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Kaizen internal quality assurance adoption and quality performance improvement in Indonesian higher education institutions: The moderating role of IT development

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Abstract

Research aims: In 2018, strengthening Higher Education Institutions (HEIs), governance began to be promoted again by the Indonesian government after its first initiation in 2003. In doing so, the Indonesian government has adopted a new internal quality assurance framework for HEIs, i.e., the Kaizen method, which emphasizes the quality improvement process. In addition, the government recommended the development of IT advancement to support management practices at the HEIs, including internal quality assurance. However, to this day, related research that examines the extent to which these policies contribute to HEI quality performance improvement still needs to be improved. To meet the gap, the current study examined the Kaizen internal quality assurance implementation role on HEI quality performance by testing the IT development as a moderator.
Design/Methodology/Approach: Using data from 191 HEI samples obtained from 31 of 34 provinces in Indonesia, the relationship between variables was tested by employing the Partial Least Square (PLS) technique.
Research findings: The results exhibited that the Kaizen internal quality assurance implementation was positively associated with HEI quality performance, where IT development strengthened the relationship (moderated). However, since the direct relationship between IT development and HEI quality performance was also significant, the moderating role of IT development was quasi in nature.
Theoretical contribution/Originality: The results provide new insights regarding the contributions of internal quality assurance reform supported by IT development to the HEI quality performance. Specifically, the study affirms the role of IT as a moderator.
Keywords: Information Technology; Internal Quality Assurance; Higher Education Institution; Quality Performance; Moderator

Introduction

Many higher education institutions (HEIs) worldwide still have serious concerns about quality today. The quality concerns arise since international and national competition on HEI in the world is getting higher due to an era of university global ranking (Fernandes & Sumardi, 2018; Tjahjadi et al., 2019). Sauder and Espeland (2009, p. 80) claim that "Rankings are part of a global movement redefining accountability, transparency, and good governance in quantitative measures". Apart from

controversy and debate (see Kallio & Kallio, 2014; Olssen & Peters, 2005), global ranking and accreditation are considered a manifestation of the current quality of HEI. On the other hand, it is generally accepted that the ability of all countries to develop their human resource effectively through education determines their ability to have a sustainable economic future (Dill, 2009).

Demand for good-quality HEI triggers universal changes in management and governance practices at HEI, especially regarding quality assurance (Mok, 2005). Many countries have begun to revise their regulations related to HEI's quality control (Blanco-Ramírez & B. Berger, 2014; Chu & Westerheijden, 2018; Das & Mukherjee, 2017; Noaman et al., 2017). For instance, the majority of European countries adopt European Standards and Guidelines (ESG) formulated by the European Association for Quality Assurance (ENQA) as standards and guidelines for assessing the quality of higher education in Europe, which constitute the main framework for quality assurance systems all over Europe (Santos & Dias, 2017). To follow these global changes in HEI quality improvement, the Indonesian government has undertaken several initiatives through the Ministry of Education and Culture (see Table 1).

Table 1 *Significant Milestones in the Indonesian HEI Management and Governance Reform*

Year	Initiatives
2003	Quality Assessment (Accreditation)
2009	Quality Assurance System for Education Institutions Internal Control System at HEI
2010	Management and Governance Reform
2011	Internal Control System at HEI (Amendment)
2012	New Accreditation System for HEI
2014	National Standard for Higher Education (Amendment) Management and Governance Reform (Amendment)
2016	Internal Quality Assurance System for HEI by Adopting Kaizen Method (Amendment)
2018	Internal Quality Assurance Guidance for HEI by Adopting the Kaizen Method Government recommendation to advance IT development for management and governance practices improvement
2019	New Accreditation Standard for HEI (Outcome-based Perspective)

In 2003, the Indonesian government first concentrated on implementing the accreditation system as a quality assessment strategy for internal and external quality assurance. External quality assurance was carried out using an audit approach in which a National Accreditation Body for HEI was tasked with assessing the quality of HEI, covering five aspects: strategic planning, academic, organizational resources (physical, human, financial), and governance. To ensure the five aspects of fulfillment, the HEI was recommended to build an internal quality assurance unit. Meanwhile, in the same year, internal quality assurance was only required, but no complementary rules explained how it should be implemented in detail. As a result, although internal quality assurance is already implemented mandatory, the Indonesian government reported that out of 4,529 Indonesian HEIs, only 1,223 (27.00%) had submitted accreditation assessment for

institutional level, with the following results: 59 (4.82%) got "A", 441 (36.06) got "B," and 723 (59.12%)[1] HEIs got "C."

