

# Information integration, procurement internal controls, material and purchasing procedure standardization and procurement performance in humanitarian organizations

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## Abstract

**Purpose** – Procuring relief products and services is a challenging process for humanitarian organizations (HOs), yet it accounts for approximately 65% of relief operations' costs (Moshtari *et al.*, 2021). This paper aims to examine how procurement internal controls, materials and purchasing procedure standardization influence information integration and procurement performance.

**Design/methodology/approach** – In this study, partial least square structural equation models and multigroup analysis were used to analyze data collected from 170 HOs.

**Findings** – Procurement internal controls and material and purchasing procedure standardization fully mediate between information integration and procurement performance.

**Research limitations/implications** – The study focuses only on HOs. Since humanitarian procurement projects take place over a period of several years, it is difficult to capture the long-term effects of information integration, procurement internal controls, material and purchasing procedure standardization and procurement performance. In this regard, a longitudinal study could be undertaken, provided that the required resources are available.

**Practical implications** – Procurement managers should implement information integration practices within acceptable procurement internal controls and standardize material and purchasing procedures to boost procurement performance.

**Originality/value** – By integrating information through procurement internal controls and standardizing material and purchasing procedures, procurement performance in a humanitarian setting can be systematically optimized.

**Keywords** Information integration, Procurement internal controls, Material and purchasing procedure standardization, Procurement performance, Humanitarian organization, Uganda

**Paper type** Research paper

**An executive summary for managers and executive readers can be found at the end of this article.**

## 1. Introduction

Catastrophes, both natural and man-made, are increasing in frequency and intensity. Such catastrophes (outbreaks of

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diseases like COVID-19, earthquakes, political conflicts, frequent weather events and natural disasters are exacerbating chronic vulnerabilities) cause death and affect a significant number of people in the world (Girling and Urquhart, 2021). A result of this is that humanitarian organizations (HOs) across the globe offer assistance, alleviate and restore the affected to a fairly normal life (United Nation, 2020; The Sphere Project, 2018). In spite of dwindling funding, HOs are trying to provide humanitarian assistance to victims (UNOCHA, 2020; UNHCR, 2019a, 2019b, 2019c, 2019d, 2019e; UNICEF, 2017). With costs escalating and donations dwindling, humanitarian assistance must be procured efficiently and effectively (Panel, 2016). The procurement of products and services is crucial since it accounts for approximately 65% of relief operations costs (Moshtari et al., 2021). Procurement is also a key enabler of competitive advantage (Abolbashari et al., 2018) and results in achievement of corporate or operational goals and objectives (Lysons and Farrington, 2016), as it enables the evaluation of the supplier, optimizes supply chain costs (Abolbashari et al., 2018), realizes significant savings (Schütz et al., 2019), mitigates risks (Kovács and Falagara Sigala, 2021; Ross, 2015) and facilitates sourcing quality products, while executing tasks in a timely manner (Baker et al., 2017), increasing value for money, as well as long-term sustainability (UNICEF, 2017).

In spite of the importance of procurement to HOs, they suffer from inefficiencies and ineffectiveness when it comes to procurement performance (UNHCR, 2019a, 2019b, 2019c, 2019d, 2019e) in terms of supplying inferior or poor-quality products and having late deliveries, which leads to untimely relief deliveries. According to anecdotal evidence, in March 2019, World Food Program's (WFP) procurement and supply of fortified food products from a sole Turkish supplier seemed questionable due to suspicions that the products were of poor quality. In another incident, food products were suspected of being linked to an outbreak of sickness in Karamoja, Uganda. As a result, four people died, and WFP stopped providing food aid dubbed super cereal to all of its government-led Maternal Child Health and Nutrition and community-based supplementary feeding programs throughout Uganda, including refugee settlements (WFP, 2019a). Consequently, WFP's procurement effectiveness was questioned during the purchase of super cereal product, as the product's quality seemed to have been compromised, despite claims from a WFP Ugandan official that the office had zero tolerance for food that was of poor quality (Parliament of Uganda, 2019; Akena, 2019). In response to this, WFP management and the Ugandan Government investigated whether the fortified food items were procured, supplied and transported following the right procedures and policies (WFP, 2019b). Therefore, HOs can improve their procurement performance by focusing on their core activities and integrating suppliers to handle other activities (Zou et al., 2019). Thus, to improve procurement performance, HOs must have governance mechanisms that enable them to control opportunism and information asymmetry associated with interorganizational relationships.

Despite the potential benefits of collaboration between buyer and supplier in procurement, information sharing and collaborative planning related to procurement of products and services in humanitarian settings are challenging. In reality, aligning procurement performance with collaboration goals is hard because of complexity (Kovács and Falagara Sigala, 2021). This is

due to the need to relieve suffering and restore normalcy to patients during emergency situations (UNICEF, 2017), which complicates procurement (Safarpour et al., 2020). The nature of humanitarian operations complicates the procurement contracting process with suppliers, as different needs of victims sometimes affect specifications and context-dependence, which increases procurement costs and delivery times (James, 2017). From a transaction cost economics (TCE) perspective, procurers should implement governance mechanisms to reduce the complexity of the procurement process, which induces opportunism in buyer-supplier relationships, reducing procurement performance (Ketokivi and Mahoney, 2020; Williamson, 1996). Asymmetry between buyers and suppliers affects procurement performance because suppliers rely on buyers for definitions of their needs, requirements and context. Additionally, in an emergency situation, buyers may lack the knowledge and skills to communicate these elements to suppliers (Handfield et al., 2015). The literature in TCE suggests opportunism arises from asymmetry of information among procurement partners (Lumineau and Oliveira, 2019). As a result, procurement performance suffers (Kovács and Falagara Sigala, 2021). The varied nature of victim's needs and operating uncertainties make it difficult to describe procurement deliveries in emergency times in contract terms (UNHCR, 2019a, 2019b, 2019c, 2019d, 2019e). Details of requirement specifications often remain unclear when HOs procure emergency items, so performance details and relevant costs cannot be determined conclusively (James, 2017). Moreover, emergency procurement may require suppliers to deliver goods and receive reimbursements (James, 2017; Nawi et al., 2017).

Suppliers may engage in opportunistic behavior, resulting in poor delivery of procurement items (Ramirio et al., 2021). Due to these challenges, HOs need to standardize material and purchasing procedures and implement procurement internal controls for effective procurement (Kovács and Falagara Sigala, 2021). Using TCE, managers can make or buy decisions, manage transactions efficiently and exchange value between suppliers. Using TCE, the objective is to select which option for governing a transaction is most appealing based on production competence, control over the supply chain and exchange efficiency (Grover and Malhotra, 2003; Williamson, 1996, p. 41). Many scholars are trying to explain humanitarian procurement performance antecedents. In accordance with this, we see mechanisms such as preparedness, mobilization, standardization, innovation and collaboration (Kovács and Falagara Sigala, 2021) and procurement practices (Moshtari et al., 2021). Some have used improvement approaches (Wankmüller and Reiner, 2021), option contracts (Liu et al., 2019) and integrated relief prepositioning (Ali Torabi et al., 2018). However, others have explained it in terms of ethics (Maria et al., 2018), quantity flexibility contract (Nikkhoo et al., 2018), reverse auction framework (Shokr and Torabi, 2017), role of information technologies mute information technology (Mwanjumwa and Simba, 2015), local resources and procurement practices (Matopoulos et al., 2014) and quantitative models (Falasca and Zobel, 2011).

There have been many scholarly studies explaining how procurement performance plays a role in humanitarian operations using various mechanisms, but very few empirical studies have examined the antecedents of procurement performance in Ugandan humanitarian operations. There are

many existing studies on the antecedents of public procurement, but they tend to focus on state-owned enterprises, central government procurement and disposal entities and banks (Pakurár *et al.*, 2019), not the humanitarian sector. Yet Uganda continues to host a large number of refugees around the world (Mutebi *et al.*, 2020b). The need to improve procurement performance in humanitarian operations to maximize the use of dwindling resources despite high procurement costs is highlighted here (Moshtari *et al.*, 2021). Based on Moshtari *et al.* (2021), further empirical research is needed on humanitarian sector procurement. Responding to Moshtari's call, we examine how information integration, procurement internal controls and material and purchasing procedure standardization affect procurement performance. In this study, we apply TCE theory to explain how information integration influences procurement performance. The current study, however, extends its research model to examine governance mechanisms that can prevent opportunism and information asymmetry and ensure both suppliers and buyers fulfill their mutual obligations (Lumineau and Oliveira, 2019) because TCE does not fully explain how information integration can be used to achieve procurement performance. As a consequence, this study contributes to TCE by examining how procurement internal controls and standardization of material and purchasing procedures influence procurement performance.

