

Competitive advantage in SMEs: effect of supply chain management practices, logistics capabilities and logistics integration in a developing country

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Abstract

Purpose – The purpose of this paper is to explore the relationship between supply chain management practices, logistics capabilities, logistics integration and competitive advantage of Small and Medium Enterprises (SMEs) in a developing country.

Design/methodology/approach – Using a structured questionnaire survey, cross-sectional data collected from 204 SMEs in Kampala – Uganda were analysed using exploratory and confirmatory factor analysis, and Structural Equation Modelling (SEM) using AMOS version 26 to validate the theorised relationships.

Findings – The study findings revealed that both supply chain management practices and logistics integration are positively and significantly associated with competitive advantage. Also, both supply chain management practices and logistics capabilities are positively and significantly associated with logistics integration. Additionally, the authors found that logistics integration partially mediates in the relationships between supply chain management practices and competitive advantage, and logistics capabilities and competitive advantage. Conclusively, the three independent variables collectively account for 11% variance in competitive advantage of SMEs.

Originality/value – Given the general observation that SMEs are fundamental to socio-economic development, yet resource constrained, this study uses Resource-based and dynamic capabilities theoretical perspectives to provide an empirical understanding of the supply chain and logistics resources and capabilities necessary for building competitive advantage of SMEs in the context of a developing economy.

Keywords Supply chain management practices, Logistics capabilities, Logistics integration, Competitive advantage, SMEs

Paper type Research paper

1. Introduction

In both developed and developing economies, Small and Medium Enterprises (SMEs) are fundamental to socio-economic growth and development for they constitute a significant part of global supply chains. For example, SMEs constitute about 99% of UK industry (Sullivan-Taylor and Branicki, 2011). In Uganda, SMEs and micro enterprises constitute about 90% of private sector industry (National survey of small businesses in Uganda, 2015). Although SMEs can be categorised variously in different economies, developing countries such as

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The authors acknowledge the almighty God for their lives and the tireless work done by the editors and reviewers. This article was funded by the authors.



Uganda categorise SMEs based on the number of employees, capital investment and annual sales turnover (Uganda Bureau of Statistics report, 2003). In Uganda, the Ministry of Finance, Planning and Economic Development (MFPED) defines a small enterprise as one employing a minimum of 5 people and a maximum of 50. A medium enterprise employs between 50 and 100 people (MFPED report, 2008). Besides their crucial role, SMEs are more disadvantaged than large firms and this compromises their competitive advantage (Wedawatta *et al.*, 2010; Thun *et al.*, 2011). Yet, it has been recently emphasised that, in order to achieve industrial growth and economic development, the competitiveness and sustainability of SMEs deserve significant attention (Arsawan *et al.*, 2020).

The extant literature indicates that SMEs have various supply chain deficiencies that affect their competitiveness. For example, compared to large firms, SMEs are understood to be more vulnerable to supply chain disruptions (Thun *et al.*, 2011; Ali and Gölgeci, 2019), lack sufficient resources (Thun *et al.*, 2011; Arsawan *et al.*, 2020), do not adequately prepare for supply chain disruptions (e.g. Wedawatta *et al.*, 2010) and encounter several operational constraints that retard their competitive advantage. In Uganda, SMEs are less competitive as depicted in the observation that many of them collapse within their first five years and only 5–10% survive and reach maturity (Private Sector Foundation Uganda, 2006). Moreover, the increased failure rate of SMEs has been pronounced in both developed and developing countries (Arsawan *et al.*, 2020). SMEs in Uganda suffer from late deliveries, poor quality products or delivery failures, which reflect poor supply chain performance and reduced competitive advantage (Eyaa and Ntayi, 2010). Recent empirical literature has underlined the role of logistics and supply chain management (SCM) practices and capabilities in creating firms' competitive advantage (McGinnis *et al.*, 2010; Aziz *et al.*, 2020; Keskin *et al.*, 2021). SCM practices such as strategic supplier partnership, customer relationships, information sharing and postponement have been earmarked as vital for building competitive advantage (Li *et al.*, 2006; Afraz *et al.*, 2021; Huo *et al.*, 2021; Migdadi, 2021).

Previous scholarly evidence suggests that firms' competitive advantage can be achieved by developing unique logistics practices and capabilities (Zhao *et al.*, 2001; Mentzer *et al.*, 2004; Gligor and Holcomb, 2012, 2014a, b; Sandberg and Abrahamsson, 2011; Day *et al.*, 2015). According to reports (e.g. World Bank report, 2017; JICA report, 2017), the efficiency and effectiveness of logistics have an impact on competitive priorities such as cost, availability, smooth movement of goods and services and meeting customer expectations. However, reports have shown that firms in Uganda have registered unsatisfactory logistics performance in the form of delayed deliveries, data invisibility and inadequate customer service delivery, which hamper their competitiveness (World Bank report, 2017; Langley and Capegmini, 2017). There are several dimensions of logistics capabilities suggested in the literature. However, a considerable stream of research consent that logistics capabilities necessary for creating and enhancing competitive advantage include demand management capabilities, supply management capabilities and information management capabilities (Mentzer *et al.*, 2004; Gligor and Holcomb, 2012, 2014a, b).