According to various literature, poor design or implementation may be the cause of ineffective and low benefit of control policies to the organizations – for example, poor performance measurement system and poor management controls system (see Akbar et al., 2012; Brusca & Montesinos, 2013; Mimba et al., 2013), but in this case is poor internal quality assurance. To tackle the weaknesses of internal quality assurance in HEI and improve its implementation, the Indonesian government adopted a Kaizen method as a new framework for HEI internal quality assurance with the paradigm of continuous quality improvement. The government also launched an internal quality assurance guidance in 2018 so that the management of HEIs can understand how the Kaizen concept is implemented.

Furthermore, some literature has proposed that IT development is pivotal to promoting effective control policy, in this case, quality assurance implementation, that subsequently contributes to the HEI quality performance (see AICPA, 2014; Cao et al., 2017; COSO, 2013; ICAF & CIPFA, 2014; Klamm & Watson, 2009; Mazza & Azzali, 2016; Rubino et al., 2017; Zhang et al., 2007). Haris et al. (2017) argue that IT helps the Quality Assurance Board to collect, process, present, and monitor various data related to the quality management process and performance achievement of HEIs effectively. At the same time, Elhoseny et al. (2017) contend that the need for accurate decision-making regarding quality standards fulfillment and performance indicators achievement through internal quality implementation could be made quickly and adequately if it supports it. By 2008, the Indonesian government had advised all HEIs to upgrade their IT to assist all management and governance aspects, including HEI control policies (www.ristekdikti.go.id, 2018)[2]. Nonetheless, research investigating IT development's role in supporting internal quality assurance in Indonesian HEIs is still lacking.

On the other hand, the majority of studies on HEI quality assurance focused on the following issues: quality measurement model and framework (Ashraf et al., 2016; Tsinidou et al., 2010), the history of HEI quality assessment approach and its development (Chu & Westerheijden, 2018), stakeholders' perceptions toward HEI quality (Dicker et al., 2019; Lapina et al., 2016; Pham & Starkey, 2016), and the HEI quality improvement model with specific analytical techniques (Das & Mukherjee, 2017; Noaman et al., 2017; Venkatraman, 2007). Meanwhile, prior studies on HEI management and governance change issues have discussed more the political, historical, and principle aspects (see Kretek et al., 2013; Wardhani et al., 2019) rather than how the changes contribute to HEI quality improvement. Today, changes in HEI governance policies, such as the new framework of internal quality assurance, performance measurement systems, and IT development, have become current research areas. However, they have not received much attention from academics,

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[1] Percentage is calculated based on all HEIs that have already submitted accreditation assessment.
[2] Press Release Number: 24/SP/HM/BKKP/III/2018

especially in developing countries like Indonesia. Hence, research is urgently needed to provide empirical evidence to what extent these policies work and contribute to HEI.

To address the highlighted gaps, this study examined the role of new internal quality assurance implementation, i.e., the Kaizen method, on HEI quality performance. It also investigated the role of IT development as a moderator. By doing so, this study presents empirical evidence to related literature that discusses HEI quality issues, especially on how Indonesian HEIs executed their internal quality assurance amendment to enhance Indonesian HEI quality. Specifically, the current study addresses this issue by empirically answering whether progressive changes in governance policies at HEIs in Indonesia, particularly through strengthening the internal quality assurance implementation by adopting a new method supported by IT development, would offer any value in improving HEI quality.

Literature Review and Hypotheses Development

Internal Quality Assurance of HEI

The issue of quality assurance is a subject of management accounting. Specifically, in the accounting department curriculum in some countries, including Indonesia, the quality issue is a concern and a subject of the management control system. For example, the Kaizen concept is a learning subject in management accounting to maintain quality and reduce costs. Chartered Global Management Accounting (CGMA) defines Kaizen as a customer-driven improvement philosophy that strives for a culture of continuous quality, cost, and delivery improvement across the value chain (CGMA, 2021). The Indonesian government officially adopted the Kaizen method to guide HEIs in implementing internal quality assurance. The primary aim of internal quality assurance implementation is to make sure that HEIs can manage and improve their quality continuously through systematic control toward teaching, learning, research, service community, service, governance/leadership, management, planning, internal and external HEI relationship, and other some HEI performance indicators (Cao & Li, 2014; Santos & Dias, 2017; Woodhouse, 1999).

Internal Quality Assurance in Indonesian HEIs

According to the Indonesian regulation of 2016 related to internal quality assurance regulation for HEI, it is instructed that the internal quality assurance implementation in HEI must go through a cycle that is Setting of standards, Implementation of standards, Evaluation of standards implementation, Control of standards implementation, and Improvement of standards (SIECI). The SIECI cycle adopts the Kaizen method, depicted in Figure 1. In detail, SIECI activities are as follows: (1) Setting of standards: Adopting national higher education standards set by the Ministry of Education and Culture and formulating own additional standards by HEI. The activities also involve the preparation of quality standard documents, SOPs, and key performance indicator targets; (2) Implementation of the standard: Fulfillment of all standards (national higher education

standards set by the Ministry of Education and Culture and formulation of own additional standards by HEI); (3) Evaluation of standards implementation: Comparing the outputs of standard compliance activities with all standards set by HEI. It is carried out by conducting an internal audit; (4) Control of standards implementation: An analysis of the causes of standards that are not achieved for corrective action. The analysis results are conveyed in the management meeting; and (5) Improvement of standards: Standards improvement activities to be higher than the currently used standards (adopted national higher education standards set by the Ministry of Education and Culture and formulation own additional standards by HEI). This activity involves internal and external stakeholders (academic community) (employer, accreditation assessors, an auditor from the public accounting firm, and others).