Unsubstantiated evidence suggests procurement internal controls can facilitate buyer-supplier exchanges and improve procurement process efficiency, procurement coordination and administrative harmonization. According to COSO (2013), procurement internal controls have helped various organizations achieve their key objectives. Despite reforms in procurement internal controls, HOs lack a strategic procurement management focus (UN procurement practitioners' Handbook, 2022). As a result of the gaps listed above, this study is needed. Also, poor information integration between buyer and supplier results in delayed response to material requirements (Jahre *et al.*, 2016). Yet by integrating information with appropriate governance mechanisms, including control environments, monitoring actions and standardizing materials and purchasing procedures, procurement can be improved to achieve high procurement performance (Ghadge *et al.*, 2019). While standardizing materials and purchasing procedures has been a challenge (Bongvereirwe, 2019; UNICEF, 2019), a number of HOs, including UNICEF, have collaborated with the Government of Uganda to improve collaboration with partnering organizations. This study examines how procurement internal controls, standardization of materials and information integration affect procurement performance.

This study assesses the mediating role of procurement internal control and materials and purchasing procedure standardization in the relationship between information integration and procurement performance. This is achieved by using partial least square structural equation modeling (PLS-SEM) to analyze data from 170 HOs operating in Uganda. Results indicate that information integration does not significantly affect procurement performance. Furthermore, procurement internal controls, material and purchasing procedure standardization mediate between information integration and procurement performance.

The rest of the paper is organized as follows; Section 2 presents the theoretical framework and hypotheses development, Section 3 presents the methodology, Section 4 the

results of the study, Section 5 presents the discussion, conclusion and implications of the results, and 6 the references.

## 2. Theoretical framework and hypothesis development

### 2.1 Theoretical foundation

The relationship between information integration, procurement internal controls, material and purchasing procedure standardization and procurement performance is hinged on TCE theory (Williamson, 1975, 1985, 1996). The theory assumes that transacting organizations share the mutual interest of organizing the transaction in an economically efficient manner to increase value creation. This implies that the effective management of procurement transactions requires efficient governance mechanisms, which consist of cooperation and coordination (information integration) as well as procurement internal controls, material and purchasing procedure standardization as means by which transacting parties can mutually share the procurement performance outcomes (Ketokivi and Mahoney, 2020). These governance mechanisms enable the identification, explication and mitigation of all forms of contractual hazards (Williamson, 1985, p. 23). In procurement-related activities, hazards arise from risks and uncertain buyer-supplier long-term relationships that involve information sharing and collaborative planning, which are difficult to specify fully in a long-term procurement contract (Yu *et al.*, 2018). In the TCE theory, the costs of a transaction are often divided into three categories; information sharing costs, negotiating and monitoring costs (Jensen and Meckling, 1976), all of which influence procurement performance. Hence, in addition to covering the essential transaction dimension, a comprehensive explanation of procurement performance should include a governance mechanism that addresses the costs of engaging in buyer-supplier information integration. In buyer-supplier exchanges, procurement performance means that both parties evaluate explicit and implicit aspects of delivered procurements to assess the effectiveness of the interfirm relationship (Ketokivi and Mahoney, 2020). The focus is on evaluating procurement performance through all procurement transaction episodes instead of only one (Khan *et al.*, 2019). According to (Neubert *et al.*, 2004), buyers should continuously monitor collaborating partner performance across a variety of dimensions. Therefore, we examine the effectiveness of information integration with procurement performance, where the underlying logic is that overall procurement performance is a focal consequence of a working partnership (WFP, 2016). This is consistent with previous measurements of procurement performance in literature (Ketokivi and Mahoney, 2020). This makes the theory applicable in understanding relationships between information integration, procurement internal controls, materials and purchasing procedure standardization and procurement performance in HOs.

### 2.2 Hypothesis development

#### 2.2.1 Information integration, procurement internal controls and procurement performance

We operationalize information integration in terms of information sharing and collaborative planning (Cai *et al.*, 2010), while procurement performance is measured in terms of cost, quality and delivery time (Caniato *et al.*, 2012). According

to prior scholars (Cai *et al.*, 2010; Wong *et al.*, 2011; Lotfi *et al.*, 2013; Shubin *et al.*, 2017; Maghsoudi *et al.*, 2018; Singhry and Abd Rahman, 2018; Yu *et al.*, 2018; Böckerman *et al.*, 2020; Madzimore *et al.*, 2020), information integration plays an essential role in managing and coordinating cross-firm activities such as procurement. Kim *et al.* (2005) indicate that information integration does not necessarily bring desirable results such as cost reduction and efficiency improvement. Based on the TCE model, there are costs related to information sharing and collaborative planning. These costs include asset specificity, measurement difficulty and uncertainties (Jensen and Meckling, 1976). A specificity of assets refers to the relationship-specific investment resources that exist between the parties involved in the transaction to share information internally and externally. Ketokivi and Mahoney (2020) certainly create a risk of hold-up behavior because one party may attempt to appropriate gains from the other party's specific investment by reducing procurement quality or increasing price. Furthermore, it is difficult to measure procurement performance, which also creates hazards. The supplier can sometimes cut corners when it is difficult to measure performance, such as in emergency humanitarian operations, where the buyer cannot measure it (Safarpour *et al.*, 2020). Despite some studies showing that organizations that are aware of how to minimize transaction costs by implementing governance mechanisms like procurement internal controls as well as standardizing material and purchasing procedures may achieve better procurement performance, we argue that information integration may negatively impact procurement performance (Zou *et al.*, 2019). The following is proposed:

*H1.* Information integration negatively relates with procurement performance.

Lotfi *et al.* (2013) claim that to mitigate procurement-related risks such as information asymmetry and opportunistic behaviors (Ramirio *et al.*, 2021; Bergh *et al.*, 2018; Steinle *et al.*, 2014), procurement internal controls like COSO's internal control-integrated framework are needed. To identify and manage procurement-related risks, HOs should have an internal control system for procurement. As a result, procurement internal controls allow HOs to ensure they are directing procurement operations efficiently and effectively and to ensure reliable procurement processes and compliance with humanitarian laws and regulations. Shipley Tomas (2019) suggests that information integration allows internal and external stakeholders to share procurement internal controls information. In COSO's view, procurement internal controls include control environment, risk assessment, control activities and information and communication.

According to Pakurár *et al.* (2019), information integration facilitates continuous collaboration among procurement stakeholders for effective internal control practices. An effective procurement internal control framework requires consistent and continuous collaboration between the management responsible for procurement procedures. As a result, opportunistic attachments will not lead the system away from predictions (Poniso *et al.*, 2017). In addition to achieving value for money, HOs with procurement transactions characterized by norms of recognized behavior mitigate risks and ensure that their outcomes are trusted (Khan *et al.*, 2019). By sharing procurement data, control goals and measures can be derived from monitoring and assessing

risks and integrated into operational procurement units and procurement practices. In a 1982 study, Monteverde and Teece used TCE to explain efficiency in automobile assembly. By integrating information and implementing internal controls, the company reduced costs. The same principles apply to improving procurement performance among HOs.

Additionally, information integration ensures that procurement-related information reaches the parties involved in procurement internal controls (Poniso *et al.*, 2017). As few studies have examined the relationship between supply chain integration and internal control in the Jordanian banking sector (Pakurár *et al.*, 2019), derived associations are only inferred. This presented an opportunity to contribute to the procurement performance literature by establishing a direct link between information integration and procurement internal controls using the TCE theory. As a result, we hypothesize:

*H2.* Information integration is positively related to procurement internal controls.

Rendon and Rendon (2016) articulate the importance of strengthening the components of procurement internal controls to enhance the reliability of procurement performance. Procurement internal controls are internal control systems including both direct and indirect internal procurement audits carried out to increase the transparency and accountability among procurement function and external service providers in the organization. Procurement internal control provides an independent appraisal of the quality of management performance as regard their ability to carry out the assigned responsibilities for better procurement outcome (Shrestha *et al.*, 2019). Zakaria *et al.* (2016) noted that an effective procurement internal control system is linked with organizational success in terms of achieving procurement performance targets. Effective procurement internal control involves revising the controls that are used to protect organizational resources.

The continuous review of the reliability and integrity of procurement information, assessment of compliance policies, procedures, applicable laws and regulations are supported by information integration. HOs have a responsibility to train, educate and sensitize their procurement staff to use internal control systems. The effectiveness of procurement internal control is based on the skills, competency and transparency of the people that use it. There are four types of internal controls: preventive and detective, corrective and directive (Lartey *et al.*, 2019). Preventive controls are used to forecast problems before they occur, find a solution, make modifications, prevent errors and acts of error from occurring. Detective controls are used to reveal and report the occurrence of an omission, an error, malicious action or act, to minimize the threat, identify the cause of the problem and correct the defective controls by rectifying the problems when discovered. Corrective are implicating the role of management and board, which involve corrective actions to address major setbacks after monitoring and reviews of the systems of operation.

This points directly to control activities taken by management to address problems discovered, while directive controls involve the establishment of guidelines that lead to satisfactory outcomes (Lartey *et al.*, 2019). HOs, most specifically the United Nation (UN) organizations, have set the standard of having strong internal controls to mitigate

consequences of risk occurrence in procurement functions, thus ensuring good procurement performance. However, a 2015 UN field office audit revealed that several organizations lacked the appropriate controls and measurement tools that could effectively and efficiently be used in managing their respective procurement activities (UNHCR, 2015). Issues of concern included deficiencies in the timeliness of requisitioning, reduction in procurement lead times, award of long-term agreements to reduce the complexity and costs related to procuring low value and/or high-volume items and several others which significantly affected the procurement performance of the organizations. TCE supports a power perspective during negotiations for fair prices. Usually, attention focuses on actors who can exert power on others in the supply chain, effectively establishing internal controls for efficient use of resources without owning them. An example is a large final assembler who can “squeeze” its small suppliers by unilaterally setting prices. The power perspective also posits that actors in the supply chain seek ways to avoid dependence on any individual actor or firm in the chain (Wang et al., 2018). This means that TCE, as a theory, explains how procurement internal controls can improve procurement performance among HOs. It is against this background that the researcher thought to investigate the relationship between the procurement internal controls and procurement performance of HOs in Uganda. We propose the following:

*H3.* Procurement internal controls positively associate with procurement performance.

