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## The Relationship Between Organisational Agility and IT Alignment in Public Organisations

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# The Relationship Between Organisational Agility and IT Alignment in Public Organisations

## Full research paper

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## Abstract

Three-decades long IS research suggests that Information Technology (IT) alignment is regarded as one of the pervasive issues among researchers and practitioners. Given the current dynamic business environment, organisations need to foresee external changes and make necessary adjustments (i.e., they need to be agile) while attempting to achieve and maintain IT alignment. However, the research on the two streams—IT alignment and organisational agility—seems not to overlap yet. On the other hand, the prior studies investigating the relationship between the two constructs report contradictory findings. To address the lack of knowledge about the influence of organisational agility on IT alignment in the public sector, this study presents the results of a multiple-case study conducted in four sub-city administrations in the capital of Ethiopia, Addis Ababa. The findings suggest that organisations success to reach IT alignment while aiming for organisational agility is the function of environmental volatility and stakeholder relationships.

**Keywords:** Organisational agility, IT alignment, public organisations, organisational performance, environmental volatility, stakeholder relationship, Ethiopia.

## 1 Introduction

Despite more than three decades of debates and extensive research on the topic, academics and practitioners still view business-information technology (IT) alignment (referred to as IT alignment in this study) as one of the most pervasive issues that have implications for the overall performance of an organisation (Luftman et al. 2017). IT alignment, defined as “*the extent of fit between information technology and business strategy*” (Talon and Pinsonneault 2011, p. 464), has become increasingly more challenging to achieve given the dynamic and volatile business environment organisations operate in and the simultaneous adjustments it requires to achieve it (Jonathan et al, 2020). A closer look into the current literature from the information systems and related research domains indicates that IT alignment has attracted even more attention given its significance for digital transformation, i.e., “*the IT-enabled change in organisations through the digitalisation of products, services, core processes, customer touchpoints and business models*” (Heilig et al. 2017, p. 3). The current emerging technologies, and the volatile market environment call for a well-formulated strategy to fit the priorities of an organisation with the resources at hand to meet the organisation’s goals and objectives (Chi et al. 2020). To this end, organisational agility which refers to “*the ability to detect and respond to opportunities and threats with ease, speed, and dexterity*” (Tallon and Pinsonneault 2011, p. 464) has also become an important issue for today’s organisations pursuing digital transformation.

Since the emergence of the phenomenon in the IS research arena, various models and frameworks as well as propositions for assessing and improving IT alignment were proposed (e.g., Henderson and Venkatraman 1999; Luftman 2000). This continuous attention among researchers has resulted in a rich volume of literature. However, recent literature reviews point out two areas of concern that need to be addressed to further our understanding of the construct. First, the focus of prior IT alignment studies has been private organisations despite the contextual differences between the two sectors (Winkler 2013). For instance, the long list of stakeholders with competing interests, the variety of services delivered, and the complex organisational structures make IT alignment practices more challenging in the public sector (Vander Elst and Rynck 2014). Second, the phenomenon ‘alignment-agility paradox’, which appeared in the recent IS literature, has become a concern for researchers and practitioners. The argument is that IT alignment might result in organisational rigidity, characterised by reduced flexibility and the inability to respond to volatile market situations, i.e., the lack of organisational agility (Liang et al. 2017). On the other hand, prior studies suggest that organisations with IT aligned positions are known to score high in organisational agility (Govuzela and Mafini 2019). Given these contradictory findings, there are calls for studies exploring the relationship between organisational agility and IT alignment (Horlach et al. 2020). To address the gap in the literature, this study aims to explore the relationship between organisational agility and IT alignment within the context of public organisations.

The remainder of this paper is structured as follows. We first present the theoretical foundations of our research model along with seven hypotheses. A diverse body of literature is consulted to reveal the competing perspectives on the link between IT alignment and organisational agility in relation to the effect of this relationship on organisational performance. Next, we describe the research methodology—the data collection and analysis methods. After discussing our results and implications for research and practice, we conclude by presenting the limitations of our study and potential future research avenues.

