SUPPLIER RELATIONSHIP MANAGEMENT AND PROCUREMENT PERFORMANCE AT THE NATIONAL AGRICULTURAL RESEARCH ORGANIZATION- NARO

BY

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DECLARATION

I, Ateker Ronny Terry Namuganyi, declare that this is my original work, and where other people's work was used, it was duly acknowledged. I further declare that this work has not been presented to any other Institution or University for any award.

Signed: ……

Date: ……...

APPROVAL

This Research Proposal, entitled "Supplier Relationship Management and Procurement Performance in National Agricultural Research Organization-NARO", has been submitted with our approval as supervisors.

First Supervisor:

Mr. Alex Nduhura

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DEDICATION

This thesis is dedicated to Embers Arya Caitlin Ateker and the unnamed one.

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LIST OF ABBREVIATIONS AND ACRONYMS

NARIs	:	National Agricultural Research Institutes
PPDA	:	Public Procurement and Disposal of Public Assets
TCE	:	Transaction Cost Economics
ZARDIs	:	Zonal Agricultural Research and Development Institutes
RDP	:	Resource Dependency Perspective
NARO	:	National Agricultural Research Organization
EDI	:	Electronic Data Interchange
PDU	:	Procurement & Disposal Unit
CC	:	Contracts Committee
LPO	:	Local Purchase Order
ICT	:	Information & Communication Technology
SRM	:	Supplier Relationship Management

ABSTRACT

The study examined the relationship between Supplier Relationship Management-SRM and procurement performance in the public sector of Uganda. Specifically the study examines the relationship between strategic alliance, communication, supplier performance management aspects of SRM and procurement Performance in NARO. The study used a cross-sectional design adopting both qualitative and quantitative approaches on a sample 79 staff of NARO from the secretariat, NARIs and ZARRIs. Data was collected using a questionnaire and interview guide. The study found that a low inclination to engage in strategic alliances considerations of joint planning and supplier development. There was a moderate significant relationship between strategic alliance and procurement performance in NARO ($r = 0.309^*$, $p = 0.010$). The study found wide reliance on informal communication and with less formal communication. There was a high significant relationship between communication and procurement performance in NARO ($r = 0.678^*$, $p = 0.000$). The study found low use of supplier performance management practices of setting performance targets and reviewing of supplier performance. There was a high significant relationship between supplier performance management and procurement performance in NARO ($r = 0.685^{**}$ and significance $p = 0.000$) and it was the highest significant predictor of the variance in procurement performance at NARO. The study concluded that there is a significant relationship between strategic alliances, communication, supplier performance management and procurement performance in NARO. To enhance procurement performance in public entities, the study recommends that management should engage in joint planning through joint identification and development of specifications, development of supplier's technical, quality and cost management capabilities. Management should explore the use of meetings, workshops, seminars, and information and communications technology for formal communication in managing the relationship with suppliers. Use of quality circles and teamwork should equally be sought. The study recommends that management should set supplier performance indicators, quantity expectations and quarterly performance expectations for strategic supplies. Use of meeting and supplier appraisal should be emphasized in the management of relationships with suppliers.

CHAPTER ONE

INTRODUCTION

1.1. Introduction

This study examined the relationship between Supplier Relationship Management (hereafter SRM) and procurement performance in National Agricultural Research Organization. SRM is the independent variable while procurement performance is the dependent variable. This chapter presents the background to the study, the statement of the problem, the purpose and objectives of the study, the research questions, the hypotheses, and scope of the study, significance, justification, the conceptual framework, operational definition of terms and concepts and limitations to the study.

1.2. Background to the Study

This section considers the historical, theoretical, conceptual and contextual perspectives of supplier relationship management and its influence on procurement performance.

1.2.1. Historical background

The evolution of Supplier Relationship Management world over is embedded in the four level of evolutions of supply chain and according to McLaren (2006) because supply chain management in the1950 to 70s (Level I) took a functional focus characterized by discrete procurement processes managed at the department level and procurement performance measured at functional level, SRM was not considered as instrumental. Level II also called Internal Integration which featured around the 1980 was characterized by company-wide processes managed at both functional and cross-functional process Levels and procurement performance measured at the company, process, and diagnostic levels. Here too, supplier relationship management was not considered as instrumental in the supply chain management World over. In the 1990s (Level III) also known as the linked

network, the supply chain emphasized core processes managed internally; information sharing with external partners; outsourcing of non-core processes; procurement metrics defined by one firm; and joint performance monitoring and correction with partners. It was at this time that SRM took precedence. Level IV- Integrated Networks which can be traced at the turn of the new millennium was characterized with end-to-end process management, coordination, and collaboration with external partners; alignment of business objectives and processes of each partner and joint metrics definition, monitoring, and correction with external partners. Level V- Optimized Network is now characterized with standardized, modular processes coordinated in real-time and executed by most capable partners; standardized performance metrics monitored and corrected jointly at the company, process, and diagnostic levels. SRM is therefore emphasized at level IV and V of the supply chain integration. However, despite the use of integrated and optimized networks for SRM in the supply chain, procurement performance in most private and public entities is still constrained (Gripsrud, 2006).

1.2.2. Theoretical background

The study was guided by the transaction cost economics (TCE) theory by Williamson (1979) which asserts that the focus of the firm is to minimize the sum of transaction costs and production costs. TCE also asserts that transaction costs affect the firm's decisions on how they organize their activities, whether to move towards vertical integration (hierarchy) or to prefer market exchange. In relation to SRM, the TCE theory posits that the decision of whether to collaborate or not should be based on the efficiency of governance. High frequency of transaction costs, uncertainty and asset specifically guide firms towards hierarchy. Blomqvist, Kyläheiko and Virolainen (2002) have presented a view of a hybrid governance structure involving partnership between markets and vertical hierarchies based on the TCE. According to them, cooperation is an efficient solution only if it creates extra value compared to the market and hierarchy options. According to their study,

the factors that encourage cooperation are a high degree of transaction frequency, mutual dependency, the possibility to share risks, and the possibility to share information. Applying TCE underlies the aspects of efficiency and cost focus. Especially, it defines the boundaries of a firm. Value can be created from supplier relationship management through learning mechanisms, routines and experience.

The study will also be underpinned by the Resource Dependence Perspective (RDP) proposed by Pfeffer and Salancik (1978) which asserts that organizations depend on resources and these resources ultimately originate from an organization's environment. The environment, to a considerable extent, contains other organizations and the resources one organization needs are thus often in the hand of other organizations. Similarly the RDP of the firm asserts that resources are a basis of power and legally independent organizations can therefore depend on each other. Power and resource dependency are directly linked where for example organization A's power over organization B is equal to organization B's dependence on organization A's resources.

Pfeffer (1982) while building on the RDP of the firm contents that to acquire resources, organizations must interact with others who control these resources and the survival of the organization can be partially explained by its ability to ensure the continuity of the needed resources. Power is determined by the definition of social reality created by the actors and their control over the resources. RDP thus applies the aspects of external and internal social relations, power distribution and the level of dependency on external counterparts. It aims at the optimization of the continuity of the business and the autonomy of a firm.

The TCE and RDP theories underpinned this study as they support the purpose of supplier management which is development of collaborative beneficial relationships, supplier performance

monitoring; communication through diffusion of supplier information between business units, minimization of transaction costs, value creation through internal capabilities and resources, and reducing the risks of supply dependence and availability.

1.2.3. Conceptual background

Hughes (2010) defines Supplier Relationship Management as a discipline of strategically planning for, and managing, all interactions with third party organizations that supply goods and/or services to an organization in order to maximize the value of those interactions. In practice, Supplier Relationship Management entails creating closer, more collaborative relationships with key suppliers in order to uncover and realize new value and reduce risk primarily through strategic alliances mechanisms, regular communication and supplier performance management.

Strategic Alliance is defined as a relationship formed by two or more organizations that share (proprietary), participate in joint investments, and develop linked and common processes to increase the performance of both companies. Many organizations form strategic alliances to increase the performance of their common supply chain. It also involves a regular cadence of operational and strategic planning and supplier development and are critical to maintaining supplier commitment and focus, and optimally leveraging their evolving capabilities (Monczka, et al., 1998; Barron, 2007; Arshinder, 2008).This study borrows from the above definition and conceptualized strategic alliances to include two indications of joint planning and supplier development enabled by collaboration.

Communication dimension of Supplier Relationship Management arises from the view that the overarching purpose of the procurement function lies in value creation aimed at supporting firm performance which depends on both frequency of contact (both formal and informal) and ease of access to information necessary to sustain the relationship (Doloi, 2009). Frequent accesses via

regular formal or informal contacts between managers across firms have been cited as a critically important element of inter-firm communication (Vargo& Akaka, 2009). According to Doloi (2009), communication between supplier and buyer should be bi-directional and two-way communication to improve the supplier's performance through buyer's feedback. This has been enabled by recent developments where information technology has been widely used to harness customer/supplier relationship management (Sanders, 2008; Graeml et al., 2009). This study borrows from the above conceptualisation and conceptualised communication to include formal and informal communication as a Supplier Relationship Management consideration in NARO.

Supplier Performance Monitoring involves the setting of performance targets or set of deliverables that a supplier has to meet to enhance the achievement of the objective of procurement (Lambert &Schwieterman, 2012). Some of the supplier monitoring suggested by Thakkar et al. (2009) include fill rate or availability ratio which is the number of items ordered by customers and number of items delivered to customers; operational performance which may relate to average order cycle time, consistency of order cycle time; on-time deliveries and service reliability which deals with accuracy of work in order entry, warehouse picking& document preparation). A related aspect is the customer accommodation aimed at capturing measurement of perfect orders an indicator of an organization's commitment to zero-defect logistics; absolute performance which provides a better indication of how a firm's logistical performance really impacts customers and customer satisfaction. This study borrows from the above definition and conceptualised supplier

performance monitoring as dimensions of Supplier Relationship Management under the indicators of setting performance indicators and supplier performance reviews.

