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# Information technology and higher education institutions (HEI) performance: the mediating role of organizational capability

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**Abstract**

**Research aims:** This study aims to examine the effect of Information Technology (IT) on the performance of Higher Education Institutions (HEIs) in Indonesia. Also, this study investigates organizational capability as a mediating variable.

**Design/Methodology/Approach:** This research was conducted at HEIs covering all regions in Indonesia, namely Sumatra, Java, Kalimantan, Sulawesi, Nusra, and Bali, as well as Papua. The research sample was 368 HEIs. The data were obtained by distributing questionnaires, and hypothesis testing was conducted using the Partial Least Square (PLS) method.

**Research findings:** The study revealed that IT positively affected organizational capability and HEI performance. Organizational capability yielded a positive effect on HEI performance. Furthermore, organizational capability mediated the effect of IT on HEI performance.

**Theoretical contribution/ Originality:** This study contributes to the research area dealing with IT, HEIs performance, and organizational capability as a mediating variable.

**Practitioner/Policy implication:** HEI managers should improve their IT resources to enhance organizational capability, thereby improving organizational performance.

**Limitation/Implication:** The limitation of the study is that the data collection only used questionnaires, so the information obtained was not in-depth.

**Keywords:** Information Technology; Organizational Capability; HEIs Institution Performance

## Introduction

Since higher education institutions (HEIs) possess a different management system from a business company, the performance measurement is also different (Mohammad, 2020; Marlina & Tjahjadi, 2021). In business companies, it is only seen from financial and non-financial aspects, while in HEIs, it is more complex not only from financial and non-financial aspects but also from academic and non-academic aspects (Mohammad, 2020; Mati, 2018; Tjahjadi et al., 2019). In addition, HEI performance refers to the achievement resulting from the HEI process/behavior (Angiola et al., 2017; Guarini et al., 2020; Manuel, 2018; Tjahjadi et al., 2019). The achievement of these HEIs' performance can be seen from the accreditation ranking obtained by the HEIs and the study department (Manuel, 2018). The HEI with an A accreditation means that it has passed excellent standards in carrying out the main activities of HEIs.

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This, of course, correlates with the quality of graduates needed in the world of business and industry.

However, based on the current reality, the quality of HEI is still far from expectations. This can be seen from the data that of 4,504 HEIs in Indonesia, only 96 HEIs, or around 2%, received an accreditation grade of A. Furthermore, 831 HEIs, or 18%, had B accreditation, and 1457 HEIs, or 32%, obtained C accreditation. Meanwhile, the remaining 2120 HEIs, or 48%, were not yet accredited (Kemendikbud Dikti, 2021).

In addition, the coronavirus outbreak that has hit the whole world has changed the operational activities of various industrial sectors, including the HEI industry in Indonesia. The social distancing restrictions recommended by the government to prevent the spread of the virus require all activities on campus to be carried out online. As a result, Information Technology (IT) has become a significant requirement in supporting institutional operational activities to carry out education, research, and service processes. With HEI technology, it will be much easier to obtain and convey information that is very important in managing its resources (Rodeiro-pazos et al. 2018). This aligns with Regulation of the Minister of Education and Culture (Permendikbud) No. 3 of 2020 concerning independent campuses, stating that technology in HEI activities will support various innovations and creativity to encourage the acceleration of freedom of learning policies.

The use of IT can improve organizational performance. According to Govindaraju et al. (2020), IT positively affects HEIs' performance. The results of this study are in line with Smith (2011), Tarhini (2018), Rodeiro-pazos et al. (2018), Rafi et al. (2019), and Dahms et al. (2020), stating that IT has a positive effect on organizational performance. However, it differs from the research results of Hadjikhani and Lindh (2020), which revealed that IT does not affect organizational performance. Based on the inconsistency of the research results described previously, other variables are suspected to mediate the relationship of IT with organizational performance. Related to that, according to contingency theory, no concept is universally applied; it depends on an organization's situational and conditional nature (Otley, 2016). Here, IT is a communication medium used to make information more effective and efficient. However, organizational performance must be supported by the ability of resources in the form of organizational capability. According to Ghobakhloo and Azar (2018), IT can support organizational capability in innovation and creativity to improve organizational performance.