## 2 Theoretical Development

### 2.1 IT Alignment in Public Organisations

Even though IT alignment is a topic that has amassed a continuous interest among researchers and practitioners, resulting in a rich volume of literature in the information systems and cognate research domains, the issue is rarely discussed within the context of public organisations (Vander Elst and De Rynck 2014; Winkler 2013). However, the few empirical studies conducted in public organisations suggest that the topic is even more important and timely for today’s organisations in the public sector (Jonathan et al., 2020). For instance, Walser et al. (2014) argue that achieving and maintaining IT alignment in municipalities is more challenging but necessary to meet the challenges of managing internal and external IT resources to enable the implementation of networking and eGovernment solutions. Following the success of private organisations in implementing digital solutions to improve their work processes, citizens and employees in the public sector are demanding changes in their organisational structure, culture and the way they use IT. These organisation-wide changes are expected to improve the efficiency of public organisations as they facilitate accountability and transparency, the efficiency of work processes, and encourage citizens participation in public decision making (Jonathan et al. 2019). Researchers argue that IT alignment enables public organisations to proactively and

appropriately manage the adoption of IT and necessary changes to support the strategic goals and realise the value derived from their investment in IT (Walser et al. 2014; Winkler 2013). The most widely cited justification for IT alignment studies is the influence it has on organisational performance. The argument is that IT alignment facilitates a shared vision and a commitment to plan and address critical areas of success improving organisational performance (Chan et al. 2006; Luftman et al. 2017). Thus, we posit the following hypothesis:

*H1: IT alignment is positively associated with organisational performance.*

## **2.2 Organisational Agility and IT Alignment**

The hyper-competition and volatile business environments enabled by the emergence of new digital technologies has revolutionised how organisations pursue their business operations. Consequently, organisations are continuously striving to produce and deliver the right products and services at the right time by making adjustments to their IT and overall organisational strategies (Horlach et al. 2020). This development is consistent with the findings of recent literature reviews (e.g., Jonathan et al. 2021), suggesting the shift in the view on IT alignment as a construct. In contrast with studies in the early 80s and 90s, IT alignment for today's organisation is a dynamic position that requires making continuous assessment and adjustments. Increased environmental uncertainty in today's market brings the need for the ability to detect and respond to changes—a phenomenon referred to as organisational agility (Talon and Pinsonneault 2011). Organisational agility is not just desirable but an essential capability that determines whether an organisation can achieve its goals and remain to be in business (Nijssen and Paauwe 2012; Seo and La Paz 2008). Even though both IT alignment and organisational agility have attracted the attention of researchers in the information systems domain, there is a lack of integration of the two research topics (Horlach et al. 2020; Talon and Pinsonneault 2011). However, the analysis of our literature review suggests that the relationship between organisational agility and IT alignment seems to influence organisational performance. On the other hand, the alignment-agility paradox, a recent phenomenon referring to the undesired outcome of IT alignment resulting in rigid IT processes and resource commitments, has also become a source of concern among researchers (Jonathan et al. 2020). Taken together, we posit the following hypotheses:

*H2: Organisational agility is positively associated with IT alignment.*

*H3: Organisational agility is positively associated with organisational performance.*

## **2.3 Stakeholder Relationships influence on IT Alignment and Organisational Agility**

Stakeholder theory has its origins in the management literature and comprises shareholders, employees, customers and the general public (Misha and Misha, 2013). In the past information systems studies, the concept of stakeholders was limited to include individuals and groups within the organisation (Pouloudi 1999). However, recent studies exploring the management of information systems, particularly in the public sector, consider stakeholders as all individuals and groups with varying levels of interest and power to influence the design, implementation and management of information systems (Chan et al. 2003; Winkler 2013). Thus, identifying the relevant stakeholders and involving them in IT and related projects is one of the critical success factors of IT initiatives (Gil-García and Pardo 2005; Jonathan 2019). The involvement of stakeholders also influences how organisations approach IT strategy, application needs, process improvements and investment decisions (Mishra and Mishra 2013). The justification for Information System management studies with particular focus in the public sector emanates from the complexity of systems and the number of stakeholders involved in public organisations. Thus, the management of stakeholder relationships is critical as it promotes necessary organisational changes and innovation to align the introduction of new information systems with the overall organisational objective (Chan et al. 2003). The ability of organisations to respond to the dynamic business environment is also a function of the compatibility of stakeholders' perceptions and expectations as well as the support to the IT investment decisions (Chan et al. 2003; Pan and Flynn 2003). Thus, we posit the following hypotheses:

*H4: Stakeholder relationships is positively associated with IT alignment.*

*H5: Stakeholder relationships is positively associated with organisational agility.*

## **2.4 Environmental volatility as a moderator**

Environmental volatility, which refers to the level of instability or unpredictability faced by an organisation (Dugal and Gopalakrishnan 2000, Dess and Beard 1984), is one of the concepts known to

have significance for both management- and organisational theory as well as systems theory (Snyder and Glueck 1982). Environmental volatility (also referred to as environmental dynamism) is measured as “*the rate at which the preferences of consumers and the products of organizations change over time*” (Wijbenga and van Witteloostuijn 2007). Within the context of public sector IT management, the volatility of the environment is related to rapid changes in technology, policy and regulations, and citizens’ demands (Boyne and Meier 2009; Walser et al. 2016). The argument is that the response of an organisation to environmental volatility has implications on the strategic choices as well as daily management activities which, in turn, are associated with organisational performance. It is no surprise that both IS and organisational studies explored the relationship between the various external environmental changes along with internal organisational structures and strategies. Thus, environmental volatility is one of the primary criteria when an organisation makes choices on several aspects of its operations. Contingency theory also states that it is in organisations’ best interest to recognise that environmental uncertainties influence their operations and formulate strategies to avoid or reduce risks or take advantage of new opportunities (Thompson et al. 2017). Scholars also argue that organisations with agile capabilities are well-positioned to integrate new technologies and reconfigure existing resources resulting in competitive advantages against their competitors and improve their performance under volatile environments (Wu 2010). Within the context of public organisations, the changes in the external environment have both direct and indirect effects on performance (Boyne and Meier 2009). According to the authors, the indirect effects of environmental volatility are related to organisational structures, work processes as well as formulation and adaptation of strategies. This argument is on a par with the fundamental proposition of contingency theorists stating that firms enhance their performance to the extent that they align their organisational structures and strategies to meet conditions in the external environment (Govuzela and Mafini 2019). In the same vein, prior studies suggest that the favourable influence of IT alignment on organisational performance is contingent upon environmental volatility (Coltman et al. 2015). The volatility of an environment also influences how well the organisational agility contributes to increased organisational performance (Govuzela and Mafini 2019; Talon and Pinsonneault 2011). Taken together, we posit the following hypotheses:

*H6: Environmental volatility positively moderates the link between organisational agility and IT alignment.*

*H7: Environmental volatility positively moderates the link between organisational agility and organisational performance.*

Figure 1 depicts the research model showing the relationships between the five constructs discussed above.

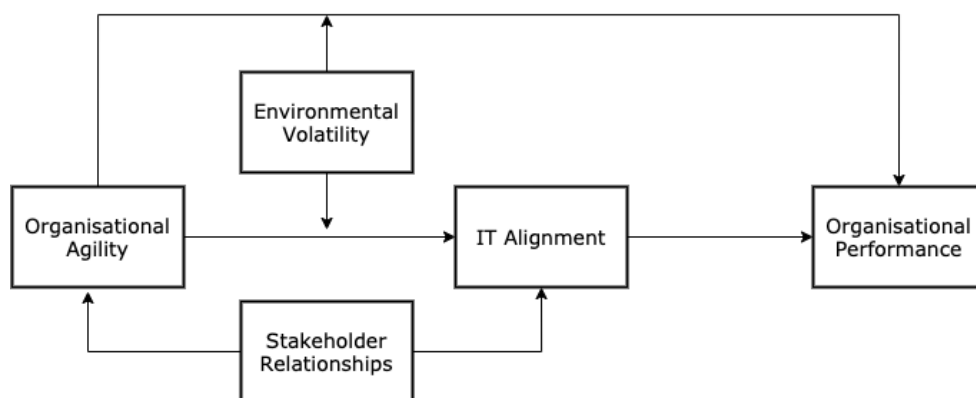


Figure 1: Research model.

