# Small and medium enterprise agro-processing firms supply chain performance: the role of owner-manager's managerial competencies, information sharing and information quality

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## Abstract

**Purpose** – The study examined the influence of small and medium enterprise (SME) owner-managers' managerial competencies on supply chain performance, the mediation role of information quality on the SME owner-managers' managerial competencies and supply chain performance relationship, the mediating role of information quality on the information sharing and supply chain performance relationship and the mediating role of both information sharing and information quality on SME owner-managers' managerial competences and supply chain performance relationship.

**Design/methodology/approach** – Data were collected from SME agro-processing firms. The determined sample size for the agro-processing firms was 200, while an effective sample size of 177 was obtained. The Covariance Structural Equation Modelling software was used to obtain results on the influence of SME owner-managers' managerial competencies on supply chain performance, the mediation role of information quality on the SME owner-managers' managerial competencies and supply chain performance relationship, the mediating role of information quality on the information sharing and supply chain performance relationship and the mediating role of both information sharing and information quality on SME owner-managers' managerial competences and supply chain performance relationship.

**Findings** – Findings indicated that a positive significant influence of SME owner-managers' managerial competencies on supply chain performance and the presence of partial mediation effects when the mediating role of information quality in the SME owner-managers' managerial competencies and supply chain performance relationship and the information sharing and supply chain performance relationship is tested. Also, a partial mediating role of information sharing and information quality is obtained in the SME owner-managers' managerial competencies and supply chain performance relationship.

**Research limitations/implications** – The study mainly focused on SME agro-processing firms eliminating other SME manufacturing firms. Also, the research employed a wholistic approach when studying the SME agro-processing firms without focusing on how SME owner-managers' managerial competencies would affect information sharing, information quality and supply chain performance based on the market type (local or foreign) and the source of raw materials (local or foreign) and the impact of information sharing on information quality hasn't been given significant attention in the existing literature.

**Originality/value** – The research focused on the mediation role of quality of information shared by SME owner-managers in the relationship between information sharing and supply chain performance, the mediating role of information quality in the SME owner-managers' managerial competencies and supply chain performance and the mediating role of both SME owner-manager's information sharing and quality of information shared in the relationship between SME owner-managers' managerial competences and supply chain performance. These mediation effects haven't been given significant attention in previous research.



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Further, while information sharing and information quality have been studied, they have been studied at a supply chain level, not at a managerial level.

**Keywords** Small and medium enterprises (SMEs), Owner-manager managerial competencies, Information sharing, Information quality, Supply chain performance

**Paper type** Research paper

## 1. Introduction

The agro-processing industry involves the processing of raw materials and semi-processed products obtained from the agricultural sector (UNOPS, 2020). The agricultural sector and its supply chains contribute to poverty reduction through job creation and are seen as a driver for enhancing income levels among communities in many developing nations (UNOPS, 2020). Developing nations are characterized by underdeveloped supply chains compared to developed nations. Underdeveloped supply chains are more common in the agro-processing sector (Obonyo *et al.*, 2023) than in other sectors. Such supply chains are longer and more fragmented yet the demand for processed foods requires strong supply chains for agro-processing firms (van Dijk *et al.*, 2023). This may be due to urbanization, a factor that distances agricultural production places from final consumers, thus requiring an increased number of connections with transport firms, warehousing firms, packaging firms and processing firms (United Nations Industrial Development Organisation, 2020).

Besides, the majority of the research on the performance of agro-processing supply chains focuses on performance measurement of the supply chains (Ramos *et al.*, 2022). Other scholars focus on network design and challenges (Yadav *et al.*, 2022), while others examine the performance of agro-processing firms outside the supply chain context and a few in the supply chain context (Uddin and Akhter, 2022) and focus on promoting environmentally friendly practices in SME agri-food upstream chains (Namagembe, 2022). In addition, a lot of work is on food processing industry, which is only a subset of the agro-processing industry (UNOPS, 2022). Further, existing research does not give significant attention to the role of management competencies, information quality and information sharing on the performance of agro-processing firm supply chains.

Owner-managers require a combination of competencies in order to achieve better supply chain (SC) performances. Previous research examines the effect of distinct competencies such as entrepreneurial competencies, entrepreneurial SC competencies and information technology competencies on firm performance (Kiwala *et al.*, 2021). Other research examines the effect of managerial competencies on small and medium enterprise (SME) performance not giving attention to SC performance and SME agro-processing firms, information quality and information sharing (Shika *et al.*, 2021). Whereas SC competencies are studied in SMEs, previous research treats them mostly as dependent variables (Pooe and Munyanyi, 2019). Additionally, the research shows that all managerial competencies including leadership, problem-solving, strategic competency and customer focus influence firm performance and a firm's competitive advantage (Olafenwa *et al.*, 2021). However, much of the research is done in the airline sector (Hawi *et al.*, 2015), pharmaceutical sector (Olafenwa *et al.*, 2021), agricultural sector (Jankelová and Mišún, 2021) and education (Lisnerova *et al.*, 2020). Moreover, it is not clear whether the SC performances of the agro-processing SMEs are due to a combination of SME owner-managers' competencies, quality of information shared and information sharing capabilities. Although information sharing is highly pronounced in the supply chain literature focusing on soft factors such as trust and collaboration (Colicchia *et al.*, 2019), little is known about whether the quality of information desired by the supply chain partners would have an influence on the level of information sharing in a firm's supply chain in the agro-processing industry or other industries. However, Ramos *et al.* (2022) argue that performance improvements in a supply chain may arise from using timely and accurate information in supply chain management (SCM). Also, Hove-Sibanda and Pooe (2018) argue that competencies may result in highly performing supply chains.

