, and is guided by the rule of thumb that R^2 is always between 0% and 100%.

Table 17. Goodness-of-fit model — Indicator level analysis

Model	R	R^2	Adjusted R^2	Std. err. of the estimate
1	0.711[a]	0.505	0.495	17.14482

Note: [a] Predictors: (Constant), Joint material forecasting, Information participation, Trust and coordination, Information sharing, Cooperation/Interdependence, Commitment, Information quality, Continuous communication, Mutual problem-solving.
Source: Authors' research data.

Table 18. Analysis of variance — Indicator level analysis

Model		Sum of squares	R^2	df	Mean square	F	Sig.
1	Regression	134143.030	9	14904.781	50.706	0.000[a]	134143.030
	Residual	131393.349	447	293.945			131393.349
	Total	265536.378	456				265536.378

Note: [a] Predictors: (Constant), Joint material forecasting, Information participation, Trust and coordination, Information sharing, Cooperation/Interdependence, Commitment, Information quality, Continuous communication, Mutual problem-solving. Dependent variable: FP.
Source: Authors' research data.

Table 19 below shows that the association between *SSA* indicators and firm performance is statistically significant. From the research findings in the GFI statistics, the model fits the research data well with an R^2 value of 0.495, which indicates that 49.5% of the total variations in *FP* are explained by strategic supplier alliance indicators (indicator level analysis).

The ANOVA of the regression model in the table provided a regression sum of squares of 134143.030 and a model residual of 131393.349 with a mean square of 293.945 for the residual. The ANOVA results produced an F-statistic of 50.706 with a p-value = 0.000.

Table 19. Regression coefficients — Indicator level analysis

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	-38.032	7.851		-4.844	0.000
	Trust and coordination	17.699	2.104	0.424	8.413	0.000
	Cooperation/Interdependence	-6.316	2.235	-0.154	-2.826	0.005
	Information quality	-16.333	3.207	-0.300	-5.092	0.000
	Commitment	4.928	3.033	0.098	1.625	0.105
	Information participation	6.340	2.047	0.266	3.097	0.002
	Information sharing	-4.515	2.407	-0.102	-1.876	0.061
	Mutual problem-solving	10.616	2.489	0.380	4.265	0.000
	Continuous communication	0.764	2.685	0.017	0.284	0.776
	Joint material forecasting	1.751	2.976	0.038	0.588	0.557

Note: Dependent variable: FP.
Source: Authors' research data.

Further from the p-values in the GFI statistics and the coefficient tables, the p-value ≤ 0.05 since the p-values of the overall model and strategic supplier alliance indicators and (indicator level analysis) areas are less than the significance level, the study shows that there is a statistically significant association between *SSA* indicators and overall *FP* (indicator level analysis).

From the research data from Table 19, the four insignificant indicators of *SSA* are "Information sharing" (p-values = 0.061), "Continuous communication" (p-values = 0.776), "Joint material forecasting" (p-values = 0.557), and "Commitment" (p-values = 0.105). The coefficients of other strategic supplier alliance indicators of "Trust and coordination" (p-values = 0.000), "Cooperation/ Interdependence" (p-values = 0.005), "Information quality" (p-values = 0.000), "Information participation" (p-values = 0.002), and "Mutual problem-solving" (p-values = 0.000) have p-values less than alpha (0.05), meaning the coefficients for the *SSA* of "Trust and coordination", "Cooperation/Interdependence", "Information quality", "Information participation", and "Mutual problem-solving" are all statistically significant. The study, therefore, uses the p-values in the model GFI and coefficients reject *H1* since the GFI model and coefficients are significantly different from 0.

Therefore, the prediction formula on the relationship independent variable indicators (trust and coordination, cooperation/interdependence, information quality, information participation, and mutual problem-solving) and *FP* (indicator level analysis) have p-values that are less than the significance level of 0.05. These results indicate that strategic supplier alliance indicators have a relationship with performance that is statistically significant: performance increases by 0.424 units for each one-unit of enhanced trust and coordination in strategic supplier alliance; performance declines by 0.154 units for each unit one unit of reduced cooperation/interdependence in strategic supplier alliance; performance decreases by 0.300 units for each one-unit of lost information quality in strategic supplier alliance; performance increases by 0.266 units for each one-unit of information participation intensification in strategic supplier alliance; and lastly performance increases by 0.380 units for each one-unit of mutual problem-solving intensification in strategic supplier alliance.

