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Article

The IT resource orchestration and performance during the pandemic: evidence from higher education institutions

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OPERATIONS, INFORMATION & TECHNOLOGY | RESEARCH ARTICLE

The IT resource orchestration and performance during the pandemic: evidence from higher education institutions

Bambang Jatmiko^{1*}, Hafiez Sofyani¹ and Wahyu Manuhara Putra¹

Abstract: Apart from bringing many social problems, the COVID-19 pandemic also possesses opportunities to increase competitive advantage for higher education institutions (HEIs). While almost all HEIs activities are required to run online, IT resource orchestration capability becomes a differentiating determinant for pursuing performance in the HEIs sector. Using a dynamic capability perspective, this study examined how the IT resource orchestration model was developed for HEIs by placing IT governance as a mediator to pursue performance amid difficult times such as a pandemic. This study employed a survey method by which a total of 129 HEIs participated. The results uncovered that IT application orchestration capability could promote business-IT alignment and process agility through effective IT governance as a mediator. Additionally, business-IT alignment was positively associated with process agility. Further, business-IT alignment and process agility were positively associated with HEIs performance. Theoretically, this study translated how dynamic capability theory is realized in applicable model. In practical speaking, the study suggested that in increasing IT capabilities to create business-IT alignment and process agility, which in turn has an impact on improving HEIs



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PUBLIC INTEREST STATEMENT

The COVID-19 pandemic has forced the government to issue a social restriction regulation where most activities in almost all sectors have shifted from face-to-face to online, including at higher education institutions (HEIs). On the other hand, competition for rankings and accreditation that impact public trust continues during the pandemic. Thus, it results in demands for performance that must be carried out. To answer this dilemma, adjustments to the organization's operations, especially by relying on increasing information technology (IT) capabilities, are a must. By using the dynamic capability as a theoretical foundation, this study tries to develop an IT resource orchestration model that is useful for maintaining HEI performance during the pandemic. This study proposed that to achieve performance during the pandemic, business-IT alignment and process agility are needed. These two factors are promoted by increasing IT application orchestration capability through the support of effective IT governance as the precondition.

performance during the crisis, effective IT governance must be a concern for HEIs management given its role as an orchestration factor (mediator).

Subjects: Government & Non-Profit Accounting; Corporate Governance; Information Technology

Keywords: Information technology; IT governance; IT application orchestration capability; process agility; business-It alignment; performance; higher education institutions; COVID-19 pandemic

JEL Classification: H83; I23; M49

1. Introduction

The quality of Higher Education Institutions (HEIs) is still a hot topic, especially in the current era of global ranking and accreditation (Musselin, 2018). Even this competition continues, although the world is in the middle of a COVID-19 pandemic. Regardless of the pros and cons of ranking and accreditation competition (see: Anowar et al., 2015; Ordorika & Lloyd, 2015), this trend somehow brings a favorable implication in the form of efforts to improve the continuing education quality (Tjahjadi et al., 2019). It is generally believed that the advancement of a country depends on the country's ability to produce competent human resources through quality education (Asongu & Odhiambo, 2019). However, when the COVID-19 pandemic hit the world, most countries, through their governments, issued a social restriction regulation by which all public activities were locked down. It has minimized community interactions, including in HEIs, and then forced the shift of the majority of activities to online (Ahmed & Opoku, 2022; Weeden & Cornwell, 2020). This situation has interfered with the pursuit of HEI performance. Further, it has brought HEI into a dilemma considering that national and global competition does not subside though the pandemic continues. In other words, the demand for performance has not decreased even amid a pandemic. To deal with that unfavorable conditions, rapid internal adjustments within the organization are highly required (Khanal et al., 2021).

Increasing information technology (IT) applications capabilities massively and quickly, primarily related to learning, research, and community service, has been a must for most HEIs during a pandemic. This is inseparable from the shift from offline to online operations. However, the facts on the ground show that not all HEIs are successful with this policy due to user unpreparedness and IT design which is considered incompatible (Anthopoulos et al., 2016; Reich, 2021). Several works of literature noted that uncertain conditions could reduce the benefit of IT use on organizational performance due to its complexity (Anthopoulos et al., 2016; Janssen et al., 2015). As a result, IT investment cannot bring added value to the organization. Our preliminary study corroborates this argument that when the demands for increasing IT capabilities during the pandemic come, many HEIs seem to be less successful in bringing added value from IT capabilities enhancement. This is evidenced by the number of lectures still being carried out, only relying on social media even though e-learning applications have been installed. In such a condition, another critical aspect that must be emphasized is the issue of IT governance (Sengik et al., 2022; Sofyani et al., 2022). IT governance refers to the top management's capacity to control the formulation and implementation of IT strategy through organizational structures and processes that result in the desired behavior, which will ensure that IT initiatives maintain and extend the organization's strategy and objectives (Bradley et al., 2012). IT governance is also concerned with the appropriation of decision rights of the IT function (Sofyani et al., 2022). Drawing from that insight, effective IT governance has a crucial role to play in aligning IT capabilities to suit the needs and business process of the organization and increasing the process agility that is useful for achieving the performance (see, also: Queiroz et al., 2018; Tallon & Pinsonneault, 2011).

However, in contrast to developed countries, the development of IT governance issues in the HEI sector in developing countries such as Indonesia—this study location—has not received sufficient

attention from academics. More specifically, related studies that have empirically tested the role of IT governance as a prerequisite for success in bringing added value to IT capability enhancement are still scarce. Queiroz et al. (2018) disclosed that IT application orchestration capability could affect company performance by first being able to create process agility. However, their study did not consider the critical role of the IT governance aspect, and they suggested including it in the next related study. In addition, they also indicated that environmental uncertainty should be used into account as a study setting. Departing from these suggestions, the context of the COVID-19 pandemic relevant to the increasing IT capabilities in HEIs was chosen as the research setting.

