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DIGITALISATION OPPORTUNITIES AS DRIVERS OF CONFIDENTIALITY RULES IN PUBLIC PROCUREMENT: ORGANISATIONAL INFORMATION CULTURE AS A MODERATOR

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Abstract: *As public procurement increasingly relies on digital systems, protecting sensitive procurement data becomes critical. Drawing on information security control theory (ISCT), this study examines the impact of digitalisation opportunities (DOP) on the enforcement of confidentiality rules in public procurement (CRP), with a specific focus on the moderating role of organisational information culture (OIC). The study employs a cross-sectional quantitative research design, collecting data from 218 procurement practitioners across public organisations in the Dodoma region, Tanzania. A structured questionnaire survey was employed to collect the data. Confirmatory factor analysis (CFA) and Hayes PROCESS Macro were used to test the model hypotheses. The results reveal that while DOP positively influence compliance with CRP. This relationship is significantly strengthened when the organisation exhibits a strong information culture. In contrast, a weak information culture diminishes the effectiveness of DOP in maintaining confidentiality. The results underscore the importance of synergies between technological systems and a strong security-conscious culture in safeguarding sensitive procurement information. This study contributes to the literature on public procurement, supply chain, and information management by integrating ISCT to explore how both technical and cultural factors influence confidentiality in public procurement processes. It provides new insights into the interplay between DOP and OIC, offering valuable guidance for policymakers and procurement practitioners in enhancing data security in public procurement processes.*

Keywords: *Digitalization opportunities, confidentiality rules, public procurement, organisational information culture*

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1. Introduction

The digitalization of procurement activities has become crucial for efficiently capturing, storing, retrieving, and managing vast amounts of procurement-related information. Procurement digitalization refers to the adoption and integration of digital technologies and tools to streamline, automate, and enhance the procurement process (Yogeswaran et al., 2025;

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Wang et al., 2024). It involves transitioning from traditional paper-based methods to electronic systems that manage tasks such as sourcing, tendering, contract management, supplier selection and evaluation, and payment processes more efficiently. The digitalization of business operations gained momentum in the 1990s, with the United Kingdom (UK), United States (US), Germany, Canada, and Australia leading the way (Lee, 2005; Kulcu, 2009). However, e-mail, which originated in the 1970s, played a significant role in laying the foundation for digital operations. Today, approximately 90% of global business activities are captured, executed, and stored using digital technologies (Hayden & Fok, 2021). These include, but are not limited to blockchain technology, the Internet of Things (IoT), big data analytics, electronic data interchange (EDI), and enterprise resource planning (ERP) systems (Yevu et al., 2021; Israel, 2023; Rutainurwa et al., 2024). In the field of procurement and supply chain management, digital solutions have largely replaced traditional paper-based systems. These systems were often reported to be tedious, costly, and time-consuming, prone to human error and corruption, difficult to track, and required large storage spaces for physical files (Amankwa et al., 2022; Nunes et al., 2024; Kulcu, 2009).

The digital procurement transformation offers significant opportunities for maintaining the confidentiality and security of sensitive information by incorporating encryption, access controls, and audit trails (Herold et al., 2023; Lorentz et al., 2021). The digital technologies enhance efficiency, transparency, streamline workflows, reduce the risk of corruption, and improve data accuracy. This is particularly important in public procurement, where the proper handling of contracts, bids, and other confidential data is essential for compliance with legal and regulatory requirements. By automating and digitalizing public procurement processes, buying agencies can reduce reliance on physical documents, lower administrative costs, and enhance transparency. This, in turn, can help buying agencies improve the security of confidential procurement information (Salvi et al., 2023; Israel & Mwenda, 2024; Yevu et al., 2021). Moreover, digitalization facilitates better supplier management by enabling more informed supplier evaluations, effective contract management, real-time data tracking, and compliance with confidentiality rules in public procurement (CRP). Procurement confidentiality rules protect sensitive data, such as suppliers' commercial information, bidding strategies, and contract details from unauthorized access (United Republic of Tanzania (URT), 2023; Seyedghorban et al., 2020). Safeguarding confidential information in public procurement is critical to maintaining the integrity and fairness of the procurement process. Breaches of confidentiality, on the other hand, can result in legal consequences, reputational damage, and compromised procurement outcomes.

Despite the perceived benefits of digitalization opportunities (DOP), the adoption of digital technologies in public procurement faces several challenges. A significant hurdle is resistance to change, particularly from employees accustomed to traditional procurement methods (Agostini et al., 2020; Legner et al., 2017). Moreover, limited financial resources, lack of technical expertise, and low digital literacy in some public organizations make it difficult to invest in and effectively manage digital technologies (Asif, et al., 2024; Almeida et al., 2020). Another challenge posed by the growing use of digital systems is the increased risk of cyber threats and data breaches. These hurdles slow down the digital procurement transition. A global analysis of information security revealed that 65% of businesses, particularly those using outdated technology, experience information leakage (Kaspersky, 2021). This is significantly high compared to only 29% of businesses that keep their systems updated (Kaspersky, 2021). Maintaining confidentiality amid digitalization requires robust regulatory frameworks and sophisticated technological safeguards. At the heart of DOP as drivers for compliance with confidentiality rules in public procurement, lies organizational information culture (OIC). OIC refers to the shared practices, values, and attitudes related to managing and protecting

information assets. The literature highlights the substantial role of digital technologies in safeguarding procurement and supply chain information (Meafa et al., 2024; Viale & Zouari, 2020). However, the extent to which the effect of DOP in mitigating information risks and addressing confidentiality issues is influenced by OIC remains a valuable area for further exploration.

