



# THE MODERATING ROLE OF TECHNOLOGY ON THE RELATIONSHIP BETWEEN DECISION SYNCHRONIZATION AND PERFORMANCE OF COSMETICS MANUFACTURING FIRMS IN NAIROBI COUNTY, KENYA

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## **Abstract**

*Global competition within firms has forced most manufacturing industries to become more innovative and strategic in their supply chain practices. One of the ways to survive this intense competition in an agile environment is to have an integrated supply chain. The level of uncertainty in the business environment continues to increase and one of the greatest challenges to a firm is responding to uncertainty caused by high volatile demand and short product life cycles. The study focused to assess the moderating effect of technology on the relationship between decision synchronization and performance of cosmetics manufacturing firms in Nairobi County, Kenya. Supply Chain Network Theory was adopted in the study. The study adopted Positivism Research Philosophy. Cross-sectional survey research design was used where the unit of analysis was 714 employees working in the procurement departments in cosmetics manufacturing firms in Nairobi County, Kenya. A sample of 256 was selected from the target population using a Multi Stage Sampling Technique. Primary data was collected using self-administered semi-structured questionnaires which were dropped and picked later. Both descriptive and inferential statistics were used. Moderated Multiple Regression (MMR) was used to analyse the relationship between the predictor variables and performance. Pilot study reliability results showed that all our Cronbach's alpha coefficients were above 0.7, implying that the research instruments were reliable. The findings of the study showed that technology*

*moderates the relationship between the predictor variable and performance of cosmetic manufacturing Firms ( $r = .588, p < 0.01$ ). Results indicated there is a positive and statistically significant correlation between decision synchronization and performance ( $r=.516, p < 0.01$ .) The study concludes that decision synchronization affect the performance of cosmetics firms. The study recommends that cosmetics firms should focus more on decision synchronization, because it is key in building and maintaining mutual partnerships of the supply chain firms. The results of the study will contribute to greater understanding of the supply chain integral factors that leads to outstanding performance of firms.*

*Keywords: Decision synchronization, performance, technology, integrated supply chain, cosmetics manufacturing firms*

## INTRODUCTION

There is growing recognition that in agile supply chains, individual organizations no longer compete as stand-alone entities, but rather as whole supply chains. In agile supply chain, a confederation of partners is linked together as a network. Gradually, it is becoming an era of “network competition,” where the orders will go to those organizations who can better structure, coordinate, and manage the relationships with their partners in a network committed to better, closer, and more agile relationships with their final customers (Andersen *et al.*, 2009). In today's challenging global markets, the route to sustainable advantage lies in being able to leverage the respective strengths and competencies of network partners in the supply chain to achieve greater responsiveness to market needs. Relationship management is vital, as supply chains are generally complex, with numerous activities usually spread over multiple functions or organizations. Sometimes, these activities can even be spread over lengthy time horizons (Burgess *et al.*, 2006); Mahapatra (2011). Therefore, it is necessary to overlay a coordination system with alliance partners.

Buyers rely on strategic partners to achieve and sustain a competitive position (Wagner & Boutellier, 2002). The concept of collaborative relationships is simple: that buyers and suppliers working together as a team can drive down total cost, improve quality and speed products to the market, far more effectively than the same people working as adversaries. Partnership can be considered as the preferred relationship strategy where there is a high level of beneficial mutual interdependence. According to Lambert and cooper (2000), operating an integrated supply chain requires continuous information flow. The success of the individual SC partners depends upon the overall success of the supply chains in which the partners participate. The theoretical proposition is that success at the SC level will result in

success at the organizational level. Seamless flow of physical and non-physical assets amongst companies would lead to pooling synergy and optimization of tangible and intangible assets that are potentially available to the individual companies. According to Sajad Fayezi and Maryam Zomorodi (2017), on the role of relationship integration in supply chain agility and flexibility development, an Australian Perspective, contributed into an understanding of the manufacturing companies' implementation of relationship integration with respect to decision trade-offs involved in contract design. The findings revealed the significant perceived importance and the impact of relationship integration on supply chain agility and flexibility development. Further, it was found out that practitioners perceive both supplier and customer relationships as important factors affecting performance of their firms. Dotun Adebajo (2017) sought to investigate the relationship between supply chain relationships integrations, innovative capabilities and manufacturing performance. The study adopted Institutional theory and Resource Based View theory to access the relation in 171 organizations drawn from 3 rapidly developing countries; Brazil, India and China. They found that supply chain relations and integrations relate positively to both product and process innovative capabilities relate positively to manufacturing performance. The findings provide new insights into manufacturers in the three countries and shows that the SC relationships they build with their customers have encouraged them to develop new innovative capabilities. These new capabilities in turn have enabled them to reap benefits of improved manufacturing performance.

