Jurnal Akuntansi dan Auditing Indonesia
https://journal.uii.ac.id/JAAI

Continuous monitoring and continuous auditing implementation in Indonesian Higher Education

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ARTICLE INFO

Article history:
Available online

Keywords:
continuous monitoring, continuous auditing, organizational culture, information quality, intellectual capital

DOI:
https://doi.org/10.20885/jaai.vol25.iss2.art5

ABSTRACT

Indonesian higher education needs to operate its activity based on productivity and efficiency. However, in reality, it faces several issues, including but not limited to lack of standard of operation, financial fraud, and non-compliance with applicable regulations. Continuous Monitoring (CM) and Continuous Auditing (CA) are essential to prevent issues related to the institution's circumstances. This research explains how organizational culture, information quality, and intellectual capital affect CM and CA applications. This study obtained the data through questionnaires sent to 102 members of the internal control unit. Using the Partial Least Square-Structural Equation Modeling to analyze the data. The results showed a positive and significant influence of organizational culture on the applications of CM and CA. Other findings are that information quality and intellectual capital had a positive and significant influence on CA application. On the other hand, information quality and intellectual capital have a positive but insignificant influence on CM application.

Introduction

Higher education as part of Indonesian Public Service Agency in definition needs to operate its activity in a healthy and productive principle. However, in reality, Indonesian higher education keeps facing many obstacles such as conflicts of interest between higher education and the regulating parties, hereinafter called multi-principals. The cases related to the operational and dysfunction of audit caused by the overlapping positions of the internal auditor (Setyaningrum & Murtini, 2014), financial fraud due to operators' inconsistency in running the internal control system (Anggraeni, 2018), financial misstatements on asset recognition (Junaidi & Kartiko, 2020), and hundreds of findings by the Audit Board of the Republic of Indonesia in case of lack of substantial risk detection due to inadequate intellectual capital (Soedarsono et al., 2019).

Continuous Monitoring (CM) and Continuous Auditing (CA) are vital aspects for Indonesian higher education to avert fraud and error at the materiality level. Lombardi et al. (2014) and Mukai et al. (2014) agreed that CM and CA applications would help an organization develop its core performance by reducing accounting errors and analyzing the condition in real-time with efficiency and effectivity principles. CM application depends on how the information system works in input, process, and output dimensions. Soedarsono et al. (2019) explained that information quality and management support positively influence the CM application.

Martusa et al. (2011) stated that human resources would need training regarding CA application to maximize its implementation. This is because human resource behavior and competency will influence CA application in Indonesian higher education. Fauzi et al. (2016) stated that organizational culture shapes human behavior in making wise decisions for the quality system improvements to be applied. Organizational culture is relevant to be discussed to explain the CM and CA applications in Indonesian higher education. According to Rogulenko et al. (2016), organizational culture influences the control management in an organization.

According to Anastasia and Meiden (2015), information quality is a crucial feature that needs to be considered in improving the internal control system and organization performance. Indonesian higher education should strengthen CM and CA applications to convince the multi-principals that all operations have been operated in the set standards. Information quality will help Indonesian higher education enhance CM and CA. Herremans et al. (2011) stated that intellectual capital would help the organization nourish the internal control system to assess and prevent uncertainty risk from internal and external parties. Intellectual capital will help Indonesian higher education build up the CM and CA applications. Besides, Indonesian higher education needs intellectual capital to analyze the trend of performance and financial matters to assess the condition of its operation.

P ISSN 1410-2420 | E ISSN 2528-6528

This study explains how CM and CA work in Indonesian higher education and identifies parts of CM and CA that need to be improved in the long run by obtaining information from the members of the internal control unit. All of the issues that Indonesian higher education faces, such as dysfunctional audit, financial fraud, and conflicts of interest, are the phenomena forming gaps that need to be studied. As the limitation of the study, the relationship between the variables, namely organizational culture, information quality, and intellectual capital on CM and CA, call for further investigation. The phenomena, gaps, and limitation of the study above are underlied by the agency theory by Jensen and Meckling (1976). Therefore, the purpose of this study is to confirm the relationship between organizational culture, information quality, and intellectual capital on the applications of CM and CA of Indonesian higher education.