In addition, another essential driver to consider in pursuing organizational performance is business-IT alignment. Buchwald et al. (2014) have formulated an integrated framework related to IT governance in which business-IT alignment is put as one of the consequences expected of effective IT governance. However, their study is only limited to the formulation of a framework. Very little empirical research has attempted to follow through. Chau et al. (2020) found that business-IT alignment contributed positively to the performance of companies moderated by effective IT governance. Ilmudeen (2021) uncovered that business-IT alignment partially mediates between managing IT investment and firm performance relationships. Due to the lack of related empirical study on business-IT alignment in the HEIs sector, this research was also initiated based on following up on the framework that Buchwald et al. (2014) proposed. Thus, the model developed in the current study is explicitly inspired by two studies mentioned, namely, Queiroz et al. (2018) and Buchwald et al. (2014).

Explicitly, this research aims to develop an IT resource orchestration model in HEIs to maintain organizational performance during swift changes due to the pandemic. To do so, this study examined the relationship between IT application orchestration capability, business-IT alignment, process agility, and HEI performance mediated by effective IT governance. This research promotes theoretical and practical contributions. Theoretically, this research presents fresh insights regarding the discussion of the IT resource orchestration model as a strategy to achieve a competitive advantage for HEI in response to the COVID-19 pandemic consequence. Specifically, this study contributes to the development of dynamic capability theory with the support of empirical data. Practically, the results of this research can be valuable inputs for HEI management, especially in designing IT development models in their institutions to promote added value for HEI performance improvement.

1.1. Theoretical framework and hypotheses development

The theoretical framework of this study is constructed by using dynamic capability theory. Dynamic capability is a theory of competitive advantage in rapidly changing environments. Teece et al. (1997) propose it as “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments”. During the pandemic, adjustment and development of internal resources, especially IT and organizational agility, continues to be encouraged (He et al., 2021). As we mentioned earlier, this cannot be separated from HEI’s ranking and accreditation competition that continues to exist even during a pandemic. Rapid adjustments in IT aspects are expected to support other internal resources, such as organizational, human, and financial, so that the HEIs can maintain their performance (Dadoukis et al., 2021; Narayanamurthy & Tortorella, 2021). The most dominant IT aspect adjustment in HEIs is related to developing and adopting new applications. The literature describes it as an IT application orchestration capability (Queiroz et al., 2018). Additionally, process agility also another aspect that gets more concern.

However, the improvement and development of IT capabilities do not guarantee the creation of added value. It is because placing IT as a strategy is complicated as IT development involves other internal organizational resources such as organizational structure, command lines and accountability, and employee readiness as users, in this context are lecturers, education staff, and students (Ali et al., 2015; Sofyani et al., 2020). To deal with such a challenge, the effectiveness

of IT governance must also be a concern (Sengik et al., 2022). Sofyani et al. (2020) uncovered that effective IT governance mediates the relationship between compliance with IT use and the quality of online-based services carried out by local governments. In other words, IT governance presence is a prerequisite for IT development to provide added value to the organization. This is also in line with the premise of dynamic capability theory that to achieve competitive advantage in rapid changes, it is not enough to only require valuable, rare, inimitable, and non-substitutable internal resources, as suggested by Barney (1991) through Resource-Based View point of view. Instead, integrating all interrelated internal resources and competencies within an organization is crucial. In IT development, this integration is conducted through effective IT governance (Sirmon et al., 2011). Asiaei et al. (2021) deduced that mobilized organizational resources integrated into a robust system could create better alignment, coordination, and direction for enhancing organizational achievement.

1.2. Hypotheses development

Studies related to IT capabilities have inspired many scholars. Although many of them find strong evidence about the contribution of IT capabilities to organizational performance (Dahiya & Mathew, 2018; Queiroz et al., 2018), little research still correlates it to business-IT alignment. IT alignment discusses the extent to which the priorities and objectives of the IT strategy are aligned or integrated with the stresses and objectives of the business strategy, such as reducing costs and increasing revenues (Wu et al., 2015). Several pieces of literature have highlighted that the role of IT resources on performance cannot be separated from the proper alignment between IT and business processes (Ilmudeen, 2021). Several scholars justify that effective IT governance is needed to harmonize IT and business processes strategically (Wu et al., 2015). When IT governance is run poorly, IT may become a wasted investment considering it is costly (Sofyani et al., 2020). Schlosser et al. (2015) deduced that IT governance mechanisms promote social alignment at various levels of management by multiple parties, from top management support and IT representatives on the executive board to joint IT planning and training, regular cycle meetings, and liaison units. If it is brought into the context of this research, then a business-IT alignment will be created if the increase in IT capabilities is accompanied by effective IT governance. Based on the preceding discussions, the following hypothesis is formulated.

H₁: IT application orchestration capability is positively associated with business-IT alignment through effective IT governance.

The same logic applies to the relationship between IT capabilities and process agility. Process agility is essential to organizational performance (P. P. Tallon et al., 2019). To alter process agility, IT application orchestration capability is one of the critical factors (Queiroz et al., 2018). However, the role of effective IT governance is also considered crucial, yet it was not tested in Queiroz et al.'s study. Therefore, they suggested that their research model be extended to include the role of IT governance. Using a similar logic to the hypothesis 1 development, this study predicts that the relationship between IT application orchestration capability and process agility is mediated by effective IT governance. Zhen et al. (2021) have examined the association between top management support, IT governance mechanisms (i.e., structural, process-based, and relational governance), and organizational agility. They uncovered that top management support is positively associated with organizational agility through the dual mediations of process-based and relational governance. Drawing from preceding discussions, the following hypothesis is formulated.

H₂: IT application orchestration capability is positively associated with process agility through effective IT governance.

Some studies have found that the aspect of IT capabilities is a determinant of organizational performance (Dahiya & Mathew, 2018; Queiroz et al., 2018). However, this benefit cannot be separated from the effective IT governance mechanism so that IT investment to increase its capabilities is in line with the organization's needs (Ali et al., 2015; Sofyani et al., 2020), especially amid a pandemic. Therefore, effective IT governance is a prerequisite for the relationship between IT application orchestration capability and HEI performance during a pandemic. Thus, the following hypothesis is proposed:

H₃: IT application orchestration capability is positively associated with performance through effective IT governance.