Although many studies on internal quality assurance have been undertaken by many researchers and continue getting attention, some remain. It is noted that most previous studies about internal quality assurance focused on a conceptual framework and design (Santos & Dias, 2017; Weusthof, 1995), history and evolution of internal quality assurance (Brennan & Shah, 2000; Zawada, 2019), and stakeholders' concern on internal quality assurance (Elassy, 2013; Mourad, 2017). However, Pratasavitskaya and Stensaker (2010) argue that the study about quality assurance approaches (accreditation, assessment, or audit) addressing issues at the institutional level was less common. On the other hand, internal quality assurance as a policy to enhance HEI quality performance is still explored insufficiently.
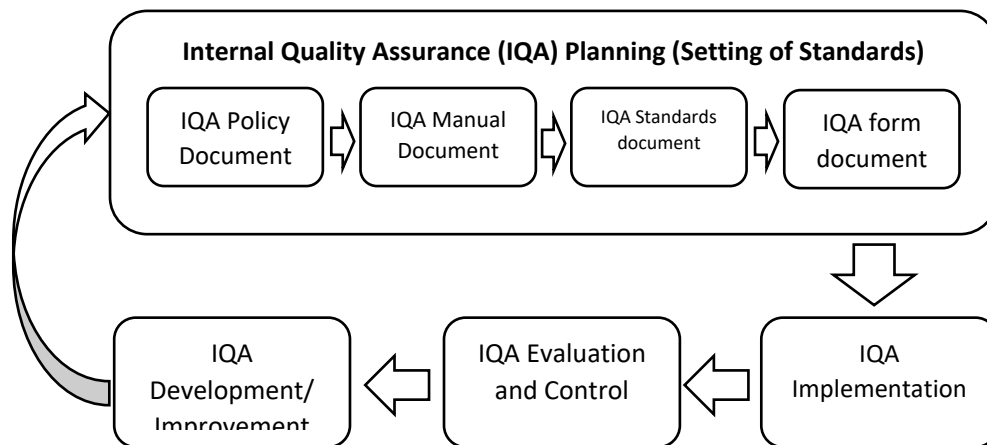

Figure 1 Kaizen Method for HEI Internal Quality Assurance
(Ministry of Research, Technology and Higher Education, 2018, p. 31)

Information Technology (IT) for Internal Quality Assurance of HEI

In this study, the IT-IQA term is used, which refers to an intelligent information system to ensure quality in HEI developed by Elhoseny et al. (2017). Simply, it refers to the IT development to support internal quality assurance system implementation within HEI, which aims to help the internal quality assurance unit apply quality standards and ensure they are maintained and enhanced (Elhoseny et al., 2017). Dealing with the

context of this study, the IT-IQA design developed by Elhoseny et al. (2017) was not fully adopted. Still, it adapted to some conditions in the research location, Indonesia.

According to Elhoseny et al. (2017), IT-IQA should be created under HEI's internal quality assurance procedure. There are two main elements of the IT-IQA; the "effectiveness of the educational process" is the first. In order to maintain the quality of higher education, this component consists of seven core activities: (1) students and alums; (2) academic standards; (3) educational programs/courses; (4) teaching and learning and physical facilities, such as buildings and computer resources; (5) staff development; (6) scientific research and scientific activities, such as organizing scientific conferences; and (7) graduate studies. These seven basic activities serve as a "protective belt" for students' general growth and experience, which is essential to the quality of HEI (Elhoseny et al., 2017). "Institutional capability" is the second element. Seven additional activities are included in this component: (1) strategic planning; (2) organizational structures; (3) leadership and governance; (4) credibility and ethics; (5) the administrative system (AS); (6) financial and material resources; and (7) community involvement and environmental development (Elhoseny et al., 2017). Each criterion in the framework has numerous indicators and calls for implementing one or more systems (Elhoseny et al., 2017). These systems, integrated into IT-IQA, each carry out a particular function in the quality system. Currently, empirical research on IT-IQA deployment is still hard to find. A study by Elhoseny et al. (2017) is an initiative that formulates how IT is implemented to support IQA at HEI. Nevertheless, they did not empirically examine the concept they proposed.