Apart from that, HEI performance is assessed from input, process, and output, which is reflected in the accreditation scores obtained. The highest accreditation assessment weight is attained from the quality of the organization's human resources. Therefore, HEI accreditation is greatly influenced by the ability of educators to implement the main activities of HEIs, including education and teaching, research, and community service (Wahyudi, 2020). In this case, IT supports its human resources in quickly obtaining the latest information to foster ideas, innovation, and creativity in operational activities (Tarhini, 2018). Thus, IT will encourage organizational capability in HEIs to be much

better. This corroborates with the research results of Wang (2016) and Ghobakhloo & Azar (2018), which assert that IT has a positive effect on organizational capability.

According to the resource-based view (RBV) theory, the combination of organizational resources and capabilities that are different from competitors can create a competitive advantage, which in turn can improve organizational performance (Wernerfelt, 1984; Ie et al. 2019). In this instance, HEIs are complex organizations that produce competent resources that human resources must support with competence both functionally, namely education and teaching, research and community service, and structurally, namely organizational management (Tjahjadi et al., 2019). Therefore, the ability of the organization to interact both economically and socially, internally and externally, can create advantages and ultimately improve the performance of HEIs (Ie et al., 2019). This agrees with the research results uncovered by Li and Liu (2014), Sugiarto (2016), Heckmann et al. (2016), Prange and Carlos (2017), Angulo-ruiz et al. (2018), Annunziata et al. (2018), Ie et al. (2019), Sanchez-Medina (2020), Er and Nurmawati (2020), and Kimata and Itakura (2021), showing that organizational capability has a positive effect on organizational performance. Nevertheless, research on this topic in HEIs is rarely carried out.

Therefore, this study aims to examine empirical evidence that IT affects HEI performance by mediating organizational capability. This research provides practical and theoretical contributions. Concerning practical contributions for HEIs, managers should improve organizational performance by paying attention to organizational capabilities in using IT. Furthermore, the theoretical contribution of this research is that developing a resource-based theory of HEIs as a non-profit organization is rarely carried out.

## **Literature Review and Hypotheses Development**

### **Underlying Theory**

RBV theory elucidates that organizations use their resources as a source of competitive advantage to improve organizational performance. This theory views resources and capabilities as critical for organizations because they are the basis of competitive capabilities and organizational performance. The resources in question are all assets, capabilities, organizational processes, organizational attributes, information, knowledge, and others that can be controlled by the organization (Wernerfelt, 1984; Barney, 1991; Tzokas & Saren, 2004; Crick, 2019). In this research, the RBV theory is used as a basis for explaining the influence of IT on organizational capability and HEI performance. Here, IT is a resource used as a communication medium so that interaction capabilities within organizations become more effective and efficient (Ghobakhloo & Azar, 2018; Wang, 2016; Luo et al., 2012; Chen et al., 2019). With good organizational interaction capabilities, one can increase synergy between resources in carrying out operational activities so that services to all stakeholders are high quality (Rodeiro-pazos et al., 2018).

### **IT and HEI Performance**

According to the RBV theory, IT is one of the organizational resources that makes it easy for individuals to integrate (Er & Nurmadewi, 2020; Dahms et al., 2020). This denotes that IT is a vital asset in company performance innovation. IT can strengthen intra- and inter-organizational relationships, i.e., the exchange of ideas and information that takes place occasionally. IT is also essential in building the strength of HEI relationships both internally and externally. In addition, IT is a medium that plays a crucial role in the development and progress of HEIs. With IT, each individual involved in operational activities can interact more efficiently so that organizational management becomes more effective and efficient, ultimately improving HEIs' performance. This aligns with Govindaraju et al. (2020), Rodeiro-pazos et al. (2018), and Rafi et al. (2019), who showed that IT has a positive effect on HEI performance. Based on the explanation above, the hypothesis proposed is as follows.