Van Weele (2010) defines procurement performance as the extent to which the procurement function is able to realize its predetermined goals at the sacrifice of a minimum of the company's resources resulting into among others, better decision making, higher visibility, buyer motivation, operating cost reductions and internal customer satisfaction. This study maintained this broader view of procurement performance to include indicators of procurement agility, value for money and internal customer satisfaction with supplies.

1.2.4. Contextual background

National Agricultural Research Organization is the principal institution for the coordination and oversight of agricultural research in Uganda. This is effected through Semi-Autonomous Public Research Institutes, coordinated and managed by the National Agricultural Research Organization Council and its Secretariat. There are 6 National Agricultural Research Institutes (NARIs) and 9 Zonal Agricultural Research and Development Institutes (ZARDIs).

A Public Procurement and Disposal of Public Assets (PPDA) Authority audit report (2012) on the entity revealed constraints on Supplier Relationship Management related aspects which constrained procurement performance. For example on contract performance records, Regulation 91 requires that all the contract management records maintained by a user department which include *inter alia*; delivery documents evidencing delivery of supplies or completion certificates in relation to a contract for services or works under the contract. Regulation 260 (1) requires that contract managers should submit reports on the progress or completion of a contract as required by a Procurement and Disposal Unit or the Accounting Officer. The audit revealed that, in a few instances, the Entity did not acknowledge receipt of supplies delivered. Examples include; *Supply*

of Scanner and Printer by MTA Computers Ltd at USD 4,140 and Supply of Furniture by Footsteps furniture Ltd at UGX 46,950,000. The Implication was that it was difficult to know whether deliveries conform to the terms and conditions of the contract or Local Purchase Order. Similarly, Value for money cannot be established because invoices were not verified against deliveries.

In accordance with the Fifth Schedule of the Public Procurement and Disposal of Public Assets Regulations 2003, Procuring and Disposing Entities are required to submit monthly reports to the Authority. The entities are required to report using standard form PP Form 200. The audit found that the Entity estimated to spend UGX 22.48 billion on procurement during the year, but only reported procurements of UGX 3.12 billion to PPDA, leaving a difference of about UGX 19.36 unexplained. The implication was that these procurements might not have been carried out in accordance with public procurement procedures laid down in the PPDA Act and Regulations 2003.

Furthermore, although Regulation 259(1) requires that a user department shall nominate an existing member of staff with appropriate skills and experience, or who is supervised by a member of staff with appropriate skill and experience, as a contract manager, the review noted that a number of cases did not have Contract Mangers. As a result of this most of the contract implementation documents especially payment documents were missing yet it is mandatory for the Contract Manager to ensure that the Entity meets all payment and other obligations in accordance with the terms and conditions of the contract. Examples of the cases include*; Binding Manuals by TTB Investments Ltd at UGX 29,018,088.* The implication was that some contracts were haphazardly supervised and value for money many be not realized.

The audit also revealed that in a number of instances, the PDU did not make submissions to contract committee and hence contracts committee did not make some of the key approvals such

as approval of solicitation document, procurement method, Bid notice, shortlist of providers, approval of negotiation teams and evaluation committee recommendations prior to Negotiations, contract amendments and reserve prices for markets. Examples include; Supply of Various Tractor Implements by Farm Engineering Industries Ltd at USD 32,100. The implication was that the contracts were not done in a fair and transparent manner, as required by Reg. 87(3); Value for money may not have been realized as required by Reg. 86(2).

1.3. Statement of the Problem

An organization benefits greatly when key suppliers reduce costs, introduce new services designed to address the organization's needs, and work with the organization to streamline joint processes. For the purchasing organization, this process develops new services and products that can increase customer and/or taxpayer value, close capability and performance gaps, create a reliable and long-term source of supply, provide access to new ideas and opportunities for improvement and prioritize capability development and supplier investment (Monczka, et al., 1998; Arshinder, 2008; Barron, 2007; Doloi, 2009; Hughes & Jonathan, 2010; Lambert & Schwieterman, 2012). However despite the efforts to engage in Supplier relationship management for strategic supplies, procurement function in NARO manifest significant performance gaps. A PPDA Audit report (2012) on NARO found 730,183,197/= at medium risk representing 26% of all procurement audited and 51,667,48/= at high risk representing 2% suggesting that about 30% of the procurements in the entity were at risk with failure to attain value for money. The report also points out inadequacies in supplier engagement relying on mostly on Request for Quotation resulting into 16% high risk of the procurement value audited (PPDA Audit Report, 2012). This study therefore examined the relationship between Supplier Relationship Management and procurement performance in National Agricultural Research Organization.

1.4. Objectives of the study

1.4.1. General Objective

To establish the relationship between Supplier Relationship Management and procurement performance at the National Agricultural Research Organization

1.4.2. Specific Objectives

1. To establish the relationship between Strategic Alliance and Procurement Performance in NARO
2. To examine the relationship between Communication and Procurement Performance in NARO
3. To analyze the relationship between performance management and Procurement performance in NARO

1.5. Research Questions

1. What is the relationship between Strategic Alliance and Procurement Performance in NARO?
2. What is the relationship between Communication and Procurement Performance in NARO?
3. What is the relationship between performance management and Procurement performance in NARO?

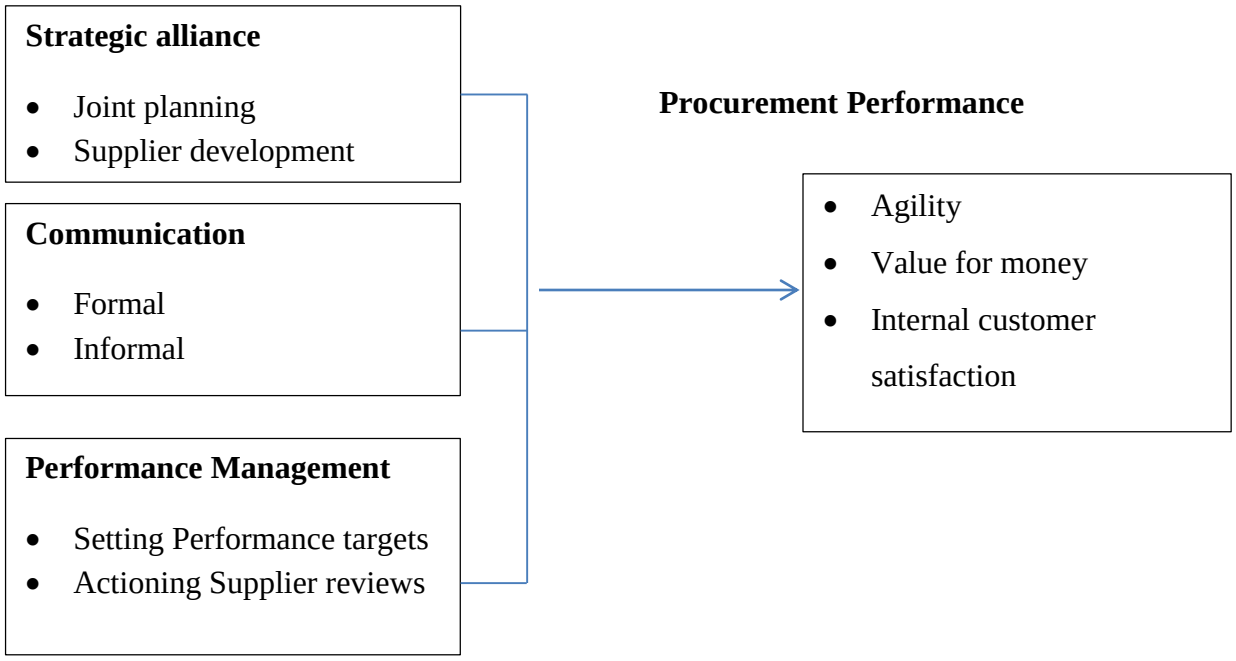
1.6. Study Hypotheses

1. There is a significant relationship between strategic alliance and procurement performance
2. There is a significant relationship between communication and procurement performance

3. There is a significant relationship between supplier performance management and procurement performance

1.7. Conceptual Framework

Supplier Relationship Management (SRM)



Source: Adopted with modifications from the TCE by Williamson (1979) and the RDP Theory by Pfeffer and Salancik (1978). Modified by Ateker Ronny Terry (2015)

1.8. Scope of the Study

1.8.1. Content Scope

The study concentrated on Supplier Relationship Management dimensions of strategic alliances with suppliers, communication and supplier performance management as the independent variable. Under strategic alliances, the study concentrated on joint planning and supplier development. Communication, the study will concentrate on two indicators of formal and informal

communication while supplier performance management was considered under two indicators of setting Performance targets and auctioning on supplier review reports. Procurement performance the dependent variable was considered under three indicators of procurement agility, value for money and internal customer satisfaction with supplies.

1.8.2. Geographical Scope

The study was accrued out in National Agricultural Research Organization Secretariat and all its associated NARRIs and ZARDIs in Uganda.

1.8.3. Time Scope

The study covered the period 2010-2015 the time National Agricultural Research Organization was implementing its five year strategic plan was experiencing problems with its Supplier Relationship Management and procurement performance.

