

Intellectual Capital and Indonesian Universities Performance

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Intellectual capital (IC) is an important asset for a university to face today's global economy challenges. Thus this study investigates the effect of intellectual capital and its constituent elements, namely human capital, structural capital and relational capital on the public universities performance in Indonesia. A total of 177 respondents representing from 8 top public universities in Indonesia were involved in the study. The Partial Least Square (PLS) was used to test the hypotheses. The result found a significant relationship of IC and its elements on universities performance. Relational capital, which is one of the elements of IC, contributed a very strong influence on the universities performance rather than two others, human capital and structural capital. Therefore it is wise to recommend to the university to invest on IC which consisting of human capital, structural capital and relational capital. Also these elements should be used as a new model for measurement of the university or higher education institution performance so that it provides added value to strengthen their competitiveness ability.

1. Introduction

Higher education is one of education instruments in Indonesia, which become center of implementation and development to educate the community with the knowledge, technology and art for a better quality life of community, nation and the country. These institutions have grown rapidly since last decades. As reported by the Ministry of National Education, Republic of Indonesia (2013), the amount of public and private higher education institutions in Indonesia increased about 18% and 5.39%, respectively from year 2005 to 2011. This situation has created tough competition amongst them and has changed the orientation of the country's universities are not only be able to compete in national level, but also in the global level.

Facing these challenges, Indonesian universities should enhance their performances both in academics and management. Performances measurement has increasingly pushed a call for accountability in higher education. However, there are still few frameworks of universities performances measurements have been developed. Many performances measurement frameworks are originated from private sectors for purposely getting profits. An attempt has been made by Wang (2010), who claimed that the universities performance can be measured from education and research aspects, which are in line with the university roles and functions.

Intellectual capital (IC) is one of the important elements for education and research measurements. Intellectual capital should be given a great attention in elevating the universities performance because it is consisting of knowledge as main output and input of the universities. The universities in European countries have well-organized in reporting intellectual capital since few decades. This can be proven by a lot of studies on intellectual capital in universities have been revealed in the literatures for

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some countries such as Austria, UK, Spain, Hungaria and Taiwan (Leitner, 2002; Fazlagic, 2006; Sanchez and Elena, 2006; Canibano and Sanchez, 2009; Benzhan, 2010; Ramirez, Santos and Tejada, 2011; Ramirez, 2013; Ramirez and Gordillo, 2014; Wu, Chen and Chen, 2012; Veltri and Schaffhauser, 2012).

In the case of Indonesia, studies on intellectual capital in universities are very few. Puspitahati, Ulum and Prasetyo (2011) and Ulum (2012), conducted a study on intellectual capital in the Indonesia universities through official website of the QS-Star framework. Sadalia and Lubis, (2015) examined discriminant analysis of intellectual model (organizational culture and corporate governance) of state university in Medan city, Indonesia. Besides limited in number and scopes of study, the previous studies are also not comprehensive in addressing the current problem. Thus, the study initiates a comprehensive investigation on the effects of published information of intellectual capital to the university performance.

2. Literature Review

Intellectual capital consists of three elements, i.e. human capital, structural capital and relational capital. As the university is one of types of organization, thus it is clear that intellectual capital is also a major asset for universities. A university is an organization; therefore, it is clear that intellectual capital is a major asset for the university. Furthermore, the education quality directly influences organizational performance. Intellectual capital may have a significant impact on universities performance (Jones, Meadow and Sicilia, 2009; Lu, 2012; Meihami and Karami, 2014). Universities provide an effective location for such investigation since IC is so important to universities (Yusof, 2008).

Human capital is the greatest critical component as the heart of intellectual capital. Literature indicates that past studies have also focused on the impact of human resources management practices on university performance with academicians as the center of focus (Shahzad, Bashir and Ramay, 2008; Chen, *et al.*, 2009; Malik, Nawab, Maeem and Danis, 2010). A study by Amin, Ismail, Rasid and Selemani (2014) found that human resource practices: recruitment, training, performance appraisal, career planning, employee participation, job definition and compensation have a significant relationship with university performance.

