

Internal control implementation and quality of higher education institutions: A moderation effect testing

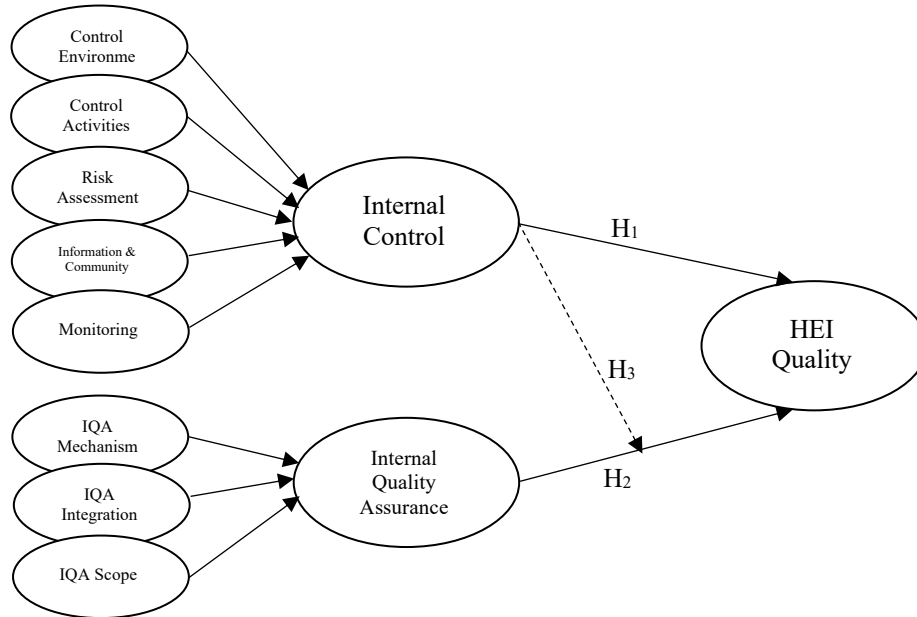


Figure A1: Conceptual Framework

Source: Authors own work

Table A1. The Demographic of HEIs and Respondents

DEMOGRAPHICS BY	Category	Internal Control		Internal Quality Assurance	
		n	%	n	%
Type of HEI	University	168	66.93	140	67.96
	Institute	23	9.16	19	9.22
	Academy	3	1.20	3	1.46
	Specialised school	33	13.15	30	14.56
	Polytechnic	24	9.56	14	6.80
Public vs. Private	Public	95	37.85	65	31.55
	Private	156	62.15	141	68.45
Accreditation Predicate	A	60	23.90	49	23.79
	B	159	63.35	120	58.25
	C	31	12.35	36	17.48
	Not Accredited Yet	1	0.40	1	0.49
Province	Aceh	12	4.78	13	6.31
	North Sumatra	6	2.39	6	2.91
	West Sumatra	6	2.39	3	1.46
	Riau	5	1.99	5	2.43
	Riau Archipelago	4	1.59	2	0.97
	Jambi	3	1.20	3	1.46
	Bengkulu	5	1.99	4	1.94
	South Sumatra	13	5.18	5	2.43
	Bangka Belitung	1	0.40	0	0.00
	Lampung	5	1.99	4	1.94
	Banten	7	2.79	6	2.91
	West Java	26	10.36	19	9.22