### **Concept of Technological Engagement**

The competitive environment critically impacts firms' operations, and elements relative to that environment are important factors when analyzing a firm's capabilities. Because technological and marketing capabilities have varying values according to environmental turbulence, their proper fit with the environment determines their performance implications. Technology in any organization can be a tool to achieve competitiveness, something that is generally acceptable in most literature and empirical studies. Technology has become the major facilitator of business activities in the world today Morone (2004). The efficiency of technology has an impact on production success and greater profitability in any business, Morone,(2004); Nor and Zulkifli (2008). Technological engagement is a system that helps in coordinating and integrating information flows electronically from the source to the end customer in order to generate effective and efficient business transactions, enable quick information access, allow better service to customers, allow better flow of information, reduce paperwork, increase productivity and save time. Farooq and O'Brien (2010), re-emphasized that Technology focused on SCM is also a catalyst of fundamental change in

SC strategy. Supply Chain Technology (SCT) is a business enabler that has led to the growth of e-supply chains as it enables firms to collaborate and compete with each other. Technology helps to coordinate the production and operations activities, logistics and processes within supply chains. This technology can be either functional SCT that supports specific functional areas of the firm's supply chain; or the integrative SCT that allows the firm to interact with all its partners in the supply chain. Both the integrative and functional SCTs play a key role of linking all aspects of supply chain Power and Simon, (2004); Nor and Zulkifli, (2008); Mukhtar *et al.* (2009); Patterson *et al.* (2003). The most common functional and integrative SCT include: E-business; Electronic Data Interchange; Bar code; point-of-sale; Radio Frequency Identification; Warehouse Management Systems; the internet; E-Procurement; E-marketplaces and reverse auction (Patterson *et al.*, 2003).

Owing to the important roles of technology, there is need to explore the moderating effect of technological engagement on supply chain integral relationship and performance of selected cosmetic firms in the Kenyan context. Rapid and significant technological changes in an industry reflect technological turbulence. Firms facing significant and persistent technological changes can adapt by utilizing their technological capabilities. However, under low technological changes, they do not face such serious demands to respond to technological changes. Thus, technological capability in a low technological turbulence context has less value than it has in a high technological turbulence context (Patterson *et al.*, 2003).

According to Hatzicronoglou (2007), firms which engage technology intensively innovate more, win new markets, and use available resources more productively. Some researchers proposed about the role of technology in supply chains management. Autry *et al.*, (2010), supply chain technologies could be implemented as the tools or techniques in order to effectuate integrated supply chain management within or across organizational boundaries. The range from low-level operational technologies such as bar coding, through mid-range tactical technologies (warehouse management systems, transportation management systems) are designed to enhance logistics and supply chain functionality through strategic level. These technologies and systems could further establish long-term supply chain process integration and planning, and inter-firm relationships (Autry *et al.*, 2010). Assessing the impact of specific technology engagement is important for improving plant operations because building technology-based competence is an ongoing process that requires incremental investments in new technology applications in order to improve the effectiveness and efficiency of operational processes at different levels (Heim & Peng, 2010). Moreover, Wilbon (2002), asserts that technology literacy at the executive level is not only critical to increase operational efficiency but also to firm survival hence supply chain agility.

## **Statement of the Problem**

As the level of competition in the 21<sup>st</sup> Century intensifies and markets become more global, so do the challenges associated with getting a product and service to the right place at the right time and at the lowest cost also continue to be on the increase. Consequently, the whole process of understanding and practicing supply chain management has become an essential prerequisite for staying competitive in the global race and for enhancing performance. Cosmetics industry is one of the fastest growing industry in Kenya. It is estimated that Kenyans spend up to 4 Billion Shillings each month on cosmetics and its related beauty products. The industry competes in a market where rivalry is intense with a plethora of brands and sub brands occupying both the lower and upper tiers of the price continuum. Despite its fast growth, past research done on this sector reveals that there are quite a number of supply chain challenges, which includes: securing a reliable internal operation capabilities, supply chain disruptions, complexities in the supply chain, inconsistencies of quality supplies, poor visibility of demand, lack of cooperation among supply chain members, conflicts among supply chain members, short product life cycles and competition from other supply chains (Gordon Otila, 2011; Betty, 2014; Anderson, 2012). The level of competition in the cosmetics industry has reached a high level, and there is therefore the need for these firms to explore other avenues from which their performance can be increased. One of the strategies being employed by firms is decision synchronization in order to enhance their level of competitiveness and eventually firm performance. This will require the development of an effective integration between the players in the supply chain. Reviewed studies reveals little to none has been done regarding the effect of decision synchronization on performance, taking into account a moderating effect of technology. The study therefore was designed to fill this knowledge gap by assessing the effect of decision synchronization on performance of cosmetics manufacturing firms in Nairobi County, taking into account the moderating role of technology.

## **Specific Objective of the study**

To establish the effect of Decision Synchronization on Performance of Cosmetics Manufacturing Firms in Nairobi County.

## **Research Hypothesis**

**Ho:** Decision Synchronization has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

## LITERATURE REVIEW

### Theoretical Review

Theories are significant in any study since they provide the basis for the conceptualization of the variables under study. The theory utilized in the study was Supply Chain Network Theory.