1.9. Justification of the Study

Procurement performance in vital for public sector accountability and stakeholders satisfaction as well as facilitating decision making. There is however little research focusing on Supplier Relationship Management best practices and their application in the public sector and its influence on procurement performance. There are also theoretical gaps on the application of TCE and RDT theories in the Supplier Relationship Management and procurement performance especially in the public sector. This study therefore helps fill knowledge and theoretical gaps and helps generate policy recommendations for enhanced Supplier Relationship Management and procurement performance.

1.10. Significance of the Study

The study may be useful in the following ways:

To the Government of Uganda and the management of National Agricultural Research Organization, the study will help develop SRM policy and managerial recommendations for enhanced attainment of value for money and internal customer satisfaction with the procurement function.

To the academia, the study generates new knowledge in the area of SRM and procurement performance in public sector of a developing country Uganda. By so doing the study helps fill knowledge and theoretical gaps on the relationship between SRM and procurement performance.

1.11. Operational Definition of Terms and Concepts

Supplier Relationship Management in this study refers to the efforts to engage in strategic alliances with suppliers, use of modern supply chain communication technology and supplier performance management.

Supplier alliances in this study refer to the efforts to undertaken joint planning of supplies and engagement in early supplier development to ensure attainment procurement objectives.

SRM technology in this study refers to the ICT infrastructure and associated communication networks use in the supply chain.

Supplier performance management in this study refers to the efforts to set supplier performance indicators and reviewing supplier performance through monitoring and evaluation.

Procurement performance in this study refers the attainment of procurement objectives of procurement agility, value for money and internal customer satisfaction with supplies.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents a review of related literature on Supplier Relationship Management and procurement performance based on what other scholars have observed world over in both profit and nonprofit making entities. It specifically presents related literature on the theoretical underpinnings of Supplier Relationship Management, and a review of related literature in relation to the specific objectives.

2.2. Theoretical Review

The study is to be guided by the transaction cost economics (TCE) theory by Williamson (1979) which asserts that the focus of the firm is to minimize the sum of transaction costs and production costs. TCE also asserts that transaction costs affect the firm's decisions on how they organize their activities, whether to move towards vertical integration (hierarchy) or to prefer market exchange. In relation to Supplier Relationship Management, the TCE theory posits that the decision of whether to collaborate or not should be based on the efficiency of governance. High frequency of transaction costs, uncertainty and asset specify guide firms towards hierarchy. Blomqvist, Kyläheiko and Virolainen (2002) have presented a view of a hybrid governance structure involving partnership between markets and vertical hierarchies based on the TCE. According to them, cooperation is an efficient solution only if it creates extra value compared to the market and hierarchy options. According to their study, the factors that encourage cooperation are a high degree of transaction frequency, mutual dependency, the possibility to share risks, and the possibility to share information.

In support of the TCE theory, Heide and John (1990) argue that transaction cost analysis has been useful in studying relationship management because it provides insights into the circumstances that cause the development of a closer relationship between the buyers and suppliers. Heide and John base their theoretical argument on Williamson's (1979) studies stating that the establishment of a closer relationship corresponds to a shift away from market-based exchange toward bilateral governance.

Heide and John (1990) criticize the TCE theory that it does not recognize power or dependency in the interaction between the firms. According to them the features of the relationship determine what kind of a relationship is constructed. Similarly, Krapfel, Salmond and Spekman (1991) present that transaction costs are optimized if the relationship management is optimized according to the relationship type, and argue that transaction costs have an impact on the type of relationship. Furthermore, Cox (1996) argues that all discussion on the proper form of the relationship between the firm and its external environment must include the theory of TCE, because it presents the factors which determine the internal and external boundaries of the firm. However, he points out that TCE does not tell under which circumstances and conditions internal or external contractual relationships are more or less successful, achieving lowest transaction costs. He states that successful firms will be those who can create skills and knowledge that help them get the dominating position within a supply chain. Also Ghoshal and Moran (1996) criticize TCE because it fails to explain the influences of internal management and social relations. Later, Cox (2005) has argued that TCE does not take into account the potential benefits that can arise out of a collaborative relationship with suppliers or how the costs and gains are combined within the decision-making framework. Grover and Malhotra (2003) argue that transaction costs can be

studied in relation to efficiency and performance metrics within the supply chain. According to them, transaction costs can affect to buyer- supplier relationships and flexibility.

The study will also be underpinned by the resource dependency perspective (RDP) by Pfeffer and Salancik (1978) which asserts that organizations depend on resources and these resources ultimately originate from an organization's environment. The environment, to a considerable extent, contains other organizations and the resources one organization needs are thus often in the hand of other organizations. Similarly the RDP of the firm asserts that resources are a basis of power and legally independent organizations can therefore depend on each other. Power and resource dependence are directly linked where for example organization A's power over organization B is equal to organization B's dependence on organization A's resources.

Pfeffer (1982) while building on the RDP of the firm contents that to acquire resources, organizations must interact with others who control these resources and the survival of the organization can be partially explained by its ability to ensure the continuity of the needed resources. Power is determined by the definition of social reality created by the actors and their control over the resources. Organizations seek to avoid dependencies and external control and try retain their autonomy for independent action (Pfeffer and Salancik, 1978, pp. 258-259).

Krapfel, Salmond and Spekman (1991) refer to RDP and argue that the value of a relationship differs according to the willingness and ability of current exchange partners to provide sufficient demand for current and expected outputs, in light of the availability and cost of locating, qualifying and establishing relationships with an alternative exchange partner. Cox (2005) states that relational power determines the sharing of added value, thus it is also relevant to explore how the power and dependency forms the relationship types. Recently, resource dependence theory has been under scrutiny in several review and meta-analytic studies by Drees and Heugens (2013);

Sharif and Yeoh (2014) which all indicate and discuss the importance of this theory in explaining the actions of organizations, by forming interlocks, alliances, joint ventures, and mergers and acquisitions, in striving to overcome dependencies and improve an organizational autonomy and legitimacy. While resource dependence theory is one of many theories of organizational studies that characterize organizational behavior, it is not a theory that explains an organization's performance per se.

Applying TCE underlies the aspects of efficiency and cost focus. Especially, it defines the boundaries of a firm. Value can be created from supplier relationship management through learning mechanisms, routines and experience. RDP applies the aspects of external and internal social relations, power distribution and the level of dependency on external counterparts. It aims at the optimization of the continuity of the business and the autonomy of a firm.

The TCE and RDP theories underpinned this study as they support the purpose of supplier management which is development of collaborative beneficial relationships, supplier performance monitoring; communication through diffusion of supplier information between business units, minimization of transaction costs, value creation through internal capabilities and resources, and reducing the risks of supply dependence and availability.

2.3. Strategic Alliances and Procurement Performance

Strategic alliances are enabled by effective collaboration of which Monczka et al., (1998) perceive collaboration as the process by which partners adopt a high level of purposeful cooperation to maintain a trading relationship over time. The relationship is bilateral; both parties have the power to shape its nature and future direction over time. Mutual commitment to the future and a balanced power relationship are essential to the process. The supply chain members may coordinate by joint

consideration of the system wide costs, sharing cost and price information, synchronizing order processing time and networked inventory management information systems results in reduction in ordering cost, holding cost, procurement cost, and supply chain system wide costs and improvement in customer service level and product availability and product variety (Barron, 2007; Piplani and Fu, 2005).

Similarly, Huttinger, et al (2014) examines the factors that influence a supplier's choice to treat selected customers more preferentially than others and found that the growth opportunities for suppliers and customers' operative excellence, reliability and relational behavior are factors that induce suppliers to award preferential customer treatment. In contrast, innovation potential for suppliers, customers' support of suppliers, supplier involvement and contact accessibility do not show a significant effect on suppliers' behavioral intentions toward preferential customer treatment.

Rashed, et al (2010) examine the combined consequence of information and knowledge sharing in joint planning on supplier's operational performance through supplier-buyer relationship and found that information sharing during joint planning is a prerequisite for knowledge sharing and the close supplier-buyer relationship is a vital factor for escalating the supplier's operational performance.

Perez et al., (2013) equally examine alliance outcomes and found that alliance inception, joint-learning, specialization and discovery constitute sequences of increasing understanding, cooperation, and higher order learning between the partners; evolving from an exchange of existing knowledge to the joint development of new knowledge. In the context of business- to-business relationships, the study recommends that strategic alliances with suppliers should involve

learning about customers, interacting with customers, instituting customer- specific investments and co- develop breakthrough innovations.

In complement, Hill and Omar (2006) are of the view that coordination among supply chain members jointly minimizes the operating costs arising from shared benefits after jointly planning the production and scheduling policies. Arshinder (2008) equally supports the role of joint planning and collaboration in the supply chain and proposes that supply chain coordination is a vehicle to redesign decision rights, workflow, and resources between chain members to leverage better performance such as higher profit margins, improved customer service performance, and faster response time. Arshinder et.al., (2011) support the importance of strategic alliances and opines that benefits such as elimination of excess inventory, reduction of lead times, increased sales, improved customer service, efficient product developments efforts, low manufacturing costs, increased flexibility to cope with high demand uncertainty, increased customer retention, and revenue enhancements may accrue from use of joint planning with key suppliers.

Some case studies have been carried out to establish how strategic alliances with suppliers can contribute to procurement performance. Larson (1994) had earlier noted that establishing long-term relationships with the key suppliers can lead to improved firm's financial performance yet procurement coordination of the firm's activities with key suppliers can impact total costs. Dawes (2008) equally describes a continuum of different types of buyer–supplier relationships and reports that the Japanese auto firms cultivate their suppliers through investments, sharing of knowledge, and joint problem solving. Filho et al. (2008) analyzed the extent of strategic alignment in the Brazilian automotive chain by examining the strategies adopted by the Procurement function in the first tier suppliers for managing relationships with their suppliers.