Internal Quality Assurance and HEI Quality Performance

Internal quality assurance has a significant role in oversee ing, ensuring, and controlling the activities carried out by HEI, following the quality standards and indicators (Martin, 2018; Mourad, 2017; Santos & Dias, 2017). Welsh and Dey (2002) revealed that internal quality assurance covers various quality aspects of the HEI: external accountability, academic programs, improvement of academic performance, outcomes assessment, and academic program databases. Therefore, it is expected that the HEIs could improve their quality performance by implementing internal quality assurance. However, an internal quality assurance implementation might enhance HEI quality performance if these two policies are implemented effectively (Akbar et al., 2012; Sofyani et al., 2018). This situation aligns with the RBV theory claim that internal quality assurance can be seen as a combination of human and organizational resources (Ali et al., 2015). Thus, to achieve a competitive advantage, these two resources should fulfill four criteria: valuable, rare, difficult to imitate, and no equivalent substitutes (Barney, 1991).

The RBV four criteria could be manifested as 'effectiveness' internal quality assurance implementation. The effectiveness of internal quality assurance indicates that they are valuable resources. On the other hand, although generally developed from the same concept and guidance as mandatory, internal quality assurance implementation is developed to fit HEI's specific characteristics and needs and, therefore, tends to be unique and exclusive. Thus, it triggers the differences in design, structure, and

procedures from one HEI to another due to contingent factors (Jokipii, 2010). Consequently, it makes how to achieve effective internal quality assurance implementation on one HEI might be difficult to imitate by another HEI. As such, pure imitation of internal quality assurance policies from other HEIs might not necessarily provide significant added value if the imitation process does not address the contingent factors that apply to the imitator HEIs (Lee & Zhou, 2012).

Moreover, these two policies are not provided in the market since they should be developed by HEI independently. Thus, this policy implementation effectiveness is rare and difficult to substitute. It is logical to expect that effective internal quality assurance implementation would positively affect the HEI quality performance. Developing that, the hypothesis was formulated as follows:

H₁: *Internal quality assurance implementation is positively associated with HEI quality performance.*

Information Technology Development and Performance

Haris et al. (2017) argue that IT could effectively support the internal quality assurance unit in collecting, processing, presenting, and monitoring various data related to the quality management process and performance achievement of HEIs. Elhoseny et al. (2017) also contend that IT support in internal quality assurance implementation can promote good monitoring and accurate decision-making primarily related to quality standards fulfillment and performance indicators achievement. From the preceding arguments, IT development could enhance HEI's quality performance. Several studies have found that IT implementation can improve organizational performance (Chae et al., 2018; Queiroz et al., 2018; Tahar et al., 2022). Based on the preceding discussions, the hypothesis was formulated as follows:

H₂: *IT-IQA implementation is positively associated with HEI quality performance.*

Information Technology as Moderator

Although various studies have demonstrated the role of IT on organizational performance, some have also found divergent results (see Liang et al., 2011; Wu et al., 2015). A faulty paradigm that sees IT as a non-strategic tool that supports sound governance practices in businesses results in a less ideal IT role in performance improvement (Ali et al., 2012). To achieve the opposite condition, i.e., IT can support performance, IT should be incorporated into the organization's strategic plans. Positioning IT as an organizational strategy means that IT must be synchronized with other procedures, including internal quality assurance. If these resources, i.e., IT and internal quality assurance, are managed in harmony and with good synchronization, they will be more effective in encouraging the organization to attain its competitive

advantage. This circumstance is consistent with what Resource Orchestration Theory predicts.

According to Zhou et al. (2017), combining resource management with contemporary IT may enable businesses to find and gather special resources more successfully, enhance their capabilities, and generate value through ongoing resource reconfiguration. Low-tech businesses are, therefore, more likely to improve organizational performance and gain a competitive edge over rivals if they work to incorporate current IT in their resource orchestration process. The relationship between enterprise risk management and competitive advantage was found to be moderated by IT strategy and IT structure, according to Saeidi et al. (2019). Finally, Tetteh et al. (2020) discovered that IT moderates the association between adopting internal controls and firm performance. As a result of the conversation that has already taken place, the final hypothesis is as follows:

H₃: IT-IQA implementation moderates the relationship between internal quality assurance and HEI quality performance.