Besides the above, the agro-industry has grown very rapidly in the developing world in the past 3 decades. For example, the Global agri-food trade has more than doubled since 1995, amounting to $1.5tn in 2018, with emerging and developing countries' exports on the rise and accounting for over one-third of the world's total (Food and Agriculture Organization of the United Nations, 2020). The share of developing countries' value addition in global manufacturing of agro-processed products has almost doubled (Food and Agriculture Organization of the United Nations, 2017). For instance, processed foods now account for some 80% of global food sales estimated at US$4tn (Shrimpton, 2017; Wilkinson and Rocha, 2008). Packaged food is one-third or less of total food expenditure in developing countries, while retail sales are from 3 to 10 times faster than those in developed countries where growth has stagnated (Wilkinson and Rocha, 2008). Despite the progress on the developing countries' process of global trade, not every developing country has received tremendous performance from the agro-processing firms. For example, agro-processing firms in Eastern Africa (EAC) are largely operating at low levels of capacity utilization, with most operating at 30–50%, and experience unreliable supply of quality raw materials and inputs (Ndemezo and Ndikubwimana, 2020). Further, a few countries in sub-Saharan Africa have had better performance from their agro-processing firms, Uganda inclusive. SME agro-processing firms' SC performance is still poor in Uganda despite agro-processing being a key component of Uganda's manufacturing sector and accounting for almost 70% of total manufacturing output.

Whereas the structural transformation potential of SME agro-processing is enhanced by the growing demand for processed agricultural goods both in Uganda and from abroad, a large number of SME agro-processing firms in the country currently exhibit a striking underutilization of capacity with some plants operating at only around one-third of the capacity (Kovandova and Fowler, 2019). For example, the World Bank (2012) reported that most SME agro-processing facilities operate at under 50% capacity; Onward Resources International (2016) found that the facilities it reviewed operated at just 20–30% capacity, and Munu (2019) found that the two textile factories in Uganda operate at less than two-thirds of capacity and ginneries at less than 40%. Besides underutilization of the available capacity, the projected raw material supply unavailability to the processing plant was too high, which affected both the supply needs of the SME agro-processing firms and their ability to meet customer demand. These indicate poor SC performance for the SME agro-processing firms.

To address the concern, the study uses four research questions so as to achieve the intended objectives and applies the complementary theory to explain the link between the variables in the conceptual model. According to the theory, mutually reinforcing pairs of factors may not have simple additive but rather have multiplier effects. In this case, to achieve superior supply chain performance, there is a need for effective information sharing and quality information both of which depend on existing management competencies in firms. That aside, to answer the research questions, both a cross-sectional survey and a deductive approach were employed. A statistical sample size of 200 SME agro-processing firms in Kampala was used during data analysis. The firms were chosen using the simple random sampling method without replacement.

Research questions used include:

*RQ1.* What is the influence of managerial competence of owner-managers and SC performance?

*RQ2.* Does information quality mediate the relationship between the managerial competence of owner-managers and SC performance?

*RQ3.* Does information quality mediate the relationship between information sharing and SC performance?

*RQ4.* Does information sharing and information quality mediate the relationship between the managerial competence of owner-managers and SC performance?

The rest of the paper is structured as follows: Part 2 discusses the theories used in the research; Part 3 focuses on the methodology; Part 4 presents the findings on testing the research hypotheses, while Part 5 presents the conclusion, research implications and areas of further research.

## 2. Literature review

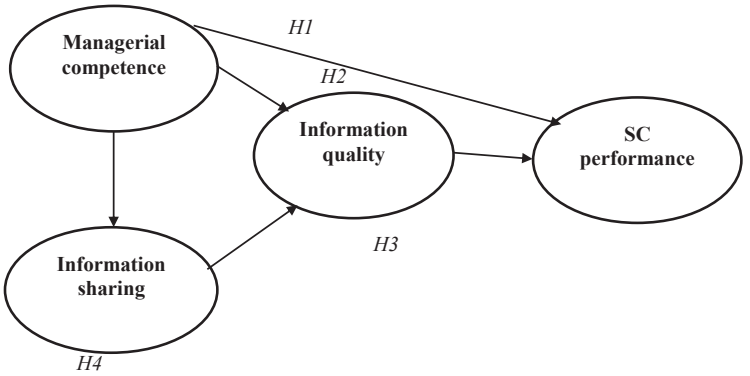
This subsection provides the theoretical perspective used in explaining the variables in Figure 1 and also the link between the variables. The review of the literature is guided by the set research questions, research objectives or hypotheses.

### *2.1 Theoretical perspective: complementary theory*

The variables in the figure above are explained using the complementary theory. Complementarity occurs when the overall value arising from combining two or more interrelated factors exceeds the value that can be generated using the factors separately (Nakata *et al.*, 2011). Besides, the theory has been used in supply chain research when explaining interactions or interdependencies among various aspects (Feizabadi *et al.*, 2021). However, the majority of the previous researchers focus on examining supply chain agility, and adaptability which are just small components for supply chain performance and others use the theory when examining supply chain market orientation, just-in-time (JIT) and total quality management (TQM), agile production (AP) and green SCM (GSCM) practices (Green *et al.*, 2019). Besides, scholars applying the theory use it to examine the impact of a combination of factors on performance (Green *et al.*, 2019). Also, some scholars have used the theory when examining for example risk information sharing (Posch, 2020) and competencies (Nakata *et al.*, 2011; Mishra and Shah, 2009). Earlier research shows that competencies, information quality and information sharing complement each other to produce good performance although not empirically tested.

### *2.2 The relationship between managerial competence of owner-managers and supply chain performance*

Managerial competence is a key element in SCM, and the future of supply chains is based on these competencies (Derwik and Hellström, 2017). Previous researchers identify managerial




**Source(s):** Chye *et al.* (2010); McDowell *et al.* (2013); Du *et al.* (2012); Lee *et al.* (2015); Swanson *et al.* (2021); Keszey and Biemans (2017); Tarka (2017); Keszey (2018)

**Figure 1.**
Conceptual framework

competence as a component of supply chain competence (Ngai *et al.*, 2011; Shou and Wang, 2017), although not empirically examined. Besides being advanced as a key component in SCM, competence is defined in many ways by various scholars. Some scholars argue that competence is composed of knowledge, skills, capabilities or abilities and resources (Derwik and Hellström, 2017). It also comprises behaviors, attitudes, skills and knowledge (Ismail and Changalima, 2019; Biteko and Ismail, 2020). In the management context, competencies consist of specialized competencies, personal competencies and social competencies (Mieszajkina, 2021; Veliu and Manxhari, 2017; Biteko and Ismail, 2020); personal-oriented skills and task-oriented skills (Chye *et al.*, 2010); managerial experience (Derwik *et al.*, 2016); communication, planning and organizing (Masoud and Al khateeb, 2017); and skills, knowledge, attitudes and behaviors (Ismail and Changalima, 2019; Nunkoo *et al.*, 2020; Veliu and Manxhari, 2017). All scholars emphasize the importance of specialized competencies, personalized competencies and social competencies.

