Supply chain agility in third-party logistics providers: its relationship with institutional and cultural geographical traits in a developing country

Benjamin R. Tukamuhabwa, Henry Mutebi and Rebecca Kwagala
Procurement and Logistics Management, Business School, Makerere University, Kampala, Uganda

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Abstract

Purpose – The purpose of this paper is to investigate the relationship between geographical traits consisting of institutional traits and cultural traits, and supply chain agility in third-party logistics providers.

Design/methodology/approach – A theoretical model was developed and assessed through a structured questionnaire survey using cross-sectional data from 170 third-party logistics providers registered in Uganda. To validate the suggested model, data were analysed using exploratory factor analysis, correlations and regressions.

Findings – Correlation results revealed that all institutional and cultural geographical traits in the model, i.e. infrastructural frameworks, regulatory frameworks, organisational culture and national culture are positively and significantly associated with supply chain agility. However, a further analysis using regression revealed that regulatory framework and organisational culture are the only significant predictors of supply chain agility and together, all the four traits account for 28.1% variance in supply chain agility.

Research limitations/implications – This study applies the institutional theoretical framework to provide an empirical understanding of the role of institutional and cultural factors in supply chain management practice. Furthermore, it confirms and expands on the existing theories about supply chain agility.

Practical implications – The findings provide firm ground for managerial decisions regarding emphasis on external factors in building firms' supply chain agility. Managers should scan the macro-environment and make conscious firm decisions regarding institutions and culture in certain geographical locations. The host countries should also be aware of their role in building firms' supply chain agility.

Originality/value – Distinctive from the literature on antecedents of supply chain agility, which predominantly focuses on the firm and supply chain capabilities, this study utilises the paradigm of institutional fit to empirically show how managers in a developing country wishing to build supply chain agility should not only focus on their supply chains and internal operations, but go beyond and consider geographical traits when making firm location and/or operational decisions for certain geographical contexts in order to achieve fit.

Keywords Geographical traits, Supply chain agility, Institutional traits, Cultural traits, Third-party logistics providers

Paper type Research paper

1. Introduction

Today's globally pronounced occurrences such as market turbulence and volatility, shorter product life cycles, increased demand uncertainty and competitive pressures have aggravated demand for customer responsiveness. Such responsiveness is needed, for example, in managing disruption risks as well as ensuring uninterrupted service to customers, which calls for building and maintaining supply chain agility (SCA) (Ismail and Sharifi, 2006; Sheppard and Young, 2006; Barve *et al.*, 2007; Braunscheidel and Suress, 2009;

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Almahamid *et al.*, 2010; Gligor *et al.*, 2013). Consequently, agility has been underlined as a strategic choice and an essential characteristic for designing the best supply chains for enhanced performance and competitiveness (Ketchen *et al.*, 2007; Grigor and Holcomb, 2012; Sharma *et al.*, 2017). Agile supply chain dimensions such as alertness, accessibility, decisiveness, swiftness and flexibility enable quick response to unpredictable changes in demand and/or supply (Gligor *et al.*, 2013). SCA has been acknowledged as fundamental to all Third-Party Logistics providers (3PLs) (Ismail and Sharifi, 2006; Al-Shboul, 2017).

The importance of 3PLs has recently been dramatically underlined as companies' competitive priories shift from production to delivery and flexibility, underscoring the need for SCA (Barve *et al.*, 2007). 3PLs are firms that manage all or a significant part of other firms' logistics outsourcing requirements such as transportation, warehousing, cross-docking, inventory management, packaging and freight forwarding (Gligor *et al.*, 2013). Many companies have appreciated the importance of 3PLs due to elevation of logistics from an operational to a strategic status (Sandberg and Abrahamson, 2011; Fugate *et al.*, 2010), necessary for fulfilling customers' expectations by ensuring timely delivery of products (World Bank report, 2017). Therefore, 3PLs need to embrace SCA due to the need to appropriately align their services between their clients, suppliers and customers (Lin *et al.*, 2006). This is because the level of SCA of a 3PL can be critical for its overall performance and agility as well as for other firms (Prater *et al.*, 2001; Paulraj and Chen, 2007). Many of the 3PLs run international supply chains, which frequently limit performance along many traits usually associated with agility such as uncertainty related to changes in the manufacturing or political environment in different continents (Prater *et al.*, 2001).

To date, many of the 3PLs have not attained the desired level of agility in their supply chains and are therefore not able to retain customers (Hallgren and Olhager, 2009; World Bank report, 2017). According to the World Bank report (2017), Uganda has a weak third-party logistics sector, with limited and inflexible customer service coupled with inadequate warehousing infrastructure that does not satisfy customer demands. Due to the poor quality infrastructure, logistics firms in Uganda experience delays at weighbridges coupled with congestion, which increase unpredictability for clients regarding delivery, breakdowns and maintenance costs leading to low-quality and unreliable services (World Bank report, 2017). All the aforesaid depict problematic agility in the Ugandan logistics system. Furthermore, the World Bank (2017) revealed that service delivery in logistics firms in Uganda is constrained by ineffective enforcement of regulations within the country. More generally, prior empirical studies have also identified various institutional and cultural factors that affect supply chain response to threats in Ugandan firms. Threats such as national culture, weak legal systems and institutional factors like government policies cause raw material delays and shortages (Tukamuhabwa *et al.*, 2017), thereby affecting SCA. In addition, the problem of SCA in Ugandan firms in the form of lack of swiftness had earlier been identified by Ntayi *et al.* (2009).