The importance of process agility does the search for the determinants of this aspect crucial. Several studies have reported that IT capabilities could increase process agility (Chen et al., 2014; Queiroz et al., 2018; Tallon & Pinsonneault, 2011), yet very few associate it with the IT alignment issue (P. P. Tallon et al., 2019). P. P. Tallon et al. (2019) noted that IT tends to facilitate agility during turbulent environmental conditions, like a pandemic; for instance, the organization's ability to sense what is happening in their environment and react to what they see depends on information. The organization's process agility should result from the alignment between IT and business processes. For example, when a high version of the IT application has been installed but is not compatible with the business process requirements during the online era, like the pandemic, the organization's effectiveness will slow down and vice versa. From the above discussions, simply, business-IT alignment is required to promote process agility during the COVID-19 pandemic. Thus, it is logical to propose the following hypothesis:

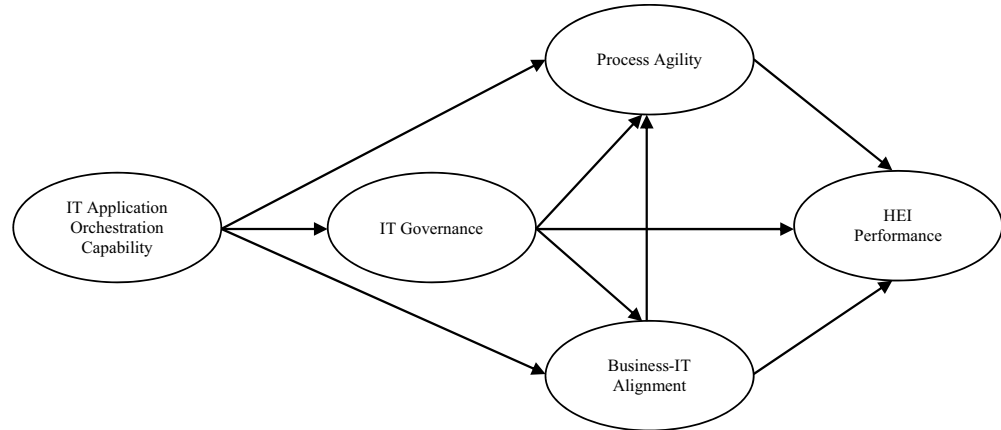
H₄: Business-IT alignment is positively associated with process agility.

The alignment or synchronization between business goals and IT initiative portfolios is pivotal since it optimizes the dynamics of business goals and processes (Schlosser et al., 2015). Gerow et al. (2014) categorized the alignment into two categories, intellectual harmony and operational harmony. When intellectual alignment is concerned with aligning business knowledge and strategic plans (what the organization wants to execute), operational alignment reflects the alignment of operational infrastructure and process strategy (P. Tallon et al., 2016). Gutierrez et al. (2009) noted that the critical factor of IT initiatives is business-IT alignment which is indicated by harmonious partnerships between business and IT managers. By so doing, aligning business strategy and IT initiatives result in positive organizational performance (Tallon & Pinsonneault, 2011). Based on the preceding discussions, the following hypothesis is proposed:

H₅: Business-IT alignment is positively associated with HEI performance.

Many studies have confirmed that the entity's process agility is positively related to performance achievement (P. P. Tallon et al., 2019). Ravichandran (2018) identified that process agility to respond to market or environment changes could positively associate with organizational performance and increase competitive advantage. In a similar vein, Chen et al. (2014) noted that environmental complexity triggers process agility, eventually contributing to the pursuit of organizational performance. Regarding this, the COVID-19 pandemic has massively and rapidly transformed most HEI activities from primarily face-to-face to online processes and has been dramatically pressured by the government lockdown instruction. This also demands agility from HEIs to adapt their operations by empowering IT resources to pursue performance. Thus, it is logical to formulate the following hypothesis:

Figure 1. Research model.



H₆: Process agility is positively associated with HEI performance.

A research model is proposed based on the theoretical framework and hypotheses developed, as shown in Figure 1.

2. Research objective, methodology, and data

2.1. Research design

This study aims to develop an IT resource orchestration model at HEI to pursue a competitive advantage measured by performance. Hence quantitative method with a cross-sectional survey is considered the fittest approach to adopt (Hair et al., 2021). This research replicates the methodology carried out by Akram et al. (2022) in conducting research related to Factors Affecting Environmental Performance during the COVID-19 Period in the Leather Industry, where moderating and mediating variables are included in their model. The data were collected through questionnaire distribution to HEIs on Java Island since most Indonesian HEIs are located. This research used a cluster sampling technique, whereby samples were chosen by considering the distribution of the provinces: East Java, West Java, Central Java, Banten, the Special Region of Yogyakarta, and the Special Capital Region of Jakarta. The respondents involved were considered to have sufficient knowledge regarding the IT development and performance of their HEIs. (Sekaran & Bougie, 2016), Therefore, members of management at all levels were involved as respondents, including the following job roles: head of the department, director, rector, vice-rector, vice-director, deputy, and dean.

2.2. Variables measurement and questionnaire administration

The IT Application orchestration capability refers to the organization's ability to update the required application profile in three ways, self-development, outsourcing, and disposition of applications that are no longer compatible. It is measured using three formative indicators developed by Queiroz et al. (2018). While IT governance alludes to certain policies that accord roles and value-added to the environment at the organization at every level. As a variable, it was measured by referring to Sofyani et al. (2020) as a development of prior research by Ali and Green (2007). Further, business-IT alignment refers to the linkage between business and IT at the strategic or planning level, which is the extent to which the IT mission, goals, and plans are supported by, the business mission, goals, and plans (Chan & Reich, 2007). The measurement of this variable uses seven items that adapt to the study of Gutierrez et al. (2009). Process agility refers to an entity's ability to respond to threats and opportunities efficiently and quickly (Tallon & Pinsonneault, 2011). This variable is measured using an instrument from Queiroz et al. (2018). Lastly, the performance of HEI alludes to the HEI accomplishment that has been planned and realized during a specified time. This variable was measured using related regulations issued by the National Accreditation

Board for Indonesian HEI. In so doing, an instrument from the Indonesian accreditation assessment of 2019 was adopted. The regulation was referred to since the measurement dealt with Indonesia's research context. Each variable was measured using a 1–5 Likert scale, indicating 1 as “strongly disagree” and 5 as “strongly agree”.

Before the questionnaire was used to collect the data, it was consulted and validated with the assistance of four associate professors from the fields of accounting information systems (Lewis et al., 2005). After obtaining some suggestions, several improvements were made to the questionnaire. The questionnaires were distributed directly in person to the prospective respondents from 15 September to 15 December 2020. This direct submission strategy was carried out to obtain a high response rate considering that most HEI management members in Indonesia were reluctant to complete the research questionnaires online.