Besides that, previous research shows that a link exists between managerial competencies and performance. For example, Veliu and Manxhari (2017) and Biteko and Ismail (2020) argue that managerial competencies that include professional, personal and social competencies improve both management and firm performance; managerial competence improves performance (Veliu and Manxhari, 2017; Odeng, 2012; Elias and Mwakujonga, 2019); managerial skills influence SMEs' performance (Ahmad and Ahmad, 2021); knowledge competences and behavioral competencies positively influence competitive advantage (Awang *et al.*, 2012; Bilal *et al.*, 2017); and managerial competences improve sales performance and customer satisfaction (Masoud and Al khateeb, 2017). Although management competencies may influence performance, their effect on the SC performance of SMEs hasn't been given significant attention.

Further, existing research examines the effect of specialized competencies (supply chain competencies) on SC performance eliminating the importance of other competencies including personal competencies, social competencies and managerial attitudes. In addition, previous research examines the moderating effect of managerial competencies on the relationship between innovativeness and SME performance in Malaysia (Chye *et al.*, 2010); the effect of managerial competences on logistics SC practices (Derwik *et al.*, 2016); measuring competency levels of SMEs (Oztemel and Ozel, 2021); distinctive management competencies and SMEs' growth decisions (Raza *et al.*, 2017); managerial political competencies and SME performance (Mashavira *et al.*, 2021); and the effect of managers' competences on small enterprises performance (Mieszajkina, 2021). However, managers including logistics and SC managers use managerial, generic and/or behavioral competencies in practice other than SC management expertise. Further, in the supply chain context, competence is defined by a combination of elements, management competencies inclusive. Managerial competencies provide a base for firms to manage their operations and supply chains (Biteko and Ismail, 2020). Also, Derwik and Hellström (2017) argue that management competencies lead to superior performance and competitiveness in supply chains. For instance, advance that top management vision and role as well as the competencies of employees in a firm affect the performance of supply chains. Whereas managerial competencies may be relevant in enhancing good supply chain performance, empirical studies testing the relationship are scarce. With the above discussion, it can be hypothesized that:

*H1.* Managerial competencies of owner-managers influence a firm's SC performance.

### *2.3 The mediating role of information quality on the relationship between management competence and supply chain performance*

The mediating role of information quality on the relationship between the managerial competence of owner-managers and SC performance hasn't received significant attention in

both SME and SC management research. Although some research treats information quality as a mediator variable, the focus is placed on the mediating role of information quality on the relationship between customer integration and operational performance (Chavez *et al.*, 2015); enterprise resource planning system and company performance (Suprapto *et al.*, 2017); supplier partnerships and organizational performance (Vivek *et al.*, 2011); human resource competence and financial accountability (Dewi *et al.*, 2019), while other research examines information quality as a dependent (Salari *et al.*, 2018).

Managers use a combination of competencies that create synergistic effects (Derwik *et al.*, 2016). Previous research shows that managerial skills and abilities contribute to information quality (Petkevich and Prevost, 2018); human resource competence has a direct effect on information quality although focused on financial reporting (Dewi *et al.*, 2019), and managerial ties act as information quality enhancing resources or platforms that allow firms to test the quality of information that is obtained by management (Chung, 2012). Keszey (2018) shows that 90% of managers lack access to high-quality information to undertake critical business decisions that impact firm performance. Whereas quality information may be the most desired by management in both SMEs and large firms, previous research indicates that managers do not often have the expertise to evaluate the quality of information they receive (Keszey and Biemans, 2017; Tarka, 2017; Keszey, 2018). According to Tarka (2017), managers experience huddles when evaluating the quality of information obtained from the market. Thus, such difficulties may lead to management failures in decision-making.

Information quality is identified as the most relevant factor for information use. Only two studies empirically examine the direct impact of information quality on supply chain performance (see Marinagi *et al.*, 2015; Kankam *et al.*, 2023). The positive impact of information quality on performance is also confirmed in previous empirical research (Low and Mohr, 2001; Keszey, 2018). High-quality information flows allow firms to plan more strategically and respond more successfully to the demands of a customer (McDowell *et al.*, 2013). Further, Yuan *et al.* (2007) argue that timely access to quality information results in good decision-making that may improve a firm's competitive advantage. In addition, Keszey (2018) argues that 40% of a firm's initiatives fail to deliver results due to deficiencies regarding information quality, while Chmielecki (2015) advances that inappropriate management communication competencies affect information quality that results in poor performance. Also, in a most recent study by Kankam *et al.* (2023), information quality is found to have an impact on supply chain performance although focus is placed on manufacturing firms in general. Given the above discussion, it can be hypothesized that:

*H2.* Information quality mediates the relationship between the managerial competence of owner-managers and SC performance.

### *2.4 The mediating role of information quality on the relationship between information sharing and supply chain performance*

Both information sharing and information quality are important components of effective SC management. The mediating role of information quality on the relationship between information sharing and SC performance hasn't been given significant attention in the SC management literature. Existing research examines the mediating role of information sharing when examining the link between information quality and SC performance (Marinagi *et al.*, 2015; Kankam *et al.*, 2023) and the mediating role of information sharing and information quality on the relationship between driven culture on customer development and firm performance (Agyei-Owusu *et al.*, 2021). In other studies, information quality is treated as an independent variable (Najjar *et al.*, 2019; Omar *et al.*, 2010; Suprapto *et al.*, 2017) with information sharing being dependent on information quality. Najjar *et al.* (2019) argue that focusing on only information sharing isn't enough to achieve good SC performance. The

shared information needs to be of high quality so as to achieve the desired outcome. In addition, Nooranian *et al.* (2021) argue that the quality of information can be gauged based on information exchange among supply chain partners.