Based on the preceding literature review for *H1*, *H2* and *H3* and from the TCE, procurement internal controls are governance mechanisms that enable the minimization of transaction costs associated with information integration in the attainment of procurement performance. Procurement internal controls like policies and procedures, monitoring activities, control environment and risk assessment act as governance mechanisms through which negotiating and monitoring costs and assets specificity, measurement difficulty and uncertainties are controlled to achieve the desired procurement with cost structure as well as achieving delivery of procured items on time (Zou et al., 2019). This postulates that there is an indirect and positive mediating effect of procurement internal control in the relationship between information integration and procurement performance. Hence:

*H4.* Procurement internal control positively mediates between information integration and procurement performance.

### 2.2.3 Information integration, standardization and procurement performance

Turkulainen et al. (2017) and Wong et al. (2011) show that information integration leads to the adoption of materials and purchasing procedure standardization. The notion of information integration spins around developing information sharing and collaborative planning infrastructure like electronic linkages to facilitate timely, accurate, standardized data exchange across internal supply chains and external organizations (Baihaqi and Sohal, 2012; Neubert et al., 2004). Information integration

that spans across internal functional units and boundaries through electronic linkages at times integrates with external organizations when they get involved in using standardized and digitized information exchange tools which facilitate and improve communication with external supply chain partners (Nasiri et al., 2020). Wong et al. (2011) earlier noted that this is achieved through the use of standardized enterprise resource planning systems. Additionally, Turkulainen et al. (2017) and Barrat and Barrat (2011) found that information integration combines standardized internal and external information-based linkages to create visibility, consistency in priorities that allow managers to understand interdependencies across the internal supply chain. TCE theory posits that procurement transaction costs for researching suppliers, negotiation costs, the costs for approving and drafting the contract, quality control costs and enforcement costs should be standardized or benchmarked for efficiency (Costantino et al., 2006). The approaches currently taken to public procurement transaction cost evaluation are mainly applicable at the microlevel to individual firms or projects. HOs should be detailed when gathering sufficiently fine-grained information on humanitarian services, which is far from always being feasible at the macrolevel:

*H5.* Information integration positively relates to material and purchasing procedure standardization.

The role materials and purchasing procedure standardization plays in the attainment of procurement performance in supply chain management has attracted significant attention of scholars worldwide (Patrucco et al., 2020; Patrucco et al., 2019; Munyimi, 2019; Nawi et al., 2017; Johnson et al., 2014; Glock and Broens, 2013; Sánchez-Rodríguez et al., 2006). In this study, we look at standardization in terms of materials and purchasing procedure standardization (Patrucco et al., 2019; Sánchez-Rodríguez et al., 2006). The standardization of material and procedure offers the possibility of buying various smaller variety or number of brand-name materials in larger volume resulting in lower unit cost through quantity discounts, as well as lower transportation, procurement and materials management costs (Nawi et al., 2017; Glock and Broens, 2013). Additionally, it also allows delivery reliability (Glock and Broens, 2013), saves management time to spend on strategic activities (Johnson et al., 2014) and increases the accuracy and effectiveness of the purchasing process, thereby resulting in better purchasing performance (Patrucco et al., 2019). Even, when the role is appreciated, extant literature indicates mixed results between standardization and procurement performance (Patrucco et al., 2020; Munyimi, 2019; Nurmandi and Kim, 2015; Glock and Broens, 2013; Croom and Brandon-Jones, 2007; Sánchez-Rodríguez et al., 2006).

Patrucco et al. (2020) found no relationship between standardization and procurement performance while exploring the relationship between public procurement configuration and performance among local governments in Italy and the USA. Nurmandi and Kim (2015) found limited standardization and disaggregated data on local government procurement expenditures and performance in Indonesia. Yet, Munyimi (2019), Glock and Broens (2013), Croom and Brandon-Jones (2007) and Sánchez-Rodríguez et al. (2006) found a positive association between materials and purchasing procedure

standardization and procurement performance. To reach this finding, Munyimi conducted a study on the role of procurement quality controls in procurement performance in the energy sector in Zimbabwe, while Glock and Broens (2013) studied the role of size and structure in the purchasing function in German municipalities. They found that formalization and centralization are key in improving the coordination of purchasing tasks. Croom and Brandon-Jones (2007) studied the impact of e-procurement in the UK public sector, while Sánchez-Rodríguez *et al.* (2006) studied the impact of standardization of materials and purchasing procedures on purchasing and business performance among 306 manufacturing companies in Spain. This points to a lack of a shared view on the role of standardization in procurement management, especially in different procurement contexts (Patrucco *et al.*, 2020; Munyimi, 2019; Nurmandi and Kim, 2015; Glock and Broens, 2013; Croom and Brandon-Jones, 2007; Sánchez-Rodríguez *et al.*, 2006). TCE theory emphasizes the importance of standardizing materials, purchasing procedures and procurement transaction costs of public customers and suppliers. This includes the entire procurement process, related information such as search costs; procurement planning and rationale costs, procurement procedure preparation costs; procurement procedure administering costs; the costs of drafting and concluding the contract; the costs of conflict settlement in relation to the procurement process that improve on procurement performance (Baleeva *et al.*, 2020).

In summary, existing literature suggests that standardization influences procurement performance, although it also presents a potential excess of bureaucracy, which might negatively affect performance (Van Den Hurk and Verhoest, 2016). Returning to the research gaps, it is still not clear how it relates to procurement performance in the humanitarian context leading to the following hypothesis:

*H6.* Material and purchasing procedure standardization and procurement performance are positively related.

Information integration is vital in sharing and developing collaborative planning infrastructure like electronic linkages to facilitate opportune, correct, standardized data exchange across internal supply chains and external organizations (Baihaqi and Sohal, 2012; Neubert *et al.*, 2004). Information integration influences the standardization of materials and purchasing procedures. Material and purchasing procedure standardization is a deliberate attempt by an organization to replace several materials and components with a single component composed of all functionalities of the materials it replaces, while standardization of the purchasing procedure is about standard procedures for ordering, expediting, receipt and inspection of goods and selection and evaluation of suppliers (Sánchez-Rodríguez *et al.*, 2006). Information integration facilitates a reduction in product complexity, which is necessary for mitigating uncertainties (Wong *et al.*, 2015) and facilitates standardized information sharing. Whenever HOs standardize their processes and data management systems, it will be a conduit through which information integration will be managed to improve on procurement performance in terms of efficiency and effectiveness (Mutebi *et al.*, 2021; Mutebi *et al.*, 2020b).

The assertion that general purpose supplies are associated with comparatively lower risk and lower governance costs than special-purpose supplies (Williamson, 1985, 1988) brings us to

a consideration of TCE's central concept, asset specificity: "the degree to which an asset can be deployed to alternative uses and by alternative users without sacrifice of productive value" (Williamson, 1996, p. 59). Specifically, the higher the sacrifice in productive value (due to nonredeployability), the higher the asset specificity. Therefore, materials and purchasing procedure standardization is useful in mediating information integration to achieve procurement performance in HOs.

This broadens the sphere of application for what has been observed and experimented with. Incremental learning from information integration, in turn, gives positive feedback for future modifications and the optimization of procedures that can lead to further standardization (David and Rothwell, 1996). Thus, the incremental change to standardized practices results in the perception of innovation as a reinvention over time that amplifies procurement performance (Rogers, 2003; Wright *et al.*, 2012). Because of this less than straightforward relationship between information integration, standardization and procurement performance, our understanding of how to support them both with the help of controls is yet underdeveloped. In this study, we hypothesize that standardization mediates between information integration and procurement performance:

*H7.* Material and purchasing procedure standardization mediates the relationship between information integration and procurement performance.

### 3. Methodology

#### 3.1 Sample description

The sample frame consisted of 196 HOs which were selected from the UNHCR database in Uganda (UNHCR fact sheet, 2019). Supply chain/logistics, operations and procurement managers were strong-minded as the most appropriate unit of inquiry as they are most familiar with their HOs procurement internal controls, sharing and collaborative planning activities, materials, purchasing procedures' standardization practices and procurement performance outcomes. The survey was administered in three mailings following Dillman's (1978) total design for survey research modified version. This involved sending a cover letter explaining the purpose of the study along with the survey questionnaire to all members in the sample frame. Another mail was sent four weeks later encouraging nonrespondent to participate in the research. After eight weeks of the initial mailing, a second survey and cover letter were sent to the remaining nonrespondents. We obtained 523 usable responses from the unit of inquiry, 280 and 243 corresponding to the first and second mailings. After aggregation of the data to the unit of inquiry (HO), the 523 usable responses translated to 86.73 per total response rate, indicating that 170 HOs participated in the study.