Therefore, this study examines the moderating effect of OIC on the relationship between DOP and CRP, drawing on the theoretical framework of Information Security Control Theory (ISCT). Essentially, ISCT is a conceptual framework that explains how organizations implement and manage security controls to protect sensitive data against threats (Straub & Welke, 1998). According to ISCT (Straub & Welke, 1998), confidentiality rules are influenced by both technical and behavioral factors. These factors include the robustness of technological systems as well as the attitudes, behaviors, and norms within the organization, which can be shaped by its information culture. In this study, ISCT provides the framework for determining how procurement-related information is managed and protected against unauthorized access. From the perspective of ISCT, a positive information culture, characterized by transparency, accountability, proper communication channels, and security awareness, can enhance efforts to safeguard sensitive procurement information (Daneshmandnia, 2019; Wright, 2013). Conversely, a weak information culture can weaken these efforts, even when advanced digital systems are in place. Digitalization opportunities, on the other hand, are viewed as key control mechanisms for securing procurement information. Moreover, confidentiality rules represent formal guidelines governing access to and sharing of procurement information. Empirical studies suggest that OIC affects how digital systems and strict confidentiality rules are enforced and followed (Nel & Drevin, 2019; Solomon & Brown, 2021).

Despite growing interest in procurement digitalization, research has not adequately explored how DOP and OIC interact to shape compliance with CRP. Most studies focus on the general benefits of digitalization (Harju et al., 2023; Viale & Zouari, 2020; Yevu et al., 2021) and the role of information culture (Mikuletič et al., 2024; Solomon & Brown, 2021; Wright, 2013) in safeguarding sensitive organizational information. However, much of this research has been concentrated in developed countries. In particular, the moderating effect of OIC on the relationship between DOP and confidentiality compliance within the context of public procurement processes has received little attention in the existing literature. This research addresses that gap by offering a novel perspective on how digitalization opportunities drive compliance with procurement confidentiality rules, with OIC serving as a key moderating factor. This approach not only contributes to academic knowledge and literature on procurement, supply chain, and information management but also offers practical implications for procurement practitioners and policymakers. It helps them understand how DOP and OIC shape confidentiality practices in digitally-enabled public procurement activities. Moreover, the study offers valuable insights into how public procurement organizations can better manage and protect sensitive procurement information in the digital age

2. Literature review and hypotheses development

2.1. The information security control theory (ISCT)

The ISCT provides a comprehensive framework for managing information security risks by implementing both technical controls and behavioral practices within organizations. It posits that information security is achieved through a combination of preventive, detective, and corrective controls, which work together to protect sensitive data from unauthorized access, misuse, or exposure (Straub and Welke, 1998; Hong et al., 2003). However, the theory also emphasizes that technical and procedural controls alone are insufficient for safeguarding

information. They must be integrated into a broader behavioral framework and reinforced by a strong organizational culture that promotes compliance with security protocols (Anderson et al., 2017). Similar to previous empirical studies (Kache and Seuring, 2017; Flowerday and Tuyikeze, 2016), ISCT serves as the foundation for this study, linking the technical aspects of DOP and OIC with the confidentiality rules that govern access to sensitive procurement information. The theory helps explain how DOP functions as a technical control to safeguard procurement data. CRP, on the other hand, acts as formal preventive measures, ensuring that only authorized individuals can access sensitive information. OIC, meanwhile, acts as a moderating factor, strengthening the effect of DOP on CRP. Drawing on ISCT, it is theorized that a security-aware OIC enhances compliance with CRP and improves the operational efficiency of DOP. Conversely, a weak OIC can undermine these controls, potentially leading to security breaches. Therefore, ISCT's proposition that both technical systems and behavioral factors must align for optimal information security forms the theoretical basis for investigating how OIC moderates the impact of DOP on CRP.

2.2. Digitalization opportunities and confidentiality rules in public procurement

In public procurement processes, DOP play a critical role in enhancing the enforcement of confidentiality rules (Hallikas et al., 2021; Amalia et al., 2023). Digital tools provide secure and structured platforms for storing, accessing, and managing sensitive procurement data. Empirical studies by Viale and Zouari (2020) and Herold et al. (2023) revealed the significant role of digitalization in ensuring the protection of procurement information. This includes contract details, bidder data, and financial records by providing robust access control mechanisms, encryption, and audit trails. These technological features align with the ISCT, which emphasizes the importance of technical controls in safeguarding information. ISCT advocates for both preventive measures, such as restricting access to authorized personnel, and detective measures, like monitoring access logs, as key strategies for ensuring information security (Hong et al., 2003). In the context of public procurement, DOP serve as both preventive and detective controls, ensuring compliance with confidentiality requirements. Such technological features enhance real-time monitoring and encryption capabilities, reducing the likelihood of unauthorized data access and enabling the tracking of any breaches or violations (Agostini et al., 2020; Yevu et al., 2021). Moreover, by automating and streamlining procurement processes, digitalization minimizes human error, which is often a source of confidentiality breaches (Staba & Turudic, 2024; Legner et al., 2017). Prior research (Harju et al., 2023; Faridi and Malik, 2020; Viale & Zouari, 2020) suggests that digital tools provide structured platforms that enhance procurement security through access control and monitoring. However, studies have not sufficiently examined how these tools specifically reinforce compliance with confidentiality rules in public procurement. Therefore, grounded in ISCT, this study hypothesizes that:

H1. DOP positively affect CRP.