DEMOGRAPHICS BY	Category	Internal Control		Internal Quality Assurance	
		n	%	n	%
	D.K.I. Jakarta	13	5.18	12	5.83
	Central Java	31	12.35	29	14.08
	D.I. Yogyakarta	13	5.18	13	6.31
	East Java	36	14.34	31	15.05
	Bali	8	3.19	6	2.91
	West Nusa Tenggara	5	1.99	5	2.43
	East Nusa Tenggara	1	0.40	2	0.97
	West Kalimantan	4	1.59	1	0.49
	South Kalimantan	9	3.59	8	3.88
	Central Kalimantan	3	1.20	3	1.46
	East Kalimantan	6	2.39	5	2.43
	North Kalimantan	0	0.00	0	0.00
	Gorontalo	4	1.59	2	0.97
	West Sulawesi	1	0.40	1	0.49
	South Sulawesi	9	3.59	6	2.91
	Central Sulawesi	1	0.40	1	0.49
	Southeast Sulawesi	2	0.80	3	1.46
	North Sulawesi	2	0.80	1	0.49
	Maluku	4	1.59	2	0.97
	North Maluku	2	0.80	2	0.97
	West Papua	0	0.00	0	0.00
	Papua	4	1.59	3	1.46
Respondent's Education Level	Bachelor's	5	1.99	4	1.94
	Master's	184	73.31	127	61.65
	Doctoral	62	24.70	75	36.41
Length of Respondent's Working Experience	< 5 years	214	85.26	176	85.44
	5 to 10 years	28	11.16	25	12.14
	10 to 15 years	3	1.20	3	1.46
	15 to 20 years	1	0.40	2	0.97
	> 20 years	5	1.99	0	0.00
Total		251	100	206	100

Source: Authors own work

4.2. Measurement (outer) model testing

It should be noted that because the HEI quality used reflective measure, the convergent validity, discriminant validity, and reliability tests were applied to this construct. Meanwhile, the other constructs, using formative type, were analysed differently by assessing the constructs' collinearity and indicators contributions (validity). The values of VIF, outer weight, and loading, along with their significance, were the concern (Hair *et al.*, 2021).

In the first test, some outer loadings of HEI quality indicators were lower than 0.5. To increase them and satisfy the rule of thumbs required, outer loadings between 0.40 and 0.70 should be considered for removal (Hair *et al.*, 2021). In addition, we found high multicollinearity between indicators seen from the VIF values, which was greater than 3.3 (Kock, 2015). This condition also indicates the problem of CMB (Kock, 2015). Hence, the indicators which are thus experienced such problems also become objects of elimination. In the second test, after dropping poor indicators, all items' loadings of HEI quality were in the recommended value of around 0.6 to 0.7 (Hair *et al.* 2021) (Table A2). It was also found that the HEI quality construct had an AVE value that agreed with the rule of thumb required, which is 0.50 (Table A2) (Sholihin and Ratmono, 2021). Moreover, the discriminant validity test result showed that the

root of the AVE value on the HEI quality construct is higher than its squared correlation to other constructs (Table A3); hence this requirement is also met, or the discriminant validity was established (Hair *et al.* 2021). Further, from Table 3A, Cronbach's alpha value of HEI quality was above 0.6 as required, and HEI quality's CR value was higher than 0.70 (Hair *et al.* 2021). These results indicate that the reflective construct measurement is reliable (Fornell and Larcker, 1981; Hair *et al.*, 2021). Meanwhile, for formative constructs, there is no need to test reliability (Hair *et al.*, 2021).

Table A2. AVE, Outer Weight, Loading, and VIF Values

Construct	Lasting Indicator	Question item	Outer Weight	Loading	VIF
Control Environment	COEV1	Our campus details the activities needed to complete tasks in each campus unit position (i.e., Dean, Head of Department, Head of units).	0.583**	0.853**	2.030
	COEV4	Our campus adjusts the organisational structure concerning environmental changes if necessary.	0.072	0.589**	2.014
	COEV6	The finance staff team responsible for preparing financial reports in all campus units has a background in accounting education.	0.474	0.671**	1.749
	COEV10	People appointed as leaders at all levels of management have strong capabilities.	0.128	0.602**	2.131
	COEV17	Top leaders at our campus are always careful in taking action/decisions.	0.296	0.696**	2.128
Control Activities	COACT6	Campus physical asset control reviews are conducted periodically.	0.295	0.802**	2.083
	COACT7	Information technology updates for control purposes are carried out periodically.	0.626**	0.936**	2.294
	COACT9	Academic activities get continuous supervision.	0.235	0.750**	1.910
Risk Assessment	RISKAS1	Campus goals/targets are prepared by always considering possible risks.	0.360	0.868**	2.365
	RISKAS3	On our campus, at every management level, the relevant risks are analysed first before a decision is taken/made.	0.464*	0.905**	2.575
	RISKAS4	Any potential fraud that can affect campus goals/targets is always identified to be mitigated.	0.315	0.850**	2.527
Information and Communication	INCOM1	Our campus management at all levels/units is supported by various communication features easily accessible for coordination (chat, video conferencing, and email).	0.644**	0.822**	1.509
	INCOM5	Reviews of the implementation of internal control on campus involve competent external campus parties (assessors from HEI Accreditation assessors, Other HEIs' internal control forum or auditors from public accounting firms).	0.597**	0.789**	1.759