Low-quality information may result in resource wastage and would lead to poor SC performance (Najjar *et al.*, 2019; Monczka *et al.*, 1998). Poor quality information and information sharing affect SC efficiency and responsiveness through mismatched inventory levels both in the upstream and downstream (Omar *et al.*, 2010). Whereas both information sharing and information quality may influence SC performance, information sharing is seen to influence information quality which later influences SC performance. For example, Du *et al.* (2012) argue that willingness to share reflects the quality of the information shared, including its timeliness, accuracy, adequacy, completeness and reliability, while Raghunathan (1999) and Epstein and Schneider (2008) advance that information technology results in higher information quality that results in improved performance. With the above discussion, it can be hypothesized that:

*H3.* Information quality mediates the relationship between information sharing and SC performance.

### *2.5 The mediating role of information sharing and information quality on the relationship between management competence and supply chain performance*

Existing research on the effect of managerial competencies is done in sectors that include hospitality, agriculture and health (Swanson *et al.*, 2020; Vainieri *et al.*, 2019; Hilary *et al.*, 2017). Managerial competencies are strongly linked to the information-sharing processes developed by organizations (Vainieri *et al.*, 2019). Swanson *et al.* (2020) and Fanelli *et al.* (2020) argue that managerial competencies are critical for information sharing. Information sharing by management is critical because cognitive resources remain underused when information is not shared (Vainieri *et al.*, 2019). In addition, Hussein and Taher (2021) argue that managerial skills are positively correlated with information sharing, while Rika and Nurhayati (2017) find that professional competencies are positively associated with information sharing.

Furthermore, Swanson *et al.* (2020) advance that sharing information by top management is of paramount importance and management may share information using the mission, vision and strategies. However, on the contrary, Mutlu (2014) takes information sharing to be part of a manager's competencies, while both Lee *et al.* (2015) and Swanson *et al.* (2020) advance that information sharing is promoted when members possess the ability or expertise in the associated field. Sveiby (2007) shows that management behavior or lack of formal processes for sharing is among the major factors hindering information sharing, while Wang *et al.* (2014) find managerial competence has a direct impact on the amount of information shared but not its quality. Albeit, the presence of trust and openness enhances the contribution of management competence in information sharing and the quality of the information shared. Willingness to share information determines the quality of the information shared (Zaheer and Trkman, 2017) and good quality information is never possible without trust, a key dimension for willingness to share (Kwon *et al.*, 2005; Zaheer and Trkman, 2017). Besides, willingness to share, information technology affects the quality of shared information as well (Michalski *et al.*, 2014; Zaheer and Trkman, 2017). Inadequate information exchange and poor-quality information have impact on SC effectiveness and efficiency (Zaheer and Trkman, 2017). With the above discussion, it can be hypothesized that:

*H4.* Both information sharing and information quality mediate the relationship between the managerial competence of owner-managers and SC performance.

## 3. Methodology

### *3.1 Research design*

The study employed a quantitative cross-sectional research design where the study was conducted at a particular time for two months in 2021. The study also involved establishing and testing research hypotheses; thus, the use of a deductive reasoning approach was adopted in this study. Therefore, a quantitative approach was more appropriate in providing responses to the set research hypotheses. A cross-sectional design was used because the research was conducted at a single point in time. The research was quantitative because it involved testing research hypotheses.

### *3.2 Population of the study, sample size and sampling approaches*

The total population comprised 1,446 SME agro-processing firms in Kampala (Uganda Bureau of Statistics (UBOS), 2011). The unit of analysis was agro-processing firms in Kampala, and the unit of inquiry was owner-managers in those SME agro-processing firms. This is because these managers are normally knowledgeable about information sharing, management competence, information quality and the overall SC performance of their respective firms. A statistical sample size of 200 SME agro-processing firms in Kampala was used while an estimated sample size of 300 SME agro-processing. This was an appropriate sample size because according to Roscoe (1975), a sample size between 30 and 500 is appropriate. Appropriate sample size is necessary for achieving statistically valid results. A sample size between 100 and 200 is sufficient and provides accurate results (Head, 2012; Namagembe, 2022). The firms were selected using simple random sampling without replacement. Purposive sampling was then applied to select the owner-managers from the different SME agro-processing firms. This is because owner-managers were deemed to be having sufficient knowledge of the variables under study.

### *3.3 Validity of the instrument*

Pretesting is commonly applied to ensure the content validity of a research instrument (Papachristos, 2014). In a pretest, the content validity of the measurement items is obtained using a sample of respondents other than those from the study population. Once the items were developed into an instrument with a five-point Likert scale, the instrument was pretested on an expert panel. Ten Ugandan academics from the disciplines of procurement and SC management were asked to assess the quality of the measurement items and the degree to which they related to the variables they were developed for. The academics were considered to have the required research expertise and cultural knowledge. This created an impression that their feedback would ensure the content validity of the measurement items. Because of time constraints, technology, cost and COVID-19 disruptions, a pilot study was not feasible. Furthermore, in recognition of constraints, some models recommend pretesting with an expert panel only (see DeVellis, 1991). The content validity index was used to measure the validity of the research instrument. The aim was to ensure that the scale items were meaningful to the sample and that they captured the issues that were being measured. The instrument was valid since all the coefficients were above 0.7 (Nunally and Bernstein, 1978) (See Table A1).

### *3.4 Data collection and instrument*

Data were collected via a hardcopy survey questionnaire. A drop-off and pick-up survey method was used. Responses were plotted on a 5-point Likert scale in line with similar studies. Respondents were given a period of two weeks to complete the questionnaires. Failure to complete the questionnaire within two weeks signified that a particular respondent was not

willing to participate in the survey. Information sharing was measured using measures used by Fawcett *et al.* (2007); information quality using measures by Forslund (2007), SC performance using Gunasekaran *et al.* (2004) and managerial competence using Kochanski (1997). The constructs were modified to fit the context under study.