2.3. Organizational information culture and confidentiality rules in public procurement

Literature highlights the significant role that organizational information culture (OIC) plays in enhancing the enforcement and adherence to confidentiality rules (Iwaya et al., 2022; Mikuletič et al., 2024; Nel and Drevin, 2019). A strong OIC, characterized by shared values, norms, and practices that prioritize the ethical handling of sensitive information, aligns with the promotion of security protocols and confidentiality rules. Besides, Da Veiga et al. (2020) and Alhassan and Adjei-Quaye (2017) underscore the importance of fostering a culture that emphasizes transparency, accountability, and awareness of data security as essential

components in complying with confidentiality rules. According to ISCT, behavioral factors such as employee awareness, training, and organizational norms are crucial to effective information security (Straub and Welke, 1998). In organizations where a strong information culture is present, employees are not only aware of the rules but are also motivated to adhere to them due to the collective values that guide individual behavior (Al Hogail, 2015; Alhassan and Adjei-Quaye, 2017). This alignment between OIC and security practices enhances the overall effectiveness of confidentiality rules, reducing the likelihood of leakage of information and breaches of confidentiality rules. Despite the perceived importance of OIC in maintaining information confidentiality (Iwaya et al., 2022; Da Veiga et al., 2020), a significant gap remains in understanding OIC's role as a precursor to confidentiality rules in procurement and supply chain management. Based on this, the present study hypothesizes that:

H2. OIC positively affects CRP.

2.4. The moderation role of organizational information culture

According to the ISCT, both technical controls and behavioral practices, such as adherence to confidentiality rules, must work together to protect sensitive information (Anderson et al., 2017). The theory posits that technical controls (e.g., digital technologies) should be complemented by a supportive organizational culture. This is essential to ensure the effective enforcement of security protocols (Straub and Welke, 1998). With this regard, the hypothesized relationship between DOP and CRP is contingent on the strength of the OIC. Empirical studies by Halonen (2017), Israel et al. (2019), and Staba and Turudic (2024) suggest that organizations with a strong information culture, characterized by transparency, ethical data handling, and employee awareness of security protocols are more likely to grasp DOP effectively and enhance compliance with procurement confidentiality rules. In particular, a strong OIC helps employees understand the importance of confidentiality, making them more likely to follow security procedures rigorously. Conversely, in organizations with a weak information culture, DOP may be less effectively adopted. As a result, employees may neglect or bypass confidentiality rules, thereby undermining the system's security controls (Nel & Drevin, 2019; Wright, 2013). Literature in this field provides limited insight into how OIC and DOP interact to strengthen confidentiality in the public procurement process. Therefore, this study proposes that OIC moderates the relationship between DOP and CRP, such that the positive effect of DOP on CRP is stronger when OIC is robust. Accordingly, the following hypothesis if formulated:

H3. OIC positively moderates the relationship between DOP system and CRP.

2.5. Conceptual model

Figure 1 presents the research model illustrating the interplay between DOP, OIC, and CRP. In this model, DOP is the independent variable, directly influencing the enforcement and maintenance of CRP. The adoption of DOP is expected to improve the management and protection of sensitive procurement data, thereby enhancing compliance with confidentiality requirements. However, OIC, which reflects the organization's values, practices, and attitudes toward information management and security, moderates this relationship. Specifically, the model proposes that when OIC is stronger, the positive effect of DOP on CRP will be amplified, and when OIC is weaker, this effect will be diminished. This interaction effect highlights the importance of aligning information culture with technological solutions to achieve optimal protection of sensitive procurement information.

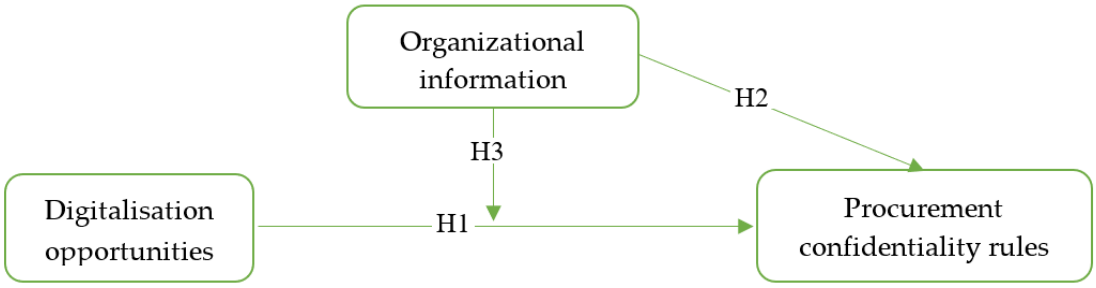

Figure 1. Conceptual Model of the Study
Source: Author

3. Methodology

3.1. Research design and study area

A cross-sectional quantitative research design was employed in this study to examine the underlying interaction effects of the study variables. This design is particularly useful for collecting quantitative data from a sample at a single point in time, allowing researchers to assess relationships, test hypotheses, and draw inferences about a population without accounting for changes over time (Creswell & Creswell, 2018). In this study, quantitative data were collected from procurement professionals in public organizations across the Dodoma region of Tanzania to capture their perspectives and test the model hypotheses regarding the interaction effects of DOP, OIC, and CRP at a single point in time. The rationale for selecting the Dodoma region as the study area was twofold. First, Dodoma is Tanzania's political and administrative capital, hosting 50 procuring entities, including both central and local government organizations (Public Procurement and Regulatory Authorities [PPRA], 2021). Second, since the relocation of the government from Dar es Salaam in 2019, the region has experienced substantial advancements in ICT infrastructure and digital technologies (Nyyssölä, 2021). These factors make Dodoma a representative sample area, with both local and central public organizations for evaluating the interplay between DOP, OIC, and CRP.