Among the HOs that participated, 54.7% are international HOs, while 45.3% are locally based HOs. This implies that humanitarian operations are lensed through a global perspective, international coordination and the funding process to enhance improved service delivery with a perspective of mutual objectives and goals of peacekeeping, health promotion mentioned but a few. Additionally, 80% of these HOs offer services in line with food security and nutrition, water and sanitation, education and health. They aim at accelerating standards of living with limited emphasis on sustainability. Also,

95.8% had operated for over 10 years in the field of humanitarian operations, demonstrating lived experience and the ability to give valid responses. Finally, 77.6% of the HOs use over 100 staff, indicating capacity to carry on the operation and enhance service delivery among societies and communities in the displaced areas; also, since the majority of relief activities are in remote areas, HOs to provide timely relief services required them to have a big number of staff (see results in Table 1).

The respondent sample was composed of 58.5%, 41.5% were female and 17% were male, accordingly. Since procurement activities are of a sensitive nature, require high levels of integrity and honesty and female are believed to be of high integrity that is the reason why they are prioritized and trusted with positions related to procurement function in the operation environment. The results also indicate that over 95% of the respondents hold at least a bachelor's degree. This implies that they could read and comprehend the items tapping the practices related to the study phenomenon and provide valid and concrete information that can be reliably used to make informed decisions. Additionally, results demonstrate that the majority of the respondents were between the age brackets of 25 to 54 years. This can be reflected in the demographic population released by the Uganda Bureau of Statistics, where over 60% of Uganda's population is composed of youth. This is in support of one of the World Bank and Government's long-term initiatives to reduce unemployment among the youth that impacts HOs to recruit more youth in their activities as one of the restrictive covenants received from donors. In regard to work experience, over 90% of respondents have worked significantly over five years. This implies that they possess substantial information in regard to the study variables hence able

Table 1 Showing humanitarian organizations' characteristics

Type of humanitarian organizations	F	%
Local	77	45.3
International	93	54.7
Total	170	100
<b>Relief sector</b>		
Food security and nutrition	54	31.8
Water and sanitation	24	14.1
Education	26	15.3
Health	34	20
Shelter, settlements and NFIs	16	9.4
Energy and environment	16	9.4
Total	170	100
<b>Operational tenure</b>		
5–10 years	7	4.1
11–15 years	39	22.9
16 years and above	124	72.9
Total	170	100
<b>No. of employees</b>		
26–50	2	1.2
51–100	36	21.2
100 and above	132	77.6
Total	170	100

Source: Table created by the authors after analyzing demographic characteristics

to provide reliable information to provide a clear pattern of measure of procurement performance based on their work experiences, as shown in Table 2.

### 3.2 Instrument design and measurement of study variables

Using the literature review, a survey instrument was developed to measure information integration, procurement internal control, standardization and procurement performance. Faculty in humanitarian supply chain management validated the content for this study to ensure it accurately measured the constructs. To identify any language vagueness or perceived omissions, we interviewed five purchasing managers from HOs. The survey instrument was modified only slightly after input from faculty members and procurement managers, as no significant changes were recommended. The survey instrument pertaining to this study measured 60 items; 5 items for information integration; 30 items for procurement internal controls; 5 items for materials and purchasing procedure standardization and 15 items for procurement performance. Materials and purchasing procedures standardization measurements were adapted from Munyimi (2019) and Sanchez Rodriguez et al. (2006), whereas procurement internal controls were drawn from COSO (2013). Moreover, information integration scales were adapted from Cai et al. (2010), whereas procurement performance scales were sourced from Caniato et al. (2012) and Arjan and Weely (2010). In addition, both procurement internal controls and procurement performance were modeled as high-order reflective-formative constructs, as described in COSO (2013)'s framework and Caniato et al. (2012) and Arjan and Weely (2010). As part of this study, respondents were asked to indicate their level of agreement or disagreement with statements using a six-point Likert scale, where 1 represented strongly disagreement and 6 represented strongly agreement. We did this to avoid middle point response categories that cause central tendency bias (Taherdoost, 2019).

### 3.3 Nonresponse bias test

There can be nonresponse bias when information is unsuccessfully obtained from the sample (Podsakoff et al., 2012), resulting in respondents who differ substantially from those intended to respond (Bryman and Bell, 2015). We used two methods – procedure and statistical analysis. Using procedural remedies, we created confidence and explained the significance of respondents' responses to overcome nonresponse bias. In addition, we sent formal letters to every participating HO along with the survey instrument. Moreover, since data were collected over two mailing waves, we compared early and late responses by using the Mann-Whitney *U*-test on the study variables, following Armstrong and Overton's (1977) recommendations. As shown in Table 3, there was no statistical difference between the two groups ( $p > 0.05$ ) regarding the study construct, which suggests nonresponse bias was unlikely.

### 3.4 Heteroscedasticity test

Statistical tests were conducted to determine whether heteroscedasticity bias affected our results and conclusions. Using an ordinary linear regression model, all regressor variables were entered into the model to determine whether all independent variables were consistently able to predict procurement performance (Khalid et al., 2021) by retaining

Table 2 Showing respondents' demographic characteristics in the humanitarian organizations

Education level	F	%	Respondents age	F	%	Employee tenure	F	%	Gender	F	%
Diploma	26	5	Below 25 years	9	1.7	Less than five years	47	9	Male	217	41.5
Degree	223	42.6	25–34 years	108	20.7	5–10 years	251	48	Female	306	58.5
Masters	226	43.2	35–44 years	227	43.4	10–14 years	163	31.2	Total	523	100
Professional qualification	38	7.3	45–54 years	119	22.8	15 years and above	62	11.9			
PhD	10	1.9	55 years and above	60	11.5	Total	523	100			
Total	523	100	Total	523	100						

Source: Table created by the authors after the analysis of demographic characteristics

Table 3 Nonresponse bias test

Analysis parameter	Information integration	Procurement internal controls	Materials and purchasing procedure standardization	Procurement performance
Mann–Whitney <i>U</i>	51.500	59.000	71.500	98.500
Wilcoxon <i>W</i>	61.500	69.000	79.500	1,583.500
<i>Z</i>	–1.735	–1.504	–1.635	–0.292
Asymp. sig. (two-tailed)	0.083	0.133	0.069	0.771
Exact sig. [2 × (one-tailed sig.)]	0.083 <sup>b</sup>	0.141 <sup>b</sup>	0.069 <sup>b</sup>	0.779 <sup>b</sup>

Notes: <sup>a</sup>Grouping variable: Gender – mean; <sup>b</sup>Not corrected for ties

Source: Table created by the authors after running nonresponse bias test

the residual value as well as the unstandardized outcome values. By considering the significance of the Analysis of Variance (ANOVA) results and regressor variables in our linear model, we were able to determine whether heteroscedasticity affected our findings. Our preliminary results in Table 4 from the ANOVA test and standardized beta coefficients for all independent variables were nonsignificant ( $p > 0.05$ ), implying that heteroscedasticity is not present and that our all-independent variables predict the dependent variable consistently (Astivia and Zumbo, 2019).

#### 4. Data analysis and partial least square structural equation modeling model assessment

We used SmartPLS 4.0.9.0, which relies on variance-based structural equation modeling (partial least square) to examine the hypothesized theoretical framework (Benitez et al., 2019). Following Cepeda Carrión et al. (2016), we used PLS as a prediction-oriented approach that allows us to assess the

predictive validity of the exogenous variables. Therefore, using PLS-SEM enables meeting our study aims, which include to examine the predictive behavior of information integration and procurement internal controls and material and purchasing procedure standardization to further our understanding regarding the building up of procurement performance, and to explain the predictive behavior of information integration and procurement internal controls on building material and purchasing procedure standardization in the humanitarian supply chain and finally, the predictive behavior of information integration on building procurement internal controls. While previous studies have tested these hypothesized relationships, our purpose is to understand how information integration, procurement internal controls and material and purchasing procedure standardization predict procurement performance in the HO context. TCE is used in organizational literature to examine these relationships; therefore, there is no previous theoretical foundation for informing such relationships (see Figure 1). As a result, the PLS method is appropriate for

Table 4 Heteroscedasticity test

Model	Unstandardized coefficients		Standardized coefficients		<i>t</i>	Sig.	<i>F</i>	Sig.
	<i>B</i>	Std. error	Beta					
1 (Constant)	0.258	0.225			1.146	0.255	0.849	0.639
Information integration	–0.044	0.048	–0.106		–0.927	0.356		
Procurement internal controls	0.025	0.079	0.055		0.467	0.559		
Materials and purchasing procedures standardization	0.018	0.059	0.035		0.307	0.759		

Note: <sup>a</sup>Dependent variable: procurement performance

Source: Table created by the authors after running heteroscedasticity test



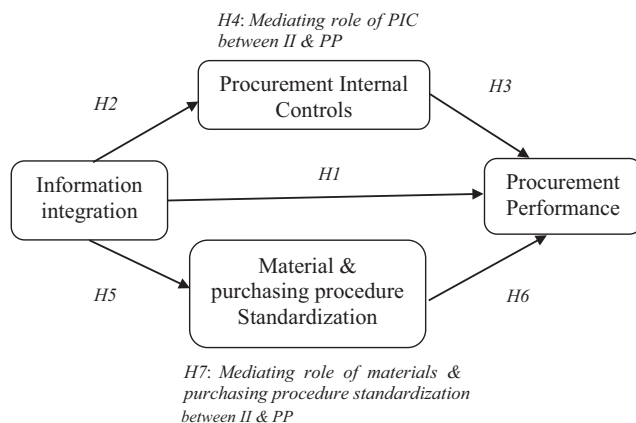
statistical analysis (Dubey et al., 2018; Hair et al., 2018; Sharma et al., 2018). To that end, we have followed the suggestions offered by Hair et al. (2014) and Peng and Lai (2012) to estimate our theoretical model, involving a two-stage process: first, examining the validity and reliability of the theoretical model (see Figure 2) and second, analyzing the structural model.