2.3. Data analysis

In this study, Partial Least Squares-Structural Equation Modelling (PLS-SEM) was used to test the structural model. PLS-SEM tends to cope with data distribution and multicollinearity problems (Hair et al., 2021). Hair et al. (2010) noted that multivariate data distribution is normal if skewness is between 2 and +2 and kurtosis is between 7 and +7. This study test results show that the Z value for skewness and Kurtosis are 3,365.39 and 920.53, respectively. These results indicate that the data collected in this study is not normally distributed. This confirms the suitability of using PLS-SEM instead of CB-SEM as the analytical technique for this study. In addition, PLS-SEM is appropriate for this research since it allows a relatively small sample (Pratolo et al., 2020). Hair et al. (2010) suggest that the minimum sample size for a study using the PLS-SEM technique is the “10 times rule”; thereby, it should be greater than a variable with the highest number of indicators within a model. In this study, HEI performance had the highest indicators (9). Therefore, the minimum sample size should be 90 (9x10). The minimum sample size requirement was satisfied with 129 samples successfully collected for this study.

3. Results and discussion

Table 1 depicts the sample demographics. After eliminating the unsuitable respondents, the remaining 129 paired responses (data) proceeded in the data analysis process.

The self-reporting nature of the survey data might bring the potential for common method variance (CMV; Podsakoff et al., 2003), whereby a respondent may attempt to answer the questionnaire in a normative way (Chang et al., 2020). To detect such bias, the Harman Single Factor analysis was conducted (Tehseen et al., 2017). This bias is considered not to significantly affect the survey study if the single-factor test results show a value of less than 50% (Podsakoff et al., 2003). The test showed only 33.67% for a single factor in this study. Mitigated CMV problems are also indicated by low VIF values of all indicators, which are less than 3.3 (Kock, 2015). As such, it can be deduced that CMV did not significantly influence the validity of the current study's results.

Furthermore, the measurement model assessment (validity and reliability) is first carried out before assessing the structural model to examine constructs relationships within the model. In this research model, there is one construct that uses formative type, namely IT application orchestration capability, while the others use reflective one. This difference has consequences for different validity assessment techniques. In the formative construct, only validity and possible collinearity problems are assessed. The value of the outer weight, loading and its significance, and the VIF become the reference (Hair et al., 2021). Meanwhile, for reflective constructs, convergent and discriminant validity tests, as well as reliability, are the benchmarks. The values of loading, AVE, Discriminant validity, Cronbach's Alpha, and Composite Reliability become requirements for reflective construct (Hair et al., 2021).

Based on measurement model assessment results in the first test, it was found that the loading value of ITAOC3 and HEIP5 was less than 0.50. Hence, as Hair et al. (2021) they were dropped. In

Table 1. Sample demographic

Description	Number	Percentage
Category:		
Academy	16	12
Polytechnic	9	7
Higher School	43	33
Institute	13	10
University	48	37
Accreditation Predicate:		
A (Excellent)	13	10
B (Good)	80	62
C (Good enough)	31	24
Not Accredited	5	4
Types:		
Private HEI	117	91
Public HEI	12	9
Province:		
Banten	5	4
West Java	7	5
Central Java	55	43
East Java	12	9
Special Region of Yogyakarta	50	39
Number of Samples:	129	100

the second assessment (Table 2), it was found that all loadings of all constructs were more than 0.50, as required. This is corroborated by the Average Variance Extracted (AVE) value of all reflective constructs, which is more than 0.50. These results indicate that all reflective constructs have met convergent validity.

Meanwhile, for formative constructs, the outer weight score and the significance of the outer loading were referred. From the analysis results (Figure 2), it was found that all the remaining indicators of the IT application orchestration construct had a positive outer weight value and a significant loading. This implies that the formative construct validity has also been met (Hair et al., 2021). In addition, the VIF value of all indicators is less than 3.3, indicating that it is free from collinearity problems and CMV threats (Kock, 2015). Thus the results of this study can be declared valid and used for practical implications.

Furthermore, the discriminant validity test was carried out with reference to the Fornell-Larcker Criterion. From Table 3, the AVE root of each construct is greater than the correlation of the construct with other constructs. This indicates that discriminant validity has been established (Fornell & Larcker, 1981; Hair et al., 2021). Therefore, as the result of validity and reliability tests have been met, a structural model assessment can be carried out (refer to Table 4).

Figure 3 shows the structural model assessment result. Because this research uses directed hypothesis predictions, the rule of thumb for hypothesis testing uses one tailed approach where the *p* value at level 0.05 (95% probability) is equivalent to *t* value of 1.64 (Hair et al., 2010). From Table 3, it can be seen that all hypotheses were supported with different levels of significance. Additionally, this research model was considered fit since the SMRM value is close to 0 and less than 0.10 or 0.08, i.e., 0.067 (Henseler et al., 2014). However, it was found that the *R*² value was at a low level, namely 0.196 (Chin, 1998).

Table 2. Convergent validity and reliability test results. Source: own research

Construct	Indicator	Loading
<i>IT Application Orchestration Capability—CA: NA; CR: NA; AVE: NA</i>		
ITAOC1	Develop IT applications internally more rapidly than other competitors	0.853
ITAOC2	Purchase valuable IT applications more quickly than other competitors	0.682
<i>IT Governance—CA: 0.83; CR: 0.90; AVE: 0.75</i>		
ITG1	The positive impact of IT on the environment at every HEI level	0.893
ITG2	The added value brought by IT to the HEI	0.890
ITG3	The significant supporting factor of IT governance in the HEI	0.815
<i>Business-IT Alignment—CA: 0.89; CR: 0.91; AVE: 0.60</i>		
BITA1	Business strategies understanding by the IT department	0.767
BITA2	IT capabilities understanding by executives	0.707
BITA3	Knowledge sharing regarding the organization's strategic and operational	0.807
BITA4	Regular meetings to discuss IT priorities	0.813
BITA5	Regular meetings to discuss IT requirements	0.817
BITA6	Regular meetings to discuss IT implementation	0.848
BITA7	Flexible communication environment to discuss business and IT strategies	0.681
<i>Process Agility—CA: 0.89; CR: 0.92; AVE: 0.62</i>		
PA1	Meeting environmental changes	0.820
PA2	Providing new services according to student needs	0.825
PA3	Adapting the academic process to the new curriculum policy	0.796
PA4	Adjusting the budget in response to environmental changes due to pandemic	0.556
PA5	Expanding regional, national, and international markets for new students	0.833
PA6	Adopting new technology to improve academic quality	0.846
PA7	Adopting new technology to improve administrative service quality	0.815
<i>HEI Performance—CA: 0.90; CR: 0.92; AVE: 0.60</i>		
HEIP1	Teaching according to the new regulated curriculum	0.731
HEIP2	Effective online lectures	0.773