Furthermore, it is argued that the ability to integrate logistics capabilities across the supply chain can be considered as a dynamic capability (Gligor and Holcomb, 2012, 2014a, b). Hence, from the dynamic capabilities perspective of the resource-based view, the ability to integrate logistics capabilities across the supply chain is an important source of competitive advantage (Gligor and Holcomb, 2012; Chang *et al.*, 2021). Logistics integration, which can be external to the organisation or intra-organisational (Rodrigues *et al.*, 2004; Li *et al.*, 2006; Gimenez, 2006; Paulraj and Chen, 2007; Gligor and Holcomb, 2012; Mellat-Parast and Spillan, 2014) can enable the firm to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Tece *et al.*, 1997). Scholars have suggested different forms in which logistics and SCM related competitive advantage could manifest. However, based on the scrutiny of several dimensions used in the previous studies,

Li *et al.* (2006) concluded that the dimensions of competitive advantage that can be gained from SCM practices are: price/cost, quality, delivery dependability, product innovation, and time to market. Other antecedents of competitive advantage underlined in the recent supply chain research include supply chain integration (Mellat-Parast and Spillan, 2014), innovative capabilities and supply chain risk management capabilities (Kwak *et al.*, 2018). These studies have observed the need for more empirical studies on potential enhancers of competitive advantage. In response, this study investigates the extent to which SCM practices, logistics capabilities and logistics integration contribute to SMEs' competitive advantage.

The rest of this paper is organised as follows: Section 2 contains the theoretical review and research hypotheses while Section 3 contains the methodology used. Section 4 follows with the empirical results while Section 5 discusses the results before summary and conclusions are provided in Section 6.

2. Theoretical review and hypotheses development

The Resource-based view (RBV) and related dynamic capabilities perspective lay foundation for this study. The RBV postulates that a firm's own resources create superior performance, which then translates into competitive advantage (Barney, 1991; Sanders *et al.*, 2011). According to Barney (1991), firm resources include assets, capabilities, organisational processes, firm attributes, information and knowledge among others. The RBV can be used to assess the development of logistics and SCM practices and their impact on firm competitiveness (Mellat-Parast and Spillan, 2014). Indeed Arsawan *et al.* (2020) underlined that SMEs' inability to manage resources has aggravated their failure in both developed and developing countries. According to the RBV, resources are linked to capabilities and capabilities to performance (Gligor and Holcomb, 2012). Dynamic capabilities refer to "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece *et al.*, 1997). Firms which successfully use resources to develop capabilities can potentially build more competitive advantage resulting in higher performance than those in which resource-capability link does not exist (Barney, 1991).

Prior research has investigated SCM practices and capabilities from the RBV (e.g. Gligor and Holcomb, 2012; Brandon-Jones *et al.*, 2014; Kwak *et al.*, 2018). Related to this, Gligor and Holcomb (2012) argue that the ability to integrate logistics capabilities across the supply chain can be considered a dynamic capability. Logistics capabilities have been underlined as a source of firms' competitive advantage (Zhao *et al.*, 2001; Mentzer *et al.*, 2004; Sandberg and Abrahamsson, 2011; Gligor and Holcomb, 2012, 2014a; Day *et al.*, 2015). This is because logistics capabilities can be used to adapt, integrate and reconfigure resources, organisational skills and functional competencies to achieve superior performance (Morash *et al.*, 1996; Stank and Lackey, 1997; Mentzer *et al.*, 2004). Gligor and Holcomb (2014b) add that within the RBV, the integration of logistics capabilities can be considered a source of competitive advantage that results from idiosyncratic inter-firm linkages or knowledge-sharing routines.

2.1 Supply chain management (SCM) practices and competitive advantage

Competitive advantage refers to the extent to which an organisation is able to build a defensible position over competitors (Porter, 1985; McGinnis and Vallopra, 1999). Porter (1985) suggested that firms can pursue either a cost leadership or a differentiation strategy to achieve competitive advantage. Later, several authors suggested different dimensions of competitive advantage. For example, Koufteros *et al.* (1997) suggested five dimensions: competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation. Li *et al.* (2006) observed that the most commonly used dimensions of