In relation to supplier development research by Wagner and Krause, suggest support from top management and proactive procurement management are key factors to the success of these supplier development programmes. The findings by Giannakis, (2008) concluded that there is a significant positive relationship between supplier development strength and procurement performance. The implication was that a long-term partnership was found to be a significant predictor of performance improvement.

Rhodes et al. (2006) identify some pitfalls in supplier development that need to be avoided such as lack of supplier commitment, insufficient supplier resources, lack of trust, poor alignment of organizational cultures and insufficient inducements to the supplier as well as unsupportive managers.

2.4. Communication and Procurement Performance

There has been a series of empirical research examining the role of communication in sully chain management since the Krause etal (1998) study which observed that supplier development process involved approaching suppliers and arranging a meeting of the buying firm's cross-functional team with top management at each of the suppliers in the strategic commodities category. In the strategic approach, the buying firm's representatives emphasized that the supplier development effort did not represent a demand for improved performance, but an agreement to work jointly to improve the flow of materials, services and information between the supplier and buying firm for mutual benefit.

On the relationship between SRM technology and procurement performance, Fin (2006) investigated the relation between Electronic Data Interchange in apparel industry and three performance levels: operational, financial and strategic. This helped in reduction of lead time from several weeks to 3 days. Devaraj et al. (2007) analyzed the relationship between supplier

integration and customer integration with supply chain performance when supported by e-business technologies. E-business capability supporting supply chain technologies such as customer orders, procurement and collaboration between suppliers and customer enhances the production information integration intensity, which in turn improves the supply chain performance.

Li et al. (2009) carried out an empirical study to explore relationship between IT, supply chain integration and supply chain performance of Chinese manufacturing organization. Supply chain integration mediates the relationship between IT implementation and supply chain performance. Hence, IT can be a good enabler to integrate supply chain. But it is important to take into account the justification of IT in changing business environment.

Rashed et al (2010) examine the combined consequence of information and knowledge sharing on supplier's operational performance through supplier-buyer relationship that information sharing is a prerequisite for knowledge sharing and the close supplier-buyer relationship is a vital factor for escalating the supplier's operational performance in Bangladesh textile firm.

Güleş, Çağlıyan, Bedük (2012) equally examines the effect of a new supply chain design on the business performance in the context of information technologies and the results demonstrate that restructuring of the supply chain by using ICT has positive effects on business performances criterions like supply, production and distribution.

Constangioara (2013) examines the contribution of communication the supply chain to overall organizational performance and found that information management and internal communication accounts for the innovational performance.

Onyango et al (2015) the study revealed that business-supplier communication and business-supplier joint decision making both individually and jointly have positive effect on internal operational performance. This study therefore recommends that management of manufacturing

firms and other organizations adopt and implement strategic supplier relationship management as one of the management strategies.

Although the above studies on the role of communication point to a positive significant relationship between communication and organizational performance, they are based on private sector entities that are profit oriented with scanty studies focusing on communication and procurement performance in the public sector. This study therefore strived to fill the literature gap by examining the relationship between communication in the supply chain and procurement performance in NARO-Uganda to help fill the knowledge gaps.

2.5. Supplier Performance Monitoring and Procurement Performance

In order to be able to assess the success of supply chain, an adequate supply chain performance management system needs to be developed. A supply chain performance management system must be able to monitor the relevant performance indicators of products, services and production processes in the appropriate time frame (Rosenau et al., 1996). Performance indicators are the criteria with which the performance of products, services and production processes can be evaluated. Besides, performance indicators are operationalized process characteristics, which compare the efficiency and / or effectiveness of a system with a norm or target value (Van der Vorst, 2000). Best practices in supply chain management demand that a supply chain system captures feedback through monthly, quarterly and annual performance reports based on the established performance indicators and targets for management decision making (Simons, 2000). Bowersox and Clos (1996) observed that a well-defined supply chain monitoring system should give an insight into the contribution of individual chain actors to the performance of the entire chain. However, there is a debate on what a best performing supply chain performance monitoring

system should exhibit. Christopher (2005) for example contends that while there are many indicators of performance that can be deployed in an organization, there are a relatively small number of critical dimensions that contribute more than proportionally to success or failure in the market or industry, which he named key performance indicators. In support, Cai, et al. (2009) note that performance indicators should relate to both effectiveness and efficiency of the supply chain and its actors.

Van der Vorst (2000) suggests three main levels in the supply chain as level of product availability, quality, responsiveness, delivery reliability and total supply chain costs; the organization level inventory level, throughput time, responsiveness, delivery reliability and total organizational costs; and the process level such as responsiveness, throughput time, process yield and process costs as key areas in identifying performance indicators.

The supply-chain operations reference-model was developed in 1996 by the management consulting firm PRTM, now part of PricewaterhouseCoopers LLP (PwC) and AMR Research, now part of Gartner, and endorsed by the Supply-Chain Council (SCC), now part of APICS, as the cross-industry de facto standard strategy, performance management, and process improvement diagnostic tool for supply chain management.

SCOR Model provides guidance on the types of indicators decision-makers can use to develop a balanced approach towards measuring the performance of an overall SC. The SCOR Model advocates a set of SC performance indicators as a combination of reliability measures such as fill rate, perfect order fulfillment; cost measures such as cost of goods sold; responsiveness measures such as order fulfillment lead-time and asset measures such as inventories (SC Council, 2004).

Recently, Aramyan et al. (2006) developed a preliminary conceptual framework of a PMS for agri-food SCs based on the literature, which captures the characteristics of agri-food SC as well as other

financial and non-financial indicators consisting of four main categories: of efficiency; flexibility; responsiveness; and food quality.

Though the establishment of performance indicators as suggested by the above authors is vital in management performance monitoring, recent studies have shown that SCs lack accurate indicators of performance for comparison, benchmarking and decision-making to the extent that current SC performance monitoring systems are inadequate because they rely on the use of costs as a primary indicators (Wijnands & Ondersteijn, 2006). Lee and Billington had earlier (1992) found that SCs do not have ample performance indicators and firms aim at accomplishing their own performance standards.

2.6. Summary of Literature Review

The review of existing literature reveals high use of strategic alliance through joint planning and supplier development mostly in the private sector. There is however little empirical research on the relationship between strategic alliance aspect of SRM and procurement performance in the public sector of developing countries. Similarly, although the literature suggests increasing use of SRM technology networking different SC partners in the supply chain, there was scanty information on the relationship between use of SRM technology and procurement performance in the public sector of a developing country. Moreover, the literature on supplier performance monitoring efforts of setting performance targets and supplier reviews was not conclusive on the efforts to use such efforts on procurement performance in the public sector. This study therefore strived to abridge the literature gaps by providing empirical evidence on the relationship between SRM aspects of strategic alliances, SRM technology, and performance monitoring and procurement performance in the public sector of Uganda.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter presents the research design, population of study, sample size and selection, data collection methods, data collection instruments, validity and reliability, data collection procedures, data analysis and measurement of variables.

3.2. Research Design

The study used a cross-sectional survey design using both quantitative and qualitative approaches. The cross-sectional design were used because the issues of SRM procurement performance were studied at that point in time (Amin, 2005). The choice of the qualitative approach as justified by Amin (2005) is that it provides in-depth explanations to SRM and procurement performance while quantitative methods provide the data needed to meet required objectives and to test the hypotheses using analytical technique such as descriptive statistics of frequency and mean and inferential statistics of correlation and regression analyses.

3.3. Study Population

The study was carried out in NARO Secretariat staff its NARRIs and ZARDIs using a target population of 79respondents at the accounting officers, contracts committee, sub contracts committees, PDU, user department and heads of NARIs and ZARDIs. This population was considered because they are responsible SRM at the strategic, operational and tactical levels thus therefore knowledgeable about the contribution of SRM and procurement performance in the entity.

3.4. Sample size and techniques

The study considered a population of 79 respondents based on Krejcie and Morgan (1970) sampling guidelines and as summarized in table 1 below.

Table 1: Study population to be used in the study

Population category	**Total population**	**Sample size**	**Sampling Techniques**
Accounting officer	1	1	Purposive
Contracts committee	5	5	Purposive
Sub Contracts Committees for 11 sub stations.	55	48	Simple random
PDU	3	3	Purposive
User departments Head	7	7	Purposive
NARIs	6	6	Purposive
ZARDIs	9	9	Purposive
Total	86	79	

Source: PPDA Audit Report, 2012.

3.5. Sampling Technique and procedure

This study used simple random sampling which is a sample obtained from the populations in such a way that samples of the same size have equally chances of being selected (Amin, 2005). As indicated above in table 1 above, the study used simple random sampling to select the Sub Contracts Committees for 11 sub stations. In using simple random sampling, the study adopted the lottery approach where names in each category were written on tag and one picked at a time until the required number was reached.

This study also used purposive sampling which involved the researcher using own judgment regarding respondents' possession of managerial and operational information on SRM and procurement performance. In this study purposive sampling technique was used to select remaining categories of respondents who possess managerial and operational knowledge on SRM in the NARO.

3.6. Data Collection Methods

The study used a survey approach where both qualitative and quantitative data was collected using a questionnaire and interviewing approaches to obtain data on SRM and procurement performance.

3.6.1. Questionnaire Survey Method

The study used a questionnaire because it is less expensive for data collection (Amin, 2005) and can collect vast amounts of data in a short period. Use of a questionnaire according to Sekeran (2003) is justified by the view that it enables the respondents to respondent with easy without undue influence of the researcher. The questionnaire was used to collect primary data from the selected respondents by personally delivering them to the respondents in the respective offices. The questionnaire was issued to 79 respondents in their different categories. The respondents recorded their answers within closely defined alternatives.