### 3 Research Methodology

#### 3.1 Research Strategy

A case study, the most preferred research strategy among researchers in the IS research domain (Oates, 2005), is chosen for this study. Prior IT alignment studies (for instance, Chan et al. 2006; Vander Elst and De Rynck, 2014; Winkler, 2013) have also applied case study research strategy. The choice of the strategy in our study is justified given the aim of examining the relationship between IT alignment and organisational agility in a natural setting (Benbasat et al. 1987).

### 3.2 Data Collection

Data for this study was collected using an online survey in four public organisations in Ethiopia. Addis Ababa city Government, comprised of ten sub-city administrations—organised as 28 districts and 328 neighbourhood units (also referred to as kebeles), is recognised as the forefront runner among public administrations working on digital transformation in the country. Both IT and administrative experts were selected from the four public organisations in Addis Ababa, Ethiopia. The similarity of these organisations in size, structure and set of services delivered justified our choices of the case organisations to improve the generalisability of the hypotheses testing (Benbasat et al. 1987). Among the ten sub-cities we approached, six of them responded favourably to our request to take part in our study. Unfortunately, two of the organisations withdraw their interest before the interviews commenced. Heads of the IT and directors of the remaining departments were approached to distribute the online survey link. As suggested in prior IT alignment studies, only respondents who were expected to possess not only IT knowledge but also to have an understanding of their respective organisations' overall strategy were the focus of the survey (Luftman 2000). Thus, our non-probability sampling strategy was aimed at selecting respondents that could provide us with data to test the hypotheses we posited (Denscombe 2014). The online survey, which was made available for forty-five days, was completed by 182 respondents. To measure the items, respondents were asked to score on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The complete list of measurement items and corresponding constructs is shown in Table 1.

### 3.3 Data Analysis

The data collected from the survey measured the five constructs (abbreviations in parenthesis) using the items shown in Table 1. Information systems, strategic management and public administration literature were consulted to select appropriate measurement items for the constructs (e.g., Dugal and Gopalakrishnan 2000; Luftman et al. 2017; Walser et al. 2016). Except for IT alignment which was measured with six items, we used three items for the remaining constructs.

Constructs	Measurement Items	Sources
IT alignment (ALG)	Communications, Dynamic IT scope, IT Governance, Partnering, Skills development, Value analytics	Luftman et al. (2017)
Organisational agility (AGLT)	Flexible IT infrastructure	Nijssen and Paauwe (2012)
	Scalable workforce	Nijssen and Paauwe (2011); Tallon and Pinsonneault (2011)
	Rapid organisational learning	Nijssen and Paauwe (2012); Seo and La Paz (2008)
Environmental Volatility (VOLT)	Policy and regulatory changes	Boyne and Meier (2009); Chan et al. (2006)
	Rapid technology changes	Dugal and Gopalakrishnan (2000); Walser et al. (2016)
	Changes in citizens demand	Chan et al. (2006); Dess and Beard (1984)
Stakeholder relations (RLT)	Citizens' involvement	Gil-García and Pardo (2005); Winkler (2013)
	Collaboration with suppliers	Seo and La Paz (2008)
	Inter-governmental relations	Winkler (2013)
Organisational performance (PERF)	Cost-effectiveness	Hackler and Saxton (2007)
	Equal service access	Førsund (2017)
	Service quality	Andersen et al. (2016); Førsund (2017)

*Table 1. Operationalisation of Constructs and the Research Model*

Partial Least Structural Equation Modelling (PLS-SEM), a second-generation multivariate data analysis method, was chosen to analyse the quantitative data. According to Hair et al. (2017), PLS-SEM is gaining popularity among IS researchers in recent years. The method has also been used in prior IT alignment

studies (For instance, Chan et al. 2006). The choice is also appropriate given our small sample size. Compared with other methods, PLS is a better alternative for studies with small sample sizes (Wong 2013). However, Hoyle (2011) suggests a sample size of between 100 and 200 for PLS modelling. Table 2 shows the assessment criteria and the reference values used to test both measurement- and structural models.