competitive advantage are: price/cost, quality, delivery dependability, product innovation and time to market. SCM practices refer to a set of activities undertaken by a firm to promote effective management of its supply chain (Li *et al.*, 2006; Koh *et al.*, 2007). Different scholars have compiled varying lists of SCM practices. These include: purchasing, quality, and customer relations (Tan *et al.*, 1998), supply chain integration, information sharing, customer service management, and JIT capability (Tan *et al.*, 2002). Min and Mentzer (2004) include agreed vision and goals, information sharing, risk and reward sharing, cooperation, process integration, long-term relationship and agreed supply chain leadership. Li *et al.* (2006) based on prior literature to develop five distinctive dimensions of SCM practices that arguably represent both upstream and downstream portions of the supply chain. These practices include strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing and postponement. According to Li *et al.* (2006), SCM practices impact both performance and competitive advantage of an organisation through price/cost, quality, delivery dependability, time to market, and product innovation. Previous studies have indicated that SCM practices such as strategic supplier partnership can enhance competitive advantage through improving supplier performance and reducing time to market (Ragatz *et al.*, 1997). It has also been observed that practices such as information sharing and information quality contribute positively to customer satisfaction (Spekman *et al.*, 1998). Postponement strategy not only increases the flexibility in the supply chain, but also balances global efficiency and customer responsiveness (Van Hoek *et al.*, 1999). Furthermore, Jie *et al.* (2013) confirmed the existence of a strong relationship between supply chain practices and competitive advantage. Finally, recent studies have emphasised that SCM practices such as buyer-supplier relationships (Afrac *et al.*, 2021), information sharing (Huo *et al.*, 2021) and customer relationship management (Migdadi, 2021) influence different facets of competitive advantage. This leads to the hypothesis that:

H1. SCM practices positively affect SMEs' competitive advantage.

2.2 Logistics capabilities and competitive advantage

The literature indicates different ways of grouping logistics capabilities (Gligor and Holcomb, 2012). For example, Mentzer *et al.* (2004) conceptualized logistics capabilities that lead to competitive advantage as being in four broad categories: demand-management capabilities, supply-management capabilities, information-management capabilities and coordination capabilities. Stank *et al.* (2005) proposed four categories: customer focus, time management, integration, information exchange, and evaluation. Esper *et al.* (2007) added measurement capabilities. After a systematic literature review, Gligor and Holcomb (2012) concluded on three dimensions of logistics capabilities: demand management capabilities, supply management capabilities and information management capabilities. Researchers have acknowledged that logistics capabilities can be a source of competitive advantage (Gligor and Holcomb, 2014a; Karagoz and Akgun, 2015). According to Cho *et al.* (2008), a firm with sufficient logistics capabilities is capable of handling small frequent orders, delivering correct orders on-time, communicating shipping information, sharing logistics information with partners, handling returned products, handling global distribution as well as handling and filling orders using web-based systems.

According to Gligor and Holcomb (2012, 2014a), logistics capabilities such as demand management and information management capabilities enable firms differentiate their logistics activities from competitors. Demand management capabilities are customer-focused capabilities that allow the firm to meet specific customers' expectations by providing differentiation through unique value-added activities (Mentzer *et al.*, 2004; Gligor and Holcomb, 2012, 2014a). Information exchange capabilities relate to the firm's ability to analyse, store and distribute strategic and tactical information both internally and externally

(Zhao *et al.*, 2001; Gligor and Holcomb, 2012). Supply management capabilities involve total system cost minimisation with explicit consideration of cross-functional trade-offs; effective management of time to eliminate wasted capital and inventory; response to demand fluctuations with less distortion of the order cycle process; use of resources to enable postponement speculation, modularization and standardization (Gligor and Holcomb, 2012).

Logistics capabilities, if well managed, can become core competences for a firm geared to achieving competitive advantage and superior performance (Zhao *et al.*, 2001; Mentzer *et al.*, 2004; Cho *et al.*, 2008; Gligor and Holcomb, 2012). Researchers (Mentzer *et al.*, 2004; Gligor and Holcomb, 2014b) argue that as time and quality-based competition becomes intense, the role of logistics capabilities becomes more critical for competitive advantage. Demand chain management logistics capabilities have strong potential to differentiate manufacturing performance and hence create competitive advantage (Frohlich and Westbrook, 2002). It is also recommended that firms should develop the logistics capability of innovativeness, which can act as a catalyst for logistics service differentiation, developing new logistics processes or services in response to a competitors' new offering, resulting into a competitive advantage (Ralston *et al.*, 2013). Finally, recent researchers have also confirmed that logistics capabilities positively influence firms' competitive advantage (Bag *et al.*, 2020; Aziz *et al.*, 2020; Keskin *et al.*, 2021). This leads to the following hypothesis:

H2. Logistics capabilities positively affect SMES' competitive advantage.

2.3 Supply chain management practices and logistics integration

Teece (2014, 2018) noted that numerous efforts have been devoted to identifying and testing the effects of capabilities but little attention has been drawn towards the need to keep such capabilities integrated. The current escalating competition suggests that firms should improve not only their internal logistics operations but also focus on linking their customers and suppliers in the overall logistics chain (Prajogo and Olhager, 2012). According to Chinomona and Pooe (2013) logistics integration refers to the degree of cooperation, collaboration, interaction and coordination between logistics activities. In circumstances where customer and cost orientations are critical, the capability of integrating activities impact on efficiency and effectiveness of logistics operations (Daugherty *et al.*, 2009; Spillan *et al.*, 2013). Logistics integration can be internal and external: internal logistics integration refers to the competency of a firm to link logistics activities performed internally into a seamless process to support customer requirement (Stank *et al.*, 2002; Paulraj and Chen, 2007). External logistics integration relates to the ability to link logistics activities across firms' boundaries (Paulraj and Chen, 2007). According to the paradigm that suggests competition is at the supply chain level, firms within the supply chain must integrate their specific firm-level logistics capabilities in order to gain a competitive advantage over firms external to the supply chain (Gligor and Holcomb, 2014b).