*H<sub>1</sub>: IT has a positive effect on HEI performance.*

### **IT and Organizational Capability**

The RBV theory views that the resources owned by an organization must be combined with the organization's ability to manage them differently from competitors to excel in competition (Crick, 2019). In this case, IT is the means and infrastructure used as a medium of information with various parties interested in the organization both internally and externally so that its operational activities run effectively and efficiently. This will undoubtedly impact organizational capability in managing tangible and intangible organizational assets, thereby increasing the organization's operational capacity. According to Ghobakhloo et al. (2018), IT supports an organization's ability to carry out operational activities. This is in harmony with the results of studies by Wang (2016), Chatterjee et al. (2015), and Chen et al. (2019), demonstrating that IT positively affects organizational capability, especially in terms of efficiency and effectiveness. From the explanation above, the hypothesis derived is as follows:

*H<sub>2</sub>: IT has a positive effect on organizational capability.*

### **Organizational Capability and HEI Performance**

RBV theory explicates how companies can build new capabilities or how to learn internal or external capabilities (Chahal et al., 2020). RBV theory defines organizational capability as a company's ability to integrate, build, and configure internal and external competition to face a rapidly changing environment (Heckmann et al., 2016). To maintain competitive advantage, HEIs must have financial and non-financial capabilities in academic and non-academic fields to improve their performance (Ie et al., 2019; Bobe & Kober, 2014). This aligns with the results of several studies that show that organizational capability helps achieve better organizational performance (Sanchez-

Medina, 2020; Hess et al., 2020; Braojos et al., 2020; Kimata & Itakura, 2021). Based on the explanation above, the hypothesis put forward is as follows:

*H<sub>3</sub>: Organizational capability has a positive effect on HEI performance.*

### Organizational Capability in Mediating the Effect of IT on HEI Performance

Under the concept of RBV theory, resources in the form of IT can encourage organizational capability by making it easier to interact with internal and external parties. Furthermore, superior organizational capability can improve HEI performance (Cass et al., 2015; Chahal et al., 2020). This is also consistent with the research results of Ghobakhloo et al. (2018) and Wang (2016), revealing that IT has a positive effect on organizational capability. Organizational capability is defined as a company's ability to integrate, build, and reconfigure internal and external competencies to assess a rapidly changing environment (Ambrosini & Bowman, 2009).

Studies on organizational capability in HEIs have been conducted, among others, by Bobe and Kober (2014) and le et al. (2019). Organizational capability or organizational abilities are essential in improving operational activities and organizational performance (Mahmood et al., 2011). The organizational capability aspect of HEIs is assessed from various aspects, such as education and teaching, research and service, and collaboration. These aspects have a crucial role in improving the operational quality of HEIs so that they gain the trust of stakeholders and can ultimately improve HEI performance (Bobe & Kober, 2014).

Furthermore, the research results of Ghobakhloo et al. (2018) pointed out that organizational capability can mediate the influence of IT on organizational performance. This indicates that IT can be used effectively and efficiently through organizational capability so that, in the end, it can improve HEI performance. Based on the explanation above, the following hypothesis is offered:

*H<sub>4</sub>: Organizational capability mediates the effect of IT on HEI performance.*

Based on the theoretical framework and hypotheses developed, this research formulates a research model presented in Figure 1.