### ***Supply Chain Network Theory***

According to Hearnshaw and Wilson (2011), a supply chain can be modelled as a network by a set of “nodes” that represent autonomous business units as firms who are able to exercise sovereign choices, and a set of “connections” that link these firms together for the purposes of creating products or services. The linkages between firms represent exchange relationships and the underlying contract if present. The critical connection types are the presence of contracts and various flow types such as material flows, information flows and financial flows. Network theory is descriptive in nature and has primarily been applied in SCM to map activities, actors, and resources in a supply chain. The focus has been on developing long-term, trust-based relationships between the supply chain members. Examples of issues include buyer-supplier relationships, third party logistics, and management roles in supply networks (Gunasekaran, Lai & Cheng, 2008). Supply management has become more critical because there is an increasing dependence on suppliers. The dependence makes companies highly exposed to supply risks. Tang, (2006) supply management should have a positive impact on the mitigation of the supply chain risks.

The performance of a firm depends not only on how efficiently it cooperates with its direct partners, but also on how well these partners cooperate with their own business partners. NT can be used to provide a basis for the conceptual analysis of reciprocity (Oliver, 1990) in cooperative relationships. Here, the firm’s continuous interaction with other players becomes an important factor in the development of new resources (Haakansson & Ford, 2002). Relationships combine the resources of two organizations to achieve more advantages than through individual efforts.

Such a combination can be viewed as a quasi-organization (Haakansson & Snehota, 1995). The value of a resource is based on its combination with other resources, which is why inter-organizational ties may become more important than possessing resources alone. Building collaborative supply base with supplier is the key element in supplier strategy. Chopra *et al.* (2014) referred to trust, mutuality, information exchange, openness and communication as important ingredients in buyer-supplier partnership. The authors further asserts that a supply contract specifies what governs the buyer-supplier relationship as it guides the behaviour and

performance of all the parties. Long-run collaborative relationships with key supplier contribute to firm's financial performance. The network theory (NT) contributes profoundly to an understanding of the dynamics of inter-organizational relations by emphasizing the importance of "personal chemistry" between the SC parties, the build-up of trust through positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes (Chopra *et al.*, 2010). Through direct communication, the SC relationships convey a sense of uniqueness, ultimately resulting in supply chains as customization to meet individual customer requirements, thus high performance of the firms.

## **Empirical Review**

### ***Decision Synchronization and Performance***

Decision synchronization refers to the process where supply chain partners orchestrate decisions in supply chain planning and operations that optimize supply chain agility benefits (Simatupang & Sridharan, 2005). It is the Joint decision making by SC partners with regards to the planning and operating context. It is also referred to as a form of non-equity governance agreed by involved partners in order to pursue certain super-ordinate objectives which, if attained, can benefit all of them (Lejeune & Yakova, 2005). Decision synchronization can be within different areas of supply chain management such as procurement, order entry procedures, delivery schedules, product/service design, and quality monitoring/improvements (Biehl, Cook & Johnston, 2006). Joint planning and resolution (through the formation of cross-functional and organizational teams) allow SC partners, for instance, to jointly develop process improvement strategies in face of SC problems like delays in lead-time. This joint effort may result in better commitment of partners towards the implementation of these strategies as they are collectively discussed and agreed upon. Empirical study by Biehl *et al.* (2006) shows the positive role of joint decision making (as a key attribute of collaborative SC relationships) on the better SC performance. In order to achieve a desirable set of objectives, firms engage in planning to determine a best way to utilize its resources. Decisions in supply chain involve planning and scheduling, procurement, and distribution management. Therefore, planning jointly helps in aligning partners and to coordinate decisions on inventory replenishment, order placement, and order delivery.

This calls for congruence among supply chain partners to act in an agile way. When there is an alignment between the goals of the supply chain and that of the partners, it would lead to a higher level of partnership and thus performance (Eliashberg & Michie, 1984). Goal congruence or mutual goals are the degree to which partners share goals that can only be accomplished through joint action and maintenance of the relationship (Wilson, 1995; Cavusgil