*3.5 Data analysis*

Data were entered into SPSS software. Using the SPSS software checks for normality, multicollinearity, reliability, common method variance and convergent and discriminant validity were conducted. Previous research on normality suggests that the absolute value of univariate skewness should be < 2, while the absolute value for univariate kurtosis should be < 7 (Curran *et al.*, 1996; Xiong and King, 2015; Namagembe, 2022). Skewness values for all variables were less than 2 with a range from −0.295 to −0.0702, while kurtosis values for all variables were less than 7 with a range from −0.22 to 1.599 (see Table A1) as recommended by Curran *et al.* (1996). Similarly, there were no multicollinearity issues because the variance inflation factors (VIF) were less than 10.0 the tolerance factors were greater than 0.1, and no common method variance problems as common method values below 0.50 (see Table A1). According to Lin and Sun (2018), such common method variance results do not invalidate research findings. Reliability values were above 0.70 as recommended (Nunally and Bernstein, 1978) (see Table A1). Further, composite reliability values were higher than the minimum threshold of 0.40 implying the existence of convergent validity (Taks *et al.*, 2015) (see Table A1). Discriminant validity was measured using the heterotrait–monotrait method. All the values were below the set threshold of 0.9 (Friman *et al.*, 2019; Henseler *et al.*, 2015; Namagembe, 2022) (see Table A2).

*3.6 Factor analysis*

Factor analysis involves examining the relationship between the measurement items and their constructs. The constructs in this case were management competence, information sharing, information quality and SC performance. The factor analysis was conducted using AMOS SPSS (covariance-based software, CB-SEM). Except for two items (Item 2 and Item 6) of the strategic action dimension, the rest of the items for the constructs had loading higher than 0.30, and significant *P*-Values (see Tables 1–4). The two items with insignificant *P*-Values and loadings below 0.30 were eliminated from the analysis.

*3.7 Firm and respondent characteristics*

Results on firm characteristics show that the majority of the firms had been in operation for more than 10 years and had more than 25 employees, while results on respondent characteristics indicate that the majority of firms were run by male owner-managers, the majority of the owner-managers were above 30 years and had undergraduate degrees and masters (see Table 5). Therefore, the sample characteristic results show that owner-managers in agro-processing firms had the relevant experience and expertise to provide relevant information had a good understanding of their firms' operations and supply chains and were able to give reliable information.

## 4. Interpretation and discussion of findings

The results reported in this paper indicate that the managerial competence of owner-managers is a significant predictor of SC performance ($\beta = 0.371$; $p \leq 0.001$) (see Table 5). An in-depth analysis of the data shows that SC performance improves when managers of SMEs have competent planning and administrative staff and when they are in a position to make sound decisions concerning resources and strive to establish long-term relationships with suppliers. Also, when teams in the SME firm are formulated based on diversity of knowledge,

| Construct | Measurement items | Loadings | *P*-values |
|---|---|---|---|
| Accuracy | Managers share information which is fair and free from bias among themselves | 0.743 | $p \leq 0.001$ |
| | Our firm shares fair and free from bias information with its stakeholders | 0.705 | $p \leq 0.001$ |
| | Our firm shares information which is free from arithmetical and grammatical errors | 0.403 | $p \leq 0.001$ |
| | Our firm obtains the information it shares directly from the right sources | 0.614 | $p \leq 0.001$ |
| Convenience of access | Information is always readily available to employees | 0.694 | $p \leq 0.001$ |
| | Our customers always access the information they need with ease | 0.467 | $p \leq 0.001$ |
| | Managers conveniently receive the information they need | 0.702 | $p \leq 0.001$ |
| | Suppliers always receive the information they need conveniently | 0.550 | $p \leq 0.001$ |
| | We contribute to information freely, without predefined structures | 0.550 | $p \leq 0.001$ |
| Reliability | The information shared in our firm is correct, thorough and based on facts | 0.649 | $p \leq 0.001$ |
| | The information shared in our firm fulfills its intended purpose | 0.536 | $p \leq 0.001$ |
| | The information shared in our firm comes from the right trusted sources | 0.409 | $p \leq 0.001$ |
| | Information shared in our firm is always complete | 0.529 | $p \leq 0.001$ |
| | Information shared in our firm is always up-to-date | 0.634 | $p \leq 0.001$ |

**Source(s):** Authors' own creation

**Table 1.** Information quality covariance-based (CB) software factor analysis results

skills and competency, with a strategic risk management plan, and are informed of the actions of competitors and strategic partners, supply chain performance will improve. Apart from the results from the in-depth analysis, Aryatwijuka *et al.* (2020) find that managerial competencies are positively associated with supply chain performance; however, the research was conducted in the humanitarian supply chain context. The finding concurs with findings from earlier research where managerial competencies including professional, personal and social competencies are found to improve both management and firm performance (Veliu and Manxhari, 2017; Biteko and Ismail, 2020). Other scholars also find that managerial competence improves performance (Veliu and Manxhari, 2017; Odeng, 2012; Elias and Mwakujonga, 2019); managerial skills influence SMEs' performance (Ahmad and Ahmad, 2021); knowledge competencies and behavioral competencies positively influence competitive advantage (Awang *et al.*, 2012; Bilal *et al.*, 2017); and managerial competences improve sales performance and customer satisfaction (Masoud and Al khateeb, 2017). Besides the results getting support from earlier research, the findings are in line with the complementary theory that puts emphasis on identifying mutually reinforcing pairs of factors that may not have simple additive but may rather have multiplier effects, making them especially potent. Managerial competence has been identified as a key factor for achieving enhanced performance outcomes both in previous research and in the research findings for this study. However, it should be noted that managers require a combination of skills if they are to improve or achieve good performance results.