The extant studies have underscored the critical role of geographical traits for the success of firms' logistics management. For example, it has been noted that 3PLs can attain the desired level of SCA, if they operate in countries that offer favourable geographical traits (Watanuki, 2015; Durach and Wiengarten, 2017). Geographical traits in this context signify characteristic differences emanating from geographical dispersion. Geographical traits that have been found particularly relevant for firms' agility include institutional factors that are composed of infrastructure and regulatory frameworks as well as cultural factors, which include national and organisational culture (Durach and Wiengarten, 2017; Al-Shboul, 2017). Scholars have for example examined how transportation infrastructure in a country within which a firm operates is instrumental for its SCA through facilitating the physical flow of products from the upstream to downstream (Durach and Wiengarten, 2017). Several other scholars have emphasised SCA-related aspects provided by information technology framework, such as enabling logistical movement of goods and services (Ekici *et al.*, 2016),

reducing set-up times, adjusting capacity and providing quick responses (Durach and Wiengarten, 2017). Favourable regulatory framework has also been underlined as vital for SCA (Durach and Wiengarten, 2017).

Some studies have also linked favourable organisational cultural traits to firms' SCA and competitive advantage (e.g. Yang *et al.*, 2008; Braunscheidel *et al.*, 2010; MCAfee *et al.*, 2002; Wieland and Wallenburg, 2013). And others have underscored the value of national culture in defining the role of 3PLs (e.g. Beugelsdijk *et al.*, 2017) and building agility (Swafford *et al.*, 2008; Durach and Wiengarten, 2017). The information on geographical traits and SCA in the aforesaid studies have provided a fragmented picture – some focusing on either a few facets of SCA such as on-time delivery (e.g. Durach and Wiengarten, 2017) or a single aspect of geographical traits (Al-Shboul, 2017). Moreover, most of these studies have focused on firms in developed economies whose geographical traits such as infrastructure, regulations and culture are arguably more favourable for agility than developing countries. Furthermore, studies on SCA involving 3PLs have investigated how 3PLs can improve SCA of other firms rather than specifically how the SCA of 3PLs can itself be enhanced. Besides, Sharma *et al.* (2017) carried out a comprehensive systematic review of 118 research papers on SCA published from 1999 to 2016 and found that the suggested enablers were firm and supply chain level capabilities such as collaboration, integration, flexibility, strategic sourcing, information sharing, information technology, competences, orientations, market sensitivity and risk management. None of the papers expressly considered macro-enablers of SCA beyond the firm and supply chain level.

Similarly, a recent systematic literature review of SCA by Humdan *et al.* (2020) revealed that geographical traits have not been considered in the extant SCA studies. This is in line with Durach and Wiengarten (2017)'s observation that country level factors have been largely ignored in studies investigating the antecedents of delivery speed – a component of SCA. Furthermore, Humdan *et al.* (2020) underlined the lack of studies addressing SCA in service firms as one of the main gaps in the current SCA literature. Moreover, studies on SCA in Uganda are scant and the few available have similarly ignored the country level antecedents in the context of 3PLs. For example, Ahimbisibwe *et al.* (2016) focused on supply chain visibility, velocity and alignment in humanitarian organisations, while Mutebi *et al.* (2021) also focused on self-organisation in humanitarian organisations. In this paper, we argue that investigating the influence of geographical traits on SCA of 3PLs is pertinent, not only because 3PLs affect the SCA and performance of other firms, but because most 3PLs transact international operations that span different geographical traits. This suggests that their supply chains are embedded in different cultural and institutional settings.

In summary, two important gaps can be identified in the extant literature:

(1) There is need for further empirical work on SCA in the service industry, particularly in 3PLs. The current SCA research has mainly concentrated on manufacturing firms, yet 3PLs have increasingly become indispensable for the general effectiveness of global supply chains.

(2) There is need to extend research on the antecedents of SCA to the country level factors. The current literature on the precursors of SCA has predominantly focused on the firm and supply chain levels, yet many of the 3PLs conduct international business operations, which makes different cultural and institutional geographical traits relevant for their SCA.

Therefore, rooted in the paradigm of institutional-fit, through a survey of 170 3PLs in Uganda, this paper finds that both institutional and cultural geographical traits are positively and significantly related to SCA. In particular, it was revealed that regulatory framework and organisational culture are the only significant predictors of SCA in Ugandan 3PLs. The main

contribution of this study is twofold. First, by examining the SCA of 3PLs, we contribute to the limited empirical evidence on the antecedents of SCA in service firms in a developing economy. Second, institutional theoretical framing has contributed to our understanding of SCA beyond the current firm and supply chain perspective to the macro-level of country institutional contingencies.

The remainder of this paper is organised as follows: in Section 2, the institutional theory is briefly reviewed followed by Section 3 in which the relevant literature is reviewed and hypotheses developed. Section 4 outlines the research method used, while Section 5 presents results and discussion. Section 6 presents the conclusion before implications; limitations and areas for further research are outlined.

2. Theoretical underpinning

The institutional theory explains how an organisation's environment, through regulative, normative and cognitive mechanisms, institutionalises and legitimises strategies (Scott, 2004). Pressures and expectations can be exerted by institutional constituents such as state, professions, interest groups, public opinions and families (Debroux, 2010). DiMaggio and Powell (1983) categorised the predominant sources of institutional pressures into coercive, e.g. government regulations; normative, e.g. industrial associations and standards; and mimetic, e.g. competitors. Previous studies have argued that the institutional environment may influence the agility levels of a firm (Huo *et al.*, 2013). Liu *et al.* (2010) observed that institutional pressures and organisational culture play a significant role in the firm's intention to adopt Internet-enabled supply chain management. This implies that the institutional environment can influence the adoption of particular information technology infrastructure within a given country.