#### 4.1 Measurement validation

To validate the study variables, we first determined whether the sample was appropriate and suitable. We used Kaiser–Meyer–Olkin’s measurement of sampling adequacy and Bartlett’s sphericity test to make the determination. For all the variables, Kaiser–Meyer–Olkin’s measure of sampling adequacy results were above the required threshold of 0.7, while Bartlett’s test of sphericity results were significant at the 0.000 level (Li et al., 2020). In this way, we were able to proceed with constructing composite measurement models for the study variables (information integration, procurement internal controls, standardization of materials and procedures and procurement performance) following a confirmatory composite analysis to ensure measurement quality (Hair et al., 2020; Schubert, 2020).

In this study, information integration, procurement internal control and procurement performance were defined as second high-order reflective-formative construct. Cost, quality and delivery time can be considered the lower-order constructs (LOCs) of the more general higher-order construct procurement performance, which was measured with eight items TC2, TC3, QP2, QP3, DS6, DS7, DS7 and DS8; information sharing and collaborative planning represent the LOCs of the more general higher-order construct information integration with six items (CP1, CP2, CP3, IS2, IS3 and IS4). In addition, policies and procedures, monitoring activities, information, communication, control environment and risk assessment represent the LOCs of the general higher-order construct procurement internal control measured with 13 items (RA4, RA5, CE3, CE4, CA2, CA3, CA5, IC1, IC2, IC3, MA2, MA3 and MA4). Material and purchasing procedure standardization was defined as a reflective LOC and represented by two items SO2 and SO3. We used the repeated indicators approach to design and assess the measurement models

**Figure 1** Theoretical framework



**Source:** The theoretical framework was drawn by the authors after review of literature

for information integration, procurement internal controls and procurement performance as recommended by (Van Riel et al., 2017), which involved loading all measurement items for each of the study variable dimensions to their global variable (Sarstedt et al., 2019; Henseler et al., 2015).

The measurement models for the LOCs were evaluated in terms of item loading and significance, item reliability, composite reliability, average variance extracted (AVE) and discriminant validity. According to Hair et al. (2020), item loading significance is attained when the item loading  $> 0.708$ , item reliability is achieved by squaring the item loading and composite reliability value should be above 0.70 but below 0.95, AVE scores  $> 0.50$  are considered sufficient while the heterotrait-monotrait ratio of correlations (HTMT) scores less than 0.85 indicate that independent variables are different from each in predicting the dependent variables (Henseler et al., 2014). Similarly, the PLS-SEM high order constructs (HOC) were also assessed in terms of reliability and validity. We used composite reliability ( $\rho_c$ ) and Cronbach’s alpha ( $\alpha$ )  $> 0.7$  to measure internal consistency. Both convergent and divergent validity was also assessed using  $AVE > 0.5$  and  $HTMT < 0.85$ .

Table 5 indicates that, in terms of item loading, AVE and reliability of internal consistency, the measures of procurement performance, information integration, procurement internal control and standardization LOC have satisfactory levels of convergence validity. Additionally, Table 6 indicates that all HOC (procurement performance, information integration and procurement internal controls) exhibit internal consistency reliability because both composite reliability and Cronbach’s alpha indices exceeded the recommended threshold of 0.7 and convergent validity as recommended by Hair et al. (2020).

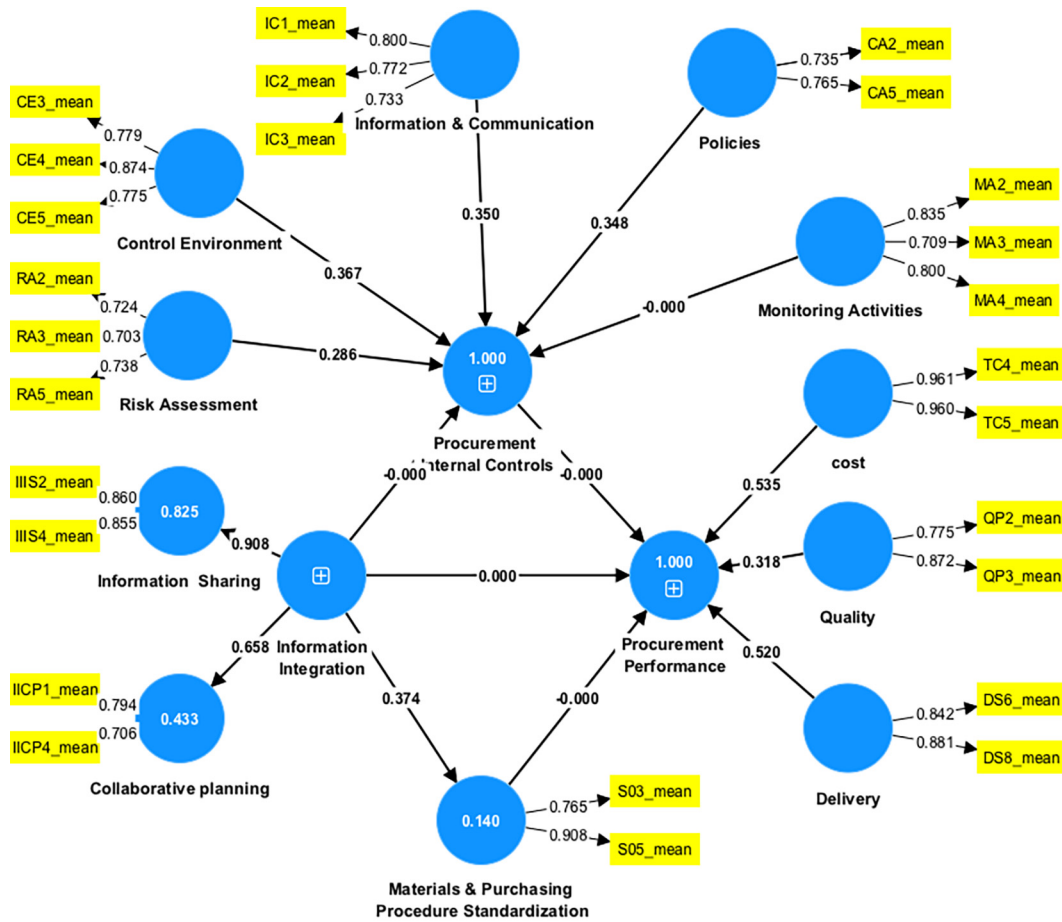
#### 4.2 Discriminant validity

According to Henseler et al. (2015), discriminant validity is measured by the HTMT ratio, which assesses the degree to which the observed factor truly differs from others. According to Tables 7 and 8, the HTMT ratios for reflective LOC and HOC in the structural model are below the conservative threshold value of 0.85, suggesting that both higher-order construct (information integration, procurement internal controls and procurement performance) and LOCs (standardization) discriminate well. The empirical data support Franke and Sarstedt (2019) and Henseler et al. (2015) in their recommendations to evaluate the structural model and test hypothesized relationships among latent constructs.

In the end, the PLS-SEM measurement models were assessed for their nomological and predictive validity (Hair et al., 2020). To determine if the study construct relationship is nomologically valid, correlational results must match theoretical underpinnings, while predictive validity means that the construct score does not predict the results of other study construct measures (Hair et al., 2020). The correlational results in Table 10 confirm nomological and predictive validity of our study variable since we find a correlation among study variables (see Table 10) as the theory purports and the measure of each specific study variable does not load on others as recommended by Hair et al. (2020).

#### 4.3 Common method bias

Hult et al. (2018) state that, to overcome common method biases in surveys, particularly when structured

**Figure 2** Partial least square structural equation model (PLS-SEM) HOC and LOC measurement model for the study variables

**Source:** Figure was created by the authors by running PLS-measurement model using SmartPLS

questionnaires are used, concerns should be raised. To overcome such challenges, both procedural and poststatistical methods were used. As recommended by Podsakoff *et al.* (2003), we ensured a robust pretest, which included interviews, consultation and pilot testing with senior procurement managers and academics. Both Harman's (1967) single-factor test and the full collinearity test (Kock, 2015) were conducted under statistical methods. As a first step, we performed Harman's (1967) single-factor test by loading all study variables into a rotated component factor analysis.