3.2. Sampling

The target population for this study consisted of six categories: procurement managers, IT specialists, accounting officers, internal auditors, user department heads, and chairpersons of tender boards from 50 public organizations in the Dodoma region of Tanzania. From each organization, one individual from each category, holding a managerial position was selected to participate in the survey as the unit of enquiry. This approach yielded a total target population of 300 participants. The selected participants were chosen due to their critical roles in planning, implementing, overseeing, and approving public procurement activities and systems, as well as ensuring compliance with confidentiality rules (Mwakolo et al., 2024). Their knowledge and experience provided valuable insights crucial for understanding how DOP interact with OIC to influence CRP. A census approach was adopted, including all eligible members of the target population within the study area in the survey. The decision to use a census was twofold: the target population was relatively small and manageable (Israel, 1992), and the data analysis methods employed in this study (Confirmatory Factor Analysis (CFA) and Hayes PROCESS macro) require a minimum of 200 cases (Wolf et al., 2013; Hayes, 2022). Using a census ensured comprehensive coverage of the entire population of interest, eliminating sampling bias and providing a more reliable and representative evaluation of the research variables (Israel, 1992).

3.3. Data collection

A questionnaire survey was employed as the primary data collection method in this study. The questionnaires were designed to capture respondents' perceptions of DOP, OIC, and CRP using closed-ended questions. This method was chosen for its efficiency and cost-effectiveness in collecting quantitative data from a large sample within a relatively short period (Saunders et al., 2019). The standardized nature of the structured questionnaire survey facilitated the collection of data necessary for testing the study's hypotheses. Out of the 300-questionnaire distributed, only 218 were adequately completed and returned, yielding a response rate of 72.7%, which was deemed substantially adequate for testing the model hypotheses (Hayes, 2022).

3.4. Measurement items

The constructs used in this study were measured through multi-item scales that had been previously used and validated in earlier studies. An adapted version of the scales by Harju et al. (2023) and Seyedghorban et al. (2020) was utilized to measure the five items related to the integration of DOP in public procurement processes. The outcome variable, CRP, was assessed using a five-item scale derived from procurement and compliance literature by Halonen (2017) and Henty and Ashmore (2019). OIC, serving as a moderator in the study, was measured with a five-item scale adapted from Karlsson et al. (2018), Da Veiga (2023), and Wright (2013), focusing on information-sharing behaviors within organizations.

To ensure content and face validity, all items were reviewed by a panel of 14 procurement and public sector experts, who evaluated the clarity and relevance of the items and whether they adequately represented the intended constructs. Necessary adjustments were made based on their feedback to improve the accuracy and comprehensibility of the measurement tools before full-scale data collection. In total, 15 items were examined using a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Table 2 presents the measurement statements for each item that makes up the scale for each theoretical construct used in this study.

3.5. Empirical analysis

Data analysis in this study was conducted using CFA and the Hayes PROCESS macro (Model 1). Essentially, CFA was employed to validate the measurement model by assessing the reliability and construct validity of the latent variables, ensuring that the observed data accurately reflect the theoretical constructs. This approach is crucial for testing whether the hypothesized factor structure aligns with the collected data, thereby ensuring robust model fit and facilitating a meaningful interpretation of the relationships between variables (Fan et al., 2016). Hayes PROCESS macro, on the other hand, was employed to assess the interaction effect of DOP and OIC) on CRP. This method allowed for a more nuanced analysis of the moderation effect, providing insights into how the strength of the relationship between DOP and CRP varies at different levels of OIC. The rationale for using the Hayes PROCESS macro lies in its ability to efficiently test complex moderated relationships, offering a clear understanding of the conditional effects of the focal predictor variable at various levels of the moderator (Hayes, 2022).

4. Study results

4.1. Sample profile

The findings from the sample characteristics in Table 1 provide valuable insights into the sample profile in this study. The sample consisted of 218 respondents, with a notable gender distribution. Males represented 63.76% (n =139) of the sample, while females accounted for 36.24% (n = 79 respondents). This disparity indicates a male-dominated representation in the procurement sector among the surveyed public organizations. In terms of academic qualifications, the majority of respondents held postgraduate degrees (74.31%, n = 162), with 25.69% (n = 56) having a first degree. The analysis revealed a fair distribution of respondents across work experience levels. The largest group had 6 to 8 years of experience (27.52%, n = 60), followed by those with 12 years or more (26.15%, n = 57). A smaller portion of the sample (21.56%, n = 47) had 9 to 11 years of experience. Regarding work positions, the analysis revealed a diverse range of roles. Procurement managers (18.35%, n = 40) were the largest group, followed by IT specialists (17.43%, n = 38), and internal auditors (16.97%, n = 37). These findings reflect a mix of early-career and seasoned professionals who were well-educated and held diverse positions in the procurement field. As such, respondents possessed informed perspectives to respond to the dynamic of DOP, OIC, and CRP.