Debroux (2010) observed that cultural geographical traits influence the development of entrepreneurial spirit. Entrepreneurial dimensions such as proactiveness are important definitional facets of SCA (Humdan *et al.*, 2020). The regulatory institutional environment has also been underlined in defining performance, as well as agility of logistics (Durach and Weingarten, 2017). According to the institutional theory, the environment comprises the social, political and economic systems in which firms operate and gain ligitimisation (Debroux, 2010). Institutions provide the rules of the game and define the available ways in which to operate by discouraging, constraining or encouraging given behavioural patterns (Debroux, 2010). Therefore in accordance with the institutional theoretical framework, we argue that geographical traits such as infrastructure, regulations and culture are dictated by institutions in which firms operate. Hence, in order to cultivate agility in their supply chains, 3PLs need to scan for institutional and cultural environmental factors and craft strategies that provide the best institutional fit.

3. Literature review and hypotheses development

3.1 Supply chain agility

SCA has become an essential prerequisite for staying competitive in the global dynamic market place by enhancing firms' responsiveness, flexibility and performance (Qi *et al.*, 2011; Qrunfleh and Tarafdar, 2013; Sharma and Bhat, 2014; Singh, 2015; Sangari and Razmi, 2015; Mehralia *et al.*, 2015; Bargshady *et al.*, 2016). Recently, Humdan *et al.* (2020) noted that the concept of SCA has gained increasing popularity, although it still suffers definitional ambiguity. For example, researchers (e.g. Christopher and Peck, 2004; Bezuidenhout, 2016; Bargshady *et al.*, 2016) consider SCA as the ability of firms' supply chains to effectively adapt and respond quickly to market changes and customer demand. Sharma *et al.* (2017) define SCA in terms of the pro-active and reactive strategic capability of a supply chain to quickly

sense and respond to internal and external changes. A recent systematic review of SCA definitions captured the main elements as response speed, mode in terms of re-activeness/pro-activeness, scope in terms of demand/supply and outcome in the form of competitive advantage, fulfilling end customer requirements and satisfying customers and employees (Humdan *et al.*, 2020). Various scholars have suggested different dimensions of firms' SCA. For example, Charles *et al.* (2010) suggested flexibility, responsiveness and effectiveness, whereas L'Hermitte *et al.* (2017) suggested only flexibility and responsiveness. Gligor *et al.* (2013) confirmed that SCA is composed of alertness, accessibility, decisiveness, swiftness and flexibility.

3.2 Third-party logistics providers (3PLs)

The past few decades have witnessed an increasing recognition that logistics contributes significantly to total costs in the supply chains and since 1980s, third-party logistics has increased in importance as a means to increase supply chain effectiveness and efficiency (Premkumar *et al.*, 2020). Many contemporary firms have espoused the outsourcing of some or all of their logistics operations to specialised firms known as 3PLs in order to gain from expertise and economies of scale from 3PLs necessary for cost reduction, efficiency and service improvements and enabling client firms concentrate on their core competences (Selviaridis and Spring, 2007; Sridevi and Kumar, 2015; Shi *et al.*, 2019). Since its inception, the concept of third-party logistics has been defined variously by different scholars. For example, Marasco (2008) defined third-party logistics as an "inter-organisational relationship between shippers and providers of logistics services in a supply chain".

Third-party logistics providers have become integral players in many supply chains for providing client companies with a range of services such as transportation and distribution, customer support services, warehousing and distribution, IT support, effective route planning, reduction in operational cost and providing value-added services to enhance customer satisfaction (Sridevi and Kumar, 2015). Infosys report (2020) revealed that despite the growth of third-party logistics industry, activities that are more transactional, operational and repetitive in nature continue to be the most frequently outsourced to 3PLs, as opposed to strategic, IT-intensive and customer-facing activities. The report indicated that the most prevalent activities shippers outsource are domestic transportation, warehousing, international transportation, customs brokerage and freight forwarding.

3PLs can be asset-based whereby they own physical assets such as trucks and warehouses or non-asset-based relying on human expertise and information systems to provide services such as management-oriented services, subcontracting physical distribution activities to asset-based companies as well as designing and reengineering the supply chain (Selviaridis and Spring, 2007). Since the mid-2000s the concept of fourth-party logistics has sprung up with a focus on the planning and coordination of supply chains (Saglietto, 2013). The fifth-party logistics is a recent development concerned with the design and management of the entire supply chain at the strategic level (Fredriksson *et al.*, 2021). Hence, the difference between 4PLs and 5PLs is that the latter have an extensive focus on e-business solutions. The difference between 3PLs and 4PLs is the control and accountability that the 4PLs have over their clients' supply chains: 4PLs manage all necessary logistics activities for a client firm, including those of the client's 3PLs (Kalkan and Aydın, 2020).

3.3 Geographical traits

Geographical traits in the supply chain context can be taken to mean characteristics of geographical locations spanning the supply chain that are relevant to firms' operations. At a country level, geographical traits include institutional and cultural factors (Al-Shboul, 2017). Geographical traits are contingency factors that can potentially determine the failure or success of supply chain operations (Durach and Weingarten, 2017).

3.3.1 Institutional traits. Institutional geographical traits consist of infrastructure and regulatory frameworks. Infrastructural frameworks are described as a composition of all fixed, permanent and basic installations that are needed for any firm, country or region to facilitate the flow of goods and services (Al-Shboul, 2017). Infrastructure includes roads, bridges, railways, subways, airports, information technology and telecommunication facilities (Al-Shboul, 2017). Regulatory frameworks describe as and when a party can map its logistics services and give regulations for entry, liability, monitoring and exit (Durach and Weingarten, 2017). The regulatory environment includes indicators that capture the general quality of governance and those that measure the openness to foreign participation, which includes the ease of hiring foreign labour, the extent to which the policy environment encourages foreign direct investment, the availability of trade finance and an index of multilateral treaties signed by the country pertaining to trade (Lawrence *et al.*, 2012). Generally, prior studies have underlined the association between institutional factors and positive business outcomes such as enhanced investment (Owusu-Nantwi, 2019; Mahmood *et al.*, 2021), Internet financial reporting in financial service firms in Uganda (Bananuka, 2020) and enhanced economic growth in sub-Saharan Africa (Forson *et al.*, 2020).