& Deligonul, 2012). Goal congruence is the extent to which supply chain partners perceive their own objectives are satisfied by accomplishing the supply chain objectives (Cao & Zhang, 2011). It is the degree of goal agreement among supply chain partners (Angeles & Nath, 2001). In the case of true goal congruence, supply chain partners either feel that their objectives fully coincide with those of the supply chain, or, in case of disparity, believe that their goals can be achieved as a direct result of working toward the objectives of the supply chain (Lejeune & Yakova, 2005). Decision synchronization among supply chain partners provides strong reason for relationship continuance. Wilson *et al.* (2006) suggest that mutual goals influence performance satisfaction, which, in turn, influences the level of commitment to the strategic alliance. Strategic alliances are known to be risky. Potential partners may be a lot better or worse than the company at the strategic alliance formation (Cavusgil & Deligonul, 2012). Goal assessment is seen as important criteria in choosing partners besides complementary skills and cooperative cultures (Brouthers *et al.*, 1995). The needs and expectations of the partners have to be incorporated in the operations and strategies of a supply chain to enhance each chain member's profit, return- on- investment, and cash flow (Simatupang & Sridharan, 2005). One way to judge decision synchronization is the responsiveness of the supply chain partners in filling customer demands and the effectiveness of joint decisions in enhancing supply chain profitability (Corbett *et al.*, 1999). Harland *et al.*, (2004) in their study implied the level of synchronization in the decision making process as a key element of supply chain coordination and agility, as a way of building and maintaining mutual partnerships. Very often, supply chain partners have conflicting goals that guide decision making, which lead to solutions that are less than optimum (Lee *et al.*, 1997). The supply chain members may have conflicting objectives and disagreements over domain of supply chain decisions and actions. It must be noted that a typical supply chain also deals with human systems, and hence, which may pose following challenges and difficulties in coordinating supply chain members.

The individual interest, local perspective and opportunistic behaviour of supply chain members results in mismatch of supply and demand, hence supply chain agility (Fisher *et al.*, 1994). The traditional performance measures based on the individual performance may be irrelevant to the maximization of supply chain profit in a coordinated manner. Similarly, the traditional policies, particularly rules and procedures, may not be relevant to the new conditions of inter organizational relationship. There has been over reliance on technology in trying to implement IT (Lee *et al.*, 1997). At the same time, literature reports that it is usually observed that supply chain partners have different decision rights and expertise (Simatupang & Sridharan, 2005). If a company believes it must change all of its key operations and systems to attain the benefits of supply chain integration, then it becomes a great challenge because it is very difficult



to make individual trading partners in the supply chain, each with their own goals, function as a synergistic whole. Thus, supply chain partners should coordinate critical decisions that affect the performance of their firms.

## **RESEARCH METHODOLOGY**

### **Research design**

According to Cooper and Schindler (2008), research design is a planned and structured investigation conceived to obtain answers to a research question or problem. It is a statement of essential element of a study and constitute the blue-print for the collection, coding and analysis of data. It is a logical and systematic plan prepared for directing a research study. Cross-sectional survey research design was used in the study. Cross sectional survey design enabled the researcher to collect data once over the same period of time, analyze and make a report. The study adopted positivism philosophy because the study variables were based on facts derived from empirical literature review and the theoretical premises discussed in chapter two. Its results are quantitative and explain the relationship between the variables in a quantitative manner. The respondents to the questionnaire were procurement employees whose knowledge on the variables under study were based on facts gathered through direct observations and experience. This was then measured empirically using quantitative methods and statistical analysis.

### **Target population and Sampling technique**

The target population of the study consisted of 714 employees working in the procurement departments in the cosmetic manufacturing firms in County Government of Nairobi. A sample size of 256 respondents was used in the study. Since arriving at the 10 Cosmetic Firms involved stages, a two staged sampling technique was used. First-stage sampling involved getting a list of all Cosmetic Manufacturing Firms found in Nairobi County, from the Kenya association of Manufacturers. From the list, a sample of 10 cosmetic manufacturing companies were selected via simple random sampling technique. Simple random sampling method was used since it reduced bias by giving equal and independent chance to every member of the population (Kumar, (2005); Lohr (2009). This method offered the most generalizability for the findings (Sekaran & Bougie, 2010). In the second stage of sampling, the researcher purposively selected the procurement departments to pick the subjects of the study and were given the research survey instrument to fill up. Purposive sampling involved a deliberate selection of particular units of the universe (Miller & Yang, 2008). It enabled the

researcher to select specific subjects that provided the most extensive information about the phenomenon being studied (Kombo & Tromp, 2009).

### Research instruments

Self-administered (structured and unstructured questionnaires) were the main research instruments of collecting primary data (Eriksson & Kovalainen, 2008). Self-administered questionnaire has a higher response rate (Benchhofer & Paterson, 2008). The likert scale was used in the study. A likert scale is a psychometric scale commonly involved in research that employs questionnaires (Burns *et al.*, 2008). It is the most widely used approach to scaling responses in survey research. It is commonly used in similar research, which allows respondents to express either a favourable or unfavourable attitude toward the object of interest (Cooper & Schindler, 2006). The range captures the intensity of their feelings for a given item (Norman, 2010). The scale normally ranges from 'Strongly Disagree'= 1, 'Disagree' = 2, 'Neutral'= 3, 'Agree' = 4, 'Strongly Agree'= 5, In this way, the variability of the responses was captured more accurately and the questionnaire became more sensitive to responses. The structured and unstructured questionnaires were administered on the basis of 'drop and pick later'. The researcher personally distributed the questionnaires. The researcher agreed with the respondents when the research instruments were to be administered and specific dates of collecting the questionnaires. Adequate time was provided for the respondents to respond.