Gligor and Holcomb (2012) observe that supply chain practices facilitate logistics capabilities and logistics integration. The role of SCM practices such as strategic supplier partnership, customer relationship and information sharing in logistics integration is eminent. For example, literature reveals how it is impossible to achieve integrated logistics capabilities without cooperation at all levels within the firm and among the firms that constitute a supply chain (Heide and Miner, 1992; Gligor and Holcomb, 2012). Similarly internal and external coordination capabilities contribute to process integration and the development of collaborative relationships within the supply chain (Gligor and Holcomb, 2014b). Gligor and Holcomb (2014b) suggest that SCM practices such as cooperation; coordination and communication lead to integrated logistics capabilities. Similarly, Wang *et al.* (2020) found that supply chain relationships make logistics integration effective. The following hypothesis is therefore stated:

H3. SCM practices positively affect logistics integration in SMEs.

2.4 Logistics capabilities and logistics integration

Capabilities are composed of a system of interdependent elements which enable strong integration both within and outside the situation (Teece, 2018). Integration of capabilities not only helps in adapting to business environment but also shapes it through response to changes and opportunities (Teece, 2014, 2018). Wiengarten *et al.* (2014) maintained that with globalisation and cross border transactions, logistics capabilities are reputed for successful integration. Due to the increasing complexity of logistics chains, logistics integration is vital in determining the capabilities that a firm can use to make changes and fully capitalise on opportunities (Chen *et al.*, 2009). Logistics providers with well-developed logistics capabilities can ably ensure proper integration of activities with suppliers/customers (Zacharia *et al.*, 2011; Wiengarten *et al.*, 2014). It is also observed that integration is an integral part of logistics capabilities, especially where information exchange is a concern for routine transactional activities between customers/suppliers and intermediaries (Menzter *et al.*, 2004; Jayaram and Tan, 2010; Gligor and Holcomb, 2012, 2014a). Logistics personnel have the unique capability to actively coordinate with other functions inside the company and to extend logistics externally to incorporate customers and suppliers (Gligor and Holcomb, 2012). This leads to the hypothesis below:

H4. Logistics capabilities positively affect logistics integration in SMEs.

2.5 Logistics integration and competitive advantage

Logistics integration with suppliers and customers is important in delivering value to customers and building competitive capabilities like quality, delivery flexibility and cost (Prajogo and Olhager, 2012; Chinomona and Pooe, 2013). For a firm wishing to have a holistic performance in a competitive business environment, different levels of capabilities and processes must be integrated (Teece, 2014, 2018). Teece (2018) argues that proper link between capabilities help in addressing imbalances by ensuring that work flow and information exchange are seamless. Despite the fact that little attention has been given to the relative importance of logistics integration in achieving competitiveness (Mellat-Parast and Spillan, 2013), logistics aspects like internal logistics integration and external logistics integration are deemed to be vital in achieving efficiency and effectiveness in logistics activities (Rodrigues *et al.*, 2004; Gimenez, 2006). In circumstances where customer and cost orientations are paramount, the capability of integrating activities impact on efficiency and effectiveness of logistics operations (Daugherty *et al.*, 2009; Spillan *et al.*, 2013).

Stank *et al.* (2005) observe that logistics capabilities such as customer focus, time management, integration, information exchange, and evaluation may represent resource expertise in other functional areas. According to the RBV, such firm resources can be a source of competitive advantage (Barney, 1991). Langley and Holcomb (1992) maintained that integrating logistics externally to include customers and suppliers can generate benefits such as asset productivity, operational effectiveness and enhanced customer value. The integration of logistics capabilities is said to be a prerequisite for successful performance in a competitive environment (Bae, 2012; Breznik and Lahovnik, 2016), through lowering overall firm costs, bettering relationships with customers and delivering superior customer value (Gligor and Holcomb, 2012, 2014a). This therefore leads to the fifth hypothesis:

H5. Logistics integration positively affects competitive advantage in SMES.

From the foregoing literature review, it has been observed that SCM practices are positively related to logistics integration (Gligor and Holcomb, 2012, 2014b; Wang *et al.*, 2020).

Logistics integration is also positively related to competitive advantage in the form of dimensions such as quality, delivery flexibility and cost (Prajogo and Olhager, 2012; Chinomona and Pooe, 2013). In addition, SCM practices are also positively related to competitive advantage (Jie *et al.*, 2013; Afraz *et al.*, 2021; Huo *et al.*, 2021; Migdadi, 2021). For example, Mellat-Parast and Spillan (2014) found that supply chain strategies influence logistics integration, which in turn significantly influences firms' competitive positions. Furthermore, prior research indicates that logistics capabilities are positively related to logistics integration (Zacharia *et al.*, 2011; Gligor and Holcomb, 2012; Wiengarten *et al.*, 2014) and competitive advantage (Gligor and Holcomb, 2012, 2014a; Bag *et al.*, 2020; Aziz *et al.*, 2020; Keskin *et al.*, 2021) (see Figure 1). This discussion leads to the final set of hypotheses:

- H6.* Logistics integration mediates in the relationship between SCM practices and competitive advantage of SMEs.
- H7.* Logistics integration mediates in the relationship between logistics capabilities and competitive advantage of SMEs.