Based on the theoretical framework and hypotheses produced, the conceptual framework of this study is created, as illustrated in Figure 2.
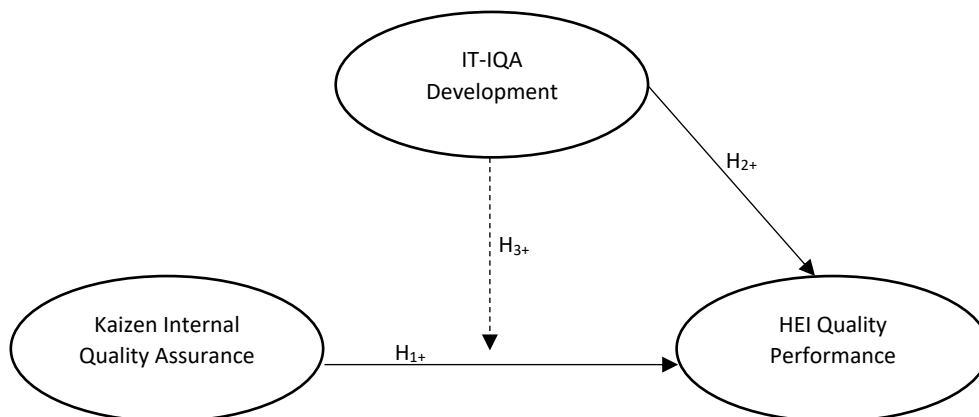

Figure 2 Conceptual Framework

Research Method

The population of this study included all HEIs in Indonesia. Purposive sampling was used to choose the samples, and the following criteria were determined: the HEIs had developed IT to support internal quality assurance implementation. Besides, the samples were also chosen using the cluster sampling technique by considering HEIs' locations, i.e., all 34 Indonesian Provinces. By so doing, this study could provide strong external validity results (Sekaran & Bougie, 2019). Judgment sampling was then employed to pick the respondents. The respondents should be in the best possible position to give the necessary details (Sekaran & Bougie, 2019). Specifically, the respondents were the members of HEI's internal quality assurance unit management. As

this study used non-probability sampling, power analysis is advised to determine the sample size (Memon et al., 2020). Therefore, this study's minimum sample size should be 77 HEIs. The distribution of the questionnaire's results is shown in Table 2. A minimum sample size was satisfied because 206 responses could be gathered and used for data analysis.

Table 2 Questionnaire Distribution Results

Information	Responses	
	Frequency	%
Sent	628	100.00
Received	233	37.10
Un-appropriate respondent	25	3.98
Extreme answer	1	0.16
Usable questionnaire	**206**	**32.80**

The study by Elhoseny et al. (2017) for IT-IQA, which examined relevant rules, served as the basis for the questionnaire employed in this study. Then, the Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia No. 62 of 2016 on Quality Assurance System for HEI and the Internal Quality Assurance Guidance Book of 2018 were both used as the primary references when developing the internal quality assurance measurements. However, several relevant studies related to internal quality assurance, such as Martin (2018), Santos and Dias (2017), Mourad (2017), and Cheng (2003), were referred to confirm the compatibility of the measures. Internal quality assurance was measured using three dimensions: internal quality assurance mechanisms, integration, and scope. A 2019 Indonesian HEI certification assessment tool was also employed to evaluate HEI quality performance. Due to the study context in Indonesia, it was implemented.

Additionally, all variables in the questionnaire were scaled using a Likert of 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree. Following Lewis et al. (2005), before being applied in a field, the questionnaire was sent to 13 experts for validation. They came from the domains of internal audit, quality control, and accounting information systems in the public sector. Following the results of the expert consultation, improvements were made to the questionnaire's instructions, word choice, grammatical errors, and scale.

Furthermore, to test the hypotheses, the variant-based Partial Least Square-Structural Equation Modelling (PLS-SEM) method was used. The non-parametric structure of the Likert scale and the size of the potential multicollinearity components were two reasons to employ PLS. PLS has also been widely employed in field research projects on information systems and accounting (Urbach & Ahlemann, 2010). Additionally, PLS was appropriate for this research since it imposes few data assumptions, necessitates a small sample size, and uses hypotheses with modest theoretical underpinnings (Chin et al., 2003). Since three dimensions with formative type formed the internal quality assurance construct, higher-order construct analysis was performed in this study (Becker et al., 2012). Specifically, a two-stage approach was adopted to test the moderating

hypothesis, considering it is suitable for a model that includes formative constructs (Memon et al., 2019).

Results and Discussion

Table 3 presents information on research respondents, where most were Head/Director of IQA units.

Table 3 Respondents Information

Position	n	%
Head/Director of IQA unit	127	61.65
Management member of IQA unit	38	18.45
Head of section unit of IQA unit	12	5.83
Secretary of IQA unit	21	10.19
Coordinator of internal auditor of IQA unit	7	3.40
Deputy head of IQA unit	1	0.49
Total	**206**	**100.00**

Then, Table 4 describes the demographics of the sample and respondents. Out of 34 provinces in Indonesia, only three provinces had no representative sample, namely North Kalimantan, Bangka Belitung Archipelago, and West Papua. Thus, the results of this study had sufficient external validity to cover Indonesia. However, caution is needed in reading the research result as the ideal proportion of samples per province was uneven.