Literature Review

This study used agency theory to explore the Indonesian higher education internal control system in applying CM and CA. Educational institutions work as the agents and other regulators responsible for institution operation work as the principals. Figure 1 shows the study construct.

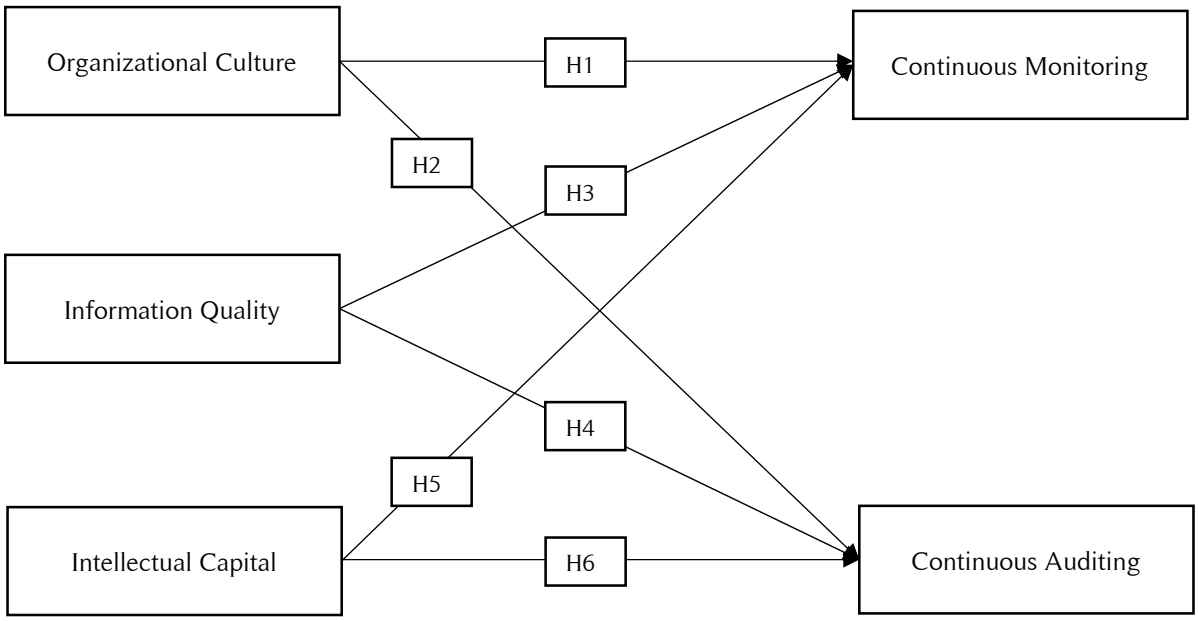

Figure 1. Study Construct

Klimova (2019) defined CM as an automatic process that works in real-time by assessing the effectiveness of the internal control system, detecting the system risk, developing business processes, and monitoring operation compliance level for applied ethic standards in the organization. Mancini et al. (2013) explained that CM has several characteristics to look into, namely ease of technology, organizational impact, and output. CM will provide a more significant transparency percentage for the operational activity in the organization. CA is a process that offers an alert for the system to detect errors in the internal control system promptly. CACM Team (2018) defined CA as a methodology to ensure the set standard operational and management system are functioning. Furthermore, Syafei (2015) explained that CA could be measured through three components: continuous risk assurance, continuous risk assessment, and implementation.

Porto (2020) described organizational culture as a set of norms, values, and arts with specific characteristics that characterize an organization. Management will communicate organizational culture in writing or verbally. Organizational culture has several characteristics to be explored: innovation and risk-taking, attention to detail , outcome orientation, people orientation, and team orientation (Robbins & Judge, 2015). Robbins and Judge described innovation and risk-taking as one of the factors for organizations to innovate their activities to support them in taking risks in the long run by strengthening the system. Siringoringo (2017) stated that Indonesian higher education has set a systematic monitoring and auditing process to ensure that the operation works based on the set standards. This reflects one of the characteristics of organizational culture, namely attention to detail.