3.3.2 Infrastructure framework and supply chain agility. Sahay and Mohan (2003) argue that infrastructure deficiencies can adversely affect the agility of a supply chain in any country in terms of fulfilment of customer orders, lead-time, efficiency, speed, inventory control and costs. Creating a well-established infrastructure may help in shipping the right products, at the right time, to the right place, in the right quantity and in the right condition: the firm may use several routes for transportation mode(s) based on quality, dependability, speed and reliability to achieve the lowest cost strategy (Qi *et al.*, 2009; Borggstrom and Hertz, 2011; Cook *et al.*, 2011). Information technology infrastructure provides the platform that can help firms exchange knowledge, align processes and achieve operation flexibilities, which can be leveraged to develop SCA (Liu *et al.*, 2013). Similarly, Humdan *et al.* (2020) argued that supportive information technology and information system tools boost connectivity amongst members leading to SCA.

Ekici *et al.* (2016) argue that infrastructure can enable trade in terms of the logistical movement of goods, which impacts on delivery period. The strategic choice of a transportation operation has a direct significant impact on SCA by facilitating the physical flow of products, goods, components, items and raw materials from upstream to downstream (Qi *et al.*, 2009; Al-Shboul, 2017). Furthermore, the availability of a well-structured infrastructure framework is expected to enhance and support SCA and performance by reducing set-up times, adjusting capacity, flexibility and providing swift customer responsiveness (Tse *et al.*, 2016; Al-Shboul, 2017). Infrastructure framework such as information technology helps the firm to consolidate information flow concerning products, orders and inventory across the supply chain to increase channel visibility and agility (Liu *et al.*, 2013). However, Al-Shboul (2017) found that infrastructure framework does not contribute significantly to SCA but is partially mediated by some logistics practices, e.g. delivery dependability and time to market. This therefore leads to the following hypothesis:

H1. There is a positive significant relationship between infrastructure framework and SCA.

3.3.3 Regulatory framework and supply chain agility. Watanuki (2015) asserts that as a result of flexible regulatory frameworks, parties derive maximum utility, get desired outcomes and their relationship is strengthened (Watanuki, 2015). On several occasions, 3PLs are focused on regulatory framework for high SCA (Durach and Weingarten, 2017). Durach and Weingarten (2017) argue that a regulatory environment that provides a high quality of governance will act as an additional safeguard to receive goods on time from suppliers, since suppliers that might not fulfil their contractual agreements and deliver late might get

sanctioned. Studies (e.g. Qrunfleh and Tarafdar, 2013; Watanuki, 2015; Durach and Wiengarten, 2017) contend that a favourable regulatory environment that is conducive to cross-border trade, including efficient clearance of goods across borders enables on-time deliveries. Moreover, Tukamuhabwa *et al.* (2017) found that firms' responsiveness to supply chain threats in Uganda can be constrained by unfavourable legal system. This therefore leads to the hypothesis that:

H2. There is a positive significant relationship between regulatory framework and SCA.

3.4 Cultural traits

Culture has been defined at various levels of analyses, including national and organisational levels (Krishnan *et al.*, 2013; Al-Shboul, 2017). National culture is a set of shared values among people within a specific nation that distinguishes them from other nationalities (Kirkman *et al.*, 2017). The national cultural traits according to Hofstede *et al.* (1990), which include power distance, individualism, masculinity and uncertainty avoidance have been acknowledged by several scholars as important for facilitating agile practices such as on-time deliveries (Durach and Wiengarten, 2017). The potential influence of national culture on organisational culture is also well acknowledged in the extant literature (Ansah *et al.*, 2019). Organisational culture can be defined as the values or beliefs shared by members of an organisation (Zu *et al.*, 2010). Scholars (e.g. Braunscheidel *et al.*, 2010; Zu *et al.*, 2010; Cai *et al.*, 2010) suggested four dimensions of organisational culture including group culture, hierarchical culture (shared values of top-down control and coordination in a firm) and rational culture (shared beliefs and incentive systems adopted to fulfil the objectives of a firm). Development culture refers to the value of long-term goals shared by the members of a firm (Cai *et al.*, 2010).

3.4.1 National culture and supply chain agility. Beugelsdijk *et al.* (2017) underline the value of national culture in the functioning of 3PLs. Almahamid *et al.* (2010) observe that in order to neutralise unexpected performance rigidities, firms should pay attention to national culture. The role of national culture in the success of multiple operations and supply chain practices has been extensively explored (Kull and Wacker, 2010). The concept of agility has been widely used for improved organisation performance when evaluated on the basis of national cultural aspects (Durach and Wiengarten, 2017). Swafford *et al.* (2008) argue that national culture has an influence on improving firm competitiveness and enhancing agility in changing dynamic environments. National cultural attachments regulate infrastructural framework (Krishnan *et al.*, 2013), which influences SCA (Qi *et al.*, 2009). Furthermore, Sheffield and Lemétayer (2013) found that national culture is associated with the software development agility of successful projects. Finally, Durach and Wiengarten (2017) found that firms situated in countries with a culture of low levels of national uncertainty avoidance experience fewer late deliveries upstream. The following hypothesis is therefore derived:

H3. There is a positive significant relationship between national culture and SCA.