Table 4 Demographic of Samples and Respondents (n = 206)

Demographic by	n	%
Type of HEI		
University	140	67.96
Institute	19	9.22
Academy	3	1.46
Specialized School	30	14.56
Polytechnic	14	6.80
Public vs. Private		
Public	65	31.55
Private	141	68.45
Accreditation Predicate		
A	49	23.79
B	120	58.25
C	36	17.48
Not Accredited Yet	1	0.49
Accredited by International Body		
Yes	42	20.39
Not yet	164	79.61
Province		
Aceh	13	6.31

Table 4 Demographic of Samples and Respondents (n = 206) (Cont.)

Demographic by	n	%
North Sumatra	6	2.91
West Sumatra	3	1.46
Riau	5	2.43
Riau Archipelago	2	0.97
Jambi	3	1.46
Bengkulu	4	1.94
South Sumatra	5	2.43
Bangka Belitung Archipelago	0	0.00
Lampung	4	1.94
Banten	6	2.91
West Java	19	9.22
DKI Jakarta	12	5.83
Central Java	29	14.08
Special Region of Yogyakarta	13	6.31
East Java	31	15.05
Bali	6	2.91
West Nusa Tenggara	5	2.43
East Nusa Tenggara	2	0.97
West Kalimantan	1	0.49
South Kalimantan	8	3.88
Central Kalimantan	3	1.46
East Kalimantan	5	2.43
North Kalimantan	0	0.00
Gorontalo	2	0.97
West Sulawesi	1	0.49
South Sulawesi	6	2.91
Central Sulawesi	1	0.49
Southeast Sulawesi	3	1.46
North Sulawesi	1	0.49
Maluku	2	0.97
North Maluku	2	0.97
West Papua	0	0.00
Papua	3	1.46
Respondent's Education Level		
Bachelor	4	1.94
Master	127	61.65
Doctoral	75	36.41
Time of Working Experience of Respondent		
< 5 years	176	85.44
5 to 10 years	25	12.14
10 to 15 years	3	1.46
15 to 20 years	2	0.97
> 20 years	0	0.00

Common Method Variance (CMV) Analysis

The survey research data were self-reported. Therefore, CMV was a possibility (Podsakoff et al., 2003). For resolving this issue, the literature offers numerous options.

One of the methods frequently used to uncover this issue is the Harman single-factor test (Tehseen et al., 2017). Evidence method bias arises when a single factor emerges from the factor analysis or when one general factor accounts for most (more than 50%) of the covariance between the measures (Podsakoff et al., 2003). According to analysis results, the first factor only explained 29.57% of the total variance or less than 50%. This finding demonstrates that common method bias insignificantly affected the study's findings.

Table 5 displays descriptive statistics of research variables in which internal quality assurance was represented by three dimensions: internal quality assurance mechanism, integration, and scope. In general, the implementation of internal quality assurance with the Kaizen method at HEIs in Indonesia has been running at a high level. Nonetheless, the development of IT-IQA is still at the level of moderate. The HEI quality performance is also generally at a moderate level. It implies that improvement efforts still need to be made.

Table 5 Descriptive Statistics

Criteria	IQA Mechanism	IQA Integration	IQA Scope	IT-IQA	Quality Performance
Min	2.05	2.00	1.82	1.72	1.03
Max	5.00	5.00	5.00	5.00	4.93
Mean	4.20	4.35	4.06	3.89	3.30
SD	0.54	0.58	0.64	0.75	0.67

Furthermore, this study scrutinized the relationship between variables by conducting a structural model assessment. Before that, the measurement model assessment became a prerequisite to ensure the validity and reliability of the constructs within the model. It should be noted that the internal quality assurance and IT-IQA constructs were built with a formative type, while the HEI quality performance construct was reflective. Therefore, testing the validity and reliability of these different constructs also referred to different criteria. The formative constructs were analyzed by assessing indicators contributions (validity) of the constructs and the collinearity issue. The values of outer weight, loading, and with their significance, and VIF values were the concern. On the one hand, for the HEI quality construct that used reflective measures, the convergent validity, discriminant validity, and reliability tests were referred to in this construct (Hair et al., 2021).

Measurement Model Assessment

In the first test, it was uncovered that many indicators had poor loading and VIF scores, so following the advice of Hair et al. (2021), they should be eliminated. In the second test, after dropping the poor indicators, satisfactory results were found on the validity and reliability test results.

Table 6 shows discriminant validity results for the HEI quality variable (reflective construct). The AVE root indicated a higher score than its correlations with other

constructs. It denotes the establishment of discriminant validity (Fornell & Larcker, 1981). Meanwhile, the 'FC' code suggests that the intended construct used a formative type, so the discriminant validity test was not applicable (Hair et al., 2021).