According to the principal component matrix, 20 factors accounted for 73.55% of the covariance among the measures, significantly above the 50% threshold value (Greene and Organ, 1973), indicating no common method variance exists in this study. In the next step, we conducted a full collinearity test on all study variables to assess both vertical and lateral collinearity among and between predictor variables and the criterion variable. As shown in Table 9, there was no common method variance since the inner VIF values for all models were below 3.3, as recommended by Kock (2015). In view of the results, we consider the potential common method variance to be nonsubstantial.

#### 4.5 Zero-order correlations among study variables

A correlation analysis was conducted to determine the relationships among the study variables. Table 10 confirms that the study variables are associated in a positive, moderate, linear and significant way. Therefore, this formed the basis for running a variance-based PLS-SEM.

#### 4.6 Hypothesis results

Our research hypotheses were tested using SmartPls 4.0.9.0, which uses bootstrapping to estimate standard errors and significance. To achieve significance, 10,000 subsamples are used with a no-sign significant option at a 95% bias-corrected confidence interval. For the model, we report the PLS path coefficient and *p*-values, and the results are statistically significant at ( $p \leq 0.05$ ).

Based on the results in Table 11, information integration and procurement internal controls, procurement internal controls and procurement performance, material and purchasing procedure standardization and procurement performance are all positively and significantly related to supporting *H2*, *H3*, *H5* and *H6*, respectively. *H1* is rejected since results show a negative but nonsignificant correlation between information integration and procurement performance.

Table 5 Reliability and validity statistics lower order constructs

LOC	IC	SIL	IR	$\alpha$	$\rho_c$	AVE
CP	Make joint efforts in long-range planning with supplier for product development (CP1)	0.87	0.75	0.64	0.85	0.73
	Make joint efforts in testing market acceptance of new products (CP3)	0.84	0.71			
IS	We provide suppliers with information that might help them to deliver (IS2)	0.85	0.72	0.64	0.85	0.74
	Regularly exchange information of supply and demand forecast with our suppliers (IS4)	0.87	0.76			
CA	Selects and develops general control over technology (CA2)	0.73	0.53	0.65	0.81	0.59
	Procurement activities are carried out through following policies and procedures (CA3)	0.80	0.63			
	Conducts top and functional level reviews of actual performance against established goals (CA5)	0.78	0.60			
CE	Follows established structure, authority and responsibility (CE3)	0.79	0.62	0.74	0.85	0.65
	Demonstrates commitment to competence (CE4)	0.87	0.75			
	This organization ensures enforcement of accountability (CE5)	0.77	0.59			
IC	Uses internally and externally communication (IC1)	0.80	0.65	0.65	0.81	0.59
	Information flows in a timely manner (IC2)	0.78	0.60			
	Process of providing, sharing and obtaining necessary information is in place (IC3)	0.73	0.53			
MA	Policies and procedures are in place to ensure that deficiencies are promptly resolved (MA2)	0.84	0.71	0.70	0.83	0.62
	Monitors and provides oversight to suppliers to achieve desired outcomes (MA3)	0.74	0.55			
	Measures the effectiveness of risk treatment on a regular basis (MA4)	0.77	0.60			
RA	Mechanism for identifying and analyzing risks are in place (RA2)	0.72	0.52	0.56	0.76	0.52
	This organization always assesses the probability of risk occurrence (RA3)	0.68	0.47			
	Always identify and analyze significant changes that may occur (RA5)	0.75	0.57			
STD	Our organization uses a standard purchasing process for when sourcing from suppliers (S03)	0.77	0.59	0.60	0.83	0.71
	My organization buys standardized materials and requirements (S05)	0.91	0.82			
Deliv	Suppliers are flexible (DS6)	0.84	0.71	0.66	0.85	0.74
	Suppliers deliver as many times as required (DS8)	0.88	0.78			
Qual	We focus on the quality of goods and services when procuring (QP2)	0.78	0.60	0.54	0.81	0.68
	Suppliers provide performance securities during the provision of goods and services contracts (QP3)	0.87	0.76			
Cost	In this organization suppliers charge low prices on the goods (TC4)	0.96	0.92	0.92	0.96	0.92
	In this organization a lot of money is spent on the suppliers (TC5)	0.96	0.92			

Notes: LOC = lower order construct; IC = indicator codes; SIL = standardized item loading; IR = indicator reliability;  $\alpha$  = cronbach's alpha;  $\rho_c$  = composite reliability; AVE = average variance extracted

Source: Table was created by the authors after PLS-A analysis

Table 6 Reliability and validity statistics higher order constructs (HOC)

Study variables	$\alpha$	$\rho_c$	AVE
Information Integration	0.715	0.824	0.539
Procurement internal controls	0.809	0.849	0.594
Material and purchasing procedure standardization	0.596	0.826	0.705
Procurement performance	0.694	0.797	0.782

Source: Table was created by the authors after PLS-A analysis

Table 11 shows that both procurement internal controls and material and purchasing procedure standardization fully mediate the relationship between information integration and procurement performance. Based on Table 11, H4 and H7 are supported. According to Baron and Kenny (1986), when the direct relationship between an independent variable and a dependent variable is insignificant, but the indirect relationship is significant, then the mediating variable enables the independent and dependent variables to interact completely. In this study, the relationship between information integration and procurement performance is not significant, but we found that standardization of material and purchasing procedures and procurement internal controls helped information integration to relate to procurement performance (II -> PICs -> PP and II -> MPPS -> PP) since they were significant.

Additionally, Hair *et al.* (2016) recommend that  $R^2$ ,  $Q^2$  and  $F^2$  are reported. The  $R^2$  value explains the explanatory power of endogenous constructs.  $R^2$  values between 0 and 1 indicate predictive relevance. Our  $R^2$  values of 0.346 for procurement performance, 0.116 for materials and purchasing procedure standardization and 0.406 for procurement internal controls demonstrate our predictive relevance, and such values are considered moderately strong. Additionally, we reported the predictors' effect sizes ( $F^2$ ). According to Cohen (1988),  $F^2$  values of 0.63, 0.10, 0.09, 0.07 and 0.01 are considered large, medium and small, respectively.

Furthermore, a blindfolding test was conducted with an omission distance of seven to assess the model's prediction ability ( $Q^2$ ) (Peng and Lai, 2012). Blindfolded test results indicate that the model has predictive relevance for procurement performance

**Table 7** Discriminant validity assessment using HTMT criterion for LOC

Constructs	CP	CE	Cost	Del	IC	IS	MA	CA	Qual	RA
CP										
CE	0.53									
Cost	0.20	0.25								
Del	0.45	0.56	0.42							
IC	0.57	0.43	0.43	0.34						
IS	0.73	0.5	0.26	0.42	0.6					
MA	0.37	0.37	0.26	0.36	0.35	0.49				
CA	0.64	0.52	0.36	0.53	0.79	0.61	0.48			
Qual	0.40	0.42	0.04	0.8	0.39	0.35	0.23	0.54		
RA	0.63	0.51	0.2	0.76	0.7	0.39	0.41	0.46	0.67	

**Notes:** Legend: CP = collaborative planning; CE = control environment; Del = delivery; IC = information and communication; IS = information sharing; MA = monitoring activities; CA = control activities; qual = quality; RA = risk assessment

**Source:** Table was created by the authors after PLS-A analysis

**Table 8** Discriminant validity assessment using HTMT criterion for HOC

Study variables	II	PIC	PP	STD
II				
PIC	0.78			
PP	0.52	0.75		
MPPS	0.55	0.76	0.57	

**Notes:** Legend: II = information integration; PICs = procurement internal controls; PP = procurement performance; MPPS = material and purchasing procedure standardization

**Source:** Table was created by the authors after PLS-A analysis

(0.404); procurement internal controls (0.303) and material and

**Table 9** Common method bias

Study construct	1	2	3
II		1.101	1.245
PICs	1.193		1.245
MPP	1.854	1.657	1.000
PP	1.193	1.101	

**Notes:** Legend: II = information integration; PICs = procurement internal controls; PP = procurement performance; MPPS = material and purchasing procedure standardization

**Source:** Table was created by the authors after analyzing for common method bias in PLS-SEM

**Table 10** Relationship between the study variables

Study variables	Mean	SD	Range	1	2	3	4
Standardization (1)	5.10	0.33	1–6	1.00			
Procurement internal controls (2)	5.27	0.19	1–6	0.42**	1.00		
Information integration (3)	5.29	0.30	1–6	0.29**	0.62**	1.00	
Procurement performance (4)	3.27	0.87	1–6	0.41**	0.50**	0.39**	1.00

**Notes:** Legend: II = information integration; PICs = procurement internal controls; PP = procurement performance; MPPS = material and purchasing procedure standardization S; \*\*Significance level is at  $P < 0.001$

**Source:** Table was created by the authors after analysis of primary data

purchasing procedure standardization (0.107). As a last step, we ran Shmueli *et al.*'s (2016) PLSpredict procedure (tenfolds and ten repetitions) to test our model's out-of-sample predictive power regarding procurement performance. PLSpredict analysis also supports the model's predictive power with regard to PP because the PLS-SEM analysis produces smaller predictive errors [Mean absolute error (MAE) and Root mean square error (RMSE)] than the naive linear benchmark model (Sarstedt *et al.*, 2019) (Figure 3).