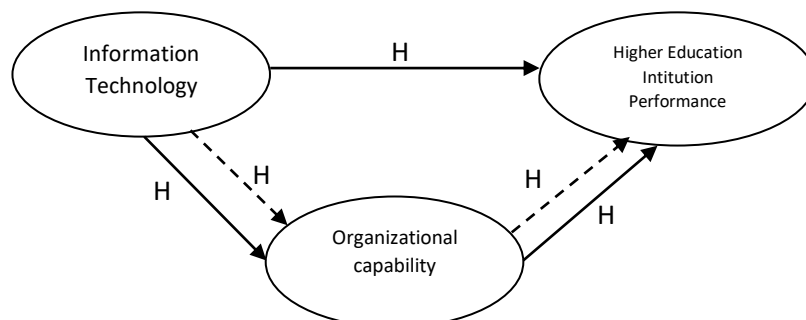


Figure 1 Research Model

## **Research Method**

The research population was 4,504 HEIs throughout Indonesia. In selecting the research sample, probability sampling was used. The number of samples was determined using the Slovin formula so that 368 HEIs were obtained as the research sample. Therefore, for the distribution of the data obtained to cover all existing HEIs from Sabang to Meraoke, the sample determination technique employed proportionate stratified random sampling (Hair et al., 2014) covering the islands of Papua, Sulawesi, Maluku, Kalimantan, Bali, and Nusra, Java as well as Sumatera. As for the data collection method, due to limited access to direct interviews, the researchers distributed questionnaires via Google Forms, which were sent directly to each of the head HEIs that became the research respondents.

To measure variables, a Likert scale of 1 (one) to 5 (five) was used. The instrument utilized by Tahar et al. (2021) was adopted for the college performance variable, including the following dimensions: (1) Curriculum, namely curriculum design, can increase student competency and is relevant to industry needs; (2) Teaching professionally oriented and includes the dimensions of student quality attributes; (3) Research, i.e., the number of lecturer research article publications and the number of studies that have been conducted; (4) Community service, namely a work program that has been produced in the community; (5) Services, which are student services that are effective and efficient, especially libraries, IT, and other academic fields; (6) Administration, covering the efficiency and effectiveness of administrative services and non-academic staff development.

Additionally, the measurement of IT variables adopted the instrument used by Georgina and Olson (2008), which includes the following dimensions: (1) IT Knowledge, namely technology literacy and technology training; (2) IT Operations, which are learning technology, online administration, and digital library; (3) IT Objects, i.e., technology integration and online system service. The measurement of organizational capability variables adopted Bobe and Kober's (2014) instrument, which is seen in three dimensions, namely research, teaching, and collaboration capabilities as follows: (1) Research capability is that the institution has a reputation in research, pursues research grants and produces publications and commercializes research through patents or consulting/training services; (2) Teaching capability, i.e., the institution has a reputation for leading teaching staff and core competencies in applying theory to practical problems (vocational) for product development or research teaching or consulting; (3) Cooperation capabilities, in which HEIs involve alums to attract and recruit students and professional relations/involvement of educational and non-educational personnel with government regulators, professional bodies, and the media in general.

Following that, data analysis was performed using SEM-PLS (Structural Equation Models Part Least Square). This research aims to confirm existing theories based on the data obtained and explain the relationship between latent variables. Therefore, SEM-PLS is deemed more appropriate for this research because it can carry out confirmatory multivariate analysis (Hair et al. 2014).

## Result and Discussion

Questionnaires were distributed online from January to April 2023 via Google Forms at 600 HEIs in Papua, Sulawesi, Maluku, Kalimantan, Bali Nusa Tenggara, Java, and Sumatra. One HEI only filled out one questionnaire. The research respondents were HEI leaders or their representatives. Since there were 380 returned questionnaires, 368 were suitable for processing, meaning they had met the minimum standards for questionnaires that would be processed according to the sample size determined based on the Slovin formula. The respondents' demographic can be seen in Table 1.

