ACKNOWLEDGING INTELLECTUAL CAPITAL IN MALAYSIAN PUBLIC UNIVERSITIES PERFORMANCE

Hazlina Hassan*[1], Amrizah Kamaluddin[2], Shukriah Saad[3], Nur Quratun 'Aini Haron[4] and Noradiva Hamzah[5]

[1,4]Faculty of Accountancy, Universiti Teknologi MARA Malaysia
40450 Universiti Teknologi MARA, Shah Alam, Selangor, MALAYSIA
(Email: hazli872@uitm.edu.my, quratun@uitm.edu.my)

[2,3]Faculty of Accountancy, Universiti Teknologi MARA Selangor Branch
42300 Bandar Puncak Alam, Selangor, MALAYSIA
(Email: amrizah@uitm.edu.my, shukriah736@uitm.edu.my)

[5]School of Accounting, Universiti Kebangsaan Malaysia
43600 Universiti Kebangsaan Malaysia, Bangi, Selangor, MALAYSIA
(Email: adibz@ukm.edu.my)

*Corresponding Author: hazli872@uitm.edu.my

ABSTRACT

In today's knowledge-based economy, intellectual capital has emerged as a crucial component for boosting productivity and sustaining organizational performance. The intellectual capital approach has assumed a preeminent position in the higher education industry, where knowledge is the primary output and input. The majority of its valuable input consists of researchers, managers, and students who are acquainted with the university's procedures, rules, and regulations, as well as its network of relationships. Principal outputs include research results, publications, educated students, and productive stakeholder relationships. If universities are to continue providing high-quality services and ensure their long-term viability, these intellectual capital components must be properly identified and managed. Malaysian public universities were chosen as the sample for this investigation into how universities extract the value of their intangible assets. This study seeks to provide empirical evidence on the relationship between the intellectual capital of universities and their performance. IBM-SPSS analysis software was applied to the dataset of 56 respondents. The analysis demonstrates that intellectual capital significantly influences universities' performance, especially on financial, internal process and learning growth performance perspectives. This study provides a deeper understanding of how universities measure their intellectual capital and the significance of its value in enhancing the performance of public universities. The indicators discovered in measuring intellectual capital are anticipated to become a model applicable to ASEAN public universities for managing and reporting intellectual capital and its significant influence on a university's performance.

Keywords: Intellectual Capital; Public Universities; University Performance; Measurement

1.0 INTRODUCTION

The international context of higher education institutions nowadays has to deal with a number of changes, which in turn enhance the number of functions of universities, such as: (1) the appearance of new demands and aspirations of different stakeholders; (2) decreasing public funding for research and growing competition from the education offered by companies; (3) new focus on knowledge production and the implementation of new research methods; and (4) the growing level of internationalization of education and research and pressure for harmonization of different national university systems (Ramirez et al., 2011; Kamaluddin et al., 2016). The universities are not only expected to provide training and research but are also expected to provide lifelong learning opportunities (Canibano & Sanchez, 2009). In addition, they are also expected to help organizations to improve their innovation capacities and solve social problems (Canibano & Sanchez, 2009). The development of useful conceptual tools or models for analyzing universities as being economic within the knowledge-based economy is seriously hampered by the lack of data on the roles of universities that enable comparisons across time or national innovation systems. Indicators that enable longitudinal analysis of the roles of universities in training scientists and engineers contributing to "public knowledge" or transferring inventions to industrial firms are scarce. The absence of broader longitudinal and cross-nationally comparable indicators of university-industry interaction impedes policy formulation and evaluation (Mowery & Sampat, 2010). Thus, it is important to conceptualise the measurement of intellectual capital in universities as their key resources to deliver good quality services to the stakeholders and enhance their performance (Chatterji & Kiran, 2022).

2.0 LITERATURE REVIEW

2.1 Intellectual Capital in Higher Education

Higher education sector faces many challenges in this new era. With the knowledge-based view (KBV) development, knowledge was recognized to be one of the most important resources (Oksana, 2016). In the context of higher education, universities are the institutions where knowledge creation and transfer takes place. This makes universities the epicenter of a knowledge-based economy (KBE). The key element of a KBE is reliance on intellectual capabilities. There are many types of intellectual capital have been introduced in this industry. The intellectual capital approach has become a prime importance in universities because knowledge is their main output and input. Most of its valuable input of resources are researchers, managers and students with the university's procedures, rules and regulations, network of relationships and its major output is knowledge incorporated in research results, publications, educated students and productive relationships with stakeholders. These elements of intellectual capitals need to be properly identified and managed to sustain quality services provided by the universities and ensure their viability. Thus, this study explores the relationship between intellectual capital and each individual perspective of a university's performance. This study will allow a greater understanding of how university management measures their intellectual capitals and its relationship to a university's performance. Indeed, this study will highlight a specific index on intellectual capital measurement in the higher education sector, which should be seen in the light of socioeconomic conditions.