Generally, structural capital of organizations comprises of infrastructure, system policies and procedures, (Khalique *et al.*, 2011). An organization cannot live on without human capital. The mere creation of knowledge by individuals is useless without a structure to determine how that knowledge leads to better products. The consideration that the characteristic of public university operation direction, university funds, and the operation expenditure of the schools in teaching, research, education, and training, guidance and assistance etc. These factor serve to strengthen the internal organizational and energize research and teaching (Lu, 2012).

Relational capital as an invisible asset that made based on developing, maintaining and nurturing high quality relationships with any organizations, individuals or groups that influences organization performance. Lu (2012) stated the new economic model has pushed the universities to explore how to get profits from the knowledge that they possess as educational institutions. If a university has a strong relationship with numerous customers, it is likely that the university will continue to be profitable and reputable.

- H1:** There is a relationship between intellectual capital and the public universities performance.
- H1a:** There is a relationship between human capital and the public universities performance.
- H1b:** There is a relationship between structural capital and the public universities performance.
- H1c:** There is a relationship between relational capital and the public universities performance.

3. The Methodology and Model

A total of 177 respondents comprised of the university and faculty leaders have participated in this study. Samples of populations were taken from 8 Indonesian public universities listed under the QS World University Rankings in between year 2014 and 2015. A questionnaires survey technique through online survey was used to obtain the data from the respondents from the listed universities. The respondents involved in the study were Rector, Vice Rector, Dean, Vice Dean and Head and Secretary of Departments and lecturers. They were purposely chosen since they know more about their institutions.

Intellectual capital in university is a term used to cover all the institution's non-tangible or non-physical assets, including processes, capacity for innovation, patents, the tacit knowledge of its members and their capacities, talents and skills, the recognition of society, its network of collaborators and contacts, etc. The instrument to measure intellectual capital adopted from Ramirez *et al.*, (2011). The instrument consisted of 1 to 5 Likert scales, where 1-scale is for "not at all important" and 5-scale says that "it is very important". There dimensions of intellectual capital are considered for analysis purpose including human capital, structural capital and relational capital.

Human capital is the sum of the explicit and tacit knowledge of the university staff (teacher, researcher, manager, administration and service staff) acquired through formal and non-formal education and refresher process included in their activities. A total of 12 items questions were delivered for human capital. Structural capital is the explicit knowledge relating to internal process of dissemination, communication and management of the scientific and technical knowledge at the university. Structural capital includes organizational capital and technological capital. Organizational capital is the operational environment derived from the interaction between research, management and organization processes, organizational routines, corporate values, inter procedures, quality and the scope of the information system, etc. Technological capital is the technological resources available at the university, such as bibliographical and documentary resources, archives, technical developments, patents, licenses, software, database, etc. A total of 13 items questions were delivered for structural capital. Relational capital is the extensive collection of economic, political and institutional relations developed and upheld between the university and its non-academic partners, i.e. enterprises, non-profit organizations, local government and society in general. It also includes the perception other shave of the university; its image, appeal, reliability, etc. A total of 16 items questions were delivered for relational capital.

University performance can be measured by the extent to which each of university functions is maintained toward the university goals. This study uses the university

organizational performance measurement by Wang (2010). The measurement method was chosen just simple because this method has multidimensional performance measurement including aspects of academic and management. The academic performance dimension can be further divided into research and educational dimensions. The management performance dimension can be further divided into financial and human resource dimensions.

Measurement of academic research performance consists of 12 questions, while 14 questions were used to measure the academic education performance. Measurement of financial management performance consists of 5 questions, while 10 questions were given to measure the human resources management performance. Similarly, the respondents were asked to evaluate their universities performances based on the given Likert Scale as mentioned earlier.

The Partial Least Square (PLS) approach with WarpPLS program version 3.0 was used to test the hypothesis. This approach has several advantages as stated by Hair *et al.*, (2013) and Kock (2013). Firstly, SEM-PLS is suitable for this research model that uses variables that cannot be measured directly (latent variables) and has predicted measurement error. Secondly, analysis of SEM-PLS can simultaneously test multiple dependence and independence variables as used in this research model. Thirdly, component-based SEM-PLS can overcome complexity models with small sample sizes.