Based on the regression analysis coefficients presented in Table 19, the model is expressed as follows:

$$FP(Y) = f(SSA - Indicator\ level\ analysis, X)$$
$$Y = 0.424\ Trust\ and\ coordination - 0.154\ Cooperation/Interdependence - 0.300\ Information\ quality + 0.266\ Information\ participation + 0.380\ Mutual\ problem\text{-}solving \quad (10)$$
$$Y = f(X_{1-5})$$
$$Y = 0.424\ X_1 - 0.154\ X_2 - 0.300\ X_3 + 0.266\ X_4 + 0.380\ X_5$$

where,

- X_1 = trust and coordination;
- X_2 = cooperation/interdependence;
- X_3 = information quality;
- X_4 = information participation;
- X_5 = mutual problem-solving.

This, therefore, depicts that strategic supplier alliance indicators of trust and coordination, cooperation/interdependence, information quality, information participation, and mutual problem-solving are key in determining firm performance, and as such, the hypothesis that *SSA* has no significant influence on *FP* (indicator level analysis) is rejected.

4.11. Discussion

The research results showed that the association between strategic supplier alliance and firm performance is statistically significant. The results at the variable level analysis indicate that 30.4% of the total variation in firm performance is explained by strategic supplier alliance, while results at the indicator level analysis indicate that 49.5% of the total variation in firm performance is explained by strategic supplier alliance indicators of trust and coordination, cooperation/interdependence, information quality, information participation, and mutual problem-solving.

The research findings at the indicator level analysis are in support of the social capital theory that, according to Celestini et al. (2014), postulates a very strong relationship, which is characterized by information sharing and mutual trust, dependency among others, between different firms.

These findings further support extant researchers. For instance, Lin and Len (2010) observations that strategic supplier alliance may lead to sustainable competitive advantage through cost reduction, delivery time, time to the market, reduction in total cost, value enhancement, and cycle time and further support the empirical findings by Celestini et al. (2014), Funk (1993), Nakamura et al. (1998) which concluded that strategic supplier alliance encourages cooperation, sharing information, materials, and joint forecasting.

5. CONCLUSION

This study examined the relationship, validating the hypothesis and achieving the research objective. The findings indicate a statistically significant relationship between strategic supplier alliances and firm performance, with regression results showing that strategic supplier alliances explain 30.4% of the total variation in firm performance at the variable level ($F = 198.404$, p-value ≤ 0.01, $R^2 = 0.304$, adjusted $R^2 = 0.387$) and 49.5% at the indicator level ($F = 50.706$, p-value ≤ 0.01, $R^2 = 0.711$, adjusted $R^2 = 0.495$). The unstandardized coefficient results further indicate that a one-unit increase in strategic supplier alliances leads to a 0.551-unit increase in firm performance at the variable level and a 0.623-unit increase at the indicator level. These results confirm that strategic supplier alliances significantly impact firm performance, leading to the rejection of *H1* and supporting the alternative hypothesis.

At the indicator level, key components of strategic supplier alliances — including trust and coordination, cooperation/interdependence, information quality, information participation, and joint problem-solving — emerged as critical drivers of firm performance. The study further supports the structural dimensions of strategic supplier alliances, such as proper scheduling, real-time information sharing, continuous communication, capacity expansion, commitment, and demand forecasting, as key factors contributing to firm success. These findings align with the social capital network theory (Adler & Kwon, 2002; Putnam, 1995) and reinforce the assertion by Celestini et al. (2014) that sustainable competitive advantage is created through cooperative relationship practices, including dependency, performance evaluation, information sharing, and appropriability. Additionally, the study negates prior research by Cousins et al. (2008) and Kale (2010), which suggested that strategic supplier alliances do not significantly influence firm performance.

Despite its contributions, the study assumes a linear relationship exists, potentially overlooking curvilinear associations. Moreover, it does not account for external factors such as government policies, operational strategies, and competition from low-cost imports, which may also influence firm performance. Methodologically, data collection was costly and challenging due to the absence of centralized databases, despite a substantial sample size of 457 respondents.

Future research should address these limitations by considering alternative performance measures, incorporating nonlinear relationships, and expanding the analysis to service sectors such as universities and government parastatals. Further studies should be disaggregated by industry to provide deeper insights. Additionally, future research should evaluate the impact of strategic supplier alliances on government policies aimed at enhancing global competitiveness in the manufacturing sector. Given the uncertainties in the manufacturing industry — such as the effects of the COVID-19 pandemic and political instability — these factors should be integrated as control variables to provide an in-depth insight into the relationship between strategic supplier alliances and firm performance.

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