Table 1. Overview of sample characteristics

Factors	Variables	Frequency	Percentages
Sex respondents	Female	79	36.24
	Male	139	63.76
	Total	218	100.00
Academic qualification	First degree	56	25.69
	Postgraduate	162	74.31
	Total	***218***	***100.00***
Years of work experience	3 – 5 years	54	24.77
	6 – 8 years	60	27.52
	9 – 11 years	47	21.56
	12 years and above	57	26.15
	Total	***218***	***100.00***
Work position or role in SC	Procurement managers	40	18.35
	IT specialists	38	17.43
	Accounting officers	32	14.68
	Internal auditors	37	16.97
	User department heads	35	16.06
	Chairpersons of tender boards	36	16.51
	Total	***218***	***100.00***

Source: Survey output

4.2. Measurement model

The results of the CFA demonstrated an adequate goodness-of-fit between the data and the model, as indicated by the values recommended by Hair et al. (2020). CMIN/DF of the measurement model (Figure 2) was 1.927, Root Mean Square Error of Approximation (RMSEA) = 0.058, Adjusted Goodness of Fit Index (AGFI) = 0.897, Root Mean Residual (RMR) = 0.024, Goodness of Fit Index (GFI) = 0.928, Probability of Close Fit (Pclose) = 0.165, Tucker–Lewis Index (TLI) = 0.962, Incremental Fit Index (IFI) = 0.969, Normed Fit Index (NFI) = 0.938, and

Comparative Fit Index (CFI) = 0.969. All fit indices fell within the acceptable ranges, thereby validating the model using AMOS version 23.

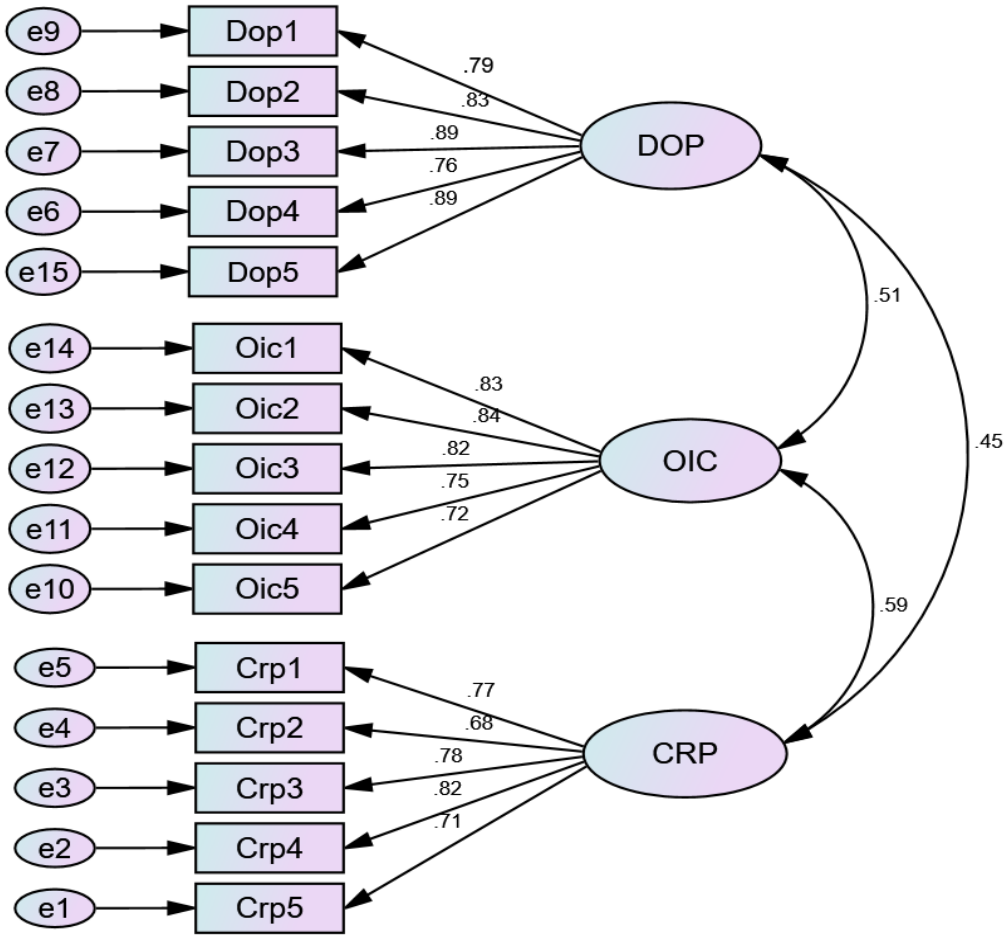

Figure 1. Measurement model
Source: Survey output

4.3. Validity and reliability assessment

Furthermore, the results of the CFA supported the attainment of convergent validity, as the values for both the average variance extracted (AVE) and standardized factor loadings (λ) exceeded the recommended threshold of 0.5 (Hair et al., 2020). Also, the composite reliability (CR) and Cronbach's alpha (α) values for all latent variables in the model were above 0.7, confirming the internal consistency reliability of the latent constructs (Nawi et al., 2020). Table 2 presents the values for standardized factor loadings, composite reliability, Cronbach's alpha, and AVE. Lastly, the Fornell-Larcker criterion (Fornell and Larcker, 1981) was employed to assess the model's discriminant validity. According to this criterion, the square root of the AVE for each construct should be greater than its correlations with any other construct in the model to demonstrate discriminant validity. The results presented in Table 3 confirm the attainment of discriminant validity, as the square root of the AVE (italicized diagonals) is greater than the inter-correlations between the constructs in the research model. Consequently, the measurement model was deemed acceptable, providing evidence of sufficient construct reliability, as well as convergent and discriminant validity.