In terms of outcome orientation, management will focus on the system by looking at the results. Management will evaluate the CM and CA applications by measuring the expected outcome to the realized work. Robbins and Judge explained that management would take action based on people's behavior and personality to

take an action on people orientation optimally. As for team orientation, Porto (2020) stated that an organization would operate based on the success criteria to measure the organization's achievement. This characteristic will help management advance their work towards clear goals.

Zelmiyanti and Anita (2015) showed that organizational culture has a positive and significant result on the internal control system in an entity. Fauzi et al. (2016) showed that corporate culture will increase organizational commitment to intensify a better control system. With the explanation above, the formulated hypotheses are as follows.

H_1: Organizational culture has a positive and significant influence on continuous monitoring.
H_2: Organizational culture has a positive and significant influence on continuous auditing.

Dalle et al. (2020) defined information quality as a collected data instrument that transforms into information with attributes attached to the system measured by accuracy, relevance to the state of the organization, timeliness of information, and completeness. Dalle explained that information quality has four components to be explored: accuracy, substance and value, timeliness, and relevance. In terms of timeliness, Gorla stated that information quality is measured by the required time to collect and provide information. As for relevance, Gorla argued that information ought to support management to make decisions. The indicator for this component is the decision-making consideration aspect. As for accuracy, Dalle et al. (2020) stated that it is essential to examine the occurrence of accuracy based on the reality in the institution. Meanwhile, substance and value is a measurement whether the information is understandable to the management and adds value to the institution.

Setyawati (2015) stated that adjusting information quality based on the applied standards will reduce the internal control system errors. Soedarsono et al. (2019) explained that information quality has a positive and significant influence to the applications of CM and CA. With the explanation above, the formulated hypotheses are as follows.

H_3: Information quality has a positive and significant influence on continuous monitoring.
H_4: Information quality has a positive and significant influence on continuous auditing.

Ahangar (2011) defined intellectual capital as a completion variable between competency and commitment. Based on Based on human resource capital theory and its empirical evidence of human resource capital theory, intellectual capital is the individual capacity to produce added value and create welfare for the organization. Herremans et al. (2011) proposed three characteristics of intellectual capital, namely growth and renewal, efficiency, and stability. Herremans argued that growth and renewal means that intellectual capital is measured by the facilitation or effort from the institution to amplify intellectual capital level. On the other hand, stability focuses on the institution's experience to establish a more stable system. As for efficiency, Herremans stated that management focuses on the skill and expertise of human capital to boost the applied system in the institution.

Pedro et al. (2018) agreed that intellectual capital has a positive and significant influence on in building up the activity and system, including CM and CA applications. With the explanation above, the formulated hypotheses are as follows.

H_5: Intellectual capital has a positive and significant influence on continuous monitoring.
H_6: Intellectual capital has a positive and significant influence on continuous auditing.

Research Method

This study is quantitative research that used primary data to process the research by spreading digital questionnaires to the unit of analysis as the first source via WhatsApp and e-mails due to the Covid-19 condition. This study used Indonesian higher education as a population and the questionnaires were spread to the whole population. This study determined 102 Indonesian higher education institutions as the unit of analysis, while the observation unit was 102 members of the internal control unit. The variables were measured by the Likert scale from 1 (strongly disagree) to 5 (strongly agree). Table 1 presents the indicators of the operational dimensions representation each variable to be examined.

This study adopted the Partial Least Square-Structural Equation Modeling (PLS-SEM) approach to analyze the data using Smart PLS 3.3.3 software. The reason was that PLS-SEM could process the data characteristics in this study without requiring data to have a multivariate normal distribution. Besides that, PLS-SEM can analyze data in tiny scales and be an alternative approach based on a variant to analyze established reflective indicator construct without depending on numerous assumptions. The researcher decided to use PLS-SEM by considering the advantages provided by PLS-SEM and data alignment in this study. Figure 2 shows that the variables were represented by seven indicators and picturizes the relationship between each of the variables.