Most studies have dealt with the intellectual capital of developed countries like Spain and Italy. Developing countries other than Russia, Columbia and Romania have not found much reference. Developed countries are well equipped to deal with the power of knowledge in terms of the available human, social and intellectual capital. This is complemented by the political will of the

governments of these countries. On the contrary, developing countries are still accumulating the human and social capital necessary to create and manage knowledge. It will, therefore, be interesting to see how countries, like Malaysia explore the role of universities in creating a KBE. Thus, the present study brings up a fresh perspective from the Southeast Asian region on the significance of intellectual capital for universities. In the context of the Malaysian scenario, the government has pursued increasing the rate of transfer of academic research advances to industry and to facilitate the application of these research advances by local firms as part of a broader effort to improve national economic performance. The Ministry of Higher Education has spent millions to sponsor and support the research agenda in Malaysian public universities.

On top of that, the Malaysian Higher Education landscape has changed since the shift from a production-based economy to a knowledge-based economy. These changes are driven by globalisation factors that demand more efficient human capital and skilful employees (Shariffuddin, Razali, Shaaidi, & Ibrahim, 2017; Grapragasem, Krishnan & Mansor, 2014). University transformation programme (UniTP), (MOHE, 2017a) has developed several guidelines in promoting transformation in Malaysian higher institutions. The strategies planned by UniTP are strengthening academic career pathways and leadership development, explore talents (academics, professional, practitioner), expanding global sourcing and standard of procedures, review talent value to ensure competitiveness, creating more opportunities for professional development (innovation and structural capital), enhancing University Board Governance and monitor quality. All the guidelines and strategies stated are related to the elements of intellectual capitals embedded in human capital, structural capital and relational capital in public universities. Situations of sustainability and performance on higher education institutions raise a red flag to Ministry of Higher Education Malaysia to ensure the continuance of excellence in their public university (Hadijah, 2019). In light of achieving this vision, an empirical study is needed to inform the current state of measurement of intellectual capitals among public universities in Malaysia and further broaden the study through comparative lens in Southeast Asia. The higher education sector needs to implement a good strategy in order to be sustainable.

Thus, it is the right time to propose a comprehensive model of intellectual capitals in public universities, which would later form the base to develop the national university intellectual capitals index. Consistent with the aspiration of the universities as producers of knowledgeable human capital and their vital role in inculcating innovation culture in ensuring continuous development of new ideas and knowledge, the main objective of this paper is to propose a comprehensive model of intellectual capitals from the public universities' perspective. Due to the above challenges and policies, the current study is motivated to review the concept and measurement of intellectual capitals from the public universities' viewpoint coherent with the role of the universities as research centres and the place for production and diffusion of knowledge. The proposed model can act as an evaluating its intellectual capital achievements. The respective ministry is able to benchmark the intellectual capital activities achievements of various universities if a standard model is produced. It may also assist the government in making decisions and setting future strategies relevant to the intellectual capitals policy in the higher education system monitoring tool to govern the public funds, which have been awarded and spent by the universities for research and development activities.

2.2 Intellectual Capital and its Dimensions

In the literature a variety of assets are specified as intellectual capitals. There are many subcategories of intellectual capitals being mentioned and it is clear that they have to be properly classified. There are many definitions of intellectual capitals. Boisot (1999) defined the intellectual capitals as, "stocks of knowledge from which services are expected to flow for a period of time that may be hard to specify in advance, with an economic life viable within industry and market context". Kamasak (2010) stated that intellectual capitals represent the source of an organisation's abilities and skills that are deemed needed for its development, competitive advantage and human growth. The most significant intellectual capitals were determined as knowledgeable people, aptitude to learn, know-how, information technology, human skills, social relations and linkages, available journals and databases, intellectual property rights, registered designs, web content, copyrights, organizational procedures (Sadalia & Lubis, 2015) and Chu et. al (2016). In addition, Nonaka et al. (2000) define intellectual capitals as "firm-specific resources that are indispensable to create values for the firm". In order to make use of intellectual capitals and to manage knowledge creation and exploitation effectively organizations must be able to identify and quantify these resources. Hence, a company has to map its stocks of intellectual capitals while keeping in mind that they are dynamic, and new intellectual capitals can be created from existing ones (Nonaka et al., 2000). The importance of intellectual capitals depends on the goals, objectives and the strategy of the specific organization. Therefore, intellectual capital should be analyzed at the basis the company's goals and objectives.

In the context of public university, Leitner (2002) referred human capital as the researchers and nonscientific staff of the university. Torres (2006) defined human capital as the knowledge and skills of individuals in the university. She further classified human capital as teaching skills, researching skills and personnel relationships. Teaching skills refer to updated programmed learning, class preparedness, programmed learning coordination and research result dissemination. Researching skills refer to the percentage of research and teaching staff with PhD in the department and the percentage of researching economic complements in the department. In contrast, personnel relationships refer to personal relationships, collaboration and internal cohesion in the department. Warden (2003) defined human capital as the explicit and tacit knowledge of the organisations' personnel (researcher and research manager), shared or otherwise, that is of value to the organisation. While Ramirez et al. (2007) defined human capital as the set of explicit and tacit knowledge of the universities' personnel acquired through formal and informal educational actualisation processes embodied in their activities. It is the knowledge that the human resources (teachers, researchers, PhD students and administrative staff) would take with them if they left the institution (Sanchez, Castrillo & Elena, 2006). Additionally, Lu (2012), Boutchich (2020), Maltseva et al., (2018) asserted human capital within a university as the faculty's knowledge foundation, ability to innovate, work motivations and team working skills.