Table 2. Results for measurement model

Constructs and indicators	Loadings
Digitalization opportunities (DOP): α = 0785, CR = 0.890, AVE = 0.669.	
Dop1: Use of digital technologies for capturing, storing and managing procurement activities	0.795
Dop2: Use of software solutions that automate repetitive tasks such as purchase order creation, approval processes, notifications, and data entry	0.833
Dop3: Use of online platforms such as tender portals that support procurement activities such as supplier selection, tendering, and contract management	0.886
Dop4: Use of digital platforms such as ERP, VIM and EDI that enable integration with vendors, monitor performance, and enhance collaboration	0.764
Dop5. Leveraging big data analytics to gain insights into procurement trends, supplier performance, cost management, and decision-making processes	0.890
Source(s): Harju et al. (2023), Seyedghorban et al. (2020).	
Organizational information culture (OIC): α = 0.813, CR = 0.895, AVE = 0.632.	
Oic1: The degree of importance placed on information management	0.830
Oic2: Effectiveness of communication channels for disseminating information	0.841
Oic3: Level of trust among employees regarding information confidentiality	0.820
Oic4: A culture of transparency and accountability on information sharing and access	0.753
Oic5: Existence of formal policies and procedures governing information sharing	0.724
Source(s): Karlsson et al. (2018), Da Veiga, (2023), Wright, (2013).	
Confidentiality rules of public procurement processes (CRP): α = 0.801, CR = 0.867, AVE = 0.566.	
Crp1. Confidentiality of information related to bidders' technical proposals and financial details	0.774
Crp2. Only designated individuals involved in the procurement process (e.g., evaluation committee members) are allowed to access sensitive procurement data	0.677
Crp3. Details of procurement decisions, such as evaluation criteria, remain confidential until the appropriate time (e.g. after contracts are awarded).	0.777
Crp4. Violating confidentiality rules in public procurement is addressed with legal penalties, sanctions, or contract termination	0.818
Crp5. Certain details (e.g., such as trade secrets, contractual clauses, and financial-specific issues), continue to be protected under confidentiality rules even after a contract is completed	0.708
Source(s): Halonen (2017), Henty and Ashmore (2019).	

Source: Survey output

4.4. Descriptive statistics and correlation analysis

The inter-construct coefficients in Table 3 indicate a moderate positive correlation between DOP and CRP ($r = 0.449$, $p < 0.01$) as well as between DOP and OIC ($r = 0.514$, $p < 0.01$), both at a two-tailed significance level. In addition, OIC shows a stronger positive correlation with CRP ($r = 0.586$, $p < 0.01$), also at a two-tailed significance level. None of the correlation coefficients exceeds 0.7, with the highest being 0.586 (between CRP and OIC), indicating that multicollinearity is not a major concern (Pallant, 2020). Concerning descriptive statistics (Table 3), which are based on a five-point scale, the high mean score of 4.285 and standard deviation (SD) of 1.833 for DOP reflect a strong recognition of digitalization's role in enhancing procurement processes. Furthermore, the relatively high mean score of 3.762 and SD of 1.904 for OIC, along with a moderate mean score of 3.016 and SD of 1.972 for CRP, indicate that while the cultural context and confidentiality rules are generally acknowledged, there is still room for improvement.

Table 3. Descriptive statistics and constructs inter-correlation matrix

	Mean	SD	MSV	ASV	CRP	DOP	OIC
CRP	3.016	1.972	0.343	0.272	*0.753*		
DOP	4.285	1.833	0.264	0.233	0.449**	*0.835*	
OIC	3.762	1.904	0.343	0.304	0.586**	0.514**	*0.795*

Note(s): **Correlation is significant at the 0.01 level (2-tailed). Italic fonts (italicized diagonals) are the square root of AVE.
Source: Survey output

4.4. Structural model and hypotheses testing

Table 4 displays the results of hypotheses testing using Hayes' PROCESS macro, analyzing path coefficients, explained variance (R^2), and conditional effects through the bootstrapping method. The analysis indicates a moderate predictive power for the structural model ($R^2 = 0.304$, F-statistic = 39.390, $p < 0.05$). The revealed R^2 of 0.304 suggests that the endogenous constructs (DOP and OIC) explain 30.4% of the variance in the exogenous construct (CRP). The t-values derived from bootstrapping were used to assess whether the path coefficients of the endogenous constructs were positive and significant. According to Hayes (2022), a t-value greater than 1.65 indicates significance at the 10% confidence level (CL), a t-value greater than 1.96 indicates significance at 5% CL, and a t-value greater than 2.57 shows significance at 1% CL. Accordingly, the results demonstrate that DOP ($\beta = 0.374$, $t = 8.130$, $p < 0.01$) and OIC ($\beta = 0.322$, $t = 5.366$, $p < 0.01$) have significant positive effects on CRP, confirming the first (H1) and second (H2) hypotheses.

Furthermore, as suggested, the study found that OIC positively moderates the relationship between DOP and CRP ($\beta = 0.144$, $t = 2.769$, $p < 0.05$), hence providing support for the third hypothesis (H3). More importantly, an R^2 change of 0.032, $F = 4.614$, and $p < 0.05$ was found, indicating that the interaction term (DOP*OIC) positively and significantly impacts CRP and increases the model's explained variance by 3.2%. Table 4 further displays the conditional effects of DOP on CRP at varying levels of OIC, based on different standard deviation (SD) values. It is evident that the effect of DOP on CRP is conditioned on the level of OIC. At a low level of OIC (SD = –0.776), DOP has a weak effect on CRP, whereas at a high level of OIC (SD = 0.776), DOP exhibits a stronger significant positive effect on CRP. Overall, the results support the model's hypotheses, as the confidence intervals do not include zero (Hayes, 2022), confirming the positive moderating effect of OIC on the relationship between DOP and CRP.