### Data Processing and Analysis

The data that were obtained from the questionnaires were both quantitative and qualitative. Before processing the responses, every filled questionnaire was tallied for every response per question. The responses were first edited, coded and cleaned for analysis. Qualitative data was condensed by editing, paraphrasing and summarizing in order to derive meaning from it. Using the content analysis technique, the data was coded and thereafter put into theme categories and tallied in terms of the number of times it occurs.

Data was then tabulated into respective themes. Quantitative data were analyzed using both descriptive and inferential statistics. Descriptive statistic such as, mean, standard deviation and variance were used to give a glimpse of the general trend (Mugenda, 2011). Inferential statistics was also applied in the study. Inferential statistics techniques allowed the researcher to use a sample size of 256 respondents to make a generalization about the entire population (Cooper & Schindler, 2011). SPSS was used to conduct both descriptive and inferential data analysis of each variable. To assess the factorability of items, two indicators were examined: Kaiser Meyer-Olkin measure of sampling adequacy and Barlett's Test of Sphericity (Pallant,

2010). These tests were generated by SPSS and helped to assess the factorability of data or suitability of data for structure detection (Pallant, 2010). Kaiser-Meyer-Olkin (KMO) test was used to assess sampling adequacy. Bartlett test of sphericity was performed to assess the appropriateness of using factor analysis (Hair *et al.*, 2013).

## RESULTS AND DISCUSSION

### Response Rate

The researcher administered questionnaires to 256 respondents who were sampled out as per the methodology described in the previous chapter. 210 duly filled questionnaires were returned. This represents a response rate of 93.75 %. According to Sekaran, (2006), a response rate of 30% is considered acceptable for surveys. Thus, the response rate achieved in this study can be considered sufficient to give the findings adequate reliability.

### Descriptive Statistics of the Variables

This section illustrates descriptive findings and discussions based on the objectives of the study. The findings were presented in form of Mean, Standard Deviations, and Variances. Weighted Mean was done to give a conclusion of the findings. The responses are in line with a 5 Point Likert-Scale ranging from:- Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5.

### Decision Synchronization

The study inquired on the effect of Decision Synchronization on Performance. The results are presented in Table 1.

Table 1: Descriptive Statistics for Decision Synchronization

Decision Synchronization Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Our firm and SCP have agreement on the goals of the SC.	1.9	1.9	16.2	59.0	21.0	210	1	5	3.95	0.787
Our firm and the SCP have common agreements on integral relationships of the SC	0	2.9	14.3	56.2	26.7	210	2	5	4.07	0.722
Our firm and the SCP agree that our individual firm goals can be achieved through working towards the goals of the SC.	0	2.9	14.8	48.1	34.3	210	2	5	4.14	0.767
Our firm consistently incorporates our SCP input to joint planning and assortment	0	3.3	29.0	42.4	25.2	210	2	5	3.90	0.818
We jointly develop demand forecasts with our SCP	1.0	7.1	18.6	50.5	22.9	210	1	5	3.87	0.879

Our firm incorporates the SCP input on order exceptions	1.9	6.2	21.0	44.3	26.7	210	1	5	3.88	0.940
Our firm and the SCP have common agreement on improvements that benefit the SC as a whole.	1.4	1.0	18.1	53.3	26.2	210	1	5	4.03	0.772
Our firm and the SCP have joint Agreement on the inventory requirements.	0	3.8	17..6	51.9	26.7	210	2	5	4.01	0.773
There is alignment between the goals of the SC partners	0.5	4.8	13.3	52.4	29.0	210	1	5	4.05	0.811
As a result of joint effort, it has resulted into better commitment of partners,	1.0	1.4	16.7	49.5	31.4	210	1	5	4.09	0.786
Grand Mean = 4.00										
Valid N (Listwise) =210										

The findings in Table 1 indicates that the respondents agreed (Mean =4.14; Std Dev =0.767) that their firm and the supply chain partners agree that their individual firm goals can be achieved through working towards the goals of the supply chain. The findings further indicated that as a result of joint effort (Mean =4.09; Std Dev =0.786) has resulted into better commitment of partners, hence performance. The respondents were also in agreement (Mean =4.07; Std Dev =0.722) that our firm and the supply chain partners have common agreements on the importance of integral relationships of the supply chain.

Further, findings indicated that there is an alignment (Mean =4.05; Std Dev =0.811) between the goals of the supply chain and that of partners in the supply chain. The respondents also concurred (Mean =4.03; Std Dev =0.772) that our firm and the supply chain partners have common agreement on the importance of improvement that benefit the supply chain as a whole. In addition, respondents were in agreement (Mean =4.01; Std Dev =0.773) with the statement that our firm and the supply chain partner have joint agreement on the inventory requirements. Findings too indicated that respondents agreed (Mean =3.95; Std Dev =0.787) with the statement that our firm and supply chain partners have agreement on the goals of the supply chain.