**Table 1** Respondents' Demographic

Characters	Frequency (People/HEI)	Percentage (%)
<i>Gender</i>		
Male	231	68
Female	137	31
<i>Education level</i>		
Master degree	244	66
Doctoral degree	124	34
<i>Age</i>		
< 35 years	88	24
35 - 45 years	148	40
46 - 55 years	99	27
> 55 years	33	9
<i>Location</i>		
Sumatra	153	42
Java	118	32
Bali and Nusa Tenggara	21	6
Kalimantan	17	5
Sulawesi	54	14
Maluku and Papua	5	1
<i>Type of HEIs</i>		
University	75	20
Academy	102	28
Institute	20	5
Polytechnic	23	6
College	148	40

Table 1 demonstrates the demographics of research respondents based on gender, age, education, location, and type of HEIs. Regarding gender, 63% were male and 31% were female. However, this study did not differentiate from a gender perspective. Furthermore, the majority of HEI leaders were in the 35–45-year age range, as many as 40%, and the education level of the majority was masters (S2), which was 66%. While the location of the largest respondent HEIs was from Sumatera Island, namely 42%, this did not indicate that the most significant number of HEIs was on Sumatera Island. Meanwhile, from the aspect of HEIs, the majority were colleges, i.e., 40%.

**Descriptive Statistics**

Furthermore, descriptive statistics for each research variable can be observed in Table 2. The HEI performance variable yielded a minimum value of 2, a maximum of 5, and a mean value of 4.13. The IT variable had a minimum value of 1, a maximum value of 5, and a mean value of 4.20. Furthermore, the organizational capability variable obtained a minimum value of 2, a maximum value, and a mean value of 4.39. The three variables had an average value above a scale of 4, meaning that most respondents' answers were at the level of agree and strongly agree.

**Table 2** Descriptive Statistics

Variables	Minimum	Maximum	Mean	SD
HEIs Performance	2	5	4.13	0.63
Information Technology	1	5	4.20	0.72
Organizational Capability	2	5	4.39	0.65

N=368

**Table 3** The Outer Loading Value

Indicator	Outer loading	Reliability	AVE
<i>HEIs' Performance</i>		0.902	0.571
The new curriculum of KKNi	0.629		
Online learning	0.489		
Punctual graduation	0.618		
International publication	0.692		
National publication	0.703		
Community service implementation	0.762		
Effective service	0.840		
Quick service	0.821		
Administration quality	0.819		
<i>Information Technology</i>		0.911	0.605
Technology literacy	0.773		
Technology training	0.788		
Learning of technology	0.715		
Online administration	0.832		
Digital library	0.769		
Technology integration	0.798		
Online service system	0.765		
<i>Organizational Capability</i>		0.914	0.594
Availability of research facilities	0.782		
Research Reputation	0.796		
Reputation of teaching staff	0.715		
Facility of teaching and learning	0.806		
Learning innovation	0.779		
Alum involvement in networking	0.523		
Partnership of intern student	0.760		
Partnership of HEIs main activities	0.754		

Table 3 indicates that the HEI performance, IT, and organizational capability variables that could meet the convergent validity test were only indicators 8, 7, and 8,



respectively. Furthermore, each construct met the reliability criteria because it had a recommended composite reliability value above 0.70 and an AVE value greater than 0.40.

**Discriminant Validity**

A good discriminant validity model is one in which the loading value for each variable indicator is greater than the loading value for each indicator of another variable. The following are the discriminant validity test results:

**Table 4** The Cross-loading Values

Indicator	HEIP	TI	OC
HEIP1	0.629	0.520	0.530
HEIP4	0.692	0.526	0.497
HEIP5	0.703	0.562	0.517
HEIP6	0.762	0.556	0.558
HEIP7	0.840	0.623	0.637
HEIP8	0.821	0.574	0.597
HEIP9	0.819	0.593	0.661
IT1	0.562	0.773	0.632
IT2	0.581	0.788	0.623
IT3	0.520	0.715	0.501
IT4	0.628	0.832	0.642
IT5	0.572	0.769	0.579
IT6	0.635	0.798	0.619
IT7	0.573	0.765	0.570
OC1	0.548	0.538	0.782
OC2	0.579	0.570	0.796
OC3	0.586	0.590	0.715
OC4	0.619	0.588	0.806
OC5	0.583	0.676	0.779
OC7	0.544	0.561	0.760
OC8	0.629	0.600	0.754

Table 4 demonstrates that the value of the loading factor for each indicator for each variable was more significant than the value for each indicator for each other variable. This denotes that each variable had a good discriminant validity value.