Table 6 Discriminant Validity

Construct	IQA Integration	IQA Mechanism	IQA Scope	IT-QA	QUAL
IQA Integration	FC				
IQA Mechanism	0.788	FC			
IQA Scope	0.732	0.723	FC		
IT-IQA	0.707	0.699	0.735	FC	
QUAL	0.538	0.583	0.592	0.678	0.707

Furthermore, Table 7 presents the results of the HEI quality construct's convergent validity and reliability tests. The results demonstrated that all indicators had a loading score higher than 0.5. Then, the fulfillment of convergent validity of the HEI quality was also indicated by the AVE score of 0.500. For reliability test results, Cronbach's Alpha and Composite Reliability values were the references (Chin et al., 2003). The test results denoted a score exceeding the rule of thumbs, 0.6 and 0.7, respectively (Chin, 2010; Hair et al., 2021). This result indicates that the requirement of the reflective construct reliability (HEI quality) was also met.

Table 7 The Results of the Convergent Validity and Reliability Test of the HEI Quality Construct

Indicator	Item	Loading
QUAL3	The number of study programs/departments accredited by the International Accreditation Board and acknowledged by the government of Indonesia	0.672
QUAL4	Accreditation predicate of study program given by the Ministry of Education and Culture	0.671
QUAL5	Lecturer Recognition at both International and National Levels	0.715
QUAL6	The selection of new students	0.745
QUAL7	International students	0.668
QUAL12	The impact of the community service program executed	0.743
QUAL13	Income performance	0.771
QUAL14	Income other than tuition fees	0.703
QUAL24	The graduates are employed by multinational corporations or international organizations.	0.697
QUAL26	Number of patents or simple patents produced	0.673
QUAL28	Number of appropriate technologies, products, artwork, and social engineering produced	0.708
Cronbach's Alpha		0.900
Composite Reliability		0.916
AVE		0.500

Furthermore, internal quality assurance and IT-IQA constructs were assessed by using a formative assessment approach. Tables 8 and 9 reveal the results of the first-order (IT-

IQA) and second-order (IQA) formative construct validity tests, respectively. In Table 8, the test results indicate that even though some indicators had insignificant outer weights, all their loading scores were significant, so they could still be concluded as valid (Hair et al., 2021).

Table 8 Formative Construct Validity (First Order)

	Outer weight	P value	Loading	P value	VIF
IT-IQA 1 -> IT-IQA	0.108	0.052	0.525	0.000	1.898
IT-IQA 11 -> IT-IQA	0.079	0.094	0.463	0.000	1.608
IT-IQA 2 -> IT-IQA	0.143	**0.025**	0.557	0.000	2.195
IT-IQA 3 -> IT-IQA	0.342	0.000	0.628	0.000	2.003
IT-IQA6 -> IT-IQA	0.055	0.193	0.459	0.000	2.131
IT-IQA7 -> IT-IQA	0.146	**0.032**	0.515	0.000	2.084

The same thing applied to the second-order IQA construct validity test results in Table 8. Though one lower-order construct had insignificant outer weight (IQA integration), all their loading scores were significant. As such, it can still be concluded as valid (Hair et al., 2021). In addition, the VIF scores were less than 3.3 (Tables 8 and 9), indicating an insignificant autocorrelation issue. Also, a low VIF score suggests data independent of the CMV issue (Kock, 2015).

Table 9 Formative Construct Validity (Second Order)

	Outer-Weight	P Values	Loading	P Values	VIF
IQA Integration -> IQA	0.220	0.060	0.880	**0.000**	3.074
IQA Mechanism -> IQA	0.363	**0.002**	0.905	**0.000**	2.991
IQA Scope -> IQA	0.511	**0.000**	0.935	**0.000**	2.450

Because the validity and reliability tests had been fulfilled, hypothesis testing using the structural model assessment could be carried out.

Structural Model Assessment

Table 10 presents the Structural Model Assessment. The results of this study indicated that internal quality assurance and IT-IQA development were positively associated with HEI quality performance. Furthermore, the relationship between internal quality assurance and HEI quality performance was still significant even though IT-IQA development was a significant moderator. Thus, it can be concluded that the nature of the moderation effect was quasi.

In addition, the results showed that the adjusted R^2 value ranged from 0.479 to 4.84, which, according to Chin (1998), is moderate, meaning that the proposed model was quite good in explaining the relationship among variables. Additionally, it was found that the moderated model had a higher adjusted R^2 value, indicating superior results (Memon et al., 2019). In other words, although the nature of moderation was quasi, a model with this moderation is recommended to be used as a basis for practical implications.