3.4.2 Organisational culture and supply chain agility. Naor *et al.* (2008) found that group culture is positively related to both supplier and customer involvement. Such practices as early supplier involvement are important for agility (Narasimhan and Das, 1999). Researchers (e.g. Braunscheidel *et al.*, 2010; MCAfee *et al.*, 2002) found that organisational culture has a significant bearing on SCA and is a source of competitive advantage. An organisation with an appropriate communication culture is capable of achieving on-time deliveries (Yang *et al.*, 2008; Wieland and Wallenburg, 2013; Durach and Wiengarten, 2017). Altay *et al.* (2018) found a positive significant effect of control and the flexible organisational cultural dimensions on SCA. Similarly, Felipe *et al.* (2017) found that clan and adhocratic cultures have a positive relationship with firm agility. In addition, Turner *et al.* (2019) observed that specific

organisational culture attributes such as multi-team systems are required for the success of SCA of an organisation. An organisational culture that embraces change and learning through continuous improvement, top management support and staff empowerment enables cultivation of SCA (Humdan *et al.*, 2020). This therefore suggests that:

H4. There is a positive significant relationship between organisational culture and SCA.

4. Methodology

4.1 Design, population and sample

This study follows a positivist approach where the researcher independently investigates the social world, through an objective methodology (Fincher, 2007). We adopt a reductionist stance of testing pre-stated hypothesis derived from the previous literature. A cross-sectional survey design using a structured questionnaire that was both descriptive and analytical was used in the study. The study was carried out in 3PLs within the districts of Kampala, Mukono and Wakiso because the three districts house the majority of 3PLs in Uganda (Uganda Revenue Authority (URA) portal, 2017). The study population constituted 326 3PLs as listed by URA list of authorised 3PLs (URA portal, 2018). The unit of analysis was 3PLs and the units of inquiry were general manager, ICT manager, operations manager, procurement manager, supply chain manager and other managers who were knowledgeable about logistics and supply chain–related functions. We used a sample of 178 3PLs and obtained useful and valid data from 170 firms. Before administration, the questionnaire was pre-tested with three academic professionals and two 3PL managers and the items were adjusted accordingly for field data collection.

4.2 Measurement of the study variables

The measurement scales for the study variables were adapted from previous studies to ensure validity. Institutional geographical traits were measured using infrastructural framework and regulatory framework, while cultural traits were measured using national culture and organisational culture based on Cao *et al.* (2015), Durach and Wiengarten (2017) and Al-Shboul (2017). SCA was measured based on dimensions of alertness, accessibility, decisiveness, swiftness and flexibility as adapted from Gligor *et al.* (2013).

4.3 Non-response bias test

Nonresponse bias occurs when the researcher is unsuccessful in obtaining information from sampling units selected for the study (Podsakoff *et al.*, 2012). In this study, both procedural and statistical remedies were adopted to alleviate any likely nonresponse bias problems (Cheung *et al.*, 2017). The procedural remedies undertaken included; explaining the importance of the study to the respondents, formally writing to each invited respondent and seeking approval for the study from each third-party logistics firm that participated. Then, statistically, we compared respondents and non-respondents by conducting the Mann–Whitney *U*-tests on study variables. The results in Table 1 indicate that there is no statistically significant

Table 1. Non-response bias test results

	Institutional traits	Cultural geographical traits	Supply chain agility
Mann–Whitney *U*	360.000	399.500	390.500
Wilcoxon *W*	825.000	864.500	855.500
Z	−0.737	−0.089	−0.234
Asymp. Sig. (2-Tailed)	0.461	0.929	0.815

difference between the two groups of respondents on all constructs under study, meaning that non-response bias is not likely to affect our findings and conclusion.

4.4 Common method variance

We adopted both procedural and post analysis statistical remedies as recommended by Podsakoff *et al.* (2003) to control for common method variance. Procedural remedies adopted include; adapting of previously validated measurement scales for the study variables to suit the study context, keeping questions short and precise, avoidance of double-barrelled questions and limiting the use of negatively worded items. Additionally, we ensured respondents' anonymity which enabled them to give unbiased responses. Further, we also contacted three professional academics and two managers to ensure the items were clear and captured their respective constructs. We further conducted Harman's single-factor test on all variables, by loading them to a principal component factor and using the unrotated solution. The principal component analysis of all the variables used in our model showed nine factors with eigenvalues greater than one (77.739%) of the variance in the data. Then common method bias does not seem to be a problem: we identified more than one factor, the first accounted for 31.643% of the variance and the unrotated factor structure did not show a general factor (Gruber *et al.*, 2010).

4.5 Tests of factorability, validity and reliability

An exploratory factor analysis was conducted by running a rotated component matrix that resulted in reducing the items and ensuring relevance of the remaining to respective constructs. This helped in assessing construct validity in terms of convergent and discriminant validity. Items that had loadings of less than 0.500 were eliminated from the factor components. Our instrument was also pre-tested for content validity using two academic professors and two managers from 3PLs. To establish the adequacy and suitability of our data for EFA, Kaiser–Meyer–Olkin (KMO) and Bartlett's tests were assessed. The rule of thumb is that the KMO value should be above 0.7 and Bartlett's test should reach significance ($p < 0.05$). The results in Table 2 indicate that there was sampling adequacy and suitability to carry out EFA. We also computed the Cronbach alpha coefficients for reliability and CVI and all the values were above 0.7.

4.5.1 Component analysis for institutional traits. The results in Table 3 show that regulatory framework and infrastructural framework account for 60.2% variance in institutional traits. This also shows that regulatory framework is the dimension that best explains the institutional element of geographical traits given that it accounts for 30.6% variance.

4.5.2 Component analysis for cultural traits. The results in Table 4 show that national culture and organisational culture account for 68% variation in cultural traits. National culture accounts for 21.56% and organisational culture accounts for 46.6% variance. This therefore, implies that organisational culture explains cultural traits better than national culture (see Figure 1 for the entire conceptual framework).