3.6.2. Interview method

Interviewing method was used to enable gaining of in-depth information from the targeted respondent through forms of face-to-face conversations and probing of the respondent's responses to gain detailed explanations SRM and procurement performance as suggested by Amin (2005). The study specifically interview the PDU team.

3.7. Data Collection Instruments

3.7.1. Self-administered Questionnaire

The study used a close-ended self-administered questionnaire divided into sections of background information, SRM and procurement performance. A standard Questionnaire on a five point Likert scale of 5- Strongly Agree; 4- Agree; 3- Not Sure; 2- Disagree; 1- Strongly Disagree were used to get quantifiable primary data from individual respondents (appendix 1).

3.7.2. Interview guide

The Interview was semi structured along areas of strategic alliance, communication and performance management and how they influence procurement performance (appendix II).

3.8. Validity and Reliability

3.8.1. Validity

The validity of the instrument was tested using the Content Validity Index. This involved judges scoring the relevance of the questions in the instruments in relation to the study variables and a consensus judgment given on each variable taking only variables scoring above 0.70.

The Content Validity Index (CVI) was arrived at using the formula:

$$CVI = \frac{\text{Total number of items declared valid}}{\text{Total number of items}}$$

Table 2: Content Validity Results

Variable	Total No of items	Number of valid items	CVI
Strategic alliances	10	8	0.800
Communication	11	9	0.730
Supplier performance management	12	10	0.833
Procurement performance	13	11	0.846

Source: Expert Judgment

Table 2 shows that strategic alliance yielded CVI of 0.800, communication yielded a CVI of 0.730, suppler performance management yielded a CVI of 0.833, while procurement performance yielded a CVI of 0.846. Since all variables yielded a CVI above 0.70 accepted for social sciences, it was inferred that the instrument was relevant in measuring SRM and procurement performance in NARO.

3.8.2. Reliability

Reliability measures the consistence of the instrument in measuring what it is supposed to measure (Amin, 2005). The study questionnaire was pretested for its reliability on a sample of 10 respondents to examine individual questions as well as the whole questionnaire very carefully (Amin, 2005). Cronbach's alpha coefficient was used to compute show how reliable the data collected on SRM and procurement performance is using Software Package for Social Sciences (SPSS) taking only variables scoring above 0.70 as suggested by Nunally and Bernstein (1994) and he results are presented below.

Table 3: Reliability Results

Variable	Total No of items	Cronbach's alpha
Strategic alliances	10	0.789
Communication	11	0.774
Supplier performance management	12	0.894
Procurement performance	13	0.846

Source: Primary data

Table 3 above shows that on the supplier relationship management yield Cronbach's alpha value of 0.79, communication yielded an alpha value of 0.774, supplier performance management yielded alpha value of 0.894, while procurement performance yielded alpha value of 0.846. Since all variables yielded an alpha value higher than 0.70 accepted for social sciences, it was concluded that the instrument was consistent and therefore reliable in measuring SRM and procurement performance in NARO.

3.9. Data collection procedure

After successful defense of the proposal, an introductory letter from the School Of Management Sciences-Uganda Management Institute was used to seek permission from the management of NARO. The questionnaire was printed and distributed with the help of a research assistant who distributed at NARO secretariat in Entebbe. Anonymity and confidentiality of the respondents

was observed by not asking the respondents to put their names on the questionnaires. The data collected was then entered into SPSS in preparation for analysis. Interviews were carried out concurrently with the questionnaire data collection exercise.

3.10. Data Analysis

3.10.1. Quantitative Analysis

Quantitative data was analyzed using descriptive statistics of mean and standard deviations for each of the variables used in the study. Pearson's correlation statistics was used to test the relationships at 99 and 95 confidence limits. A positive correlation indicates a direct positive relationship between the variables while a negative correlation indicates an inverse, negative relationship between the two variables. A regression analysis using ANOVA statistics of adjusted R^2 values and standardized coefficient statistics of beta, t values and significance values as suggested by Amin (2005) was used to determine the extent to which SRM has influenced procurement performance in NARO.

3.10.2. Qualitative Analysis

Qualitative analysis was analyzed using content analysis technique which involved organizing the narrative statements, and responses to generate useful conclusions and interpretations on SRM and procurement performance. This involved coding of data, identifying categories and patterns that emerge in the responses on SRM and procurement performance. Further qualitative analysis involved comparing the qualitative data with the quantitative data for commonalities or differences.

3.11. Measurement of Variables

The variables were measured by operationally defining concepts. For instance the questionnaire will be designed to ask responses about strategic alliance measures based on Monczka, et al., (1998); supply chain communication was measured based on Doloi (2009)measures, supplier performance management based on Thakkar et al.(2009) measures and procurement performance based on Van Weele (2010) guidelines. These were channeled into observable and measureable elements to enable the development of an index of the concept. A five- Likert scale namely: 5- Strongly agree; 4- Agree; 3- Not sure; 2- Disagree; 1- Strongly disagrees was used to measure both the independent and dependent variables.

3.12. Ethical Considerations

An introductory letter from UMI to seek permission to conduct the study in NARO. The respondents were introduced to the objectives of the study which examining the SRM practices in NARO and their influence on procurement performance. Their consent to participate in the study was sought for them to volunteer to participate in the study. The respondents were assured that the information was treated with utmost confidentiality and at no moment was it to be used against them.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1. Introduction

This chapter presents analyses and interprets the study findings of SRM and procurement performance in NARO based on the information obtained from the study questionnaire, interviews and documentary review. It specifically presents the response rate, background information about the respondents and a presentation of the inferential findings in relation to strategic alliances, communication, supplier performance management and procurement performance in NARO.

4.2. Response Rate

Response rate indicated the ration of study tools issued against those actually returned can considered in the study. It therefore means the representativeness of the study finding in relation to the total sample used from a given population (Amin, 2005). Table 4 below shows the response rate for both the questionnaire and interview.

Table 4: Response Rate

Study tool	**No issues/anticipated**	**Actual**	**Response rate**
Questionnaire	76	68	89%
Interview schedule	3	2	67.7%
Overall response rate			78%

Source: Primary data

A total of 76 questionnaires were distributed but 68 useable questionnaires were returned in time for consideration in this study giving a response rate of 89% for questionnaires which was high. Three interviewees were targeted and two were successfully conducted yielding a response rate of 67%. The overall response rate for questionnaire and interview was therefore 78% which high and

representative of the study sample as it suggests that about 8 in every 10 targeted respondent responded to the study.

4.3. Background Information about the Respondents

This sub section presents the positions in the NARO procurement function, station, job category and highest level of educations.

Table 5: Background Information about the Respondents

Item	Response	Frequency	Percent
Positions in the NARO procurement function	Contracts committee	3	4.4
	User (secretariat)	6	8.8
	Procurement and Disposal Unit	2	2.9
	Sub Contracts Committee	48	70.6
	NARIs	4	5.9
	ZARDIs	6	8.8
	Total	**68**	**100.0**%
Work station	Secretariat	11	16.2
	NARIs	24	35.3
	ZARDI	33	48.5
	Total	**68**	**100**
Job category	Scientific research staff	52	76.5
	Support staff	16	23.5
	Total	**68**	**100.0**
Highest level of education	Degree	22	32.4
	Masters	28	41.2
	Doctorate / PhD	18	26.4
	Total	**68**	**100**

Source: Primary data

Table 5 above that majority of 70.6% of respondents were sub contract committee members. Other respondents were from ZARDIs representing 8.8%, NARI representing 5.9% and contract committee representing 4.4% of the respondents. The findings implied that data was solicited from respondents who are directly involved in the procurement function as users, contracts committees

which adjudicate on procurements and management who make procurement decisions and therefore deemed to have adequate experiences on SRM and procurement performance in NARO.

Table 6 also shows that 48.5% worked at the ZARDI, 35.3% worked at NARIs, while 16.2% worked at the secretariat a findings which suggested that data was collected from virtually all NARO activity centers who procurement specific inputs to achieve the strategic objectives especially in relation to the ZARDI and NARIs, were research is conducted.

Majority of 76.5% were scientific research staff while 23.5% were support staff. Among these, 41.2% had attained a master's degree, 32.4% were degree holders while 26.4% had PhDs. This was so as NARO used highly qualified scientific staff in agriculture innovations. The findings also suggest the respondents had attained a good level of education to appreciate SRM and its impact on supplies agility, value for money and their satisfaction.

4.4. Strategic alliance and Procurement performance

The first objective of the study was to establish the relationship between Strategic alliance and procurement performance in NARO. Strategic alliance according to the conceptual framework had two indicators of joint planning and supplier development measured using 10 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3= Not Sure, 2= Disagree, 1= Strongly Disagree and the findings are presented in Table below using descriptive statistics of mean and standard deviation.