Respondents also concurred (Mean =3.90; Std Dev =0.818) with the statement that our firm consistently incorporates our supply chain partners input to joint planning and assortment. Further, respondents were in agreement (Mean =3.88; Std Dev =0.940) with the statement that our firm incorporates the supply chain partners input on order exceptions. Finally, the respondent's concurred (Mean =3.87; Std Dev =0.879) that they jointly develop demand forecasts with our supply chain partners. These findings imply that when Cosmetics Manufacturing Firms ensure that the needs and expectations of the partners have been incorporated in the operations, will lead to the achievement of superior firm performance. Generally, the respondents were on agreement with the statements pertaining to decision

synchronization. The findings are consistent with the study findings of Wilson *et al.*, (1995), who found that mutual goals influence performance satisfaction which in turn influences the level of commitment to the strategic alliance. The study findings are also supported by the findings of Harland *et al.*, (2004), who concluded that the level of synchronization in the decision making process is a key element of supply chain coordination and as a way of building and maintaining mutual partnerships.

### Factor Analysis on Decision Synchronization and Performance

Factor analysis was carried out to describe the variability among the observed variables and check for any correlated variables with the aim of reducing data that was found to be redundant. Conventionally, statements scoring more than 30% which is the minimum requirements for inclusion of variables into the final model were included (Hair, Black & Rabin, 2010). Factor analysis on decision synchronization and performance was carried out. The results are presented in Table 2.

Table 2: Component Matrix for Decision Synchronization

Decision Synchronization Statements	Factor Components
Our firm and supply chain partners have agreement on the goals of the supply chain.	0.792
Our firm and the supply chain partners have common agreements on the importance of integral relationships of the supply chain	0.754
Our firm and the supply chain partners agree that our individual firm goals can be achieved through working towards the goals of the supply chain.	0.721
Our firm consistently incorporates our supply chain partners input to joint planning and assortment	0.682
We jointly develop demand forecasts with our supply chain partners	0.761
Our firm incorporates the supply chain partners input on order exceptions	0.775
Our firm and the supply chain partners have common agreement on the importance of improvement that benefits the supply chain as a whole.	0.555
Our firm and the supply chain partner have joint agreement on the inventory requirements.	0.44
There is an alignment between the goals of the supply chain and that of partners in the supply chain	0.580
As a result of joint effort, it has resulted into better commitment of partners, hence supply chain agility.	0.500
<b>Average</b>	<b>0.6560</b>

Extraction Method: Principal Component Analysis.

Table 2 shows the loadings of the ten variables. The higher the absolute value of the loading, the more the factor contributes to the variable. From the analysis shown in Table 2, most respondents reported that the firm and supply chain partners have agreement on the goals of the supply chain, with a factor component of 79.2%. The firm incorporates the supply chain partners input on order exceptions scored a factor component of 77.5%. This was followed by the statement that the firm jointly develop forecasts with the supply chain partners having common agreements on the importance of integral relationships of the supply chain with a factor component of 75.4%. On the other hand, the statement on the firm and the supply chain partners having common agreements that their individual firm goals can be achieved through working towards the goals of the supply chain scored a factor component of 72.1%. The statement that the firm consistently incorporates supply chain partners input to joint planning and assortment scored a factor component of 68.2%. There is an alignment between the goals of the supply chain and that of partners in the supply chain scored a factor component of 58%. The firm and the supply chain partners have common agreements on the importance of improvement that benefits the supply chain as a whole scored a factor component of 55.5%.

As a result of joint effort, it has resulted into better commitment of partners, hence supply chain agility scored a factor component of 50%. The statement that the firm and the supply chain partner have joint agreement on the inventory requirements scored a factor component of 44%. Overall, majority of the respondents were in agreement that there is a close relationship between decision synchronization and Performance of cosmetics manufacturing firms in Nairobi County. From the analysis, none of the statements required to be dropped since their factor components were above 30% which is recommended threshold for inclusion of variables into the final model (Hair, Black & Babin, 2010).

### Correlation between Decision Synchronization and Performance

The correlation between Decision Synchronization and Performance in cosmetics manufacturing firms in Nairobi County, Kenya was done. The results of the correlation are presented in Table 3.

Table 3: Correlation between Decision Synchronization and Performance

Variable		Performance
Decision Synchronization	Pearson Correlation	.516**
	Sig. (2-tailed)	.000
	N	210

\*\* Correlation is significant at the 0.01 level (2-tailed).



The correlation results show that there is a positive and statistically significant correlation between decision synchronization and performance of cosmetics firms in Nairobi County ( $r=.516$ ,  $p < 0.01$ ). This implies that when there is alignment between the goals of the supply chain and that of the partners, it would ultimately lead to a higher level of Performance.

### Chi Square Test

To examine the strength of associations between the bivariate categorical variables, a Chi-Square test for association was done for the independent variables, dependent and moderating variable.