Table 2. KMO and Bartlett's tests for the study variables

KMO and Bartlett's test		Supply chain agility	Institutional traits	Cultural traits
Kaiser–Meyer–Olkin measure of sampling adequacy		0.895	0.709	0.745
Bartlett's test of sphericity	Approx. Chi-square	717.744	263.138	507.859
	df	45	36	55
	Sig	0.000	0.000	0.000

	Regulatory	Infrastructure
The regulations of country easily enable obtaining trade finance at affordable cost (RF8)	0.83	
The country's regulations help this firm to measure the efficiency of the domestic financial sector (RF7)	0.81	
The country's regulations measure the intensity of domestic competition and quality of related policies in this organisation (RF6)	0.72	
Regulations of the country capture the efficiency of the government	0.70	
Regulations of this country enable this organisation to be open to foreign participation (RF5)	0.69	
We deliver most products to customers through roads because of low costs (IF6)		0.78
We use roads as a fast way to serve our customers (IF5)		0.74
Roads are considered an efficient facility to deliver our products (IF7)		0.69
Telecommunication networks have high reliability (IF8)		0.62
Total	2.76	2.66
% Variance	30.6	29.5
% Cumulative	30.6	60.2

Table 3. Component analysis for institutional traits

	Organisational	National
We have been able to keep environmental friendly due to our firms' culture DC3	0.88	
Our firm stays at the leading edge of new technology in our industry DC2	0.87	
Our organisational culture guides our clientele along the supply chain DC5	0.84	
Our supervisors encourage the people who work for them to work as a team DC6	0.82	
Our incentive system is fair in rewarding people who accomplish firm objectives DC9	0.79	
Our incentive system really recognises the people who contribute the most to our firm DC10	0.76	
The incentive system at this firm encourages us to reach firm goals DC11	0.72	
There is a defined national policy for guiding our activities as 3PLs (NC7)		0.73
The open national investment culture supports 3PLs NC3		0.71
The national ideologies have helped to shape stakeholders perceptions on 3PLs NC5		0.68
There is a legal platform for addressing logistics issues nationally NC6		0.66
Total	2.56	1.185
% Variance	46.6	21.56
% Cumulative	46.6	68.16

Table 4. Component analysis for cultural traits

4.5.3 Component analysis for supply chain agility. The results indicate that the five components which include flexibility, swiftness, decisiveness, accessibility and alertness account for 64.427% variance in SCA. Of the five dimensions, flexibility was found to be the best component in explaining SCA (39.977% variance). Table 5 presents the component analysis results for SCA while Figure 2 demonstrates the entire research methodological framework.

5. Results and discussion

5.1 Descriptive and correlation analysis

The results in Table 6 indicate that organisations in the study were rated highly on infrastructural framework, regulatory framework, national culture, organisational culture and SCA with a mean of 4.7648, 4.3509, 4.1538, 4.2284 and 3.9865 respectively, and standard

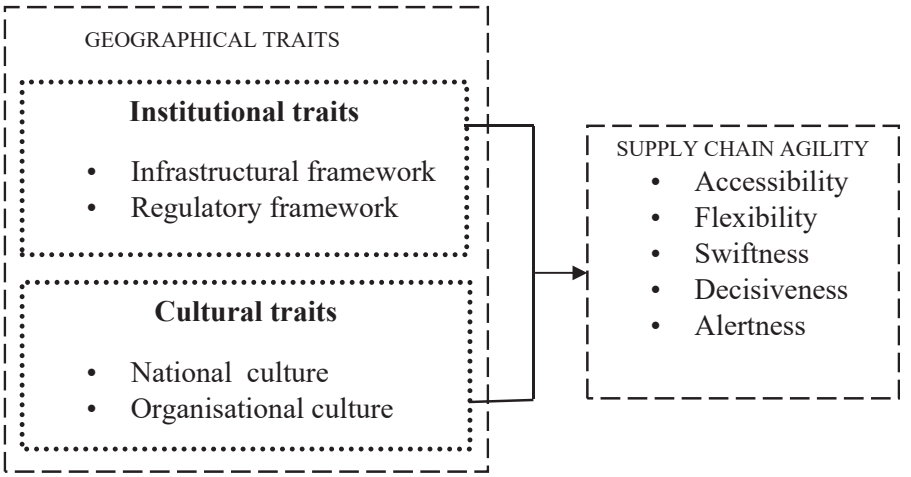


Figure 1.
Conceptual framework

deviation of 0.89390, 0.90156, 1.00045, 0.876,624 and 1.10156 respectively. Institutional framework had the highest mean of 4.7648 with a standard deviation of 0.89390. Pearson (r) correlations coefficient was used to examine the relationship between the study variables. As presented in Table 6, the results indicate a positive and significant relationship between infrastructure framework and SCA ($r = 0.358$ $p < 0.01$), hence supporting HI. This means that a 3PL that utilises favourable infrastructure such as telecommunication and road networks is likely to swiftly respond to supply and demand or any other changes in the environment. There is also a positive and significant relationship between regulatory framework and SCA ($r = 0.381$ $p < 0.01$), supporting H2. This means that a 3PL that utilises national regulations to obtain trade finances at affordable costs and measures the intensity of domestic competition together with quality of related policies is likely to achieve SCA. Further, the findings indicate a positive and significant relationship between national culture and SCA ($r = 0.373$ $p < 0.01$), thereby supporting H3. This means that a 3PL that abides by national policies guiding 3PL activities and is flexible to national ideologies that shape stakeholders perceptions is likely to enhance its SCA. There is also a positive and significant relationship between organisational culture and SCA ($r = 0.471$ $p < 0.01$), supporting H4. This implies that 3PLs with favourable organisational culture such as using leading edge technology and teamwork are likely to quickly respond to environmental changes.