Table 1. Operationalization of Variables

No.	Variable	Dimension	Indicator	Scale
1	Organizational Culture (X1) (Porto 2020; Robbins Judge, 2015; Rosvita, et al., 2017)	1. Innovation and Risk-Taking 2. Attention to Detail 3. Outcome Orientation 4. People Orientation 5. Team Orientation	1. Innovation as strategic emphases 2. Risk tolerance 3. Detail-oriented for system flow 4. Outcome influence 5. Consideration of human resource feeling 6. Consideration of human resource behavior 7. Existence of vision and missions	Likert
2	Information Quality (X2) (Dalle et al., 2020; Soedarsono et al., 2019)	1. Timeliness 2. Relevance 3. Accuracy 4. Substance and Value	1. Timeliness of information 2. Ease of accessibility 3. Decision-making consideration aspect 4. Accuracy of information 5. Completeness 6. Easy to be understood 7. Value added from information	Likert
3	Intellectual Capital (X3) Herremans, dkk (2011)	1. Growth and Renewal 2. Stability 3. Efficiency	1. Years in profession 2. Education and training provided 3. Contribution of customers into system 4. Relative pay position 5. Age of the organization 6. Proportion of professional in entity 7. Satisfied customer index	Likert
4	Continuous Monitoring (Y1) Dalle et al. (2020); Soedarsono, et al. (2019)	1. Ease of Technology 2. Organizational Impact 3. Output	1. System used by first and second line of defence 2. Replacement of manual preventive controls with automated detective controls 3. Enhancement of internal controls and performance 4. Continuous or rotating 5. Continuously reported as they occur 6. Comparison of the target and realization of monitoring result 7. Greater transparency and reduced complexity	Likert
5	Continuous Auditing (Y2) Klimova (2019); Soedarsono, dkk (2019); Syafei (2015)	1. Implementation 2. Continuous Risk Assessment 3. Continuous Risk Assurance	1. Audit activity frequency 2. Reporting 3. Audit procedure 4. Automated collection of audit evidence 5. Sample extention 6. Technological functions 7. Existence of check and balance system	Likert

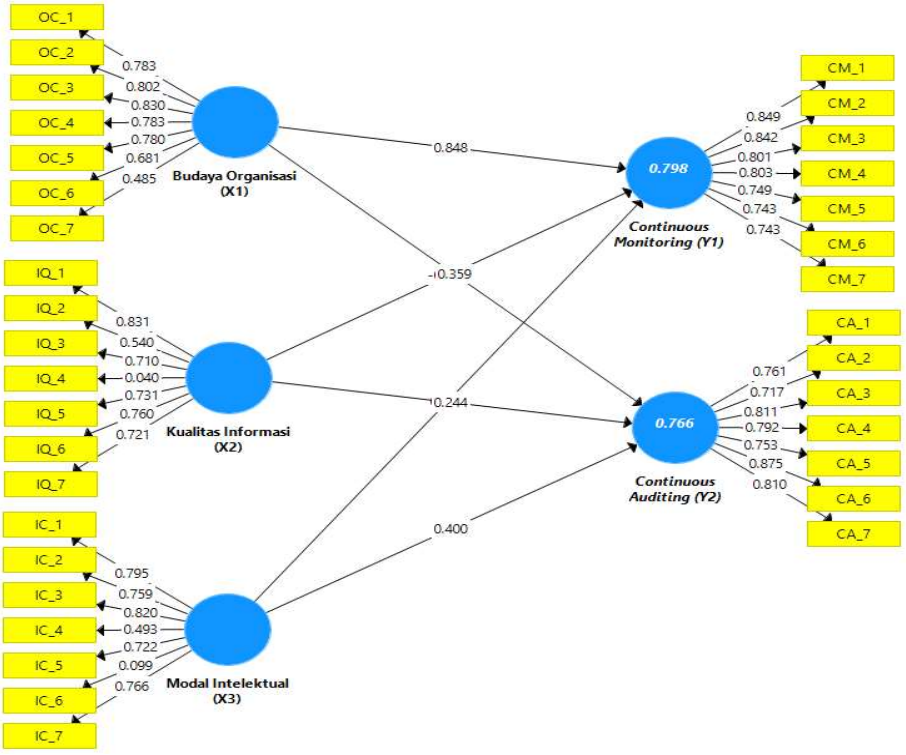

Figure 2. Indicators and Variables – Smart PLS

Results and Discussion

The respondents of this study were members of Internal Control Units from Indonesian higher education. Based on Table 2, most respondents were male holding a master's degree with one to five years of work experience in the Indonesian higher education.