Type of assessment	Criteria	Reference values	Source
Measurement model	<i>Convergent validity</i>		
	Item loading	≥ 0.4	Hair et al. (2017)
	Composite reliability	≥ 0.6	Fornell and Larcker (1981)
	AVE	≥ 0.5	Fornell and Lacker (1981)
	Cronbach's alpha coefficient	≥ 0.6	Hair et al. (2017)
	<i>Discriminant validity</i>		
	Item cross loadings to construct correlations	Item loads on its own construct ≥ to others	Fornell and Lacker (1981)
	Square root of AVE of each construct correlation with others	Square root of AVE between construct and its measures ≥ to others	Fornell and Lacker (1981)
Structural Model	Coefficient of determination (R <sup>2</sup> )	≥ 0.5	Chin (1998) Hair et al. (2017)
	Path coefficient significance	≥ 0.1 small ≥ 0.3 moderate ≥ 0.5 strong	Cohen (2013)

Table 2. Assessment criteria for measurement model and structural models

The data analysis was conducted in two steps—evaluation of the measurement model followed by assessment of the structural model (Hair et al. 2017) based on the assessment criteria and reference values shown in Table 2. First, the convergent and discriminant validities were assessed to test the measurement model. Second, the structural model was tested by evaluating the coefficients of determination (R<sup>2</sup>) and path coefficient significance. The data analysis was conducted using the SmartPLS software, version 3.3.3 (Ringle et al. 2015). The seven hypotheses posited were tested through the calculation of each *P*-value associated with the path coefficient. Kock (2014) suggests a threshold of *P*-value of .05 to declare a hypothesis to be supported.

## 4 Results and Discussions

### 4.1 Measurement Model

Our theoretical model comprises five constructs. When conducting PLS-SEM analysis, the reliability and validity of items need to be established to ensure rigour (Wong 2013). As shown in Table 3, to assess the reliability and validity of the construct, the composite reliability, Cronbach's alpha coefficient, as well as the extracted average variance (AVE) were examined (Fornell and Larcker, 1981).

The Cronbach's alphas of three of the five constructs—IT alignment (ALG), organizational agility (AGLT), and stakeholder relations (RLAT)—meet the acceptable level of 0.60 (Fornell and Larcker, 1981), but the Cronbach's alpha of organisational performance (PERF) which stands at 0.584 and environmental volatility (VOLT) with the value of 0.568 slightly falls below the suggested threshold. On the other hand, the composite reliability of all constructs falls between 0.578 and 0.706. Hair et al. (2017) suggests an acceptable value of composite reliability of 0.6 for exploratory studies. On the other hand, as shown in Table 3, the values of AVEs in diagonals are higher than the intercorrelations with other constructs, indicating the discriminant validity is confirmed (Chin, 1998).

Construct	A	B	AGLT	ALG	PERF	RLAT	VOLT
AGIL-VOL-ALIG (A)	<b>1,000</b>						
AGIL-VOL-PER (B)	1,000	<b>1,000</b>					
AGLT	0,337	0,337	<b>0,714</b>				
ALG	0,016	0,016	0,442	<b>0,520</b>			
PERF	0,363	0,363	0,611	0,280	<b>0,668</b>		
RLT	0,078	0,078	0,504	0,501	0,233	<b>0,597</b>	
VOLT	0,480	0,480	0,627	0,516	0,462	0,269	<b>0,660</b>

Table 3. Inter-construct correlation matrix.

The AVE results also show that the variance explained by a latent variable which is not attributed to the measurement error. The cut-off value for AVE in the literature is 0.5, which says more than half of the variance from the indicators is attributed to the latent variables (Johnston and Warkentin, 2010). The AVE values of all five constructs range between 0.520 and 0.714, which is above the recommended level of 0.5. The composite reliability of all constructs also is above the threshold of 0.6 (Fornell and Larcker, 1981).