4. The Findings

The first step in data analysis with SEM-PLS approach is validity and reliability test. Testing the validity with the reflective indicator was measured through convergent validity and validity discriminant. Testing reliability for reflective construct was measured by Cronbach alpha and composite reliability based on Kock (2013). Meanwhile, testing construct validity and reliability are not required for the formative indicators. This can be done by looking at the weight indicator only. This indicator should be statistically significant and multicollinearity of variance inflation factor (VIF) should be smaller than 3.3. Table 1 summarizes the results of validity and reliability testing for reflective constructs.

Table 1 Conclusion from the Results of the Validity and Reliability (Outer /Measurement Model) Testing

Construct	Validity		Reliability		Full Collinearity VIF
	Loading Range	AVE	Composite Reliability	Cronbach Alpha	
Rule of thumb	> 0.5	> 0.5	> 0.7	> 0.7	< 3.3
<i>Intellectual Capital (IC)</i>					
Human Capital (HC)	0.622-0.782	0.510	0.838	0.757	2.107
Structural Capital (SC)	0.640-0.794	0.510	0.912	0.892	1.994
Relational Capital (RC)	0.599-0.798	0.513	0.904	0.879	1.713
<i>University Performance</i>					
Academic Research (PR)	0.674-0.809	0.551	0.936	0.925	1.841
Academic Education (PE)	0.583-0.861	0.548	0.856	0.789	1.469
Management Financial (PF)	0.794-0.839	0.663	0.908	0.873	2.288
Management Human Resources (PH)	0.593-0.753	0.503	0.901	0.876	2.044

Source: Results of data processing by software WarpPLS 3.0

Overall, the results of measurement model (outer model) reflective constructs have met the criteria, so that it can proceed to the inner model or structural models. The

results of this study shows a loading range of 0.593 to 0.861 and agrees with Hair *et al.*, (2013), who stated that the loading between 0.40-0.70 should be taken into consideration and retain for a newly developed questionnaire. Based on criteria of each variable cross loading should be greater than 0.70, hence it have also met the criteria as discriminant validity (Table 2).

The formative construct of the WarpPLS program just looked at the significance of weight indicators with criteria p value less than 0.05 and VIF (variance inflation factor) of less than 3.3 (Kock, 2013) are presented in Table 3.

Convergent validity testing for each construct indicated that there are several indicators that should be dropped. Indicators dropped since they are not meeting the test criteria of convergent validity and value AVE (average variance extracted) with terms of greater than 0.05.

Table 2 Result of Discriminant Validity

Construct	University Performance						
	Human Capital	Structural Capital	Relational Capital	Academic Research	Academic Education	Financial Management	Human Resources Management
<i>Intellectual Capital</i>							
Human Capital	0.714						
Structural Capital	0.644	0.714					
Relational Capital	0.588	0.548	0.716				
<i>University Performance</i>							
Academic Research	0.209	0.216	0.251	0.742			
Academic Education	0.260	0.230	0.285	0.390	0.740		
Management	0.132	0.074	0.194	0.596	0.453	0.815	
Financial Management							
Human Resources	0.205	0.214	0.243	0.532	0.440	0.672	0.709

Source: Results of data processing by software WarpPLS 3.0

Table 3 Results of Formative Construct Testing

Constructs	P value	VIF
Rule of thumb	< 0.05	< 3.3
<i>Intellectual Capital</i>		
lv_HC	<0.001	2.052
lv_HC	<0.001	1.921
lv_HC	<0.001	1.639
<i>University Performance</i>		
lv_PR	<0.001	1.658
lv_PE	<0.001	1.336
lv_PF	<0.001	2.200
lv_PH	<0.001	1.976

Source: Results of data processing by software WarpPLS 3.0

Table 4 Summary Indicators Dropped

Latent Variables	Early	Drop I	Drop II	Drop III	Drop Total	Finally
<i>Intellectual Capital (IC)</i>						
Human Capital (HC)	12	3	4	-	7	5
Structural Capital (SC)	13	3	-	-	3	10
Relational Capital (RC)	16	4	3	-	7	9
<i>University Performance</i>						
Academic Research (PR)	12	-	-	-	-	12
Academic Educational (PE)	14	5	3	1	9	5
Financial Management (PF)	5	-	-	-	-	5
Human Resources Management (PH)	10	1	-	-	1	9
Total	82	16	10	1	27	55

The number of indicator questions given to the respondent before the convergent validity testing were 82 items questions, as summarized in Table 4. After testing, the eventual number of valid and reliable indicators was 55 that can be used to test the hypothesis. The indicators do not meet the test criteria convergent validity and value AVE (average variance extracted) was 27 of the 82 indicators used to measure latent variables.