Table 2. Demographic Profile of Respondents

Characteristic	Size	%
Gender		
- Male	92	90%
- Female	10	10%
Education		
- Diploma	1	1%
- Bachelor's degree	43	42%
- Master's degree	56	55%
- Doctor's degree	2	2%
Work Experience		
- Less than one year	31	30%
- One to five years	64	63%
- Six to ten years	4	4%
- More than ten years	3	3%

Table 3. Validity Test Results

Variable	Item	Outer Loading	Conclusion
Continuous Monitoring	CM1	0.849	Valid
	CM2	0.842	Valid
	CM3	0.801	Valid
	CM4	0.803	Valid
	CM5	0.749	Valid
	CM6	0.743	Valid
	CM7	0.743	Valid
Continuous Auditing	CA1	0.761	Valid
	CA2	0.717	Valid
	CA3	0.811	Valid
	CA4	0.792	Valid
	CA5	0.753	Valid
	CA6	0.875	Valid
	CA7	0.810	Valid
Organizational Culture	OC1	0.783	Valid
	OC2	0.802	Valid
	OC3	0.830	Valid
	OC4	0.783	Valid
	OC5	0.780	Valid
	OC6	0.681	Invalid
	OC7	0.485	Invalid
Information Quality	IQ1	0.831	Valid
	IQ2	0.540	Invalid
	IQ3	0.710	Valid
	IQ4	0.040	Invalid
	IQ5	0.731	Valid
	IQ6	0.760	Valid
	IQ7	0.721	Valid
Intellectual Capital	IC1	0.795	Valid
	IC2	0.759	Valid
	IC3	0.820	Valid
	IC4	0.493	Invalid
	IC5	0.722	Valid
	IC6	0.099	Invalid
	IC7	0.766	Valid

Validity test was employed to measure the capability of research instruments by examining construct in several tests. An exemplary construct needs to have a loading factor value higher than 0.70. For this reason, the

standard loading factor of the construct must be higher than 0.70 to be valid (Ghozali & Latan, 2015). The results of the validity test is represented in Table 3. Based on Table 3, the results of the validity test demonstrated six indicator variables, namely items OC6, OC7, IQ2, IQ4, IC4, and IC6, with a standard loading factor under 0.70. This study determined not to use six indicators whose values were under 0.70 and proceeded with 29 indicators representing the research variables.

This study did three methods of calculations to measure latent variable reliability, namely Composite Reliability, Cronbach Alpha, and Average Variance Extracted (AVE). The reliable construct in this study needs to have a value greater than 0.60 for Cronbach Alpha calculation, a value greater than 0.70 for Composite Reliability calculation, and a value greater than 0.50 for AVE calculation (Ghozali & Latan, 2015). The results of reliability test are demonstrated in the following Table 4. Based on Table 4, the results were all latent variables whose values were greater than 0.60 for Cronbach Alpha, greater than 0.70 for Composite Reliability, and greater than 0.5 for AVE. The respondents answered the questionnaire consistently, and all of the variables in this study are reliable.

Moreover, estimation of path coefficient indicates how the direction of one variable will affect other variables. The path coefficient of this study is presented in Table 5, in which organizational culture, information quality, and intellectual capital on the implementation of CM and CA have a positive direction. According to Table 5, it can be understood that the better implementation of organizational culture, information quality, and intellectual capital will support the better implementation of CM and CA in Indonesian higher education.