Table 6: Descriptive results for strategic alliance

Strategic alliance	**MEAN**	**S.D**
Joint planning		
1. NARO engages its strategic suppliers in identifying its annual strategic procurement requirements	2.38	1.258
2. NARO engages its strategic suppliers in the development of procurement specifications	2.41	1.225
3. NARO engages its strategic suppliers in scheduling annual strategic procurement requirements	3.97	.772
4. NARO engages its strategic suppliers in identifying distribution/delivery centers	3.88	.783
5. NARO engages its strategic suppliers in identifying procurement support services required to meet procurement objectives	3.65	1.182
Supplier development		
6. NARO undertakes to increase the technical capabilities of its strategic supplies partners to meet its supply needs	2.37	1.292
7. NARO undertakes to increase the quality capabilities of its strategic supplies partners to meet its supply needs	2.29	1.210
8. NARO undertakes to increase the delivery capabilities of its strategic supplies partners to meet its supply needs	3.88	1.100
9. NARO undertakes to increase the cost management capabilities of its strategic supplies partners to meet its supply needs	2.10	.883
10. Supplier development has helped develop long term mutual relationships between national agricultural research organization and its strategic partners	3.62	1.008

Source: Primary data

Table 6 above shows that the respondents disagreed with engagement of strategic suppliers in;- identifying its annual strategic procurement requirements (mean = 2.38) and development of procurement specifications (mean = 2.41). The respondents however agreed that engagement of strategic suppliers in scheduling annual requirements (mean 3.97), distribution/delivery centers (mean = 3.88) and procurement support services like transports logistics (mean = 3.65). These findings revealed limited joint planning in the identification and development of specifications

between NARO and its strategic supplier. NARO only involved its strategic suppliers in supplies scheduling, delivery centers, and procurement support services to meet the objectives of the procurement.

Table 6 above shows that whereas the respondents agreed with NARO support to strategic suppliers in increasing delivery capacity (mean = 3.88) and development of long term mutual relationships (mean = 3.62), they disagreed with development of supplier technical (mean 2.37), quality (mean 2.29), and cost management capabilities (mean = 2.10). These findings revealed a low level of supplier development as NARO did not engage in development of supplier's technical, quality and cost management capabilities. NARO only undertook to increase the delivery capabilities and development of long-term mutual capabilities.

Asked on the challenges in using strategic alliances with suppliers, the head PDU noted:

> *NARO at a minimal level engages in supplier development for key inputs like equipment, reagents, and material for conducting scientific research which are highly specialized. I few case we also engage our technology distributors like AT-Uganda and victoria seeds to ensure diffusion of agriculture technology. The challenge however is that the partner's budgets are so huge that we cannot support them and we always advise them on the technical aspects in the event of defects detected in the technology being diffused in the communities. The law also demands that we engage in supplier development at the very minimal level and only if economic conditions demand that we advance them some payments at the initiation of the procurement.*

4.4.1. Correlation analysis between strategic alliance and procurement performance

To test if there was relationship between strategic alliance and procurement performance in NARO, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics and the findings are presented in Table below.

Table 7: Correlation Results between strategic alliances and Procurement Performance

		Strategic alliance	Procurement Performance
Strategic alliance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	89	
Procurement Performance	Pearson Correlation	.309*	1
	Sig. (2-tailed)	.010	
	N	68	68
**. Correlation is significant at the 0.01 level (2-tailed).			

P≤ 0.05

Source: Primary data

Table 7 above shows the Pearson's correlation coefficient r = 0.309* between strategic alliance and Procurement Performance suggesting that the two variables had a positive significant relationship. The r = 0.309* and significance p = 0.010 between strategic alliance and procurement performance suggests that there was a moderate positive significant relationship between strategic alliance and procurement performance. The managerial implication was that the attainment of procurement agility, value for money and internal customer satisfaction with the procurement function significantly depends on joint planning and supplier development. The failure to engage in joint planning and supplier development considerations of SRM adversely affects procurement performance in NARO.

4.5. Communication and Procurement performance

The second objective of the study was to establish the relationship between communication and procurement performance in NARO. Communication according to the conceptual framework had two indicators of formal and informal communication measured using 11 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3= Not Sure, 2= Disagree, 1=

Strongly Disagree and the findings are presented in Table below using descriptive statistics of mean and standard deviation.

Table 8: Descriptive results for communication

Communication	**MEAN**	**S.D**
1. NARO holds regular meetings with its strategic suppliers for information sharing	2.41	1.175
2. NARO holds regular workshops with its strategic suppliers for information sharing	2.38	1.197
3. NARO holds regular procurement seminars with its strategic suppliers for information sharing	2.47	1.215
4. NARO uses ICT for regular communication with its strategic suppliers	2.22	1.091
5. Written communications are emphasized for communication between NARO and its strategic suppliers	3.81	1.011
Informal		
6. NARO has put in place quality circles for sharing information with its key suppliers	2.42	1.093
7. NARO uses teamwork for sharing information with its key suppliers	2.29	.624
8. Telephones calls are used for communication between NARO and its strategic suppliers for information sharing	4.34	.874
9. Impromptu visits to suppliers premises are sometime undertaken by NARO management to share information on key supplies	4.18	1.036
10. Informal meetings with Key suppliers are sometimes undertaken with key suppliers	4.32	.781
11. Invitations by are sometimes used to share information with strategic suppliers	4.40	.715

Table 8 shows that although the respondents agreed that NARO used formal written communications (mean = 3.81), they disagreed with use of meeting (mean 2.41), workshops (mean = 2.38), seminars (mean = 2.47) and ICT (mean = 2.22) for sharing supplies information with strategic suppliers. These findings revealed limited efforts to explore the use of meetings, workshops, seminars, and ICT formal means of communication in managing the relationship with

suppliers. Communication was predominantly written in form of orders and invoicing a finding which suggests that communication could have affected procurement performance for lack of the necessary information required for supplies decision making.

Table 8 further shows that whereas the respondents disagreed with use of quality circles (mean = 2.42) and teamwork (mean = 2.29) for sharing information with its key suppliers, they agreed with use of telephone (mean 4.34), spot visits (mean = 4.18), informal meeting (mean = 4.32) and occasional invitation of strategic supplier (mean = 4.40). These findings revealed that NARO relied on informal means of communication using telephone calls, impromptu visits to supplier's premises, informal meetings, and invitations to share supplies information. Quality circles and team work were not used to manage supplier relationships which may affect the procurement performance.

Asked on the efforts to share information, the head of the PDU had to say:

> *"Wide use of LPO and Contracts where suppliers are expected to meet the terms of the procurement as prescribed in the contract. We also use contract management meetings to discuss supplier's progresses with key suppliers.*

4.5.1. Correlation analysis between communication and procurement performance

To test if there was relationship between communication dimension of SRM and procurement performance in NARO, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics and the findings are presented in Table below.

Table 9: Correlation Results between communication and Procurement Performance

		Communication	Procurement Performance
Communication	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	89	
Procurement Performance	Pearson Correlation	. 678**	1
	Sig. (2-tailed)	.010	
	N	68	68
**. Correlation is significant at the 0.01 level (2-tailed).			

$P \leq 0.05$

Source: Primary data

Table 9 above shows the Pearson's correlation coefficient r = 0.678** between communications and Procurement Performance suggesting that the two variables had a positive significant relationship. The r = 0.678** and significance p = 0.000 between communication and procurement performance suggests that there was a high positive significant relationship between communications and procurement performance. The managerial implication was that the attainment of procurement agility, value for money and internal customer satisfaction with the procurement function significantly depends on formal and informal communication. Weak formal and informal communication mechanisms adversely affect procurement performance in NARO.

4.6. Supplier performance management and Procurement performance

The third objective of the study was to establish the relationship between supplier performance management and procurement performance in NARO. Supplier performance management according to the conceptual framework had two indicators of setting performance targets and conducting of performance reviews measured using 12 items scored on a five point Likert scale ranging from 5= Strongly Agreed, 4= Agree, 3= Not Sure, 2= Disagree, 1= Strongly Disagree and

the findings are presented in Table below using descriptive statistics of mean and standard deviation.

Table 10: Descriptive results for supplier performance management

	Mean	S.D
Setting performance targets		
1. NARO has established key performance indicators for all its strategic supplies	2.12	1.264
2. NARO has established quality expectations that suppliers are expected to meet	4.28	.770
3. NARO has established quantity expectations that suppliers are expected to meet	2.37	1.292
4. NARO has established quarterly performance expectations that strategic suppliers have to meet	2.15	1.200
5. NARO has established annual performance expectations that strategic suppliers have to meet	3.68	.871
Performance reviews		
6. NARO has an established data collection tools/forms for collecting information on strategic suppliers	2.19	1.225
7. The contract manager regularly collects contract performance information	2.39	1.225
8. Meetings are used to share information on supplier performance	2.16	1.192
9. NARO always ensures that suppliers submit all required documentation in accordance with terms and conditions of a contract.	3.97	.992
10. NARO always ensures that the strategic suppliers deliver in the agreed time.	4.09	.973
11. NARO generates timely procurement contracts monitoring staged/phased reports on each contract	2.06	1.244
12. NARO conducts supplier appraisals at the end of each suppliers contract	2.07	1.262

Source: Primary data

Table 10 above shows that although the respondents agreed with established quality expectations for suppliers (mean = 4.28) and annual suppliers expectations (mean = 3.68), they disagreed with established key performance indicators (mean = 2.12), establishment of quality expectations (mean = 2.37) and quarterly performance expectations. These findings revealed weaknesses in setting performance targets with suppliers as NARO did not adequately set supplier performance indicators, quantity expectations and quarterly performance expectations for strategic supplies but emphasized quality and annual performance expectations

On performance reviews, the respondents disagreed that; - there existed a performance management tool for suppliers (mean = 2.19), contract managers always collected performance information (mean 2.39), supplier performance reports were generated in time (mean = 2.06) while they also disagreed with conducting of annual supplier appraisals (mean = 2.07). They only agreed with ensuring timely deliveries (mean = 4.09) and documentation of deliveries (mean 3.97). These findings revealed material weaknesses in reviewing supplier performance for lack of data collection instrument on supplier performance, failure by contract managers to promptly collect supplier performance information, inadequate use of meeting, supplier appraisal and use of performance reports to review supplier performance a practice which constrains procurement performance.

4.6.1. Correlation analysis between supplier performance management and procurement performance

To test if there was relationship between supplier performance management dimension of SRM and procurement performance in NARO, a correlation analysis was conducted using Pearson's correlation coefficient and significance statistics and the findings are presented in Table below.