The value of standardized path coefficient of intellectual capital to university performance is 0.35 and is significant at p-value less than 0.001 (Figure 1). Also, the value of R^2 of 0.12 and is considered as relatively weak in a group R^2 in accordance with Chin (1998). This result means that only 12% of the performance variances university (PU) can be explained by the variance of intellectual capital (IC).

Figure 1 Result of Structural Model for Hypothesis 1 Testing

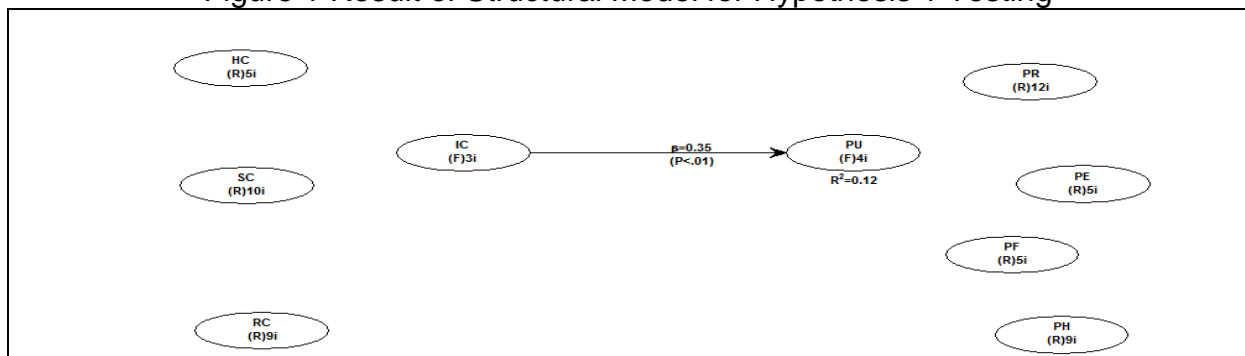


Table 5 shows results of correlation coefficient value of intellectual capital (IC) to the university performance (PU) is approximately 0.349 (rounded to the image output becomes 0.35) and significant at 0.001. The output shows that the hypothesis is accepted. This means that the intellectual capital significantly influence university performance. In other words, it can be said the higher the transparency of the publication of intellectual capital of an organization, the higher the university performance.

Table 5 Output Path Coefficients for Hypothesis 1

Path coefficients	Standard Errors	Effect Sizes	Path coefficients values	p-values	Result of hypothesis
IC → PU	0.064	0.122	0.349	<0.001	H1 Supported

The result of effect size estimation of the value of intellectual capital of the university performance is 0.122 and categorized into medium effect size group. This means that the effect of intellectual capital has an important influence in the organization based on practical point of view by Cohen (1988).

Previous studies show significant positive correlations between intellectual capital and organizational performance. These findings are consistent with Jones *et al.*, (2009), Ramirez *et al.*, (2011), Lu (2012) and Meihami and Karami (2014). The findings have proved that intellectual capital plays a significant contribution to enhance the universities performance. Thus, it is clear that intellectual capital is a major intangible asset for universities and education quality which directly influences the universities performance.

The value of standardized path coefficient of human capital to university performance is 0.27 and significant at p-value less than 0.001 (Figure 2). The obtained value R^2 is 0.07 and falls into relatively weak group R^2 based on Chin (1998). This shows that the variance university performance (PU) of 7% can be explained by the variance of human capital (HC).