Table 4: Chi- Square Tests between Decision Synchronization and Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	1256.001 <sup>a</sup>	552	.000
Likelihood Ratio	389.355	552	1.000
Linear-by- Linear Association	54.922	1	.000
Sample size	210		

The nature of the association between Decision Synchronization and Performance was examined using Chi-square test resulting in a Pearson Chi-Square value = 1256.001,  $p = 0.000$ . The  $p$  value is less than 0.05 and hence there is a statistically significant association between decision synchronization and performance. This meant that there is a statistically significant association between decision synchronization and performance of cosmetics manufacturing firms in Nairobi County.

### Regression Analysis

Multiple regression analysis was conducted so as to determine the relationship between Performance, technological engagement and the independent variables. Regression models were generated at two levels. The first level without the interaction term and the second level with the moderator.

### ***Relationship between Decision Synchronization and Performance in Cosmetics Manufacturing Firms in Nairobi County, Kenya***

Table 5 shows two model summary for decision synchronization when moderator is included and when the effect of the moderator is not included.

Table 5: Regression Model Summary for Decision Synchronization

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	R Square Change	Change Statistics			
						F	Df1	Df2	Sig. F Change
1	.516 <sup>a</sup>	.267	.263	.387	.267	74.524	1 <sup>a</sup>	206	.000
2	.640 <sup>b</sup>	.410	.404	.348	.144	49.676	1 <sup>b</sup>	205	.000

a. Predictor (Constant), Decision Synchronization

b. Predictor (Constant), Decision Synchronization \* Technological Engagement

Model 1 shows there is a positive relationship between decision synchronization and performance ( $R = 0.516$ ,  $R^2 = 0.267$ ) and ( $F(1,206) = 74.524$ ,  $p=0.000$ ). An  $R^2$  of 0.267 was obtained which indicates that 26.7% of the variations in the performance of cosmetics manufacturing firms can be accounted for by decision synchronization. Model 2 shows the results after the interaction of the moderator (Decision Synchronization \* Technological Engagement) was introduced in the model.

The results show there is a positive relationship between decision synchronization and performance in cosmetics manufacturing firms with ( $R = 0.640$ ,  $R^2 = 0.410$ ) and  $F(1,205) = 49.676$ ,  $p=0.000$ ). An  $R^2$  of 0.410 indicates that 41% of the variations in the performance of cosmetics manufacturing firms can be accounted for by decision synchronization \* Technological Engagement. The inclusion of the interaction term resulted in a  $R^2$  change of .144 which indicates that the moderating effect explains 14.4% of the variation in the performance above and beyond the variation explained by the decision synchronization. Moderating effect of technological engagement on the relationship between decision synchronization and performance in cosmetics manufacturing firms in Nairobi County, Kenya shows a significant effect.

Table 6 shows the significance test results with two models, the model with the inclusion of the interaction term and the other model without the moderator.

Table 6: Significance Test Results for Decision Synchronization

Model		Unstandardized Coefficients		Standardized Coefficient	T	Sig
		B	Std. Error	Beta		
1	(Constant)	2.167	.230		9.425	.000
	Decision Synchronization	.493	.057	.516	8.633	.000
2	(Constant)	1.022	.263		3.885	.000
	Decision Synchronization	.276	.060	.289	4.614	.000
	Technological Engagement	.469	.067	.442	7.048	.000

a. Dependent Variable: Performance

Model 1 indicates that relationship between Decision Synchronization and Performance was positive and significant ( $b_1=0.493$ ,  $p = 0.000$ , Beta = 0.516). Equation 4.1 shows the regression equation for model 1, for every unit increase in Decision Synchronization, Performance is predicted to increase by 0.493.

**OLS Model:** Performance = 2.167+ 0. 493 Decision Synchronization.....Equation 4.1

This implies that an increase in information pertaining to decision synchronization leads to an increase in performance amongst cosmetics manufacturing firms. The null hypothesis that states decision synchronization has no significant effect on the performance was rejected at 95% significance level. The study therefore fails to reject the alternative hypothesis and concludes that decision synchronization has a significant effect on performance amongst cosmetics manufacturing firms in Nairobi County.

Model 2 shows that the moderating effect of Technological Engagement on the Relationship between Decision Synchronization and Performance of cosmetics manufacturing firms in Nairobi County was positive and significant ( $b_1=0.276$ ,  $p = .000$ , Beta = 0.289). Equation 4.2 shows the regression equation with the inclusion of the moderator (Technological Engagement). The equation implies that for every unit increase in decision synchronization, performance is predicted to have a change of 0.276 given that technological engagement is kept constant.

The null hypothesis is therefore rejected at 95% significance level and it is concluded that technological engagement moderates the relationship between decision synchronization and performance of cosmetics manufacturing firms in Nairobi County.

**MMR Model:** Performance = 1.022+ 0.276 Decision Synchronization Sharing + 0.469 Technological Engagement.....equation 4.2

### **Hypotheses Testing Results**

To test for individual significance of a coefficient, t-test was used under the null hypothesis. The test was done at 95% level of significance ( $\alpha=0.05$ ), critical value  $t=1.96$ . The null hypothesis is rejected when the t-calculated is strictly greater than the t-tabulated. The research hypothesis that the study sought to test are addressed in this section.