Second, the results indicated a partial mediation effect of information quality in the relationship between the managerial competence of owner-managers and SC performance (see Figure 2). A simultaneous mediation analysis was run to examine the mediation effect of information quality and the procedure of Afthanorhan *et al.* (2014) and Warner (2012) was followed. The mediation effect was obtained by obtaining the product of the two paths (Path 2 and Path 3) (0.411 x 0.309 = 0.127). For mediation to exist, all paths ought to have significant *P*-values. All two paths had significant *P*-values although the effect of managerial competence of

| Construct | Measurement items | Loadings | *P*-values |
|---|---|---|---|
| Planning and administration competency | We have clear and functioning administration in our firm | 0.563 | $p \leq 0.001$ |
| | We have a functioning planning department in our firm | 0.671 | $p \leq 0.001$ |
| | We have competent planning and administration staff in our firm | 0.635 | $p \leq 0.001$ |
| | Our firm includes its key suppliers in its planning and goal setting activities | 0.539 | $p \leq 0.001$ |
| | All departmental managers are in a position to make sound decisions concerning public resources | 0.510 | $p \leq 0.001$ |
| | The staff workforce within our institution is balanced in terms of their level of expertise | 0.465 | $p \leq 0.001$ |
| | Our firm regularly solves problems with its suppliers | 0.310 | $p \leq 0.05$ |
| | Our firm strives establish long term relationship with its suppliers | 0.420 | $p \leq 0.05$ |
| | Our firm helps its suppliers to improve their product quality | 0.696 | $p \leq 0.001$ |
| Team work competency | Team work is highly encouraged in our firm | 0.709 | $p \leq 0.001$ |
| | Tasks are allocated to teams and not individual employees | 0.411 | $p \leq 0.001$ |
| | Teams in our firm are based on diversity of knowledge, skills and competency | 0.577 | $p \leq 0.001$ |
| | Employees are highly versatile and can apply different approaches while executing their tasks | 0.350 | $p \leq 0.001$ |
| Strategic action | Our activities are guided by a clear mission, vision and aspirations | 0.669 | $p \leq 0.001$ |
| | Our firm has top management which sets strategic actions | 0.243 | $p > 0.05$ |
| | Our firm has a strategic risk management plan | 0.526 | $p \leq 0.001$ |
| | Management is informed of the actions of competitors and strategic partners | 0.465 | $p \leq 0.001$ |
| | Management understands the concerns of the stakeholders | 0.372 | $p \leq 0.001$ |
| | Management understands the strengths and limitations of our various business strategies | 0.295 | $p > 0.05$ |

**Source(s):** Primary data

**Table 2.** Managerial competence covariance-based (CB) software factor analysis results

owner-managers on supply chain performance still remained higher and significant. An in-depth analysis of the data reveals that managerial competencies influence information quality when SME owner-managers establish long-term relationships with suppliers, ensure diversity of knowledge, skills and competency among managerial teams and understand the concerns of the stakeholders. Information quality improves SC performance when SME owner-managers share timely, adequate, accurate and complete information. The results are in agreement with previous research, which shows that managerial skills and abilities contribute to information quality (Petkevich and Prevost, 2018); and managerial social interactions act as information quality-enhancing resources or platforms that allow firms to test the quality of information obtained (Chung, 2012). Further, social interactions provide a platform for building trust, an aspect that proved to be important for improving the quality of information shared. Thus, the results also are in line with the complementary theory that advances that a combination of complementary factors results in enhanced performance outcomes. In addition, the positive impact of information quality on performance is confirmed in previous empirical research (Low and Mohr, 2001; Keszey, 2018). Sharing high-quality information enables firms to plan more strategically and respond more successfully to the demands of a customer (McDowell *et al.*, 2013). Further, Yuan *et al.* (2007) argue that timely access to quality information results in

| Construct | Measurement items | Loadings | *P*-values |
|---|---|---|---|
| Connectivity | We have information technology tools which facilitate information access | 0.634 | $p \leq 0.001$ |
| | Information systems in different departments are connected into a single system | 0.552 | $p \leq 0.001$ |
| | We interact with our customers using various internet-enabled platforms | 0.469 | $p \leq 0.001$ |
| | Linkages have been established across various departments with the use of different information tools | 0.612 | $p \leq 0.001$ |
| | All employees are allowed to access all the information they require | 0.669 | $p \leq 0.001$ |
| | Employees regularly interact with each other in different departments with different means | 0.619 | $p \leq 0.001$ |
| | Customer data is systematically collected for aggregation | 0.658 | $p \leq 0.001$ |
| | Supplier data is systematically collected for aggregation | 0.715 | $p \leq 0.001$ |
| | Our information systems are interlinked with those of our suppliers | 0.598 | $p \leq 0.001$ |
| Willingness | Information is freely shared to all the employees | 0.611 | $p \leq 0.001$ |
| | Managers are always willing to share information among themselves | 0.616 | $p \leq 0.001$ |
| | Different departments in our firm engage in information exchange willingly | 0.624 | $p \leq 0.05$ |
| | Our firm always shares information with its stakeholders (e.g., customers, suppliers, banks) willingly | 0.602 | $p \leq 0.001$ |
| | Our stakeholders (e.g., customers, suppliers, banks) always share information with our firm willingly | 0.395 | $p \leq 0.001$ |

**Source(s):** Authors' own creation

**Table 3.**
Information sharing covariance-based (CB) software factor analysis results

| Construct | Measurement items | Loadings | *P*-values |
|---|---|---|---|
| Inventory costs | We keep optimum inventory levels in our firm | 0.765 | $p \leq 0.001$ |
| | The cost of keeping inventory in our firm is low | 0.586 | $p \leq 0.001$ |
| | The cost of keeping inventory significantly affects the profitability of our firm | 0.421 | $p \leq 0.05$ |
| Operating costs | We have low operating costs in our firm | 0.325 | $p > 0.05$ |
| | Sharing of information in our firm has led to a reduction in operating costs | 0.442 | $p \leq 0.05$ |
| | Management competencies in our firm have led to a reduction in operating costs | 0.443 | $p \leq 0.05$ |
| Lead time | There is timely processing of customer orders in our firm | 0.677 | $p \leq 0.001$ |
| | Our suppliers conform to the delivery schedules and timelines | 0.462 | $p \leq 0.001$ |
| | We have strategies with which we handle urgent customer orders | 0.506 | $p \leq 0.001$ |
| Stock out probability | We always have enough stock to fulfill a given demand request | 0.693 | $p \leq 0.001$ |
| | We keep extra stock to cater for unpredicted customer orders | 0.473 | $p \leq 0.05$ |
| | We never run short of stock in our firm | 0.284 | $p \leq 0.05$ |
| Fill rate | We have a good order fulfillment record to our customers | 0.622 | $p \leq 0.001$ |
| | Customer orders are always fully met by immediate stock availability | 0.339 | $p \leq 0.05$ |
| | We don't experience stock outs in our firm | 0.381 | $p \leq 0.05$ |
| | We never lose sales because of lack of stock | 0.602 | $p \leq 0.001$ |