**Hypothesis Testing Using Structural Model Analysis**

Table 5 shows the results of hypothesis testing and R-Square. Furthermore, the percentage value of the structural model of explained variance can be seen from the value of the structural path coefficient.

**Table 5** Hypothesis Testing Results and R-Square

Hypothesis	Code	Original Sample (O)	T Statistic	Decision
IT → HEI Performance	H <sub>1</sub>	0.357	6.179*	Supported
IT → Organizational Capability	H <sub>2</sub>	0.767	23.799*	Supported
Organizational Capability → HEI Performance	H <sub>3</sub>	0.331	5.496*	Supported
IT → Organizational Capability → HEI Performance	H <sub>4</sub>	0.254	5.285*	Supported

\* Significant at alpha 0.000; Adjusted R-Squared = 0.167

**The effect of IT on HEIs’ performance**

It has been found that IT had a significant positive effect on HEI performance. These results indicate that IT is an effective and efficient communication medium in implementing HEIs' main activities to encourage organizational performance. This study is relevant to RBV theory, which proposes that IT is one of the organizational resources that makes it easy for individuals to integrate. Based on research results, the use of IT in HEIs in Indonesia could encourage flexibility in operational activities, both academic and non-academic (Smith, 2011). Furthermore, IT makes coordinating and evaluating between lines within the organization easier. IT also encourages literacy and training of organizational resources, thereby encouraging efficiency and effectiveness in organizational management (Abaidoo & Arkorful, 2014), especially in carrying out main activities in HEIs and ultimately improving the performance of HEIs in Indonesia. The results of this study align with the research of Govindaraju et al. (2020), Rodeiro-pazos et al. (2018), and Rafi et al. (2019), showing that IT has a positive effect on HEI performance.

**The effect of IT on organizational capability**

Based on the results of hypothesis testing, IT produced a significant positive effect on organizational capability. These results denote that IT is a means that can facilitate interaction both internally and externally effectively and efficiently to encourage innovation and creativity of HEI resources in Indonesia. The results of this study support the RBV theory, which states that IT is one of the organizational resources that makes it easy for each individual to integrate so that organizational capabilities are superior to competitors (Ryssel et al., 2004; Er & Nurmawati, 2020; Dahms et al., 2020). The study results corroborate with the results of the study of Ghobakhloo et al. (2018), Wang (2016), Chatterjee et al. (2015), Liu et al. (2018), Luo et al. (2012), and Chen et al. (2019), revealing that IT has a positive effect on organizational capability. Based on research results, IT includes learning technology and online administration, integration of technology and online service systems, and literacy and training, which can encourage innovation and creativity in organizational resources in teaching, research, and community service, as well as collaboration at HEIs in Indonesia. The use of technology in implementing the main activities has encouraged organizational resources to be creative and productive in carrying out their activities to advance the HEI industry in Indonesia.

### **The effect of organizational capability on HEIs' performance**

Based on the hypothesis testing results, it can be concluded that organizational capability significantly positively affected HEIs' performance. These results indicate that organizational capability is the best ability of organizational resources to innovate and be creative to improve HEI performance. The results of the present study support the RBV theory that views that scarce and difficult-to-imitate resources can create a sustainable competitive advantage (Wernerfelt, 1984; Crick, 2019). The results of the study are also consistent with the study of Ie et al. (2019), Li and Liu (2014), Heckmann et al. (2016), Prange and Carlos (2017), Angulo-ruiz et al. (2018), Annunziata et al. (2018), Sanchez-Medina (2020), Hess et al. (2020), Braojos et al. (2020), and Kimata and Itakura (2021), showing that organizational capability has a positive effect on organizational performance. Based on research results, organizational capabilities, which include learning, research, and community service capabilities, as well as collaboration, can boost the performance of HEIs in Indonesia. In other words, HEIs have high resource capabilities for the quality of curriculum, teaching, research, community service, and HEIs administration in Indonesia.