#### 4.6.1 Multigroup analysis

To investigate whether there is a significant or meaningful difference between local and international NGO subsamples with the total population in various study relationships, we conducted a multigroup analysis. Table 12 confirms that there is no significant and meaningful difference between the local and international NGOs on the study hypotheses. This is based on comparisons of path coefficient estimates (international and local HOs) based on Henseler's (2007) approach.

## 5. Discussion

According to the study, information integration is negatively related to procurement performance but not significantly. This finding means that even when HOs are based on sharing information and collaborative planning both internally and externally, i.e. interdepartmental coordination as well as interorganizational coordination, this may not help them procure products and services at reasonable costs, of good quality and delivered on schedule. In line with Kim *et al.* (2005), who indicated earlier that information integration does not necessarily result in desirable results such as cost reduction and efficiency improvement, this hinders the achievement of a common goal of meeting beneficiaries' welfare sufficiently. This may be due to information asymmetry and opportunism (Lumineau and Oliveira, 2019; Bergh *et al.*, 2018). As a result, HOs must establish policies and procedures, establish a control environment, share information and communicate effectively, monitor activities and conduct risk assessments to reap the procurement performance benefits accrued from information integration. It is also crucial that they are able to standardize their procurement procedures and processes as well as the products and services they procure. Local organizations distributing food items to displaced victims in settlements, for example, collaborate with UNHCR on food distribution planning. Through integrated procurement platforms, vendors can be coordinated more effectively, resulting in a timelier delivery of relief. Taking the UN global marketplace platform as an example, Shubin *et al.* (2017) suggest that effective information sharing systems can help organizations improve

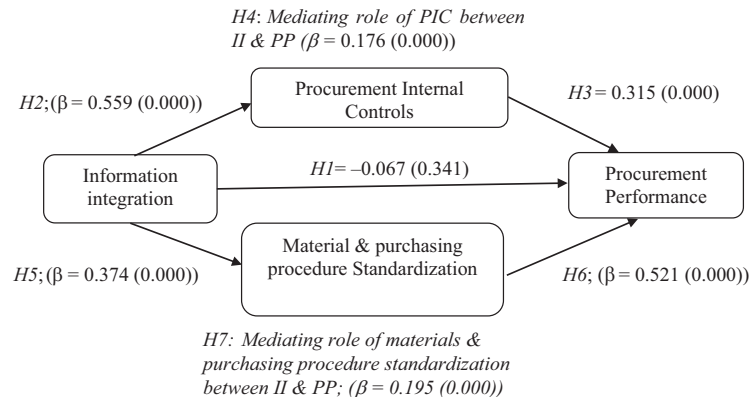
Table 11 Showing results of direct, indirect and total effect

Direct effect	$\beta$	<i>T stat</i>	<i>p-values</i>	CIBaC	VIF	f2
II → PICs	0.559	11.637	0.000	0.526–0.732	1.000	0.626**
II → PP	−0.067	0.346	0.341	−0.067–0.298	1.627	0.011
II → MPPS	0.374	6.355	0.000	0.167–0.486	1.000	0.096
PICs → PP	0.315	4.358	0.000	0.201–0.572	1.802	0.086
MPPS → PP	0.521	9.711	0.000	0.070–0.360	1.212	0.067
<b>Indirect effect</b>	$\beta$	<i>T stat</i>	<i>p-values</i>	CIBaC	VAF	
II → PICs → PP	0.176	3.974	0.000	0.125–0.392	57.89%	Full Mediation
II → MPPS → PP	0.195	4.425	0.000	0.000–0.148	64.14%	Full Mediation
<b>Total effect</b>	$\beta$	<i>T stat</i>	<i>p-values</i>	CIBaC		
II → PICs	0.559	10.857	0.000	0.526–0.732		
II → PP	0.304	4.237	0.000	0.287–0.554		
II → MPPS	0.374	5.397	0.000	0.167–0.486		
PICs → PP	0.315	4.358	0.000	0.201–0.572		
MPPS → PP	0.521	9.711	0.000	0.070–0.360		
<b>Prediction quality criteria</b>	$R^2$	Adj $R^2$	$Q^2$	RMSE	MAE	$Q^2_{predict}$
PP	0.502	0.493	0.404	0.967	0.772	0.074
PICs	0.313	0.309	0.303	0.841	0.628	0.302
MPPS	0.140	0.135	0.107	0.942	0.732	0.123

Notes: Legend: II = information integration; PICs = procurement internal controls; PP = procurement performance; MPPS = materials and purchasing procedure standardization; \*\* $p < 0.001$

Source: Table was created by the authors after analysis for hypotheses test through PLS-SEM in SmartPLS

Figure 3 Partial least square structural equation model (PLS-SEM) for procurement performance in HOs



Source: Created by the authors after after analysis for hypotheses test through PLS-SEM in SmartPLS

visibility, design robust processes, increase operational efficiency, increase responsiveness and eliminate waste. According to TCE theory, governance choices are embedded within broader institutional environments, making it difficult to align information with governance structures. As a result, there may be information asymmetry and opportunistic behavior, which could negatively affect the performance of procurements.

The second finding is that information integration significantly predicts procurement internal controls in a positive manner. Researchers found that HOs use intangible resources such as information sharing with stakeholders,

collaborative planning with stakeholders and risk assessment to enhance operations. This can be attributed to donor funds carrying restrictive covenants tailored to specific objectives. As a result, goal achievement and information sharing are enhanced. This view is supported by Arnold *et al.* (2015), that enterprise risk management integrates strategic planning, operations management, performance management and internal controls for managing organizations. They further assert that proactive identification and tackling of available risks and opportunities enables organizations to create value for shareholders. This enables them to enhance resource allocation and assure well-managed supply chains. Howard and Best

Table 12 Multigroup analysis results

Direct path	Difference (InternationalHOs – LocalHOS)	One-tailed (InternationalHOs vs LocalHOS) <i>p</i> -value	Two-tailed (InternationalHOs vs LocalHOS) <i>p</i> -value
II → MPPS	0.095	0.227	0.455
II → PIC	0.137	0.108	0.216
II → PP	–0.036	0.584	0.832
MPPS → PP	0.12	0.142	0.283
PIC → PP	–0.231	0.92	0.16
Indirect path	Difference (InternationalHOs – LocalHOS)	One-tailed (InternationalHOs vs LocalHOS) <i>p</i> -value	Two-tailed (InternationalHOs vs LocalHOS) <i>p</i> -value
II → MPPS → PP	0.092	0.124	0.248
II → PIC → PP	–0.083	0.763	0.474

**Notes:** Legend: II = information integration; PICs = procurement internal controls; PP = procurement performance; MPPS = materials and purchasing procedure standardization

**Source:** Table was created by the authors after PLS-A analysis

(2010) also note that internal controls are vital systems within HOs' structural setup due to their stringent and restricted budgets while working with limited resources and are, therefore, the first line of defense in protecting organizations' assets and detecting and preventing misdemeanors, errors and fraudulent activity.

As a result, procurement internal controls significantly predict procurement performance in a positive manner. When HOs adopt and implement procurement internal controls in their purchasing activities, such as benchmark budgets and compliance with the stipulated procurement guidelines and laws, these results are indicative. These laws mitigate risks in the form of fraud and embezzlement of funds that impact the cost of the procurements. In this regard, operational efficiency is achieved, which results in cost savings and enhanced fast deliveries of relief to the respective beneficiaries. This view is supported by Rendon and Rendon (2016) who appreciate the importance of strengthening procurement internal controls to improve procurement performance. Zakaria *et al.* (2016) further note that fraudulent activities and risks cannot be completely eliminated through the adept design and implementation of sound procurement internal controls. TCE theory asserts that internal controls accounts for what specifically happens in the supply chains, how they are structured, who owns what, who controls what and what kinds of contracts govern the transactions (Cachon, 2003).

We also found that procurement internal controls fully mediate the relationship between information integration and procurement performance. This means that information integration can impact procurement performance indirectly through procurement internal controls. This finding has the following contextual meaning. Procurement internal controls provide quality information that leads to improvement in interrelated procurement material costs and loss reduction. The HO's investment in procurement internal controls provides a means to reduce information asymmetry among its stakeholders. In the same way, procurement internal control helps various HOs to achieve procurement objectives, including operational, financial and strategic decision-making for increased visibility. It has been shown that procurement internal control reduces the agency problem in environments where socially responsible commitment is strong (Martinez-Ferrero *et al.*, 2015;

Macagnan and Seibert, 2021; Holm *et al.*, 2014). The findings support TCE theory by asserting that strong internal controls reduce uncertainty risk bearing, improve cost efficiency, mitigate asymmetric information and opportunistic behavior among the HOs to improve procurement performance.

Similarly, information integration is a significant predictor of materials and purchasing procedure standardization in HOs. This indicates that HOs' information integration initiatives, collaborative planning and information sharing are necessary for standardizing materials and purchasing procedures. We discovered that HOs make joint efforts in long-range planning with suppliers and evaluate the market acceptance of new services they intend to provide beneficiaries. After-sales services are included in their procurement contracts with suppliers to achieve this. Additionally, the results indicate that HOs that share supply and demand forecasts with suppliers might develop standard processes for sharing this information. These define the manner or criteria of HOs' operations. Standardizing the information sharing process promotes secure and responsible information sharing, enables participants to avoid harm and builds trust so they can effectively work together to achieve shared goals. To maximize the impact of humanitarian efforts, HOs enter into MOUs with suppliers and share information resources.