Table 4. Reliability Test Results

Latent Variable	CA > 0.6	CR > 0.7	AVE > 0.5	Conclusion
Organizational Culture	0.875	0.909	0.668	Reliable
Information Quality	0.814	0.869	0.572	Reliable
Intellectual Capital	0.837	0.885	0.607	Reliable
Continuous Monitoring	0.900	0.921	0.626	Reliable
Continuous Auditing	0.899	0.920	0.624	Reliable

Table 5. Path Coefficient

Latent Variable	Continuous Monitoring (Y1)	Continuous Auditing (Y2)
Organizational Culture	0.765	0.281
Information Quality	0.064	0.324
Intellectual Capital	0.122	0.388

Table 6. Summary of Path Analysis Results

Hypothesis	Path	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	Conclusion
H1	OC → CM	0.762	0.048	15.889	Confirmed
H2	OC → CA	0.276	0.062	4.553	Confirmed
H3	IQ → CM	0.065	0.085	0.761	Not confirmed
H4	IQ → CA	0.331	0.086	3.777	Confirmed
H5	IC → CM	0.121	0.091	1.349	Not confirmed
H6	IC → CA	0.383	0.088	4.416	Confirmed

Based on the hypothesis of test results in Table 6, H1 was confirmed with the t-count value of 15.88, which is higher than the t-table value of 1.96 at an error rate of 5%. Thus, organizational culture has a significant influence on the implementation of CM. This result is in line with Porto (2020) and Zelmiyanti and Anita (2015). The result is aligned with the agency theory that organizational culture is an internal factor that affects the Indonesian higher education as an agent to behave on its implementation of CM based on the norm established under multi-principal control. In this case, multi-principal control will ensure that the agent will work based on the applied standard and principle.

Organizational culture has a good impact on the implementation of CM in Indonesian higher education as a set of norms in the government affects the management to behave and operate according to the existing culture. Descriptive analysis of this study shows that organizational culture influences the direction to innovate their CM performance since Indonesian higher education will be braver to take risks with the support from the implementation of CM in terms of making good decisions. Organizational culture is proven to strengthen the implementation of CM because a set of norms aims to add more value to the Indonesian higher education through an exemplary internal control system supported by the implementation of CM.

Subsequently, this study concluded that H2 was confirmed with the t-count value of 4.55, which is higher than the t-table value of 1.96 at an error rate of 5%. Thus, organizational culture has a significant influence on the implementation of CA. This result is in line with Maulidiastuti et al., (2018) and Zelmiyanti and Anita (2015). The result has been approved by the agency theory that organizational culture from multi-principal will be downscaled and adjusted to the Indonesian higher education as an agent to use CA to conduct daily influential controlling. Organizational culture becomes a norm that supports the Indonesian higher education on implementing CA to nourish technology-based internal control systems. This study found that Indonesian higher education is concerned with the outcome from the implementation of CA because of their orientation on results and their principle that upholds productivity.

On the other hand, this study concluded that H3 was not confirmed with the t-count value of 0.76, which is less than the t-table value of 1.96 at an error rate of 5%. Thus, information quality has no significant influence on the implementation of CM. This result is in line with Apriliani (2012), but contradictory to Soedarsono et al., (2019). An applied agency theory between Indonesian higher education and multi-principal can be found by looking at the existing regulation to provide analysis and information to ensure that the Indonesian higher education works for the expected target. Therefore, they need to improve their information quality to fulfill the obligation from the established law.

Many factors contribute to the implementation of CM in Indonesian higher education to reinforce a better internal control system. In reality, this study found a percentage gap of information quality in the punctuality for the applied system of CM in Indonesian higher education. Supported by descriptive analysis, the data showed that accurate internal system of information of Indonesian Higher Education still lacks and needs to be reviewed. This study indicated that information quality in the internal system has an insignificant role in supporting the implementation of CM. Meanwhile, comparison analysis in this study found that Indonesian higher education still lacks transparency since there are many missing items in terms of information system setting.