A multiple regression analysis was conducted to further assess the relationships at a multivariate level. First, we examined the correlations among the independent variables to determine whether multicollinearity problems exist. Although none of the correlations exceeded 0.80 or 0.90, we follow Myers (1990) suggestion that some degree of multicollinearity can still exist even when none of the correlation coefficients is very large. We examined the Variance Inflation Factors (VIFs) and as can be observed from Table 7, all VIFs were below the threshold of 10 as recommended by Field (2009), suggesting multicollinearity does not pose a problem to the regressions. In Table 6, institutional geographical traits, i.e. infrastructural and regulatory framework) and cultural traits (national culture and organisational culture) together account for 28.1% variation in SCA of 3PLs (Adjusted R Square = 0.281). The significant predictors of SCA were organisational culture (Beta = 0.321, $p < 0.01$), and regulatory framework (Beta = 0.183, $p < 0.01$), while infrastructural framework and national culture were not

	1	2	3	4	5
The company's delivery times for 3PLs are flexible (FB2)	0.739				
We have room for quick adjustments in tactics and technology where necessary (FB6)	0.738				
Our staff are free to change working times on their schedules (FB1)	0.702				
We accommodate changes in the design or documentation where necessary (FB3)	0.632				
Our company freely adjusts its supply flows with customer's requests (FB4)	0.56				
Our company managers take short time to make decisions (SW4)		0.779			
There is shorter delivery times which reduces lean related challenges SW5		0.728			
We are quick to introduce a new products SW6		0.728			
We are quick to modify the range of our supply chain members and tactics (SW1)		0.67			
We are swift to respond to any challenges or risks along the supply chain (SW3)		0.601			
We take time to make changes basing on our customers' needs (DE6)			0.708		
As a company we are dependable by our clients (DE5)			0.677		
We have strengthened our networks and partnerships along the supply chain (DE2)			0.668		
Our operations in supply chain are decision backed (DE3)			0.642		
We have strict control on inventory and related stores decisions (DE4)			0.614		
Our supply chain allows customers to give their opinions and seek for feedback (A5)				0.748	
There is a 24/7 customer service desk to meet our customers' needs (A6)				0.607	
There is room to provide more services in stores and transport (A3)				0.587	
Our factory/firm premises are accessible any time of day (A2)				0.571	
We ensure our stores are accessible for any emergence supplies (A4)				0.547	
As a company we are always ready to relate with new prospective clients (AL6)					0.876
We tell our clients about the changes in the routes of transit when necessary (AL5)					0.772
There is necessary infrastructure to inform about risks like fire and theft (AL1)					0.561
Total	9.195	1.823	1.513	1.181	1.106
Variance%	39.977	7.926	6.58	5.135	4.809
Cumulative variance%	39.977	47.90	54.484	59.619	64.427

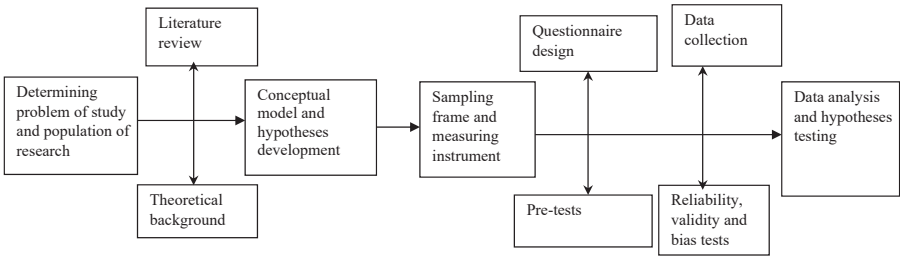
Table 5.
Component analysis for supply chain agility

significant predictors of SCA (Beta = 0.087, $p > 0.05$) and (Beta = 0.122, $p > 0.05$) respectively.

5.2 Discussion

In this section, we discuss the results from the hypotheses tests, comparing them with the previous literature. Consistent with H1, the results established a positive and significant relationship between infrastructural framework and SCA. The regression analysis however indicated an insignificant beta coefficient. This level of analysis implies that infrastructure

framework such as Internet facilities, telecommunication and road networks does not cause a significant improvement in SCA of 3PLs. This corroborates Al-Shboul (2017) who found that infrastructure framework elements do not contribute significantly to SCA are partially mediated by delivery dependability and time to market. Similarly, scholars (e.g. Liu *et al.*, 2013) emphasised that information technology infrastructure provides the platform that can help firms exchange knowledge, align processes and achieve operation flexibilities, which can be leveraged to develop SCA. In the Ugandan context, facets of infrastructural framework are deficient, e.g. in terms of poor road and non-operational railway network coupled with poor technology and inadequate accessibility to Internet facilities for most firms. Such situation cannot support SCA in Ugandan firms.



Source(s): Adapted from Teoman and Ulengin (2018)

Figure 2. Research methodological framework

	Mean	STD	1	2	3	4	5
Infrastructure framework (1)	4.7648	0.8939	1				
Regulatory framework (2)	4.3509	0.90156	0.501**	1			
National culture (3)	4.1538	1.00045	0.448**	0.373**	1		
Organisational culture (4)	4.2284	0.87624	0.389**	0.339**	0.445**	1	
Supply chain agility (5)	3.9865	1.10156	0.358**	0.381**	0.373**	0.471**	1

Note(s): **Correlation is significant at the 0.01 level (2-tailed)

Table 6. Correlations

Model	Unstandardized coefficients *B*	Unstandardized coefficients Std. Error	Standardized coefficients Beta	*t*	Sig	Collinearity statistics Tolerance	Collinearity statistics VIF
(Constant)	0.370	0.460		0.805	0.422		
Infrastructure framework	0.105	0.098	0.087	1.073	0.285	0.650	1.538
Regulatory framework	0.208	0.088	0.183	2.356	0.020	0.710	1.408
National culture	0.130	0.083	0.122	1.563	0.120	0.698	1.433
Organisational culture	0.425	0.100	0.321	4.232	0.000	0.745	1.343
R square	0.298						
Adjusted *R* square	0.281						
Std. Error of the estimate	0.798						
R square change	0.298						
F statistic	17.287						
Sig	0.000						
Durbin–Watson	1.018						