Table 4. Results of hypotheses testing

Variables	Coefficient	Se	T	P	LLCI	ULCI
Constant	2.458	0.033	74.485	0.000	2.093	2.824
H1: DOP → CRP	0.374	0.046	8.130	0.000	0.283	0.464
H2: OIC → CRP	0.322	0.060	5.366	0.000	0.304	0.541
H3: DOP*OIC → CRP	0.144	0.052	2.769	0.018	0.089	0.177
R^2	0.304					
F(sig.)	39.390			0.000		
R^2 change	0.032					
F(Sig) Change	1.718			0.018		
Conditional effects of the focal predictor (DOP) at values of the moderator (OIC)						
Low (-0.776)	0.101	0.032	3.156	0.005	0.068	0.152
Mean (0.000)	0.374	0.046	8.130	0.000	0.283	0.464
High (0.776)	0.456	0.028	16.286	0.000	0.398	0.501

Source: Survey output

5. Discussions

This study examined the moderating effect of OIC on the relationship between DOP and CRP in public procurement processes, using the theoretical framework of ISCT. Consistent with the theoretical proposition of ISCT, which emphasizes the role of control mechanisms in safeguarding sensitive information (Straub and Welke, 1998), and supported by empirical studies (Harju et al., 2023; Seyedghorban et al., 2020), this study demonstrated a noteworthy and favorable impact of DOP on compliance with CRP. In the context of public procurement, DOP enhances control mechanisms by automating data protection processes, enforcing access controls, and securing communication channels, thereby reducing the risk of data breaches and ensuring compliance with confidentiality rules. Advanced digital procurement systems, such as online tender portals, allow organizations to monitor and audit procurement activities more effectively, thereby strengthening the enforcement of confidentiality rules. These findings are also in line with those of Karttunen et al. (2023) and Gunasekara et al. (2022), which opine that digital tool such as blockchain technology, provide real-time monitoring and encryption capabilities, which align with ISCT's emphasis on maintaining the integrity and security of information. Furthermore, the integration of digital technologies into procurement processes increases transparency, accountability, and security, leading to improved adherence to confidentiality rules and regulations (Halonen, 2017; Henty and Ashmore, 2019).

The results further confirm a significant positive association between OIC and CRP. Consistent with previous empirical studies by Staba and Turudic (2024) and Uluç (2022), the findings suggest that incorporating OIC into public procurement processes has a notable and favorable impact on compliance with confidentiality rules. The reasons for this may be that OIC fosters an environment where data protection practices, privacy awareness, and adherence to security protocols become ingrained in individual and organizational behavior, thereby enhancing compliance with confidentiality requirements (Daneshmandnia, 2019; Solomon and Brown, 2021). The results also support the theoretical proposition of ISCT, which posits that effective control mechanisms, such as access controls and secure communication systems, are essential for safeguarding sensitive information (Straub and Welke, 1998). In line with this theoretical framework, the study demonstrated that organizations with a strong information culture are better equipped to implement and enforce regulations that prioritize confidentiality and information security in public bidding processes. Similar empirical studies by Amankwa et al. (2022) and Chang and Lin (2007) have also indicated that nurturing an information culture that prioritizes security practices, such as effective communication channels, high levels of trust, transparency, and accountability among employees, strengthens the organization's capacity to monitor, audit, and protect information from unauthorized access. In the context of public procurement, such practices reduce the likelihood of information breaches, ensuring a higher level of compliance with procurement confidentiality rules.

Finally, the findings confirmed the moderating role of OIC in the relationship between DOP and CRP. Supported by the slope plotting (see Figure 3), the results highlight the importance of the interplay between DOP and OIC in strengthening confidentiality rules within the framework of public procurement processes. Specifically, the effect of DOP on CRP is stronger at higher levels of OIC and weaker at lower levels of OIC. These findings are consistent with those of Daneshmandnia (2019) and Henty and Ashmore (2019), and align with the theoretical framework of ISCT (Straub and Welke, 1998), which suggests that OIC enhances the effectiveness of DOP by embedding data protection practices, privacy awareness, and security protocols into organizational behaviour. According to Solomon and Brown (2021), a strong OIC, supported by policies that foster trust, effective communication channels, transparency, and accountability in information sharing, enhances an organization’s ability to leverage DOP while maintaining robust confidentiality controls. Similarly, Herold et al. (2023) and Seyedghorban et

al. (2020) assert that as digital technologies become increasingly integrated into procurement processes, organizations with strong organizational information capabilities (OIC) are better equipped to securely handle sensitive data, minimize the risk of information breaches, and maintain strict compliance with confidentiality requirements. This moderating role of OIC is especially crucial in the digital era, where technological advancements necessitate not only sophisticated tools but also a security-conscious OIC to strengthen confidentiality practices in public procurement processes.