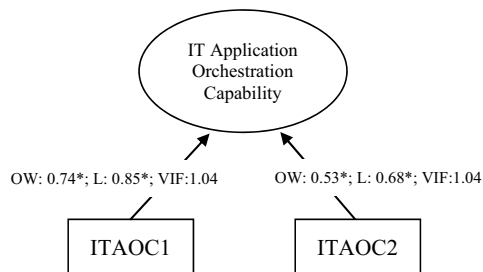
(Continued)

Table 2. (Continued)

Construct	Indicator	Loading
HEIP3	Completion of timely supervision of student's final assignments	0.822
HEIP4	Publication in academic journals	0.531
HEIP6	Community service work programs to solve problems in communities	0.776
HEIP7	Effective services to all campus academics	0.852
HEIP8	Fast service to all campus academics	0.868
HEIP9	HEI's key performance indicators achievement in general	0.826

CA: Cronbach's Alpha; CR: Composite Reliability; AVE: Average Variance Extracted; NA: Not Applicable due to formative construct; ITAOC3 and HEIP5 were dropped due to low loadings.

Figure 2. Validity Test results for formative construct.



*p<0.05; OW: Outer Weight, L: Loading; VIF: Variance Inflation Factor

3.1. Discussion

The current study formulated a conceptual framework and hypothesized relationships based on dynamic capability theory. The theory premises that survival competitive advantage that occurs quickly due to environmental uncertainty or changes could be achieved when the organization can adjust, bundle, and integrate its internal resources and competencies (Helfat et al., 2009; Teece et al., 1997). From this theoretical foundation, six hypotheses are proposed where the test results show that all were supported even though the R² value was low. However, this research model was considered fit. Therefore, the results of this study are acceptable as a practical policy reference.

Specifically, the study results supported IT governance mediation hypotheses, i.e., H₁, H₂, and H₃. Thus, it strengthens previous literature that IT governance is an important prerequisite for IT capabilities enhancement, especially application orchestration, to create business-IT alignment and process agility that eventually improve performance (Ali et al., 2015; Sengik et al., 2022). In particular, the results of this study confirm the findings of Sofyani et al. (2020) that IT governance is a prerequisite for improving IT compliance in local governments to pursue better accountability and performance. It is evident from the significant effect of IT governance as mediation. The study results also answer Queiroz's assumption that effective IT governance relationships play an important role in supporting the relationship between IT capabilities aspect and process agility. In addition, it confirms the conceptual framework that Buchwald et al. (2014) developed, where IT governance provides benefits for building IT alignment, leading to performance. Moreover, this study affirms Zhen et al. (2021) that the IT governance mechanism run by the company can mediate the relationship between top management support and organizational agility.

Figure 3. Structural model assessment result.

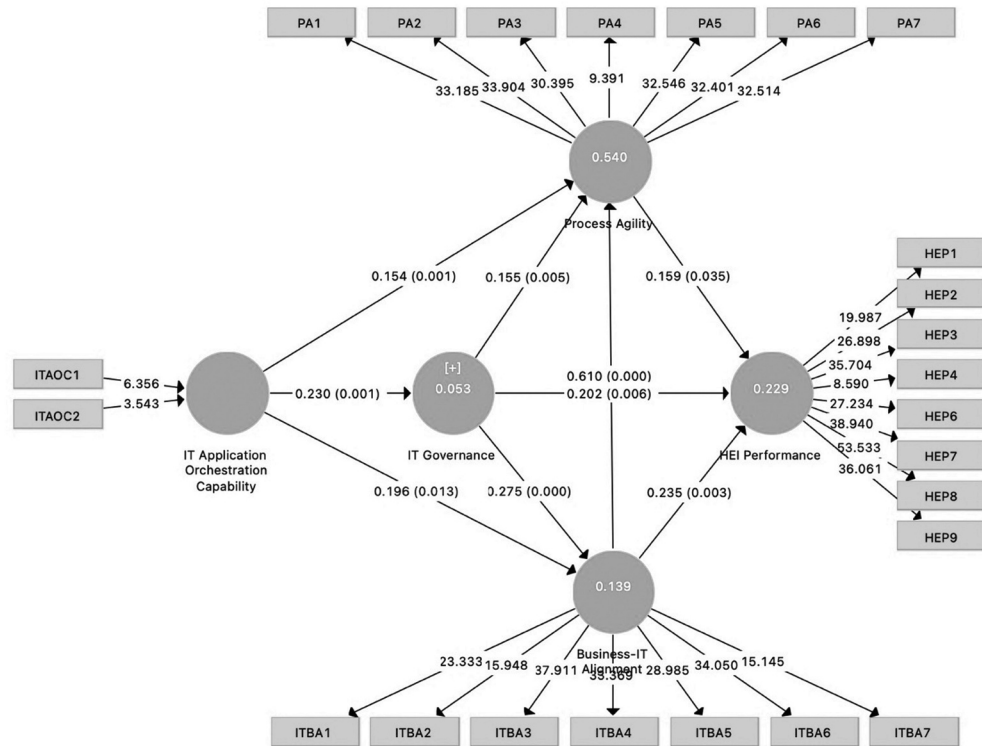


Table 3. Discriminant validity (Fornell-Larcker criterion)

Construct	BITA	HEIP	ITAOC	ITG	PA
Business-IT Alignment	0.779				
HEI Performance	0.415	0.779			
IT Application Orchestration Capability	0.259	0.266	NA		
IT Governance	0.321	0.331	0.231	0.867	
Process Agility	0.699	0.401	0.349	0.387	0.790

NA: Not Applicable due to formative →construct

Furthermore, this study also supports H₄, where business-IT alignment can promote process agility. Related research that examines the relationship between these two variables is still rare. Therefore the results of this study provide empirical evidence and add to the relevant literature. These results support P. P. Tallon et al. (2019), which implies that business-IT alignment can facilitate the creation of process agility for organizations during uncertain conditions, including during a pandemic. On the other hand, the last two hypotheses are also supported, where business-IT alignment and process agility are crucial factors for pursuing organizational performance. These results confirm the findings of many previous studies (e.g., Chan & Reich, 2007; Queiroz et al., 2018; Tallon & Pinsonneault, 2011).