Figure 2 Results of Structural Model for Hypothesis 1a Testing

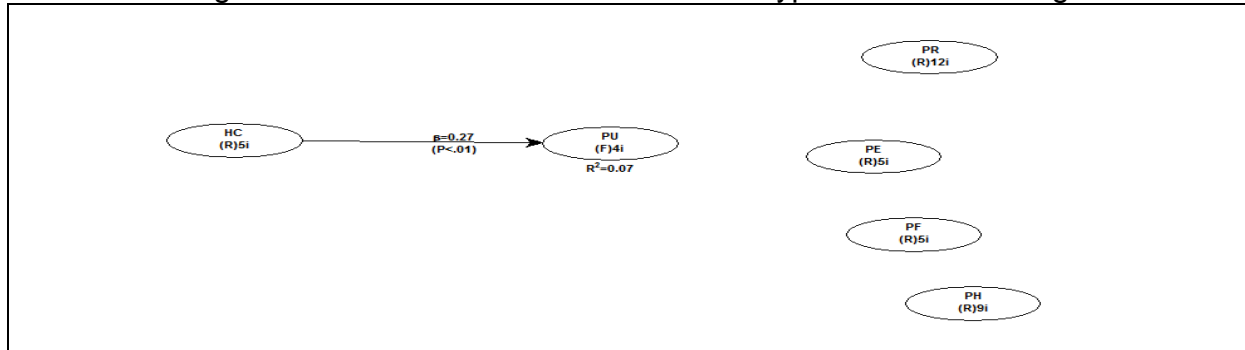


Table 6 shows the output of correlation coefficient values track human capital (HC) on university performance (PU) is approximately 0.272 (rounded to the output image to be 0.27) and significant at 0.001. The output shows that the hypothesis H1a is accepted. Thus, human capital (HC) significantly influences the university performance (PU). In other words, the higher the transparency of disclosure of an organization's human capital, the higher the performance of the university. The result of estimated effect size value of human capital (HC) on university performance (PU) is 0.074. This result falls into relatively weak group effect size and indicates that the effect of human capital disclosure transparency have less influence important from a practical view (practical point of view) based on Cohen (1988).

Table 6 Output Path Coefficients for Hypothesis 1a

Path coefficients	Standard Errors	Effect Sizes	Path coefficients values	p-values	Result Hypothesis
HC → PU	0.067	0.074	0.272	<0.001	H1a Supported

The study has found that human capital have a significant relationship with university performance. This study is consistent with the previous studies Chen *et al.*, (2009), Ramirez (2011), Lu (2012), Amin, *et al.*, (2014). Being a training and research institution, a university needs to attract, retain and develop their employees so that they would be trained and motivated people and committed to their works of conducting research and training for university performance.

The value of standardized path coefficient of structural capital (SC) to university performance (PU) is equal to 0.237 (rounded to 0.24) and significant at a p-value less than 0.001 (Figure 3). The R^2 value of 0.06 is categorized in a relatively weak group R^2 based on Chin (1998). This shows that the variance university performance (PU) by 6% can be explained by the variance of structural capital (SC).

Figure 3 Results of Structural Model for Hypothesis 1b Testing

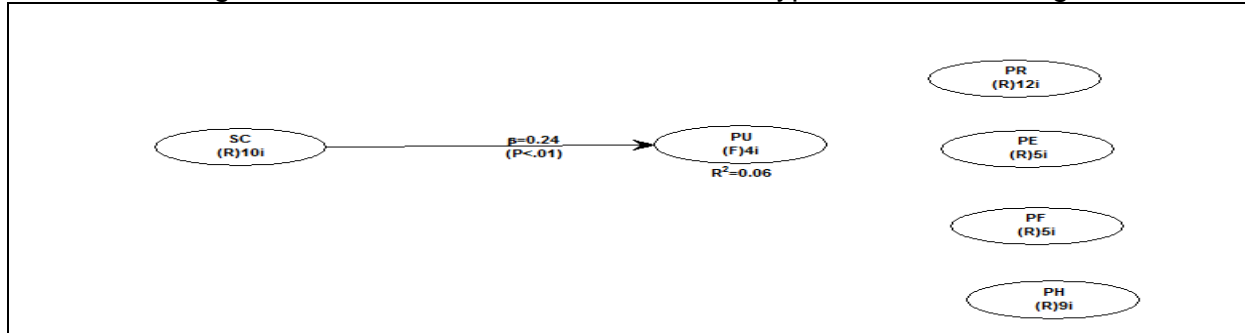


Table 7 shows path coefficient values of structural relationship capital (SC) on university performance (PU) is approximately 0.237 (rounded to the output image becomes 0.24) and significant at 0.001. The output shows that the hypothesis H1b is acceptable. Thus, structural capital gives significant effect on university performance. In other words, the higher the publication of information structural capital of an organization, it increases the university performance.