3. Methodology

3.1 Design, population and sample

This research is cross-sectional with the study population comprising of 600 SMEs in Kampala, Uganda (Uganda Small Scale Industries Association, 2019); given that the greater Kampala is the heart of commercial activities in Uganda (UBOS report, 2010/2011). We determined the sample size using Krejcie and Morgan (1970) and generated a sample of 234 SMEs. However, we were able to obtain valid and useful data from 204 SMEs with a response rate of 87.2%.

3.2 Questionnaire and variable measurement

A Likert scale questionnaire, designed to measure the opinion or attitude of a respondent was utilised to obtain self-reported information. The questionnaire design was based on previously validated scales. Competitive advantage was measured using dimensions of cost, quality, delivery, innovation and time to market (Li *et al.*, 2006). Logistics capabilities were measured using demand management capabilities and information management capabilities

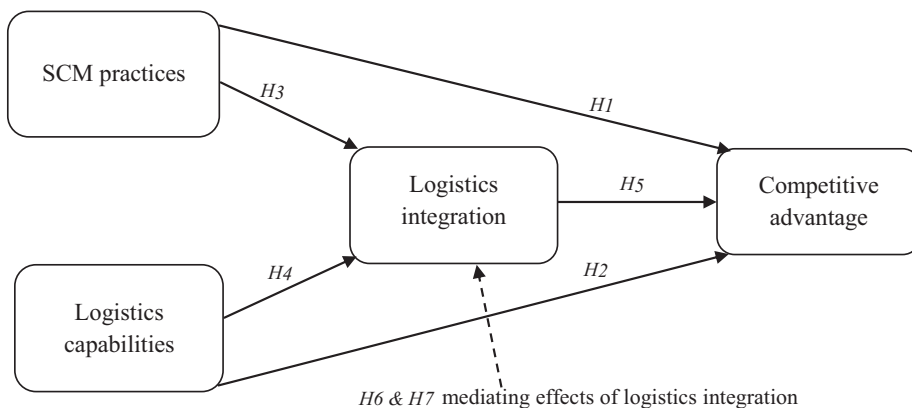


Figure 1.
Theoretical model

adapted from [Gligor and Holcomb \(2012, 2014a\)](#). SCM practices were measured using strategic supplier partnership, customer relationship, information sharing and postponement ([Li et al., 2006](#)). Logistics integration was measured based on dimensions of internal integration and external integration adapted from [Rodrigues et al. \(2004\)](#), [Gimenez \(2006\)](#) and [Paulraj and Chen \(2007\)](#).

3.3 Tests of factorability, validity and reliability

We used exploratory factor analysis (EFA) whereby the principal components for each of the five variables were extracted by running principal component analysis using varimax rotation method, and factor loadings below 0.5 were suppressed to avoid extracting factors with weak loadings. We first assessed the suitability of the data for factor analysis based on sample size adequacy, the Kaiser–Meyer–Olkin (KMO) and Bartlett tests. The results indicate that KMO values were 0.630, 0.556, 0.529 and 0.672 for SCM practices, logistics capabilities, logistics integration and competitive advantage respectively. Bartlett's test of sphericity in all scales reached statistical significance ($p < 0.05$). We computed content validity index (CVI) by obtaining the proportion of items assessed as useable divided by total number of items ([Field, 2009](#)). The CVI was 0.833, 0.778, 0.889, and 0.875 for SCM practices, logistics capabilities, logistics integration and competitive advantage respectively. To determine the internal consistency of the measurement scales, we computed Cronbach's alpha coefficients. The standard alpha coefficients were 0.744, 0.726, 0.782 and 0.755 for SCM practices, logistics capabilities, logistics integration and competitive advantage respectively.

From our EFA, the main components of SCM practices were information sharing, strategic supplier partnerships, customer relationships and postponement which all together account for 67.314% of the variance. Two components of logistics capabilities survived as information management capabilities and demand management capabilities accounting for 72.357% of the variance in logistics capabilities. Furthermore, internal integration and external integration jointly accounted for 68.866% of the variance in logistics integration. Finally, time to market, delivery, innovation, quality and cost emerged as the dimensions for competitive advantage jointly accounting for 63.066% of the variance.