### 4.2 Structural Model

PLS model’s estimates are different from other SEM techniques as it relies on the variances explained rather than maximising model fit (Wong, 2013). Thus, we tested our theoretical model by evaluating the significance of hypothesised relationships. The coefficient of determination ( $R^2$ ) was used to test the predictive power of the theoretical model. Figure 2 shows the values used to test our model.

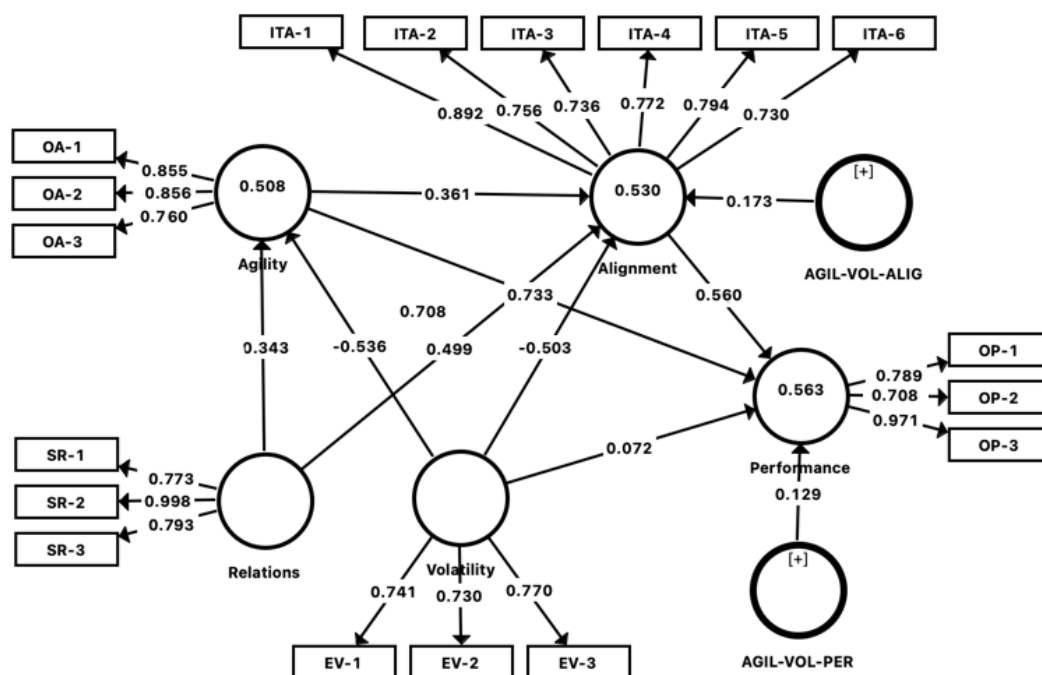


Figure 2. PLS-SEM results.

According to Chin (1998),  $R^2$  values are considered to be substantial (higher than 0.67), moderate (higher than 0.33 but less than 0.67), or weak (higher than 0.10 but less than 0.33). The PLS-SEM results indicate that the theoretical model accounted for 56.3 per cent of the variance for organisational performance, 53 per cent for IT alignment, and 50.8 per cent for organisational agility. Thus, the result of our structural model suggests that the proposed theoretical model is partially supported. Table 5 shows the test results of our seven hypotheses.



The significance of the path coefficients was evaluated in the next step. Path coefficients explain the extent of the strength of the effect of one variable on another (Wong, 2013). Measured by path coefficients, the strength of predictors may be strong (0.5 or higher), moderate (higher than 0.3 but less than 0.5) or small (higher than 0.1 but less than 0.3) (Cohen 2013). Our results indicate that there are strong associations between *IT alignment and organisational performance* (0.560), *organisational agility and organisational performance* (0.733), as well as *stakeholder relationships and IT alignment* (0.499). However, the association between *organisational agility and IT alignment* (0.361) and *stakeholder relationships and organisational agility* (0.343) seems to be moderate. On the other hand, our result also indicates that the moderating effect of environmental volatility—on the link between *organisational agility and IT alignment* (0.173), and *organisational agility and organisational performance* (0.129)—is small.