Table 11: Correlation Results between supplier performance management and Procurement Performance

		Supplier performance management	Procurement Performance
Supplier performance management	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	89	
Procurement Performance	Pearson Correlation	.685**	1
	Sig. (2-tailed)	.010	
	N	68	68
**. Correlation is significant at the 0.01 level (2-tailed).			

$P \leq 0.05$

Source: Primary data

Table 11 above shows the Pearson's correlation coefficient r = 0.685** between supplier performance management and Procurement Performance suggesting that the two variables had a positive significant relationship. The r = 0.685** and significance p = 0.000 between supplier performance management and procurement performance suggests that there was a high positive significant relationship between supplier performance management and procurement performance. The managerial implication was that the attainment of procurement agility, value for money and internal customer satisfaction with the procurement function significantly depends on efforts to set supplier performance targets and conducting of periodic performance reviews. The failure to institute effective supplier performance management practices adversely affect procurement performance in NARO.

4.7. Hypotheses Testing

Multiple regression analyses were carried out to establish the predictive strength of SRM dimensions of strategic alliances, communication and supplier performance management on

procurement performance. The multiple regression also helped establish which among the dimensions of strategic alliances, communication and supplier performance was a more significant predictor of the variance in procurement performance. The findings are presented in table 12 below.

Table 12: Multiple Regression Results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.779[a]	.607	.589	.49559

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta (β)		
1	(Constant)	.960	.511		1.878	.065
	Strategic Alliances	.266	.122	.235	2.188	.032
	Communication	.565	.145	.363	3.885	.000
	Performance management	.445	.159	.638	6.099	.000

a. Predictors: (Constant), Performance management, Communication, Strategic Alliances
b. Dependent Variable: Procurement Performance

$P \leq 0.05$
Source: Primary data

Table 12 above shows adjusted R^2 of 0.589 or 60% was the variance in procurement performance explained by Performance management, Communication, Strategic Alliancesputting into consideration all the variables and the sample size of the study. The remaining variance of 40% was explained by other factors other than SRM dimensions of strategic alliance, communication and performance management.

The standardized coefficient statistics revealed that supplier performance management was the most significant predictor of the variance in procurement performance (β=0.638, t = 6.099, p

=0.000) followed by communication (β= 0.363, t = 3.885, p=0.000). Strategic alliance was the least significant predictor of the variance in procurement performance in the entity (β=0.235, t = 2.188, p= 0.032). The implication was that priority should be given to supplier performance management considerations of setting performance indicators, monitoring and evaluating supplier performance. Second priority should go to strengthening formal and informal communication while the third priority should be strengthening strategic alliance through joint planning and supplier development.

The first research hypothesis was that there is a significant relationship between strategic alliance and procurement performance NARO. Based on the standardized coefficient statistics, strategic alliance yielded a standardized β value of 0.235 and t value of 2.188 with a significance of 0.032 suggesting that strategic alliance was a significant predictor of the variance in procurement performance at NARO. The hypothesis that there is a significant positive relationship between strategic alliance and procurement performance in NARO is upheld.

The second research hypothesis was that there is a significant relationship between communication and procurement performance NARO. Based on the standardized coefficient statistics, communication yielded a standardized β value of 0.363 and t value of 3.885 with a significance of 0.000 suggesting that communication was a significant predictor of the variance in procurement performance at NARO. The hypothesis that there is a significant positive relationship between communication and procurement performance in NARO is upheld.

The third research hypothesis was that there is a significant relationship between supplier performance management and procurement performance NARO. Based on the standardized coefficient statistics, supplier performance management yielded a standardized β value of 0.638,

and to the value of 6.099 with a significance of 0.000 suggesting that supplier performance management was a significant predictor of the variance in procurement performance at NARO. The hypothesis that there is a significant positive relationship between supplier performance management and procurement performance in NARO is upheld.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents a summary of the study finding, discussion, conclusions, recommendation on the SRM and procurement performance in NARO. It also presents the limitations and contributions of the study and areas for further research.

5.2. Summary of the Study Findings

5.2.1. Strategic alliances and procurement performance

The study found limited joint planning in the identification and development of specifications between NARO and its strategic supplier. NARO only involved its strategic suppliers in supplies scheduling, delivery centers, and procurement support services to meet the objectives of the procurement.

There was a low level of supplier development as NARO did not engage in development of supplier's technical, quality and cost management capabilities. NARO only undertook to increase the delivery capabilities and development of long-term mutual capabilities.

There was a moderate significant relationship between strategic alliance and procurement performance in NARO ($r = 0.309^*$ and significance $p = 0.010$) and it was the least significant predictor of the variance in procurement performance at NARO ($\beta = 0.235$, $t = 2.188$. sig. $= 0.032$). The hypothesis that there is a significant positive relationship between strategic alliance and procurement performance in NARO was upheld.

5.2.2. Communication and procurement performance

The study found that there were limited efforts to explore the use of meetings, workshops, seminars, and ICT formal means of communication in managing the relationship with suppliers. Communication was predominantly written inform of orders and invoicing. NARO relied on informal means of communication using telephone calls, impromptu visits to supplier's premises, informal meetings, and invitations to share supplies information. Quality circles and team work was equally not used to manage supplier relationships.

There was a high significant relationship between communication and procurement performance in NARO ($r = 0.678^{**}$ and significance $p = 0.000$) and it was the second significant predictor of the variance in procurement performance at NARO ($\beta = 0.363$, $t = 3.885$, sig = 0.000). The hypothesis that there is a significant positive relationship between communication and procurement performance in NARO was upheld.

5.2.3. Supplier performance management and procurement performance

The study found weaknesses in setting of performance targets with suppliers as NARO did not adequately set supplier performance indicators, quantity expectations and quarterly performance expectations for strategic supplies but emphasized quality and annual performance expectations.

There were also material weaknesses in reviewing supplier performance for lack of data collection instrument on supplier performance, failure by contract managers to promptly collect supplier performance information, inadequate use of meeting, supplier appraisal and use of performance reports to review supplier performance. Emphasis was put on timely deliveries in the management of relationships with its suppliers.

There was a high significant relationship between supplier performance management and procurement performance in NARO (r = 0.685* and significance p = 0.000) and it was the highest significant predictor of the variance in procurement performance at NARO (β =0.638, t = 6.099, Sig. 0.000). The hypothesis that there is a significant positive relationship between supplier performance management and procurement performance in NARO was upheld.

5.3. Discussions of the Study Findings

5.3.1. Strategic alliances and procurement performance

There was a moderate significant relationship between strategic alliance and procurement performance in NARO imply that failure to engage in joint planning and supplier development considerations of SRM adversely affects procurement performance in NARO. It was necessary that NARO undertakes to engage in joint planning and supplier development for enhanced procurement performance. This study's findings relate to Williamson (1979) TCE theory which contends that firm enter alliances to minimize the sum of transaction costs and production costs. Blomqvist, et al (2002) while building on TCE noted that partnering firms need to effectively manage the relationships with its partners if they are to enjoy cost reduction and meet the objectives of partnering. Partnering according to the Pfeffer and Salancik (1978) RDT also enable the firm to share resources possessed in other organizations there by gaining competitive advantage.

Some empirical studies confirm the impact of strategic alliances and positive outcomes. Rashed, et al (2010) found that information sharing during joint planning is a prerequisite for knowledge sharing and the close supplier-buyer relationship is a vital factor for escalating the supplier's operational performance. Perez et al., (2013) equally found that alliance inception, joint- learning, specialization and discovery constitute sequences of increasing understanding, cooperation, and

higher supply chain performance. The study therefore affirms that any efforts directed to strengthening strategic alliance through joint planning and supplier development will enhance procurement performance in NARO.

5.3.2. Communication and procurement performance

The study found high significant relationship between communication and procurement performance in NARO implying that the attainment of procurement agility, value for money and internal customer satisfaction with the procurement function significantly depends on formal and informal communication. Weak formal and informal communication mechanisms adversely affect procurement performance in NARO. This study finding on communication in SRM and its influence on procurement performance relates to a great extent to Fin (2006) observations that use of EDI for communication with suppliers and in apparel industry helped reduce on the lead time from several weeks to 3 days. Rashed et al (2010) equally finds that knowledge sharing on supplier's operational performance and close supplier-buyer relationship through communication is a vital factor for enhanced supplier's operational performance in Bangladesh textile firm.

Constangioara (2013) equally found that information management and internal communication accounts for the innovational performance in the supply chain while Onyango et al (2015) study revealed that business-supplier communication and business-supplier joint decision making both individually and jointly have positive effect on internal operational performance.

The study therefore affirms that any efforts directed to strengthening communication through formal and informal communication will enhance procurement performance in NARO.

5.3.3. Supplier performance management and procurement performance

There was a high significant relationship between supplier performance management and procurement performance in NARO implying that the attainment of procurement agility, value for money and internal customer satisfaction with the procurement function significantly depends on efforts to set supplier performance targets and conducting of periodic performance reviews. The failure to institute effective supplier performance management practices adversely affect procurement performance in NARO. The findings observations on SRM attribute of performance management and is influence on procurement performance resonate Christopher (2005) the failure to institute supplier performance management system contributed significant failure in the supply chain industry. Cai, et al. (2009) note that performance indicators should relate to both effectiveness and efficiency of the supply chain and its actors while Wijnands and Ondersteijn (2006) emphasizes that establishment of performance indicators is vital in management performance monitoring but supply chains lack accurate indicators of performance for comparison, benchmarking and decision-making to the extent that current SC performance monitoring systems are inadequate.