Note(s): a. Dependent Variable: supply chain agility

Table 7. Linear regression analysis for supply chain agility

Further, this study found that regulatory framework influences SCA. This implies that 3PLs that operate in a favourable regulatory framework that enables them to acquire financing, have fair competition as well as facilitating foreign participation in logistics services achieve enhanced SCA. The finding agrees with Watanuki (2015) who asserted that flexible regulatory frameworks provide maximum utility that enables parties derive desired outcomes and strengthens relationship. The findings also concur with Durach and Weingarten (2017) who observed that a regulatory environment provides a safeguard to receive goods on time from suppliers since suppliers might fear getting sanctioned for delivering late. A regulatory framework that enables access to financing improves the SCA of 3PLs by minimising financial constraints that affect firms' response to internal and external environmental threats (e.g. Tukamuhabwa *et al.*, 2017).

The correlation analysis also established a positive significant relationship between national culture and SCA. However, the regression analysis showed that national culture does not significantly influence SCA. This implies that a favourable national culture does not yield significant improvement in SCA of 3PLs. This contradicts with Durach and Weingarten (2017) who attribute agility to national culture. Similarly, other scholars have argued that national cultural attachments regulate infrastructural framework (Krishnan *et al.*, 2013), which influences SCA (Qi *et al.* (2009). This finding however reflects the situation in Uganda as revealed in an earlier study by Tukamuhabwa *et al.* (2017), which established that unfavourable national politics, government policy, weak legal system and corruption constrain response to environmental supply chain threats in Ugandan firms.

Finally, the study found that organisational culture positively influences SCA. This implies that 3PLs that possess favourable cultural traits such as encouraging teamwork among workforce, staying at the leading edge of new technology, environmental friendly practices, providing customer care by seeking customer opinions and allowing feedback about operations as well as recognition and incentivisation of employees create enhanced SCA. This is also in conformity with other scholars (e.g. Braunscheidel *et al.*, 2010; MCAfee *et al.*, 2002) who stressed that organisational culture has a significant bearing on SCA and is a source of competitive advantage. Turner *et al.* (2019) also agree that specific organisational culture attributes such as multi-team systems are important in an agile environment. An organisational culture that embraces change and learning through continuous improvement, top management support and staff empowerment enables achievement of SCA (Humdan *et al.*, 2020).

6. Conclusion

The study aimed to investigate the influence of geographical traits in the form of institutional and cultural traits on SCA in 3PLs in Uganda. It was found that institutional traits (i.e. infrastructural framework and regulatory framework) and cultural traits (i.e. national culture and organisational culture) have positive and significant relationship with SCA. It was further revealed that both regulatory framework and organisational culture are significant predictors of SCA and all geographical traits jointly account for 28.1% variation in SCA. The results in this paper have important insinuations for both theory and practice.

6.1 Theoretical implications

The institutional theoretical perspective underpinning this study has revealed that the institutional environment amidst which 3PLs operate possesses important geographical traits that explain their SCA. Thus, factors like regulatory framework and culture are important antecedents of SCA in 3PLs. This therefore underlines the role of external factors in explaining firms' SCA, complementing prior research on SCA enablers that has predominantly focused on factors internal to the firm and its supply chain, rather than

external contingencies. Hence, this study has contributed on the institutional theoretical explanation of supply chain phenomena by showing that the SCA of firms such as 3PLs, which operate national level and transnational businesses, is contingent upon the prevailing country level institutional circumstances. Furthermore, this study has contributed to the literature on SCA in the service industry, particularly in 3PLs in developing countries, which has been reportedly scant in the SCA literature.

6.2 Implications for practice

In practice, the management of 3PLs should build a favourable organisational culture, where for example there is an atmosphere for teamwork, communication, customer care and feedback, employee incentives and espousing leading edge technology. Managers of logistics firms should also be cautious when deciding to locate in certain geographical areas. They should first understand the geographical traits in terms of regulations; infrastructure and culture in potential host countries, and invest in those countries that provide favourable atmosphere or craft agile strategies that provide institutional fit in order to enhance SCA.

The relevance of institutions in this study suggests that the governments hosting 3PLs have an important role to play in enhancing SCA. Thus, governments and other regulatory bodies should craft regulations that facilitate agility, for example by streamlining acquisition of financing by 3PLs, streamlining the clearing and forwarding process, ensuring fair competition as well as facilitating internationalisation of logistics services provision. The 3PLs together with the government should establish infrastructure such as Internet and telecommunication as well as transport networks in order to facilitate the flow of information and materials to customers. The government should also develop and strengthen a culture that facilitates SCA such as providing open national investment policies, legal platform for addressing logistics issues and national ideologies that shape 3PLs' stakeholders perceptions towards building SCA.

6.3 Limitations and future research directions

Finally, like other studies, there are a number of limitations with the study at hand. Firstly, this study used a self-administered structured questionnaire and with it, we could not get in-depth understanding of the reasoning behind the findings. Further studies are needed to remedy this, for example, through qualitative case studies using interviews. Second, this study was limited to Uganda, which limits its external validity. This also makes comparison of traits in different geographical locations difficult. Thus, future research can be conducted in different countries since most 3PL supply chains span different national boundaries. Lastly, the fact that national culture and infrastructural framework did not significantly predict SCA suggests that there could be other factors which act as conduits between these traits and SCA like delivery dependability and time to market (Al-Shboul, 2017), and these merit further investigation.

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Corresponding author
Benjamin R. Tukamuhabwa can be contacted at: btukamuhabwa@mubs.ac.ug