3.4 Confirmatory factor analysis (CFA)

In order to confirm the convergent validity of the factors, confirmatory factor analysis (CFA) was performed. In [Figure 2](#), we provide an overview of the measurement model showing the acceptable convergent and discriminant validity. Model fit for both independent and dependent variables are above the recommended cut-off by [Hair et al. \(2010\)](#) for all study variable CFA measurement model. In particular, Normed Chi-square were above 0.05, RMSEA below 0.08, NNFI above 0.95, CFI above 0.95 and other fit indices met or exceeded the minimum threshold value as per [Hair et al. \(2010\)](#). Moreover, standard loadings were in all cases closer to or greater than 0.50 with considerable high t -value ($p < 0.01$) and composite reliability values of study factors were all above 0.7. Therefore, we can conclude that convergent validity exists in our measurement models. Furthermore, discriminant validity was established by comparing the squared correlation between two latent constructs to their average variance extracted (AVE) ([Fornell and Larcker, 1981](#)). We established that none of the correlations was higher than the squared root of the AVE for each study variable, further satisfying the existence of discriminant validity.

4. Empirical findings

4.1 Organisational characteristics

The results revealed that majority of firms were engaged in the trade sector (34.8%) followed by accommodation and food services (33.8%). The least represented firms in this study

included those engaged in other activities than those specified in the questionnaire for instance metal fabrication and carpentry (2.9%). Regarding tenure, the majority of SMEs were 5–10 years old (42.6%), followed by those that had existed for a period between 11–15 years constituting 35.8%. The majority (47.5%) of SMEs operates in the form of sole proprietorship followed by partnerships (30.4%) and the least represented category is the private limited company (22.1%). Regarding size, results indicate that the majority of firms employ between 5–49 people (91.7%). Those above 50 employees constituted only 8.3%. This implies that the dominant category is the small enterprises. The results also show that the majority (97.1%) of SMEs operate on a local basis, while only 2.9% operate as multinationals.

4.2 Descriptive statistics and correlations

From the descriptive analysis, SMEs are rated moderately on the study variables of SCM practices, logistics integration and competitive advantage (Mean = 3.733, SD = 0.513, Mean = 3.756, SD = 0.454, Mean = 3.555, SD = 0.696) respectively. Further, we observe that SMEs need to improve on their logistics capabilities (Mean = 2.838, SD = 0.535). In addition, prior to testing of the study hypothesis, a Pearson (*r*) correlation was carried out to establish associations among the study variables. This was done because regression analysis assumes linearity, implying that it cannot be carried out on variables that are not related. The correlation results reveal that all the study variables are significantly associated, suggesting that we could proceed to test hypotheses using regression through structural equation modeling.

4.3 Hypotheses tests results

In this study, we developed a hypothesized model to identify the underpinning constructs of competitive advantage. To do so, we positioned SCM practices, logistics capabilities as the independent variables, and logistics integration as the mediator variable with competitive advantage as dependent variable. Figure 2 provides the structural model. Model fit was found to be adequate ($X^2 = 4.457$ DF = 5, $\rho = 0.49$, CMIN/DF = 0.891, GFI = 0.93, NFI = 0.96, RFI = 0.92, IFI = 1.01, TLI = 1.03, CFI = 1.000, and RMSEA = 0.000). The results in Table 1 indicate a positive and significant relationship between SCM practices and competitive advantage ($\beta = 0.20$, CR = 2.86, $p = 0.004$, LB = 0.06, UB = 0.32), supporting H1. This implies that when SMEs improve on their SCM practices by, for example, sharing information, developing strategic relationships and implementing postponement strategy, competitive

Hypothesized path		β	SE	CR	CI		<i>p</i> -value
					LB	UB	
Logistics integration	← Logistics capabilities	0.19	0.11	1.73	0.00	0.40	0.050
Logistics integration	← SupplyChainMgtPractices	0.23	0.08	2.88	0.06	0.37	0.001
Competitive advantage	← Logistics capabilities	0.04	0.07	0.57	-0.01	0.18	0.570
Competitive advantage	← SupplyChainMgtPractices	0.20	0.07	2.86	0.06	0.32	0.004
Competitive advantage	← Logistics integration	0.20	0.06	3.33	0.07	0.31	0.002
Competitive advantage	← ORGSIZE	-0.04	0.07	-0.57	-0.18	0.09	0.510
Competitive advantage	← ORGAGE	0.05	0.07	0.71	-0.08	0.18	0.475

Table 1. Direct hypotheses results

Source(s): SEM analysis

advantage is likely to improve. Also, the study finds a positive and significant relationship between logistics integration and competitive advantage ($\beta = 0.20$, CR = 3.33, $p = 0.002$, LB = 0.07, UB = 0.31), thereby substantiating H5. This implies that when SMEs integrate their logistics operations at firm level as well as upstream with suppliers and downstream with customers, they are likely to achieve superior advantage over their competitors. Additionally, a positive and significant relationship was also observed between SCM practices and logistics integration ($\beta = 0.23$, CR = 2.88, $p = 0.01$, LB = 0.06, UB = 0.37) and this supports H3. This particularly implies that when SMEs improve on their SCM practices, they are likely to increase external and internal integration of their logistics activities. Further, the results indicated a positive and significant association between logistics capabilities and logistics integration ($\beta = 0.19$, CR = 1.73, $p = 0.050$, LB = 0.00, UB = 0.40), supporting H4. This finding implies that when SMEs implement strategies that increase their demand management and information management capabilities, they are likely to achieve increased logistics integration. Lastly, the study finds a positive but non-significant association between logistics capabilities and competitive advantage ($\beta = 0.04$, CR = 0.57, $p = 0.570$, LB = -0.01, UB = 0.18), thereby not supporting H2. This implies that when SMEs improve on their demand management and information management capabilities, they are not likely to achieve improved competitive advantage. Finally, we did not find significant relationships among control variables – organisational size and age with competitive advantage amongst SMEs. The SEM regression results show that together, SCM practices, logistics capabilities and logistics integration account for a variation of 11% in competitive advantage (SMC = 0.11).