The study therefore affirms that any efforts directed to strengthening supplier performance management through setting performance targets and reviewing performance will enhance procurement performance in NARO.

5.4. Conclusions of the Study

5.4.1. Strategic alliances and procurement performance

The study concluded that strategic alliances significantly influences procurement performance and the failure to adopt joint planning and supplier development constrain the attainment of procurement agility, value for money and internal customer satisfaction indicators of procurement.

5.4.2. Communications and procurement performance

The study concluded that communication with suppliers significantly influences procurement performance and the poor formal and informal communication mechanism constrain the attainment of procurement agility, value for money and internal customer satisfaction indicators of procurement.

5.4.3. Supplier performance management and procurement performance

The study concluded that supplier performance management significantly influence procurement performance and the failure to set supplier performance targets and reviewing supplier performance constrain the attainment of procurement agility, value for money and internal customer satisfaction indicators of procurement.

5.5. Recommendations of the Study

5.5.1. Strategic alliances and procurement performance

To enhance procurement performance in public entities, the study recommends that management should engage in joint planning through joint identification and development of specifications, development of supplier's technical, quality and cost management capabilities.

5.5.2. Communications and procurement performance

To enhance procurement performance in public entities, the study recommends that management should explore the use of meetings, workshops, seminars, and ICT for formal communication in managing the relationship with suppliers. Use of quality circles and team work should equally be sought.

5.4.3. Supplier performance management and procurement performance

To enhance procurement performance in public entities, the study recommends that management should set supplier performance indicators, quantity expectations and quarterly performance expectations for strategic supplies. The contract managers should also collect supplier performance data based on established tool and indicators and regularly generate report for management actions. Use of meeting and supplier appraisal should be emphasized in the management of relationships with suppliers.

5.6. Contributions of the Study

The study helps develop managerial recommendations on SRM for enhanced procurement performance in the public sector requiring the use of strategic alliances for strategic suppliers, communication and supplier performance management. The study had also helped cover literature gaps on the relationship between SRM and procurement performance in the public sector.

5.7. Areas for further Studies

The study found that SRM predicted 60% of the variance in procurement performance in NARO while other variables predicted the remaining 40%. Other studies need to examine the extent to which use of ICT in SRM influences and procurement performance in selected government entities.

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APPENDIX 1

Appendix II: Questionnaire

Introduction

Dear respondent,

My name is Ateker Ronny Terry a student at Uganda management institute. I am carrying a study on Supplier Relationship Management and procurement performance in NARO as a partial requirement for Master's degree award. You have been selected to participate in this study as a respondent. Kindly provide the most appropriate information as indicated in the questionnaire based on your objective experiences. The information provided shall be for academic purpose and will be treated with utmost confidentiality.

Thanks You

SECTION I: BACKGROUND INFORMATION

2. Your positions in the NARO procurement function:
    a) Accounting Officer
    b) Contracts committee
    c) User
    d) Procurement and Disposal Unit
    e) Sub Contracts Committee
    f) NARI
    g) ZARDIs

3. Your work station:
    a) Secretariat
    b) NARIs
    c) ZARDI
4. Your Job category in NARO:
    a) Scientific research staff
    b) Support staff
5. Your highest level of education:
    a) Certificate
    b) Diploma
    c) Degree
    d) Masters
    e) Doctorate / PhD

f) Professional Qualification

Section II: Strategic Alliances (tick as appropriate)

Indicate the extent to which the following observations on strategic alliances in NARO is true on a scale of (1) = strongly disagree, (2) = disagree, (3) = not sure (4) = agree (5) = strongly agree

Scale	**1**	**2**	**3**	**4**	**5**
Joint planning					
11. NARO engages its strategic suppliers in identifying its annual strategic procurement requirements	1	2	3	4	5
12. NARO engages its Strategic Suppliers In The Development Of Procurement Specifications	1	2	3	4	5
13. NARO engages its strategic suppliers in scheduling annual strategic procurement requirements	1	2	3	4	5
14. NARO engages its strategic suppliers in identifying distribution/delivery centers	1	2	3	4	5
15. NARO engages its strategic suppliers in identifying procurement support services required to meet procurement objectives	1	2	3	4	5
Supplier development					
16. NARO undertakes to increase the technical capabilities of its strategic supplies partners to meet its supply needs	1	2	3	4	5
17. NARO undertakes to increase the quality capabilities of its strategic supplies partners to meet its supply needs	1	2	3	4	5
18. NARO undertakes to increase the delivery capabilities of its strategic supplies partners to meet its supply needs	1	2	3	4	5
19. NARO undertakes to increase the cost management capabilities of its strategic supplies partners to meet its supply needs	1	2	3	4	5
20. Supplier development has helped develop long term mutual relationships between national agricultural research organization and its strategic partners	1	2	3	4	5

Section III: communications

Indicate the extent to which you agree with the following observations of on the supply chain communication on a scale of (1) for strongly disagree, (2) for disagree, (3) for not sure (4) for agree (5) for strongly agree

Scale	**1**	**2**	**3**	**4**	**5**
Formal communication					
12. NARO holds regular meetings with its strategic suppliers for information sharing	1	2	3	4	5
13. NARO holds regular workshops with its strategic suppliers for information sharing	1	2	3	4	5
14. NARO holds regular procurement seminars with its strategic suppliers for information sharing	1	2	3	4	5
15. NARO uses ICT for regular communication with its strategic suppliers	1	2	3	4	5
16. Written communications are emphasized for communication between NARO and its strategic suppliers	1	2	3	4	5
Informal communication					
17. NARO has put in place quality circles for sharing information with its key suppliers	1	2	3	4	5
18. NARO uses teamwork for sharing information with its key suppliers	1	2	3	4	5
19. Telephones calls are used for communication between NARO and its strategic suppliers for information sharing	1	2	3	4	5
20. Impromptu visits to suppliers premises are sometime undertaken by NARO management to share information on key supplies	1	2	3	4	5
21. Informal meetings with Key suppliers are sometimes undertaken with key suppliers	1	2	3	4	5
22. Invitations by are sometimes used to share information with strategic suppliers	1	2	3	4	5

Section IV: Supplier Performance Management

Indicate the extent to which you agree with the following observations of the NARO supply chain performance management on a scale of (1) for strongly disagree, (2) for disagree, (3) for not sure (4) for agree (5) for strongly agree

Scale	**1**	**2**	**3**	**4**	**5**

Performance targets					
1. NARO has established key performance indicators for all its strategic supplies	1	2	3	4	5
2. NARO has established quality expectations that suppliers are expected to meet	1	2	3	4	5
3. NARO has established quantity expectations that suppliers are expected to meet	1	2	3	4	5
4. NARO has established quarterly performance expectations that strategic suppliers have to meet	1	2	3	4	5
5. NARO has established annual performance expectations that strategic suppliers have to meet	1	2	3	4	5
Performance reviews					
6. NARO has an established data collection tools/forms for collecting information on strategic suppliers	1	2	3	4	5
7. The contract manager regularly collects contract performance information	1	2	3	4	5
8. Meetings are used to share information on supplier performance	1	2	3	4	5
9. NARO always ensures that suppliers submit all required documentation in accordance with terms and conditions of a contract.	1	2	3	4	5
10. NARO always ensures that the strategic suppliers deliver in the agreed time.	1	2	3	4	5
11. NARO generates timely procurement contracts monitoring staged/phased reports on each contract	1	2	3	4	5
12. Does NARO have performance supplier appraisals at the end of each suppliers contract	1	2	3	4	5

SECTION V: Procurement Performance

Indicate the extent to which you agree with the following observations on procurement performance in NARO on a scale of (1) for strongly disagree, (2) for disagree, (3) for not sure (4) for agree (5) for strongly agree

Scale	**1**	**2**	**3**	**4**	**5**
Procurement agility					
1. The procurement function in NARO is quick in responding to strategic supplies	1	2	3	4	5
2. Key strategic supplies in NARO now take shorter time when required	1	2	3	4	5
3. Key strategic supplies in NARO are demand demanded	1	2	3	4	5

4. The procurement function is highly responsive to changes in stakeholders procurement needs	1	2	3	4	5
Value for money					
5. NARO has realized a reduction in unit procurement cost	1	2	3	4	5
6. Has NARO realized a reduction in its indirect procurement costs	1	2	3	4	5
7. NARO is in position to enjoy favorable terms and condition in its procurements	1	2	3	4	5
8. NARO always achieve its intended results within its budget	1	2	3	4	5
Internal customer satisfaction					
9. All user departments requirements are procured at the right price	1	2	3	4	5
10. All user departments requirements are procured at the right time	1	2	3	4	5
11. All user departments requirements are procured from the right source	1	2	3	4	5
12. All user departments requirements are procured in the right quality	1	2	3	4	5
13. All user departments requirements are procured in the right quantity	1	2	3	4	5

Appendix II: Interview guide

1. Describe The Efforts To Use Join Planning With Strategic Suppliers In National Agricultural Research Organization
2. Describe The Efforts To Use Supplier Development With Strategic Suppliers In National Agricultural Research Organization
3. What Are The Challenges in Using Strategic Alliances With Suppliers In National Agricultural Research Organization
4. Describe the formal communication mechanism used by NARO in sharing information with key suppliers
5. Describe the informal communication mechanism used by NARO in sharing information with key suppliers
6. What are communication challenges in SRM at NARO
7. To What Extent Has National Agricultural Research Organization Considered The Use Of Supplier Performance Targets With Its Strategic Suppliers
8. Describe The Supplier Performance Reviews Are Undertaken
9. What Are The Challenges Supplier Performance Management In National Agricultural Research Organization

Appendix III: Table for Determining Sample Size from a Given Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size

"S" is sample size.