Based on the results, we acknowledge that standardization of materials and purchasing procedures is a significant predictor of procurement performance. The results indicate that when HOs undertake purchasing options across borders, especially in the global marketplace, many vendors are attracted, which results in increased competition, which results in cost savings, quality products through standardization of requirements, quick disaster response facilitated by timely deliveries, which are the key parameters of procurement performance. To ensure that the standard operating systems are adhered to, it is very important to manage the quality of services. Due to the fact that HOs engage multiple service providers to deliver necessary relief items that are needed to assist the affected communities, it is necessary to set quality benchmarks to ensure effective relief delivery. Ozturk (2020) suggests that in today's competitive global markets, consumers want high-quality

products at the lowest price possible without considering the origin or manufacturing country.

Hence, organizations are continuously assessing the available alternatives to achieve competitive advantage through cost reduction and tremendous cost savings to strengthen diversification as a result of globalization of markets. Compared with local or regional sourcing practices and agreements, Plotkin and Tweardy (2018) note that standardization results in at least 15% material savings. In addition to quality, responsiveness and technology contributions from suppliers, other improvements can be made. As a result, even in situations where components are standardized, and multiple suppliers are available, relationship specificity can develop over time, affecting contract renegotiation and switching costs. According to TCE, existing suppliers will have an advantage over new bidders in contract renegotiations precisely because a fundamental transformation has taken place. Thus, small numbers bargaining is a direct consequence of specificity (Williamson, 1985).

Categorially, results reveal a full mediating effect of materials and purchasing procedure standardization in the relationship between information integration and procurement performance. This supports the notion that materials and purchasing procedures are standardized, which enhances sharing of information and collaborative planning when conducting procurement activities. As a way of increasing transparency among internal and external procurement stakeholders when sharing procurement-related information and during collaborative planning, management standardizes materials and purchasing procedures to ease the search process to identify potential suppliers and minimize opportunistic behaviors, monitoring and negotiation costs. This enables organizations to have trusted procurement outcomes that increase stakeholders' confidence in the organization's procurement performance. The results are in agreement with Sánchez-Rodríguez *et al.* (2006), who found a positive association between materials and purchasing procedure standardization and procurement performance. This suggests that materials and purchasing procedure standardization influence procurement performance among HOs in delivering relief items. By analyzing economic exchanges between a buyer and a supplier, the findings support the TCE theory. TCE is about determining which of the available options for governing the transaction is most appealing from an efficiency perspective. It clearly demonstrates how HOs can achieve better procurement performance by using effective standardization.

### 5.1 Conclusions

As part of this study, we examined the association between information integration, procurement internal controls, standardization of materials and purchasing procedures and procurement performance, as well as assessing how procurement internal controls and material and purchasing procedure standardization mediate the relationship between information integration and procurement performance. Using our results, we conclude that procurement internal controls and materials and purchasing procedures standardization are positively and significantly related to information integration. However, procurement performance is negatively but not significantly related to information integration. Additionally, both procurement internal controls and materials and

purchasing procedure standardization are positively related to procurement performance. From the results, we conclude that both procurement internal controls, materials and purchasing procedure standardization fully mediate the relationship between information integration and procurement performance.

## 5.2 Implications

### 5.2.1 Theoretical implications

The purpose of this paper is to contribute to our understanding of procurement performance in a humanitarian context, especially in developing countries. The TCE theory contributes to our understanding of procurement performance through information integration, procurement internal controls and materials and purchasing procedure standardization. The results of this study show that information integration does not have a significant negative effect on procurement performance. Our contribution to the theory is to establish that procurement internal controls, standardization of materials and purchasing procedures help collaborative planning and information sharing lead to timely delivery of quality items at a reasonable cost. The reason for this is that standardization of materials and procedures and procurement internal controls fully mediate the relationship between information integration and procurement performance. To achieve flexible supplier delivery and quality procurements, procurement internal controls must be effective, as well as materials and procedures must be standardized. As a result, procurement internal controls and materials and purchasing procedure standardization enable organizations to implement governance mechanisms that minimize information integration transaction costs to have reliable procurement outcomes that increase stakeholder confidence in the procurement performance of the organization. Using Uganda as a case study, this study contributes to the literature on the procurement performance of HOs.

### 5.2.2 Practical implications

HOs' managers, practitioners and policymakers will gain multiple insights from this study. It is important for managers to realize that standardizing materials and purchasing procedures enables effective procurement performance. Managers should strive to standardize materials and purchasing procedures, thereby eliminating monopolies and allowing all vendors to compete for procurement opportunities. By reducing prices and meeting delivery times, vendors can offer relief more quickly without compromising quality.

Additionally, procurement internal controls lead to effective procurement performance. For HOs managers to test the fulfillment of restrictive covenants, high levels of procurement internal controls are required to eliminate all associated risks like opportunism. Through following donor policies that encourage the use of standard regulated procurement rules and regulations, information sharing and collaborative planning can be carried out. As a result, procurement risks such as information asymmetry and uncertainty can be reduced, thereby reducing transaction costs and delays. Additionally, the manager should always identify and analyze significant changes in the procurement environment by monitoring and providing oversight of the supplier sourcing process to achieve the desired outcome, appreciating supplier competence and ensuring accountability is enforced.

Information integration improved procurement performance through procurement internal controls and materials and purchasing procedure standardization. Therefore, managers in HOs to enjoy collaborative planning and information sharing outcomes like supplier delivery, minimized procurement costs and attainment of quality products need to have procurement internal controls in place like policies and procedures for risk assessment and procurement monitoring mechanism, having a control environment where established structures, authority and responsibilities are followed, enforcement of accountability as well as demonstrating a commitment to procurement competence. This will enhance value for money as value for money is a basic metric used to measure HOs' procurement function.

Finally, managers should prioritize procurement performance reviews as part of the internal controls, conducting them consistently and more often to measure, analyze, monitor and manage the performance of the procurement department to achieve operational efficiency and promote continuous improvement. Consequently, organizations that evaluate their procurement department in terms of budgets should be able to minimize unnecessary costs without compromising quality.

### 5.3 Limitations and areas for further research

As with any survey research, this study has some limitations that may affect its generalizability. This study examines the relationship between information integration, standardization, procurement internal controls and procurement performance. Researchers should examine other antecedents that influence procurement performance in the future. Studying procurement performance in a snapshot and using quantitative trajectory limits the ability to tap into variations in performance over time. Thus, a more nuanced and in-depth approach using interviews and longitudinal studies is needed. For example, tracing the procurement performance of an organization for a period of five to 10 years can reveal incremental changes or deviations. Furthermore, this study was conducted only in Uganda. Though it has the most liberal policy in the world regarding the host of people of concern and humanitarian operations, the results may not be representative of all HOs. There is a need for more research to improve generalizability to other humanitarian populations in Uganda, including all private organizations and nongovernmental organizations.

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## Executive summary

Procurement of relief products and services accounts for approximately 65% of the cost of relief operations. In spite of this, humanitarian organizations (HOs) face challenges when it comes to implementing cost reductions in buyer-supplier relationships due to uncertainty and opportunism. A number of procurement governance mechanisms, such as procurement internal controls, materials, and purchasing procedures standardization, are imperative to minimize relief procurement costs, according to transaction cost economic theory. In this paper, we discuss how procurement internal controls, materials and purchasing procedures standardization are integrated to improve procurement performance. Using data collected across 170 local and international health organizations, 523 supply chain and logistics managers, operations managers, and procurement managers provided data. To integrate information and improve procurement performance, procurement internal controls and material and purchasing procedure standardization are essential. According to the study, managers should standardize materials and purchasing procedures to eliminate monopolies. This will result in lower prices without compromising quality or delivery time, since all vendors will have the same opportunity to compete. In order to eliminate all risks associated with procurement operations, HOs managers should test the compliance with restrictive covenants. Information sharing and collaborative planning can be achieved by following donor policies, as well as by following standard procurement rules and regulations to reduce procurement risks such as information asymmetry and uncertainty, which increase transaction costs and delays. Managers must also identify and analyze significant changes in the procurement environment by monitoring and overseeing the supplier sourcing process to achieve the desired outcome, recognizing supplier competence, and ensuring accountability. Additionally, collaborative planning and information sharing can result in supplier deliveries, reduced procurement costs, and better products. Procurement internal controls should have policies and procedures for risk assessment and procurement monitoring. Control environments with established structures, authority, and responsibilities are useful for demonstrating procurement competence and enforcing accountability. As a basic characteristic of procurement functions, humanitarian organizations can achieve value for money. Managers should prioritize procurement performance reviews as part of their internal controls, consistently measuring, analysing, monitoring, and managing them. By doing so, we can achieve operational efficiency and promote continuous improvement. By evaluating their procurement department according to their budgets, organizations can minimize unnecessary costs without compromising quality.

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