In addition, this study concluded H4 was confirmed with the t-count value of 3.77, which is higher than the t-table value of 1.96 at an error rate of 5%. Thus, information quality has a significant influence on the implementation of CA. This is in line with Dalle et al., (2020) and Soedarsono et al. (2019) but contradictory to from Apriliani (2012). This result proved that, by looking at the agency theory, the Indonesian Higher Education as an agent will provide adequate information to continuously audit the operation and ensure that error of information is reduced. Good information quality will bring an added-value and increase usefulness to the implementation of CA. In addition, this study found that information quality in Indonesian Higher Education within the system of CA is understandable, enabling the user to quickly get the interpretation of information based on the provided data. The existence of CA helps the management in decision-making.

Furthermore, this study concluded H5 was not confirmed with the t-count value of 1.34, which is less than the t-table value of 1.96 at an error rate of 5%. Thus, intellectual capital has no significant influence on the implementation of CM. This is in line with Soedarsono et al., (2019), but contradictory to Pedro et al., (2018) and Herremans et al., (2011). One of the agency theories on multi-principal suggested the urgency to hire professionals and conduct training for the human resource to improve internal control system and the Indonesian higher education's governance. As a result, we proposed that Indonesian higher education evaluate their intellectual capital structure based on the criteria that the implementation of CM is required to have.

Based on the descriptive analysis of this study, the data from the respondents showed that intellectual capital has no significant role in the process of CM. As an activity that compares a target to reality using a set parameter monitored by the daily internal control system, we argued that technology to process the data has more contribution to the implementation of CM than intellectual capital. Based on the comparative analysis of this study, the results showed that Indonesian higher education still lacks the CM application professionals. This gap can be reduced by providing trainings, hiring adequate professionals for the implementation of CM, and facilitating insights about the implementation of CM to human resources regarding its urgency to minimize error and fraud.

Ultimately, this study concluded H6 was confirmed with the t-count value of 4.41, which is higher than the t-table value of 1.96 at an error rate of 5%. Thus, intellectual capital has a significant influence on the implementation of CA. This result is in line with Pedro et al., (2018) and Herremans et al., (2011), but contradictory to Soedarsono et al., (2019). Agency theory is the central theory of this research. An adequate intellectual capital with high competency will help Indonesian higher education implement ideal CA since the professionals are able to handle the system of CA and its essential operation. Moreover, multi-principal will apply the regulation to hire a professional that nourishes the internal control system of Indonesian higher education. This study found that human resources experience and competency enhanced by training and facilitation can support the complete implementation of CA because they can understand how the continuous auditing cycle is operated and executed well.

Conclusion

Based on the analysis, it can be concluded that organizational culture has a positive and significant influence on CM and CA, implying that an organizational culture that encourages Indonesian higher education to innovate its system with the proper orientation would sustain the implementation of CM and CA in the circumstances of Indonesian higher education. Subsequently, information quality has a positive but insignificant influence on CM, but it has a positive and significant influence on CA. This implies that information quality in Indonesian higher education still lacks in punctuality, which is crucial for implementing CM. However, the study found that information quality has strengthened the system of CA. Intellectual capital has a positive but insignificant influence on CM, but it has a positive and significant influence on CA. This implies that Indonesian higher education needs to review its organizational structure to run a better CM. Management support is required to implement better CM. In contrast, intellectual capital has smoothened the implementation of CA.

The limitation of this study lies on the results that tend to generalize all types of Indonesian higher education. Based on the comparative analysis, we found that the implementation of CM and CA are different across Indonesian higher education. Each university, polytechnic, academy, and college has their own methods to apply CM and CA. In addition, research-based Indonesian higher education, top universities in Indonesia, and aviation polytechnics tend to have better implementation of CM and CA than other types of Indonesian higher education. Moreover, field research was impossible to be conducted due to Covid-19. As a result, the questionnaire was distributed only via e-mail and WhatsApp.

It is suggested that further research specify the research of CM and CA to a certain type of Indonesian higher education to gain more specific results. Other units of analysis are also interesting to explore, such as companies, small and medium-sized enterprises, or banks. Internal auditors or other relevant roles can be admitted as a unit of observation to gain different perspectives and insight regarding the implementation of CM and CA. Lastly, to enrich the knowledge regarding CM and CA, further researches are encouraged to examine other variables related to the implementation of CM and CA in terms of organizational performance, audit quality, and information technology structure.

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