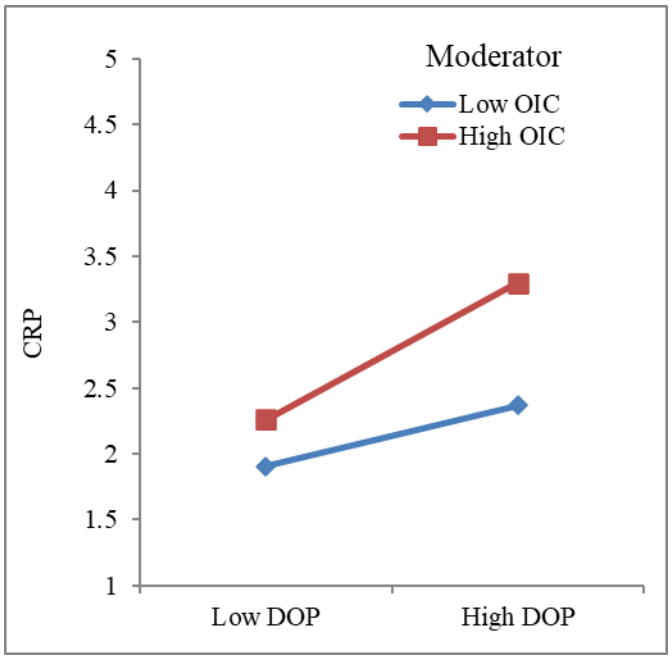

Figure 2. Moderation effects of OIC on DOP and CRP
Source: Survey output

6. Conclusion

Drawing on ISCT theory, this study examines the moderating effect of OIC on the relationship between DOP and CRP within the context of public procurement. The study highlights that integrating DOP into public procurement processes serves as a key driver for enhancing confidentiality safeguards. DOP enables more efficient and secure data management, real-time monitoring, and advanced encryption techniques. However, the effectiveness of DOP is highly dependent on the strength of an organization's information culture. It is suggested that organizations with a strong OIC are better equipped to enforce and sustain digital information security controls, fostering a culture where employees remain vigilant about confidentiality risks and strictly adhere to procurement compliance protocols. While DOP enhance the enforcement of CRP, the OIC plays a pivotal moderating role in determining how effectively digital technologies can protect sensitive procurement data. Supported by ISCT theory, the study establishes that the interaction between DOP and OIC facilitates proactive measures and preventive controls, shaping the ability of public procurement entities to address confidentiality challenges and security risks in an increasingly digital environment. The findings reinforce the idea that digital technologies alone are insufficient without the complementary influence of a supportive organizational culture that prioritizes information security at all levels of the procurement process.

6.1. Theoretical implications

This research offers novel insights into the relationship between DOP and CRP. Unlike prior empirical studies (Harju et al., 2023; Uluç, 2022; Seyedghorban et al., 2020), this study emphasizes the role of OIC as a critical moderator of this relationship, framed within the theoretical framework of the ISCT. Empirically, the study contributes to the existing literature in procurement and supply chain management, as well as information management, by highlighting how OIC can drive the enforcement of DOP and ensure compliance with robust confidentiality rules. The findings suggest DOP as a key driver for enhancing CRP enforcement. Moreover, the successful adoption of DOP to improve CRP relies significantly on OIC. This unique perspective underscores the importance of adopting DOP and having a supportive OIC that prioritizes information security, essentials for achieving CRP. Theoretically, this perspective advances the understanding of ISCT by demonstrating that digital tools and practices are not merely technological enhancements but integral components of a comprehensive approach to safeguarding sensitive information in public procurement. It is suggested that fostering an OIC that embraces digitally-enabled information security measures will enable public procurement entities to better navigate the complexities of digitalization, ultimately leading to more secure and efficient procurement processes. This advancement enriches the theoretical discourse on ISCT by illustrating how cultural dimensions can serve as both facilitators and barriers to effective information security management and the adoption of DOP. More importantly, the study lays a theoretical foundation for future research on the dynamics of digitalization and information security in public procurement systems and other sectors.

6.2. Managerial implications

Based on the findings, the study offers some managerial implications for procurement practitioners and policymakers. For procurement practitioners, it is recommended to adopt and integrate DOP, such as blockchain technology and align them with a robust OIC that emphasizes the importance of confidentiality and information security, risk awareness, and compliance in the procurement process. Such integration is crucial for enhancing real-time data monitoring, advanced encryption, secure data management systems, and overall information security. From a governmental perspective, policymakers are encouraged to establish guidelines and standards that promote the adoption of advanced digital technologies by public entities, while simultaneously reinforcing the importance of a strong OIC. Furthermore, providing resources for training programs, workshops, and awareness campaigns that highlight the significance of DOP and information security can enhance the effectiveness of confidentiality rules and compliance protocols in public procurement. By aligning digitalization efforts with OIC, organizations can foster an environment where employees are more vigilant and committed to safeguarding sensitive data, ensuring that digital initiatives achieve their intended security outcomes. Investing in both digital tools and organizational culture will not only strengthen compliance with confidentiality rules but also mitigate security risks, ultimately enhancing trust, accountability, and integrity. This is essential for cultivating a more transparent and secure environment for all stakeholders in the increasingly complex and digitally evolving procurement landscape.

6.3. Study limitations and future direction

This study has several limitations that should be acknowledged. First, the focus on public procurement in Dodoma, Tanzania, limits the generalizability of the findings to other geographical regions and sectors. This is because variations in cultural factors and technological infrastructures across different areas may lead to different outcomes. To build on the findings of

this research, future studies could explore comparative analyses across multiple regions and the private sector to assess how OIC affect the effectiveness of DOP in enforcing confidentiality rules. Second, the study primarily examines the interaction effect of DOP and OIC on CRP, without considering other potential moderating or mediating factors, such as leadership styles, employee training programs, or the level of digital maturity within organizations. These variables could further influence the effectiveness of confidentiality rules and warrant investigation in future studies. Lastly, the research primarily employed a cross-sectional quantitative design, capturing a snapshot of the relationship between DOP, OIC, and CRP at a specific point in time. This approach limits the ability to observe how these dynamics evolve over time to affect information confidentiality. Conducting longitudinal studies and qualitative research involving interviews or focus groups with procurement practitioners may offer deeper insights into how evolving digital technologies and OIC interact over time to influence CRP.

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