**Source(s):** Authors' own creation

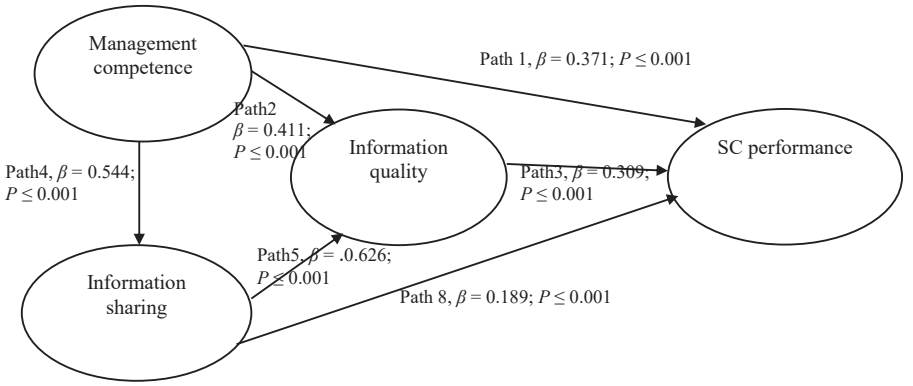
**Table 4.**
SC performance covariance-based (CB) software factor analysis results

good decision-making that may improve a firm's competitive advantage. Finally, Keszey (2018) argued that 40% of a firm's initiatives can fail to deliver results due to deficiencies regarding the quality of information shared.

| | Frequency | % | Valid % | Cumulative % |
|---|---|---|---|---|
| *Period of existence of food processing firms* | | | | |
| Less than 1 year | 8 | 4.5 | 4.5 | 4.5 |
| 1–5 years | 62 | 35 | 35 | 39.5 |
| 6–10 years | 48 | 27.1 | 27.1 | 66.7 |
| More than 10 years | 59 | 33.3 | 33.3 | 100 |
| Total | *177* | *100* | *100* | |
| *Number of employees serving in the firm* | | | | |
| Below 25 | 42 | 23.7 | 23.7 | 23.7 |
| 25–50 | 60 | 33.9 | 33.9 | 57.6 |
| 51–100 | 38 | 21.5 | 21.5 | 79.1 |
| More than 100 | 37 | 20.9 | 20.9 | 100 |
| Total | *177* | *100* | *100* | |
| *Gender of the respondents* | | | | |
| Male | 93 | 52.5 | 52.5 | 52.5 |
| Female | 84 | 47.5 | 47.5 | 100 |
| Total | *177* | *100* | *100* | |
| *Age bracket of respondents* | | | | |
| 18–30 years | 35 | 19.8 | 19.8 | |
| 30–40 years | 63 | 35.6 | 35.6 | 19.8 |
| 41–50 years | 64 | 36.2 | 36.2 | 55.4 |
| More than 50 years | 15 | 8.5 | 8.5 | 91.5 |
| Total | *177* | *100* | *100* | *100* |
| *Qualification of respondents* | | | | |
| Diploma | 23 | 13 | 13 | 13 |
| Degree | 99 | 55.9 | 55.9 | 68.9 |
| Masters | 55 | 31.1 | 31.1 | 100 |
| Total | *177* | *100* | *100* | |

**Source(s):** Authors' own creation

**Table 5.**
Firm and respondent characteristics




**Note(s):** Model Fit indices: RMR = 0.005; GFI = 0.996; AGFI = 0.958; NFI = 0.994; RFI = 0.963; IFI = 0.998; TLI = 0.987; CFI = 0.998; CMIN/DF = 1.498

**Source(s):** Authors' own creation

**Figure 2.**
Structural model

Furthermore, the results disclose that information quality partially mediates the relationship between information sharing and SC performance (see Figure 2). The influence of information sharing on SC performance is higher in the absence of information quality (see Table A3) and reduces on the introduction of information quality in the analysis (see Figure 2). A simultaneous mediation analysis was run to examine the mediation effect of information quality and the procedure of Afthanorhan *et al.* (2014) and Warner (2012) was followed when computing the mediation effect. The mediation effect was obtained by obtaining the product of the two paths (Path 5 and Path 3) (0.626 x 0.309 = 0.193) where both paths have significant *P*-values. The impact of information sharing on SC performance improves if quality information is shared. In Uganda, information sharing is regarded as a key factor for SC effectiveness while information quality fosters the reduction of unwarranted wastage and costs in the supply chain (Hilary *et al.*, 2017). Thus, the need to ensure the availability and easy access of information to those reliant on it is fundamental (Hilary *et al.*, 2017). Not only that, Bakalikwira *et al.* (2017) examine managerial competencies and supply chain performance and find that staff with the skills, knowledge and abilities will comply with set guidelines, provide timely and complete information to the stakeholders and produce the targeted results. However, the research is conducted in relief aid organizations in Uganda rather than agro-processing firms. Besides, supply chains for agro-processing firms experience limited information access and nonassurance about the quality of information received (Mubangizi *et al.*, 2004). Regardless of this, the results are supported by previous research, which shows that information sharing is seen to influence the quality of information shared through willingness to share information and connectivity, which later influences performance. For example, Du *et al.* (2012) argue that willingness to share reflects the quality of the information shared, including its timeliness, accuracy, adequacy, completeness and reliability, while Raghunathan (1999), and Epstein and Schneider (2008) advance that use of information technology results in higher information quality that results in improved performance. Low-quality information results in resource wastage and would lead to poor SC performance (Najjar *et al.*, 2019; Monczka *et al.*, 1998).

Finally, the results indicate the presence of a partial mediation effect of information sharing and information quality on the relationship between the managerial competence of owner-managers and supply chain performance (see Figure 2). The mediation effect was obtained by obtaining the product of the three paths (Path 5, Path 4 and Path 3) (0.626 x 0.544 x 0.309 = 0.105). Information sharing and information quality enhance firm efficiency for example through the use of information and communication technologies (Otaala, 2016). The competence of managers is key in enhancing the use of information technologies. Besides that, information sharing keeps farmers attuned to the demands and changing preferences of agro-processing firms that contribute to greater performance. Although information sharing and information quality mediate the relationship between management competence and SC performance, the agricultural supply chain in Uganda still experiences information scarcity leading to deficit supplies (Ruhangawebare, 2010). Additionally, the market information environment in Uganda is characterized by absent, slow or infrequent information dissemination that adversely affects SME managers' ability to make crucial decisions.