3.2. Theoretical implications

Survival organizational performance, as an indicator of competitive advantage amid a rapidly changing environment, is still a concern for many corporate and non-corporate organizations such as HEI, especially during the COVID-19 pandemic. When the pandemic swept the world,

Table 4. Structural model assessment results (Hypothesis testing)

Relationship	Symbol	Original Sample	SD	T Statistics	P Values	Conclusion
Mediation						
ITAOC → ITG → BITA	H ₁	0.063	0.025	2.555	0.005**	Supported
ITAOC → ITG → PA	H ₂	0.036	0.019	1.851	0.032*	Supported
ITAOC → ITG → HEIP	H ₃	0.046	0.024	1.954	0.026*	Supported
Direct Relations						
BITA → HEIP	H ₄	0.235	0.089	2.638	0.004**	Supported
BITA → PA	H ₅	0.610	0.059	10.255	0.000**	Supported
PA → HEIP	H ₆	0.159	0.087	1.817	0.035*	Supported
R² = 0.196						
SRMR (model fit) = 0.067						

*p < 0.05; **p < 0.01 —ITAOC: IT application orchestration capability; BITA: Business-IT alignment; PA: Process agility; ITG: IT governance; HEIP: Higher education institutions performance

almost all HEI activities were carried out online. However, it created a dilemma in the pursuit of performance. On the other hand, most studies have examined various determinants of organizational performance by using the Resource-Based View (RBV) perspective. Yet, few studies employed a dynamic capability viewpoint that is more relevant to the environmental uncertainty context. On the one hand, however, some scholars criticized that the theory of dynamic capability is unclear and tautological and fails to describe exactly how it is done (Wang & Ahmed, 2007; Wheeler, 2002). Besides, some others contended that dynamic capacities theory is difficult to identify and operationalize (Lawson & Samson, 2001). To answer these criticisms, this study examined the model that can be used to operationalize this theory into practice. Based on the proposed model testing explicitly, this study provides empirical evidence that IT application orchestration capability positively contributes to creating two added values within HEI, namely business-IT alignment and process agility through effective IT governance as an orchestrator (mediator). It subsequently contributes to maintaining the HEI performance during the pandemic. By doing so, this study contributes to the development of dynamic capability theory by presenting how the theory viewpoint is translated into an operational model which helpful for practice. Hence, practical management policies can focus on pursuing performance through IT capabilities enhancement policy during the pandemic.

3.3. Practical implications

The results of this study provide very useful input for practitioners, especially HEI management. Although the HEI sector is synonymous with not-for-profit organizations, this sector also experiences tight competition nationally and globally. For that purpose, maintaining the HEI performance, even amid a pandemic, is necessary as it is related to ranking and accreditation status (Musselin, 2018). These two things would be associated with public trust and the interest of prospective students, eventually associated with the viability of HEI (Sofyani et al., 2022). Drawing from the current study results, it is suggested that amid pressure on online activities as instructed by the government, increasing IT capabilities aimed at creating business-IT alignment and process agility needs to take the IT governance effectiveness issue into account. Therefore, IT governance mechanisms, such as structural, process-based, and relational governance, must be a concern of HEI management. If the organizations successfully create business-IT alignment and process agility, the performance would be positively enhanced. Therefore, this study's proposed IT resource orchestration model can be applied to maintain HEI's performance, especially during a pandemic situation. Although, perhaps this model is also relevant in the context of no pandemic.

4. Conclusion

This study aims to propose the IT resource orchestration model for HEI to maintain performance to promote competitive advantage amid the COVID-19 pandemic. Specifically, this study examines the relationship between IT application orchestration capability on process agility and business-IT alignment by placing IT governance as a mediator. This study also examines the relationship between process agility and business-IT alignment on HEI performance as an indicator of competitive advantage. In summary, all the proposed hypotheses were supported. It was found that IT governance plays a role as a mediator for the relationship between IT application orchestration capability, business-IT alignment, and process agility. Furthermore, business-IT alignment is positively associated with process agility and both variables are positively associated with HEI performance. The current study results align with previous studies, as we highlighted in the discussion section.

Even though it has a small R^2 level, the SRMR analysis concludes that the proposed model is a fit. As such, this model can be used for practical implications, especially in the context of HEIs in Indonesia. However, other developing countries that are also in HEIs competition and prioritize IT resources as one of the strategies might consider the model proposed by this study. In addition, even though it was executed in the context of the COVID-19 pandemic, the study results may be applied to a normal context (not a pandemic). Theoretically, this study extends the dynamic capability theory by formulating an applicable model for practice. During a pandemic, rapid

adjustments to the environment through IT application orchestration capability will determine business-IT alignment and process agility that are eventually associated with HEI performance. Nonetheless, it is not enough to get there. Proper orchestration of IT resources must also accompany the speed of environmental adjustment. This is where the role of IT governance is crucial, seen from its role as a mediator.

Finally, this study has several important limitations to note and becomes suggestions for further research on a related topic. First, the type of organization studied was only HEI, so the proposed model may not necessarily be compatible with other types of not-for-profit organizations. Therefore, future studies can extend model testing to other types of not-for-profit organizations such as schools, hospitals, government institutions, etc. Second, this study only used a survey-based, so the results presented were not detailed. For example, it was not explored sufficiently how HEIs achieve effective IT governance and then contribute to creating business-IT alignment and process agility. As such, further studies need to be carried out with a qualitative approach for investigative purposes to obtain more in-depth and detailed insights. Last but not least, this study was only conducted on Java island, Indonesia, so the generalization of the study results needs to be done carefully. Further studies can be conducted on a different island or even in other countries to expand and complement the results of the current study.