### ***Decision Synchronization and Performance***

The hypothesis for decision synchronization was stated as:

*Ho:  $\beta_1 = 0$ : Decision Synchronization has no significant effect on the Performance of Cosmetics Manufacturing Firms in the Nairobi County.*

The test was done at 95% level of significance ( $\alpha=0.05$ ), critical value  $t=1.96$ . T-test statistic was used to test for the significance of Decision Synchronization. From Table 4.6, Model 1, the T value obtained was 8.633. Comparing the t-tabulated and t-calculated values statistically, it is evident that the  $t_{\text{calc}} > t_{\alpha}$ . The study therefore rejected the null hypothesis and concluded that decision synchronization has a significant effect on the performance of cosmetics manufacturing firms in Nairobi County.

Decision synchronization is a key dimension of performance that has the potential to reduce a source of conflict inherent in supply chain relationships. The study findings are supported by previous works of Simatupang and Sridharan (2005) which notes that decision synchronization facilitates incentive alignment which allows firms to appropriately devise incentives based on the level of responsibility a party owns. The scholars further asserted that decision synchronization enables partners in the supply chain to coordinate critical decisions in planning and operations that benefit the supply chain as a whole. Decision synchronization can improve information sharing by specifying information needs and incentive alignment by providing justification for incentive alignment. Thus, supply chain partners should coordinate critical decisions that affect the agility of their firms. Supply chain network theory was relevant to the study. Firms aspiring to supply chain performance must have common inclination for managing their supply chain and develop firm-level strategies consistent with their supply chain orientation.

## SUMMARY

The third objective of the study sought to establish the effect of decision synchronization on the Performance of cosmetics manufacturing firms in Nairobi County. The correlation results showed that there was a positive and statistically significant correlation between decision synchronization and Performance ( $r=.516$ ,  $p < 0.01$ ). This implied that when there is an alignment between the goals of the supply chain and that of the partners, it would ultimately lead to a higher level of partnership and thus performance. The study also rejected the null hypothesis and concluded that decision synchronization has a significant effect on the performance of cosmetics manufacturing firms in Nairobi County. This is due to the fact that decision synchronization is a key dimension of Performance that has the potential to reduce a source of conflict inherent in supply chain relationships. From the findings, results reveal that there is a positive relationship between decision synchronization and Performance ( $R = 0.516$ ,  $R^2 = 0.267$ ). An  $R^2$  of 0.267 was obtained which indicated that 26.7% of the variations in the Performance of cosmetics manufacturing firms was accounted for by decision synchronization.

## **CONCLUSIONS**

From the findings, the researcher concludes that decision synchronization has a positive and significant relationship on Performance of cosmetics manufacturing firms. Therefore, if decision synchronization was implemented throughout the entire supply chain, it could result in enhanced Performance of a manufacturing entity. Decision synchronization among partners would result in efficient implementation of alliance practices, which anticipate improved Performance.

## **RECOMMENDATIONS**

To achieve a competitive advantage in a volatile business environment, the study recommends that firms should align with all the parties in the supply chain including the suppliers and customers. This will help to streamline operations and together achieve a level of performance beyond individual companies. Thus, supply chain partners should coordinate critical decisions that affect their firm's performance. Firms aspiring to supply chain performance must have common inclination for managing their supply chain and develop firm-level strategies consistent with their supply chain orientation. Decision synchronization is therefore a key dimension of performance that has the potential to reduce a source of conflict inherent in supply chain relationships. Based on the findings, the researcher recommends that cosmetics manufacturing firms should focus more on developing commitment to decision synchronization. This is particularly important in the decision making process and as a key element of supply chain coordination and therefore competitive advantage of the firm. It is also key in building and maintaining mutual partnerships of the supply chain firms hence achieving higher levels of performance.

## **SCOPE FOR FURTHER STUDIES**

The current research endeavor focused on cosmetics manufacturing firms in a developing economy, being Kenya. The findings could be different with other country classification groups considering developed countries. This suggests a need for more cross-boundary research to identify whether cosmetics manufacturers in other developed countries consider the same SC integral relationship antecedents. Again the antecedents of SC integral relationships were identified for agile supply chains suitable for innovative products, such as in cosmetics manufacturing firms in Kenya. Therefore, the implications might show differences in contexts where the identified antecedents are tested on industries with the adoption of lean or le-agile supply chains. On the other hand, the respondents' companies represented a small sample size, which may affect the stability of the parameter estimates. This necessitates

replication of the study in contrasting empirical contexts. Future studies should collect data from a larger population and compare with other countries to further validate or extend the theoretical constructs identified in this study. Further, the research employed a cross-sectional snapshot of the phenomenon. The research was not able to draw causal inferences because of the undertaken cross-sectional nature of data. This gap can be remedied by examining the linkage between SC integral relationship factors and performance in a longitudinal setting to study for causations in an agile environment.

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