These findings have support from previously published research. For instance, Hussein and Taher (2021) argue that managerial skills are positively correlated with information sharing, while Rika and Nurhayati (2017) find that professional competencies are positively associated with information sharing. Sveiby (2007) shows that management behavior is among the major factors hindering information sharing. Besides that, willingness to share information determines the quality of the information shared (Zaheer and Trkman, 2017), and good quality information is never possible without trust, a key dimension for willingness to share (Kwon *et al.*, 2005; Zaheer and Trkman, 2017). Besides, willingness to share, information technology affects the quality of shared information as well (Michalski *et al.*, 2014; Zaheer and

Trkman, 2017). Inadequate information exchange and poor-quality information greatly impact on SC performance (Zaheer and Trkman, 2017).

## 5. Conclusion and recommendations

The research aimed to examine the relevance of the managerial competence of owner-managers, information sharing and information quality on the supply chain performance of SME agro-processing firms. The research findings indicate that the managerial competence of owner-managers predicts supply chain performance in agro-processing firms. It was also further found that information quality increases the effect of managerial competence of owner-managers on the performance of supply chains as well as between information sharing and supply chain performance. Overall, both information sharing and information quality potentially increase the influence of managers' competencies on supply chain performance. Hence, the results indicate the relevance of SME owner-managers' managerial competencies, information sharing and information quality to SME firms' SC performance and are in line with the complementary theory that advances that a combination of complementing factors results in enhanced performance outcomes. Thus, SME owner-managers need to have diverse competencies so as to improve information sharing levels and the quality of information shared. This is because information sharing is still limited and varies across firm nations, Africa inclusive. Competencies may increase management's willingness to share information and also enhance the use of information technologies that may result in improved information sharing and information quality. Improvement in information sharing and information quality will enhance the performance of SME agro-processing firms' supply chains.

## 6. Research implications

The research has implications for practice, policy and theory. To theory, the research contributes to SC management literature by assessing the effect of SME owner-managers' managerial competencies on information sharing, information quality and SC performance and the mediation role of information sharing and information quality. Information quality has been examined as a factor that influences information sharing in previous research. However, in this research, information quality is examined as a dependent variable for information sharing. Further, the influence of SME owner-managers' managerial competencies on SC performance hasn't been given significant attention. Focus is placed on specific competencies such as entrepreneurial competencies and SC competencies in the SME management literature. Whereas managerial competencies are identified to be key for effective and efficient supply chains, and as a dimension for supply chain competencies, a holistic approach is taken when examining supply chain competencies. The contribution of each individual dimension such as managerial competencies is not examined. The research also has policy implications: The first implication is for the government to reduce the costs of information sharing. This is because it is costly for farmers to share information with the SME agro-processing firms. The government may also develop an online agricultural database that collects both the market demand information from SME agro-processing firms and information on farmers' agricultural produce in given time intervals. However, both the SME agro-processing firms and the farmers may be trained in how to use the database. To practice, the SME agro-processing firms may establish collaborative relationships with the farmers who supply them with agricultural produce. Such relationships will help them build higher levels of trust that may result in increased levels of willingness to share information. Willingness to share information will help SME agro-processing firms and the farmers in the upstream chain obtain quality information during any information exchange. Also, owner-managers in SME agro-processing firms may develop

various competencies such as social interaction competencies and professional competencies among others so as to improve their level of effectiveness in information sharing and quality of information shared. Lastly, SME agro-processing firms may formalize their supply chains through restructuring as a strategy to improve information sharing by creating an open communication environment and supply chain performance.

## 7. Limitations and areas for further study

Besides the implications, the research had limitations, which present areas of further research. The first limitation is a methodological limitation. The research was mainly quantitative which limited the amount of information collected. Thus, future research may employ a qualitative approach or mixed research approach. Second, the research was conducted in SME agro-processing firms, eliminating other SME manufacturing firms. Third, the research may examine the impact of environmental dynamism on SME managers' competencies and information sharing; and the mediating role of SME managers' competencies on the relationship between environmental dynamism and information quality. Fourth, the research employed a holistic approach when studying the SME agro-processing firms without focusing on how SME managers' competencies would affect information sharing, information quality and SC performance based on the market type (local or foreign) and the source of raw materials (local or foreign).

## List of abbreviations

SME – Small and Medium Enterprises
SC – Supply chain
SCM – Supply Chain Management

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(The Appendix follows overleaf)

## Appendix

**Table A1.** Reliability, composite reliability, collinearity, AVE values and common method variance

| Variables | Reliability values | Composite reliability | Collinearity statistics | | Skewness | Kurtosis | Common method variance (%) | CVI |
|---|---|---|---|---|---|---|---|---|
| | | | Tolerance | VIF | | | | |
| SC performance | 0.820 | 0.835 | | | −0.295 | −0.22 | 35.48 | 0.81 |
| Management competences | 0.860 | 0.884 | 0.567 | 2.043 | −0.431 | 0.61 | 29.66 | 0.85 |
| Information sharing | 0.864 | 0.887 | 0.571 | 1.752 | −0.702 | 1.599 | 40.57 | 0.89 |
| Information quality | 0.854 | 0.881 | 0.489 | 1.765 | −0.332 | 0.091 | 38.38 | 0.90 |

**Source(s):** Authors' own creation

**Table A2.** Heterotrait-monotrait discriminant validity values

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| Management competences (1) | | | |
| Information sharing (2) | 0.828 | | |
| SC performance (3) | 0.716 | 0.612 | |
| Information quality (4) | 0.732 | 0.778 | 0.610 |

**Source(s):** Authors' own creation

**Table A3.** Influence of information sharing on SC performance

| Variables | Standardized estimate | Critical ratio | *P*-value |
|---|---|---|---|
| Information sharing → SC performance | 0.493 | 5.499 | $p \leq 0.001$ |

**Source(s):** Authors' own creation

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