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References

- Ahmed, V., & Opoku, A. (2022). Technology supported learning and pedagogy in times of crisis: The case of COVID-19 pandemic. *Education and Information Technologies*, 27(1), 365–405. <https://doi.org/10.1007/s10639-021-10706-w>
- Akram, K., Saeed, A., Bresciani, S., Rehman, S. U., & Ferraris, A. (2022). Factors affecting environmental performance during the covid-19 period in the leather industry: A moderated-mediation approach. *Journal of Competitiveness*, 14(1), 5–22. <https://doi.org/10.7441/joc.2022.01.01>
- Ali, S., & Green, P. (2007). IT governance mechanisms in public sector organisations: An Australian context. *Journal of Global Information Management (JGIM)*, 15(4), 41–63. <https://doi.org/10.4018/jgim.2007100103>
- Ali, S., Green, P., & Robb, A. (2015). Information technology investment governance: What is it and does it matter? *International Journal of Accounting Information Systems*, 18, 1–25. <https://doi.org/10.1016/j.accinf.2015.04.002>
- Anowar, F., Helal, M. A., Afroj, S., Sultana, S., Sarker, F., & Mamun, K. A. (2015). A critical review on world university ranking in terms of top four ranking systems. *New Trends in Networking, Computing, e-learning, Systems Sciences, and Engineering*, 559–566. https://doi.org/10.1007/978-3-319-06764-3_72
- Anthopoulos, L., Reddick, C. G., Giannakidou, I., & Mavridis, N. (2016). Why e-government projects fail? An analysis of the healthcare.gov website. *Government Information Quarterly*, 33(1), 161–173. <https://doi.org/10.1016/j.giq.2015.07.003>
- Asiaei, K., Rezaee, Z., Bontis, N., Barani, O., & Sapiei, N. S. (2021). Knowledge assets, capabilities and performance measurement systems: A resource orchestration theory approach. *Journal of Knowledge Management, ahead-of-print*, 25(8), 1947–1976. ahead-of-print. <https://doi.org/10.1108/JKM-09-2020-0721>
- Asongu, S. A., & Odhiambo, N. M. (2019). Basic formal education quality, information technology, and inclusive human development in sub-Saharan Africa. *Sustainable Development*, 27(3), 419–428. <https://doi.org/10.1002/sd.1914>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bradley, R. V., Byrd, T. A., Pridmore, J. L., Thrasher, E., Pratt, R. M., & Mbarika, V. W. (2012). An empirical examination of antecedents and consequences of IT governance in US hospitals. *Journal of Information Technology*, 27(2), 156–177. <https://doi.org/10.1057/jit.2012.3>
- Buchwald, A., Urbach, N., & Ahlemann, F. (2014). Business value through controlled IT: Toward an integrated model of IT governance success and its impact. *Journal of Information Technology*, 29(2), 128–147. <https://doi.org/10.1057/jit.2014.3>
- Chang, S.-J., van Witteloostuijn, A., & Eden, L. (2020). Common method variance in international business research. In *Research methods in international business* (pp. 385–398). Springer. https://doi.org/10.1007/978-3-030-22113-3_20
- Chan, Y. E., & Reich, B. H. (2007). IT alignment: What have we learned? *Journal of Information Technology*, 22(4), 297–315. <https://doi.org/10.1057/palgrave.jit.2000109>