Table 10 Summary of Structural Model Testing Results

Constructs' Relationship	Model 1 (Without Moderation)			Model 2 (With Moderation)		
	β	SD	t	β	SD	t
IQA → Quality (H₁)	0.251*	0.087	2.891	0.304*	0.086	3.517
IT → IQA (Not hypothesized)	0.787*	0.029	26.730	0.787*	0.032	24.742
IT → Quality (H₂)	0.481*	0.089	5.386	0.479*	0.085	5.646
Moderating Effect of IT (H₃)				0.066*	0.037	1.802
R^2	0.479			0.484		
f^2				0.015		

* P<0.01

Discussion

The results uncovered that implementing internal quality assurance with the Kaizen method positively correlated with HEI quality performance. Moreover, the relationship was strengthened by the development of IT-IQA. These results affirm several research findings that IT has a reinforcing role in the contribution of control policies to organizational performance. Wales et al. (2013) discovered that the optimal value of entrepreneurial orientation for boosting business performance occurs at significantly greater levels in the presence of high levels of firm resource orchestration capabilities, such as IT competence, than when these capabilities are deficient. According to Liu et al. (2016), implementing the right IT expertise to match a company's supply chain integration (SCI) results in improved business performance. They disclosed, in particular, that the "moderation" approach of fit suggests that IT competency could strengthen the relationship between SCI and operational and financial performance. In addition, Saeidi et al. (2019) revealed that IT strategy and structure significantly impacted competitive advantage and had a moderating impact on the relationship between enterprise risk management and competitive advantage. The final finding by Tetteh et al. (2020) concluded that IT moderated the association between IC and company performance. However, compared to the other internal control dimensions, the interaction impact was more significant for the control environment and control actions.

Furthermore, although not hypothesized, IT-IQA development was also positively associated with effective internal quality assurance implementation. These results confirm Elhoseny et al.'s (2017) idea that IT development can help with IQA implementation and provide precise decision-making to meet quality standards and performance indicators quickly and efficiently.

Based on the current study findings, it can be suggested that developing IQA by adopting the Kaizen concept benefits quality performance improvement. Moreover, IT development should also be a serious concern for HEI management because of its positive role in improving HEI's quality performance. Nevertheless, it is essential to note that IT development also does not always bring added value if it is not accompanied by effective IT governance (Sengik et al., 2022; Sofyani et al., 2022). Therefore, good IT governance needs to be considered as it is a source of IT policy orchestration that aligns with the control policies that apply within the organization. Theoretically, this study

provides an operational model description of how RBV and RO theories are operationalized in the context of the HEI sector. So far, many academics have claimed that RBV and RO theories seem tautological and too normative as theories. Meanwhile, how these are implemented in practice is less highlighted. This study empirically answers the criticism that the Resource Orchestration Model can be realized by an interaction between IQA and IT directed at pursuing the main goal of HEI, namely quality performance.

Conclusion

This study examined the role of new (Kaizen) internal quality assurance implementation on HEI quality performance with IT-IQA development as moderator. The questionnaire survey results captured final data from 191 Indonesian HEIs, which could then be analyzed using PLS-SEM. The results of hypotheses testing indicated that the development of IT-IQA strengthened the positive relationship between Kaizen internal quality assurance and HEI quality performance. However, the moderating role of IT-IQA was found to be quasi in nature. Further, although not hypothesized, IT-IQA development was also positively associated with HEI quality performance. From the results obtained, this study suggests that the implementation of internal quality assurance should be run effectively considering its benefit toward HEI quality performance enhancement. Moreover, the development of IT-IQA continues to be carried out by HEI and should be well orchestrated to promote its optimal contribution. To achieve this, IT development should not only be seen as a tool but also perceived as a strategic policy of HEI. Therefore, the involvement of the IT team in the strategic planning of HEI is also a key requirement. Theoretically, this study confirms the RBV and Resource Orchestration Theories, where the organization's arrangement and integration of interrelated internal resources are crucial in achieving HEI's competitive advantage. Both theories are often studied in the context of companies. Meanwhile, these theories are rarely discussed in the HEIs sector, where competition is also tight due to the ranking and accreditation phenomenon impact.

This study has several limitations. First, although the sample came from 32 of the total 34 provinces in Indonesia, the sample proportion of each province was unequal. Hence, the generalization of the results of this study needs to be done with caution. Thus, similar research can be carried out in specific areas or provinces to confirm and complement the result of this study. Second, this study did not include a cross-validation test using secondary data because the data required was private. In survey research, cross-validation is necessary to strengthen the research results. To cover this weakness, at least the subsequent study can be carried out with a qualitative approach to confirm the results of this study in detail. Third, this study did not divide the sample into certain categories, such as based on size, accreditation status, and others. It can be a gap for further research to be addressed. Seeing the crucial role of internal quality assurance using the Kaizen method in promoting HEI quality performance, further studies are recommended to examine the factors triggering the successful implementation of the policy in question. It is important, considering that changes in governance-related

policies within an organization only sometimes run smoothly, which does not necessarily bring added value to the organization.

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Conflicts of Interest