Construct	Lasting Indicator	Question item	Outer Weight	Loading	VIF
Monitoring	MON1	At our campus, the results of audits or reviews related to internal control are always followed up.	0.540*	0.936**	2.774
	MON2	At our campus, rapid procedures for identifying internal control weaknesses are available.	0.384	0.883**	2.617
	MON3	Identified internal control weaknesses are always reported to the authorities on campus.	0.207	0.755**	2.108
IQA Mechanism	IQAM1	The HEI develops KPIs for all academic activities.	0.211*	0.762**	2.497
	IQAM2	The HEI develops KPIs for all non-academic activities.	0.227**	0.695**	1.897
	IQAM3	KPIs are set based on the quality standards set by the HEI.	0.111	0.641**	2.550
	IQAM4	KPIs are set based on the vision and mission of the HEI.	-0.150	0.574**	2.603
	IQAM5	KPIs are set based on the short-term goals of the HEI.	0.008	0.524**	2.012
	IQAM7	Internal assessments are carried out periodically to ensure compliance with quality standards for teaching activities .	0.170	0.742**	2.488
	IQAM10	Internal assessments are carried out periodically to ensure compliance with quality standards for HEI administrative services activities .	0.222*	0.734**	2.360
	IQAM15	In formulating quality standards, our campus refers to the quality standards formulated by the Ministry of Education and Culture (National Higher Education Standards) .	0.186*	0.504**	1.583
	IQAM 16	In formulating quality standards, our campus refers to quality standards formulated by reputable external organisations (e.g., QS World University Rankings, ASEAN University Networking-Quality Assurance [AUN-QA], and ISO) .	0.165*	0.628**	1.761
	IQAM18	The Internal Quality Assurance (IQA) Policy is formulated by always involving representatives of all HEI academics .	-0.014	0.568**	2.036
	IQAM19	The Internal Quality Assurance (IQA) Policy is formulated by always involving representatives of external stakeholders (industry/alumni users/workers).	0.286**	0.668**	2.064
	IQAM20	The Internal Quality Assurance (IQA) Policy is formulated by always referring to the IQA guidelines prepared by the Directorate of Higher Education of the Ministry of Education and Culture for IQA affairs.	-0.009	0.527**	1.830

Construct	Lasting Indicator	Question item	Outer Weight	Loading	VIF
IQA Integration	IQAI21	The IQA implementation at our HEI links to the implementation of the internal control system.	0.531**	0.907**	2.462
	IQAI24	The IQA implementation at our HEI involves all HEI supporting units (LPPM, HR Bureau, freshmen admissions agencies, etc.).	0.230**	0.705**	1.749
	IQAI26	Our HEI's IQA policy is regularly socialised to the entire academic community.	0.407**	0.873**	2.625
IQA Scope	IQAS27	The effectiveness of IQA implementation on teaching activities	0.270**	0.759**	2.021
	IQAS32	The effectiveness of IQA implementation on training activities for community service improvement	0.239**	0.831**	2.524
	IQAS33	The effectiveness of IQA implementation on student service activities	0.410**	0.899**	3.056
	IQAS34	The effectiveness of IQA implementation on lecturer career management activities	0.280**	0.814**	2.494
HEI Quality (AVE = 0.50)	QUAL3	The Number of Study Programs Accredited by the International Accreditation Board Recognised by the Indonesian Government	NA	0.684	1.807
	QUAL4	Accreditation predicate of Study Program by Ministry of Education and Culture	NA	0.677	1.681
	QUAL5	Lecturer Recognition at both International and National Levels	NA	0.706	1.733
	QUAL6	The Number of New Student Selection	NA	0.747	2.120
	QUAL7	The Number of International Student	NA	0.675	1.729
	QUAL12	The Outcome of the Community Service Program	NA	0.734	2.108
	QUAL13	Income Generation Performance	NA	0.768	2.440
	QUAL14	Income Level Other Than Tuition Fee	NA	0.705	1.918
	QUAL24	The Alumni Work in Multi-National Companies or International Institutions	NA	0.695	1.672
	QUAL26	Number of Patents or Simple Patents Generated	NA	0.675	2.449
QUAL28	Number of Appropriate Technology, Products, Artwork, Social Engineering	NA	0.706	2.502	