## 5 Concluding Remarks

The study attempted to explore the relationship between organisational agility and IT alignment as well as related constructs within the context of public organisations. By adopting the PLS-SEM technique, the study empirically tested the proposed theoretical model and the seven hypotheses.

Hypotheses	P-values	Test results
H1: IT alignment is positively associated with organisational performance.	0.000****	Supported
H2: Organisational agility is positively associated with IT alignment.	0.020	Supported
H3: Organisational agility is positively associated with organisational performance.	0.000****	Supported
H4: Stakeholder relationships is positively associated with IT alignment.	0.000****	Supported
H5: Stakeholder relationships is positively associated with organisational agility.	0.010	Supported
H6: Environmental volatility positively moderates the link between organisational agility and IT alignment.	0.181	Not supported
H7: Environmental volatility positively moderates the link between organisational agility and organisational performance.	0.202	Not supported

Table 4. Hypotheses testing with p-values and their results.

As shown in Table 4, the P-values of the associated path coefficients for H1, H2, H3, H4, and H5 are less than the threshold value of .05 indicating these hypotheses are supported (Kock 2014). On the other hand, H6 and H7 are not supported given their P-values are greater than the cut-off value of .05.

As hypothesised in our research model, the findings suggest that there is a positive relationship between organisational agility and IT alignment. Even though the relationship between the two constructs has been debated in prior studies (Tallon and Pinsonneault 2011), our study contributes to the literature by empirically testing this relationship taking into consideration of the moderating effect of environmental volatility within the context of public organisations. Even though both IT alignment and organisational agility are known to be associated with improved organisational performance, the result of our study suggests that this association is affected by the volatility of the environment.

Prior IT alignment studies in the public sector have already recognised the important role of stakeholder relationships management to achieve IT alignment (Vander Elst and Rynck 2014; Winkler 2013). However, our study has empirically tested and confirmed the role of stakeholder relationships on both organisational agility and IT alignment. This is not surprising given the challenges of managing IT within the public sector known to have a long list of stakeholders with competing or opposing interests. Furthermore, we argue that practitioners will also find the result of this study informative. For instance, the study illustrates how various factors related to the external environment could influence the flexibility of their organisations and IT alignment. Recognising the important role of, for instance,

stakeholder relationships might also help them as they introduce new digital technologies to improve their organisational performance.

One limitation of this study is related to the selection of the case organisations, which might not be representative of public organisations. Since the four organisations provide similar services and have identical stakeholders, the generalisability of our findings might not be applicable for other public organisations in Ethiopia or elsewhere. Future studies might replicate the study in other organisations in Ethiopia or elsewhere.

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## Appendix 1 Survey Instrument

Constructs	Meas. Items	Questions
Environmental volatility (EV)	EV-1	The rate of changes in legislation and policy has become rapid.
	EV-2	The emergence and changes in technologies have become rapid.
	EV-3	The preferences and requests of citizens have become much harder to predict.
IT Alignment (IA)	IA-1	The IT and administration units have a shared understanding of how IS can be used to meet our organization's goals
	IA-2	We have flexible IT department capable of meeting the current and future IT needs of our organization.
	IA-3	We have effective IT decision making structure in our organisation.
	IA-4	IT is viewed as a partner to the other departments in our organisation.
	IA-5	We have well developed skills development plans and activities.
	IA-6	We have metrics to account the contribution of IT in our organization.
Organisational Agility (OA)	OA-1	We have IT infrastructure that could accommodate reorganisation of IT resources and integration of new technologies quickly as desired.
	OA-2	We have competent human resource aligned with our organisation needs that could be assigned different roles quickly as desired.
	OA-3	We have learning and knowledge management arrangements that can mobilise and train employees as quickly as needed.
Organisational Performance (OP)	OP-1	The cost effectiveness of our service delivery has improved as more services are provided through IT platforms.
	OP-2	Citizens within our administration area have equal access to services.
	OP-3	Citizens within our administration area are satisfied with the quality of services we deliver.
Stakeholder Relationships (SR)	SR-1	Citizens participate in discussions on major investment decisions.
	SR-2	Our organisation considers suppliers as partners.
	SR-3	Our organisation collaborates well with other public institutions.

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