### **The effect of IT on HEIs performance mediated by organizational capability**

The results of this study support the RBV theory and contingency theory. These theories reveal that the capabilities possessed by organizational resources will encourage competitive advantage (Wernerfelt, 1984). Through organizational capability, the use of IT becomes more effective and efficient. This urges HEIs to be more innovative and creative to excel in competition and improve organizational performance (Rosli & Sidek, 2013; Azudin & Mansor, 2017). IT can support HEI resources' capability in research, education, and collaboration (Ie et al., 2019). Furthermore, using IT with capable resources can encourage organizations to perform best (Ghobakhloo & Azar, 2018).

The results uncovered that the use of IT in HEIs operational activities is a basic need. This is because, during the COVID-19 pandemic in Indonesia, all activities were carried out online. The high use of IT in HEIs can increase the capability of organizational resources (Bilal Ashfaq, 2021). This is due to the availability of fast and efficient access to information to encourage educators in the teaching and learning process to be more varied. Likewise, it will be easier to obtain references, data, and collaboration in the field of research to encourage more and more quality research publications. For cooperation capabilities with the availability of IT, it will be much easier and more efficient to build networks. Communicating online via Zoom, Google Meet, video calls, and others makes communication much easier and more economical. In other words, the availability of IT will encourage organizational capability in the form of creativity, innovation, and productivity of resources in producing the best work so that the performance of HEIs will be much better.

The research results also exhibited that IT mediated by organizational capabilities has been proven to improve the performance of HEIs in Indonesia. Thus, the use of IT in HEIs will encourage the capacity for innovation and creativity in conducting the main

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activities of HEIs and ultimately improve HEIs' performance. The findings of this study support several previous research results, including Lay and Jusoh (2017), reporting that organizational capability could mediate the influence of IT on organizational performance in Indonesia's banking industry. The novelties of this research are examining the relationship between IT and performance through organizational capabilities in the HEI context. Furthermore, the research results by Ghobakhloo and Azar (2018) stated that IT can improve the performance of manufacturing companies in China by mediating organizational capability. The research of Ie et al. (2019) on HEIs also showed that IT with organizational capability mediation could improve HEIs' performance.

## **Conclusion**

This study aims to examine empirical evidence that IT affects HEI performance by mediating organizational capability. The present study unveiled that IT directly affected the performance of HEIs. This study also revealed that IT directly affected organizational capability. Furthermore, organizational capability directly affected HEI performance and mediated the relationship between IT and HEI performance. This study supports the theory of RBV, in which the ability of organizational resources in research, education, and cooperation can create a competitive advantage to improve the performance of HEIs. This study also reinforces the RBV theory and contingency theory, where IT resources can encourage the capability of organizational resources in research, teaching, and community service to excel in competition to improve HEI performance. This research has implications for theoretical contributions. This research can expand RBV theory and contingency theory, especially in the use and control of IT in HEIs, because it can support communication and interaction activities at HEIs to be more efficient and effective during this pandemic. In terms of practical contribution, the findings of the present study can assist regulators in developing HEI standards related to aspects of human resources and management.

The limitations of the present research include the fact that the research was carried out during the COVID-19 pandemic. Therefore, data collection could only be done online through Google Forms. With the large-scale social restrictions and enforcement of restrictions on community activities, data collection offline or directly with respondents would not be possible. Hence, the research outcome might differ if the data were collected offline. From that, further research is suggested to collect data online and offline to obtain more accurate data. Further research can also add technology innovation capability variables.

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### Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.



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