Note: $p < 0.05$; $p < 0.01$; AVE: Average Variance Extracted; NA: Not Applicable as the construct used reflective; The reverse scale has been adjusted when tabulating the data.

Source: Authors own work

Table 3A. Discriminant Validity and Reliability Test Results

Discriminant Validity									
	COACT	COEV	INCOM	IQA-I	IQA-M	IQA-S	MON	QUAL	RISK
COACT	FC								
COEV	0.718	FC							
INCOM	0.654	0.646	FC						
IQA-I	0.221	0.159	0.217	FC					
IQA-M	0.191	0.261	0.239	0.788	FC				
IQA-S	0.268	0.274	0.235	0.733	0.724	FC			
MON	0.674	0.714	0.621	0.193	0.226	0.260	FC		
QUAL	0.257	0.260	0.206	0.532	0.586	0.589	0.272	0.707	
RISK	0.655	0.745	0.595	0.123	0.167	0.210	0.690	0.188	FC
Reliability (HEI Quality)									
Cronbach's Alpha								0.900	
Composite Reliability								0.917	

FC: Formative Construct [Discriminant validity is not applicable (Hair *et al.*, 2014)]; Diagonals (in bold) represent the root of average variance extracted (AVE), while the other entries represent the squared correlations.

Source: Authors own work

Furthermore, for second-order formative-formative constructs, i.e., internal control and internal quality assurance, the validity was assessed from the significance of their outer weight and loading values (Table 4A). The results show that most first-order constructs formed the second-order construct had outer weight values with a significant positive (direction). Although one first-order construct had insignificant outer weight (Control Environment), the loading value was greater than 0.50 and significant at alpha 0.01. Hence, it was still concluded as valid (Hair *et al.*, 2021). Thus, the analysis results indicated that the first-order construct uniquely contributed to the second-order construct (Hair *et al.*, 2021).

Table 4A. Validity Test Results of Second-Order Construct (Formative)

Second-Order Construct	Outer Weight	Loading	VIF
<i>Internal Control</i>			
Control Environment → Internal Control	0.145	0.869**	2.580
Risk Assessment → Internal Control	0.367*	0.897**	2.629
Control Activity → Internal Control	0.226*	0.852**	2.314
Information & Communication → Internal Control	0.180*	0.791**	2.072
Monitoring → Internal Control	0.244**	0.864**	2.292
<i>Internal Quality Assurance</i>			
IQA Mechanism → Internal Quality Assurance	0.363**	0.905**	3.005
IQA Integration → Internal Quality Assurance	0.220*	0.880**	3.097
IQA Scope → Internal Quality Assurance	0.511**	0.935**	2.462

* $p < 0.05$, ** $p < 0.01$

Source: Authors own work

In addition, the VIF values of all formative constructs were less than 3.3 (Table 4A). It indicated that the problem of multicollinearity and the possibility of CMB were resolved (Kock, 2015). In brief, validity and reliability test results deduced that the measurements of all constructs were valid and reliable.

References in Appendices

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- Sholihin, M. and Ratmono, D. (2021), *Analisis SEM-PLS dengan WarpPLS 7.0 untuk hubungan nonlinier dalam penelitian sosial dan bisnis*, Penerbit Andi.