4.4 Mediation testing

In order to test for the mediation relationship posited in H6 and H7, a bootstrapping technique (Hayes and Scharkow, 2013) was used. In order to test the hypotheses, the indirect effect coefficients were generated using 5,000 bootstrap samples, along with a 95% biased corrected confidence interval. Results in Table 2, show that logistics integration significantly mediates between logistics capabilities, SCM practices and competitive advantage ($\beta = 0.038$, $p < 0.05$, LB = 0.001, UB = 0.102; $\beta = 0.044$, $p < 0.05$, LB = 0.009, UB = 0.100) respectively. These mediation results indicate that logistics integration partially mediates between SCM practices and competitive advantage, logistics capabilities and competitive advantage (variance accounted for (VAF) = 18%, 46%). The partial mediation conclusion is due to the fact that the variance accounted for (VAF) for each of the indirect paths is less than 80%.

5. Discussion

The results reported in this paper suggest that SCM practices significantly predict competitive advantage. This implies, for example, that SMEs that keep each other informed about events or changes that may affect their trading partners, and are able to exchange accurate information with their trading partners are likely to achieve advantages over competitors. The finding further implies that strengthening relationships with suppliers and customers as well as implementing postponement strategies and designing products/services according to customer needs can enable SMEs achieve competitive advantage. This finding is consistent with previous scholars such as Li *et al.* (2006) who argue that SCM practices improve competitive advantage through price/cost, quality, delivery dependability, time to market, and product innovation. It is argued that strategic supplier partnership can improve supplier performance and reduce time to market (Ragatz *et al.*, 1997), information sharing and information quality contribute positively to customer satisfaction (Spekman *et al.*, 1998) and postponement strategy not only increases flexibility in the supply chain, but also balances global efficiency and customer responsiveness (Van Hoek *et al.*, 1999). Similarly, recent

Table 2.
Mediation results

	OrgSize <i>B</i> coeff	OrgAge <i>B</i> coeff	LogisticsCapabilities <i>B</i> coeff	SupplyChainMgtPractices <i>B</i> coeff	LogisticsIntegration <i>B</i> coeff
Standardized total effects					
Logistics integration	–	–	0.19*	0.23**	–
Competitive advantage	–0.044 ^{ns}	0.047 ^{ns}	0.082 ^{ns}	0.24**	0.20**
Standardized direct effects					
Logistics integration	–	–	0.19*	0.23**	–
Competitive advantage	–0.044 ^{ns}	0.047 ^{ns}	0.044 ^{ns}	0.20**	0.20**
Standardized indirect effects					
Logistics integration	–	–	–	–	–
Competitive advantage	–	–	0.038*	0.044**	–
BCI			0.001	0.009	
			0.102	0.100	
			Partial mediation	Partial mediation	
Note(s):	* = $p < 0.05$; ** = $p < 0.01$; ns = not significant is when $p > 0.05$				

studies have emphasised that SCM practices such as buyer-supplier relationships (Afraz *et al.*, 2021), information sharing (Huo *et al.*, 2021) and customer relationship management (Migdadi, 2021) influence different dimensions of SCM practices. In this study, it is noticeable that the postponement dimension had the lowest contribution to SCM practices compared to other dimensions as it accounted for the lowest variation. This could perhaps be explained by the context of this study where more than 80% of SMEs operate in the trade sector, accommodation, food services, recreation and personal services. This makes postponement more difficult than for example in the case of manufacturing where raw materials and components can be stored pending customer orders.

The study established a positive but non-significant relationship between logistics capabilities and competitive advantage. This analysis reveals that logistics capabilities do not significantly predict competitive advantage. This therefore means that for SMEs in Uganda, possession of demand management and information management capabilities does not cause a significant variation in competitive advantage. It implies for example that SMEs' linkages and synchronisation of information and logistics operations with customers may not cause a significant variation in their competitive advantage. These findings contradict previous studies (e.g. Mentzer *et al.*, 2004; Gligor and Holcomb, 2014a) who underlined the critical role of logistics capabilities in enhancing competitiveness. More generally, it is argued that logistics capabilities, if well managed, can become core competences for a firm geared to achieving competitive advantage and superior performance (Cho *et al.*, 2008; Gligor and Holcomb, 2012; Ralston *et al.*, 2013). In the same line, recent studies have underlined that logistics capabilities positively influence firms' competitive advantage (Bag *et al.*, 2020; Aziz *et al.*, 2020; Keskin *et al.*, 2021). This contradictory finding may be attributed to the context of SMEs in developing countries and Uganda in particular, where it is reported that logistics capabilities and logistics performance are generally deficient (World Bank report, 2017; Langley and Infosys, 2018). Furthermore, SMEs in developing countries (e.g. Uganda) are known to be resource constrained, which makes it difficult to develop adequate logistics capabilities due to infrastructure and technology deficiencies.