Table 7 Output Path Coefficients for Hypothesis 1b

Path coefficients	Standard Errors	Effect Sizes	Path coefficients values	p-values	Result Hypothesis
SC → PU	0.068	0.056	0.237	<0.001	H1b Supported

The estimated value of effect sizes of structural capital (SC) on university performance (PU) is 0.056 and falls into relative weak group effect size. This indicates that the effect of structural capital has less important influence than the practical view (practical point of view) as mentioned by Cohen (1988). The structural capital primarily provides the environment that support individuals to invest their human capital to create, the innovation, creativity and universities and leverage its knowledge to enhance the universities performance. The results are consistent with Sharabati *et al.*, (2010), Khalique *et al* (2011) and Lu (2012).

The value of standardized path coefficient of relational capital (RC) to university performance (PU) is 0.31 and significant at a p-value less than 0.001 (Figure 4). The obtained value R^2 is 0.09 and falls into relative weak group as stated by Chin (1998). This shows that the variance of university performance (PU) at 9% can be explained by the variance of relational capital (RC).

Figure 4 Result of Structural Model for Hypothesis 1c testing

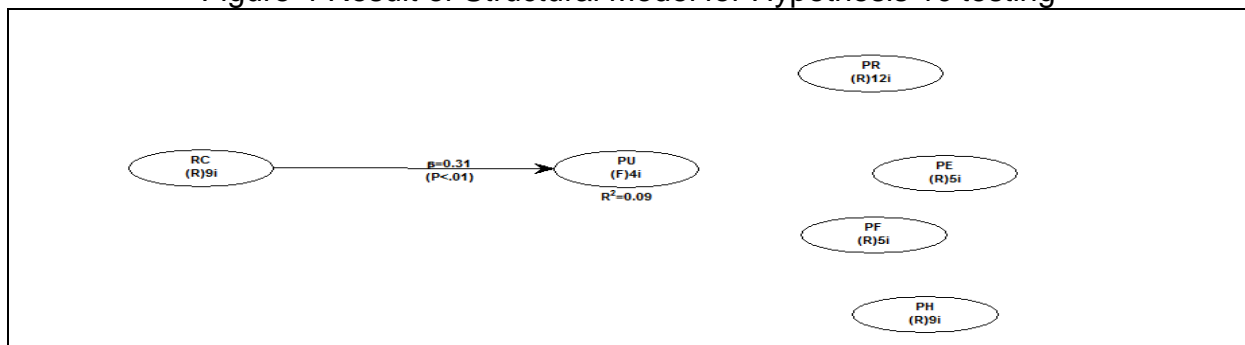


Table 8 shows the path coefficient values of relational relationship capital (RC) to the university performance (PU) is approximately 0.306 (rounded to the output image becomes 0.31) and significant at 0.001. The output shows that the hypothesis H1c is acceptable. Thus, relational capital significantly affects the university performance. In other words, there is a direct influence of transparency disclosure of relational capital that can improve the university performance.

Table 8 Output Path Coefficients for Hypothesis 1c

Path coefficients	Standard Errors	Effect Sizes	Path coefficients values	p-values	Result Hypothesis
RC → PU	0.065	0.094	0.306	<0.001	H1c Supported

The estimated value of the effect size of the university performance to relational capital is 0.094 and falls into a relative weak group effect size. This indicates that the influence of relational capital is less important than practical view (practical point of view) in accordance to Cohen (1988). The acceptance of the empirical results for 1c hypothesis is consistent with statement of Lu (2012), Meihami and Karami, (2014).

5. Summary and Conclusions

This study has proved a significant effect of intellectual capital and its elements to the public universities performance in Indonesia. Relational capital, which is an element of intellectual capital, contributed a very strong influence on the universities in Indonesia performance rather than two others of IC elements e.g. human capital and structural capital. A concern is needed for universities in Indonesia to ensure the transparency of information from these institutions by building a transparency and accountability information, so that it can drive the management to understand the need of intellectual capital.

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