- Chau, D. C., Ngai, E. W., Gerow, J. E., & Thatcher, J. B. (2020). The effects of business-IT strategic alignment and IT governance on firm performance: A moderated polynomial regression analysis. *MIS Quarterly*, 44(4), 1679–1703. <https://doi.org/10.25300/MISQ/2020/12165>
- Chen, Y., Wang, Y., Nevo, S., Jin, J., Wang, L., & Chow, W. S. (2014). IT capability and organizational performance: The roles of business process agility and environmental factors. *European Journal of Information Systems*, 23(3), 326–342. <https://doi.org/10.1057/ejis.2013.4>
- Chin, W. W. (1998). Commentary: Issues and opinion on structural equation modeling. (Vol. 22, pp. 7–16). *MIS Quarterly*. <https://www.jstor.org/stable/249674>
- Dadoukis, A., Fiaschetti, M., & Fusi, G. (2021). IT adoption and bank performance during the Covid-19 pandemic. *Economics Letters*, 204, 109904. <https://doi.org/10.1016/j.econlet.2021.109904>
- Dahiya, D., & Mathew, S. K. (2018). IT infrastructure capability and eGovernment system performance: An empirical study. *Transforming Government: People, Process and Policy*, 12(1), 16–38. <https://doi.org/10.1108/TG-07-2017-0038>
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Gerow, J. E., Grover, V., Thatcher, J., & Roth, P. L. (2014). Looking toward the future of IT-business strategic alignment through the past. *MIS Quarterly*, 38(4), 1159–1186. <https://doi.org/10.25300/MISQ/2014/38.4.10>
- Gutierrez, A., Orozco, J., & Serrano, A. (2009). Factors affecting IT and business alignment: A comparative study in SMEs and large organisations. *Journal of Enterprise Information Management*, 22(1/2), 197–211. <https://doi.org/10.1108/17410390910932830>
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate data analysis*. Pearson Prentice Hall.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.
- Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D., & Winter, S. G. (2009). *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons.
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about partial least squares: comments on rönkkö & evermann (2013). *Organizational Research Methods*, 17(2), 182–209. <https://doi.org/10.1177/1094428114526928>
- He, W., Zhang, Z. J., & Li, W. (2021). Information technology solutions, challenges, and suggestions for tackling the COVID-19 pandemic. *International Journal of Information Management*, 57, 102287. <https://doi.org/10.1016/j.ijinfomgt.2020.102287>
- Ilmudeen, A. (2021). The impact of managing IT on business-IT alignment and firm performance: An empirical study. *Foresight*, 23(6), 679–697. <https://doi.org/10.1108/FS-11-2020-0116>
- Janssen, M., Van Der Voort, H., & van Veenstra, A. F. (2015). Failure of large transformation projects from the viewpoint of complex adaptive systems: Management principles for dealing with project dynamics. *Information Systems Frontiers*, 17(1), 15–29. <https://doi.org/10.1007/s10796-014-9511-8>
- Khanal, P., Bento, F., & Tagliabue, M. (2021). A scoping review of organizational responses to the covid-19 pandemic in schools: A complex systems perspective. *Education Sciences*, 11(3), 115. <https://doi.org/10.3390/educsci11030115>
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration (Ijec)*, 11(4), 1–10. <https://doi.org/10.4018/ijec.2015100101>
- Lawson, B., & Samson, D. (2001). Developing innovation capability in organisations: A dynamic capabilities approach. *International Journal of Innovation Management*, 5(3), 377–400. <https://doi.org/10.1142/S1363919601000427>
- Lewis, B. R., Templeton, G. F., & Byrd, T. A. (2005). A methodology for construct development in MIS research. *European Journal of Information Systems*, 14(4), 388–400. <https://doi.org/10.1057/palgrave.ejis.3000552>
- Musselin, C. (2018). New forms of competition in higher education. *Socio-Economic Review*, 16(3), 657–683. <https://doi.org/10.1093/ser/mwy033>
- Narayanamurthy, G., & Tortorella, G. (2021). Impact of COVID-19 outbreak on employee performance—moderating role of industry 4.0 base technologies. *International Journal of Production Economics*, 234, 108075. <https://doi.org/10.1016/j.ijpe.2021.108075>
- Ordorika, I., & Lloyd, M. (2015). International rankings and the contest for university hegemony. *Journal of Education Policy*, 30(3), 385–405. <https://doi.org/10.1080/02680939.2014.979247>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879. <https://doi.org/10.1037/0021-9010.88.5.879>
- Pratolo, S., Sofyani, H., & Anwar, M. (2020). Performance-based budgeting implementation in higher education institutions: Determinants and impact on quality. *Cogent Business & Management*, 7(1), 1786315. <https://doi.org/10.1080/23311975.2020.1786315>
- Queiroz, M., Tallon, P. P., Sharma, R., & Coltman, T. (2018). The role of IT application orchestration capability in improving agility and performance. *The Journal of Strategic Information Systems*, 27(1), 4–21. <https://doi.org/10.1016/j.jsis.2017.10.002>
- Ravichandran, T. (2018). Exploring the relationships between IT competence, innovation capacity and organizational agility. *The Journal of Strategic Information Systems*, 27(1), 22–42. <https://doi.org/10.1016/j.jsis.2017.07.002>
- Reich, J. (2021). Ed tech's failure during the pandemic, and what comes after. *Phi Delta Kappan*, 102(6), 20–24. <https://doi.org/10.1177/0031721721998149>
- Schlosser, F., Beimborn, D., Weitzel, T., & Wagner, H.-T. (2015). Achieving social alignment between business and IT—an empirical evaluation of the efficacy of IT governance mechanisms. *Journal of Information Technology*, 30(2), 119–135. <https://doi.org/10.1057/jit.2015.2>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Sengik, A. R., Lunardi, G. L., Bianchi, I. S., & Wiedenhöft, G. C. (2022). Using design science research to propose an IT governance model for higher education institutions. *Education and Information Technologies*, 1–21. <https://doi.org/10.1007/s10639-022-11088-3>

- Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. *Journal of Management*, 37(5), 1390–1412. <https://doi.org/10.1177/0149206310385695>
- Sofyani, H., Riyadh, H. A., & Fahlevi, H. (2020). Improving service quality, accountability and transparency of local government: The intervening role of information technology governance. *Cogent Business & Management*, 7(1), 1735690. <https://doi.org/10.1080/23311975.2020.1735690>
- Sofyani, H., Tahar, A., & Ulum, I. (2022). The role of IT capabilities and IT governance on accountability and performance of higher education institutions during the COVID-19 pandemic. *Management and Accounting Review*, 21(2), 167–190. <https://mar.uitm.edu.my/index.php/current-issue/27-cv21n02/176-av21n02-7>
- Tallon, P. P., & Pinsonneault, A. (2011). Competing perspectives on the link between strategic information technology alignment and organizational agility: Insights from a mediation model. *MIS Quarterly*, 35(2), 463–486. <https://doi.org/10.2307/23044052>
- Tallon, P., Queiroz, M., Coltman, T. R., & Sharma, R. (2016). Business process and information technology alignment: Construct conceptualization, empirical illustration, and directions for future research. *Journal of the Association for Information Systems*, 17(9), 563–589. <https://doi.org/10.17705/1jais.00438>
- Tallon, P. P., Queiroz, M., Coltman, T., & Sharma, R. (2019). Information technology and the search for organizational agility: A systematic review with future research possibilities. *The Journal of Strategic Information Systems*, 28(2), 218–237. <https://doi.org/10.1016/j.jsis.2018.12.002>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. [10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and controlling for common method variance: A review of available methods. *Journal of Management Sciences*, 4(2), 142–168. <https://doi.org/10.20547/jms.2014.1704202>
- Tjahjadi, B., Soewarno, N., Astri, E., & Hariyati, H. (2019). Does intellectual capital matter in performance management system-organizational performance relationship? Experience of higher education institutions in Indonesia. *Journal of Intellectual Capital*, 20(4), 533–554. <https://doi.org/10.1108/JIC-12-2018-0209>
- Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, 9(1), 31–51. <https://doi.org/10.1111/j.1468-2370.2007.00201.x>
- Weeden, K. A., & Cornwell, B. (2020). The small-world network of college classes: Implications for epidemic spread on a university campus. *Sociological Science*, 7, 222–241. <https://doi.org/10.15195/v7.a9>
- Wheeler, B. C. (2002). NEBIC: A dynamic capabilities theory for assessing net-enablement. *Information Systems Research*, 13(2), 125–146. <https://doi.org/10.1287/isre.13.2.125.89>
- Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organizational performance. *MIS Quarterly*, 39(2), 497–518. <https://doi.org/10.25300/MISQ/2015/39.2.10>
- Zhen, J., Xie, Z., & Dong, K. (2021). Impact of IT governance mechanisms on organizational agility and the role of top management support and IT ambidexterity. *International Journal of Accounting Information Systems*, 40, 100501. <https://doi.org/10.1016/j.accinf.2021.100501>



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