The findings further revealed a positive and significant relationship between SCM practices and logistics integration. This suggests that when SMEs improve their SCM practices for example by exchanging accurate information and strengthening relationships with their supply chain partners, they are likely to achieve increased internal and external integration of their logistics operations. This is in line with previous scholars such as Jarrell *et al.* (1998) who contend that information sharing as a SCM practice leads to high levels of supply chain integration. Similarly, Gligor and Holcomb (2012) and Gligor and Holcomb (2014a) argued that supply chain practices facilitate logistics capabilities and logistics integration across the supply chain. Furthermore, we found a positive and significant relationship between logistics capabilities and logistics integration. This suggests that SMEs that improve on information management and demand management capabilities are likely to achieve greater internal and external integration of their logistics activities. These findings concur with previous research which affirms that firms with well-developed logistics capabilities can ensure proper integration of activities with suppliers/customers (Zacharia *et al.*, 2011; Wiengarten *et al.*, 2014). This also agrees with Wang *et al.* (2020) who argued that supply chain relationships make logistics integration effective.

Finally, we found a significant and positive relationship between logistics integration and competitive advantage. This implies that when SMEs integrate their logistics operations internally and with their suppliers and customers, they are likely to achieve superior advantage over their competitors. These findings confirm those of previous researchers (e.g. Prajogo and Olhager, 2012; Chinomona and Pooe, 2013), which emphasise that logistics integration with suppliers and customers is important in delivering value to customers and building competitive capabilities like quality, delivery flexibility and cost minimisation.

6. Summary and conclusions

The study sought to investigate the antecedents of competitive advantage in SMEs from a logistics and SCM perspective. Based on the extant literature and guided by the RBV and dynamic capabilities theoretical perspectives, SCM practices, logistics capabilities and logistics integration were theorised as potential antecedents of competitive advantage of SMEs. Indeed, the findings revealed positive and significant relationships between SCM practices and competitive advantage; SCM practices and logistics integration; logistics capabilities and logistics integration; logistics integration and competitive advantage. It was only with logistics capabilities that we found a non-significant relationship with competitive advantage. We also found that SCM practices, logistics capabilities and logistics integration predict up to 11% of competitive advantage.

This study has implications for both theory and practice. Theoretically, we invoke the RBV and dynamic capabilities perspectives of competitive advantage in SMEs. In so doing, we clarify on the relationship between SCM practices, logistics capabilities, logistics integration and competitive advantage. In practice, SMEs wishing to improve their competitive positions should share strategic information that can help them and their supply chain partners in planning and forecasting so as to be proactive in their operations. SMEs should also share information concerning any changes that might affect their trading partners, for example, concerning new product/service development and other business processes. The information shared should be timely, complete and accurate but they should first assess the willingness of their trading partners to reciprocate to avoid the cost of divulging valuable information without corresponding return, which may be counterproductive to their competitiveness.

Second, SMEs should build strategic supplier partnerships in aspects such as sharing continuous improvement programs with key suppliers and including key suppliers in their planning and goal-setting activities. SMEs should also encourage integration of their logistics operations at firm level and with their suppliers and customers. Thus they should embrace information technology in fostering logistics integration for example by establishing data management architectures such as data bases for sharing data, installing software services like ERP and ensuring compliance with new technological trends.

In addition, logistics capabilities did not significantly predict competitive advantage and this could perhaps be due to resource constraints that characterise SMEs in Uganda and elsewhere in the world, which makes it difficult to build logistics capabilities. Hence, government support is important for improving SMEs' competitiveness through financial assistance, construction of logistics infrastructure such transport and communication networks that can help in logistics integration and improve SCM practices such as information sharing. It is well acknowledged that public procurement constitutes a significant proportion of government spend. Hence the government should support SMEs' participation in public procurement, for example by offering preferential treatment so as to boost their market share and cash inflows.

Finally, we acknowledge some limitations in this study, some of which signal avenues for further research. For example, this study used a survey based design using close ended questions that would limit additional explanations and in-depth information. Future research could use methods that provide more detailed information about the study variables such as qualitative case studies using in-depth-interviews. Furthermore, the study was cross-sectional, which limits observation of behaviour with lapse of time. Behavioural practices like strategic supplier partnerships and information sharing behaviour can change overtime. Future studies could adopt a longitudinal design to observe the behaviour of such variables so as to counteract this limitation. Furthermore, this study was limited to SMEs in Uganda, and specifically in the greater Kampala area. Besides potential limited generalisability to the entire Ugandan SMEs, the findings may not be generalisable to all SMEs in developing

countries. Future studies can use a larger geographical area in Uganda as well as other countries for purposes of external validity.

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