Another element of intellectual capital is structural capital, which in public universities may consist of the university routines and processes (Leitner, 2002). It refers to systems, networks, policies, culture, distribution channels and other organisational capabilities developed to meet market requirements as well as intellectual property (Sanchez et al., 2006; Kok, 2007; Zhang et al., 2016). It is the explicit knowledge related to the internal process of dissemination, communication, and management of scientific and technical knowledge in the organisation (Warden, 2003; Ramirez et al., 2007; Handzic & Ozturk, 2010). The knowledge stays within the institution at the end of the

working day (Sanchez et al., 2006). She classified structural capital as teaching potential, research management, internal collaboration and organisation management. Teaching potential refers to teaching improvement, teaching innovation and the availability of subject manuals to guide students' learning. Research management refers to the production of PhD, the research group size and the research point given by the Researching Andalusia Plan. Internal collaboration refers to the criteria for selecting people for internal promotion, the number of department meeting, the effectiveness of the department commission and the accessible of information of general interest. Organisation management refers to the extra department relationship and department financiering. Najim, Al-Naimi and Alhaji (2012) and Charteji and Kiran (2022) asserted structural capital as the university's regulations, programs and routines. Lu (2012) stated that structural capital is a structure that determines how knowledge leads to better products. He considered structural capital as consisting of the characteristics of public university operation direction, university funds, and the operation expenditure of the schools in teaching, research, education and training, and guidance and assistance.

Meanwhile, Wu et al. (2010) claimed that to strengthen academic competition in the future, universities need to improve innovation capital since each form of intellectual capital will be influenced by innovation capital. Additionally, Wu et al. (2010) asserted that innovation capital comprises of intellectual property and tangible assets. From the review of literatures, they proposed the indicators for intellectual property as innovative reference (the exploration of undiscovered knowledge), innovative culture (organisation encourages providing new ideas) and numbers of new ideas. While tangibles assets consist of numbers of publications, financial support (research fund, monetary donation and other tuition) and research performance (number of teachers, and domestic and international journals.

Finally, another component of intellectual capital is relational capital, which means the relationships and networks of the researchers as well as the entire organisation. Perez et al. (2011) suggested that relational capital is any relationship beyond the borders of the organisation. Ramirez et al. (2007) emphasised that relational capital refers to the connections that the people outside of the organisation have with it, their loyalty, the market share, the level of back order and similar issues and it gathers the wide set of economic, political and institutional relationship developed and maintained by universities. All the resources linked to the institution's external relationships, such as customers, suppliers, R&D partners and government, are considered relational capital (Sanchez et al., 2006). Thus, relational capital can be termed as the external structures concerning the organisation's relations with channel partners, supply chain partner business collaborations and agreements (Chatterji & Kiran, 2022).

Overall, measurement of intellectual capitals is essential to be competitive in this knowledgebased economy since university main input and output is knowledge embedded in human capital, structural capital and relational capital. The identification and measurement of intellectual capital can help evaluate the alignment of results with planned strategies of the university and it can allow to set measurable objectives aligned with the strategic mission of the organization as well as to assess the performance such as financial, customer, internal process and learning and growth. Therefore, it will be necessary to investigate further the element of intellectual capitals specifically for public universities in order to achieve the national aspiration to transform Malaysia higher education as a hub for international higher education excellence.

2.3 Research Framework and Hypothesis Development
2.3.1 Theory Resource-Based View (RBV)
This study is grounded in the Resource-Based Value (RBV) theoretical framework. This study used the RBV theory as one of the underlying theories in developing this research framework (figure 2.1). The RBV theory is an organisational theory that highlights the significance of the organisation's external and internal resources, and management is mindful of them. An organisation's resources must be scarce and valuable and cannot be substituted or copied perfectly to provide a competitive edge (Barney, 1991). He also stated that organisational culture and human resources are crucial for an organisation to justify its performance. Previous research revealed two major assumptions of the RBV theory. First, resources should be combined, and organisational capabilities founding the production should be diverse across the organisation. The resources are the inputs in the production process, while organisations' capabilities are their capacity to use tangible and intangible resources to execute tasks (Grant, 1991). Second, the resources could not be transferred perfectly, and the diverse organisational capabilities might be needed over a long period. In addition, Grant (1991) stated that existing market prices could not be used to assign values to intangible resources because of their imperfect transferability and diversity. The significance of resources in the RBV theory leads to the production of a competitive edge for an organisation. Thus, the following research framework shows that organisations should pay attention to intangible resources and capabilities because they are critical for creating a competitive edge.
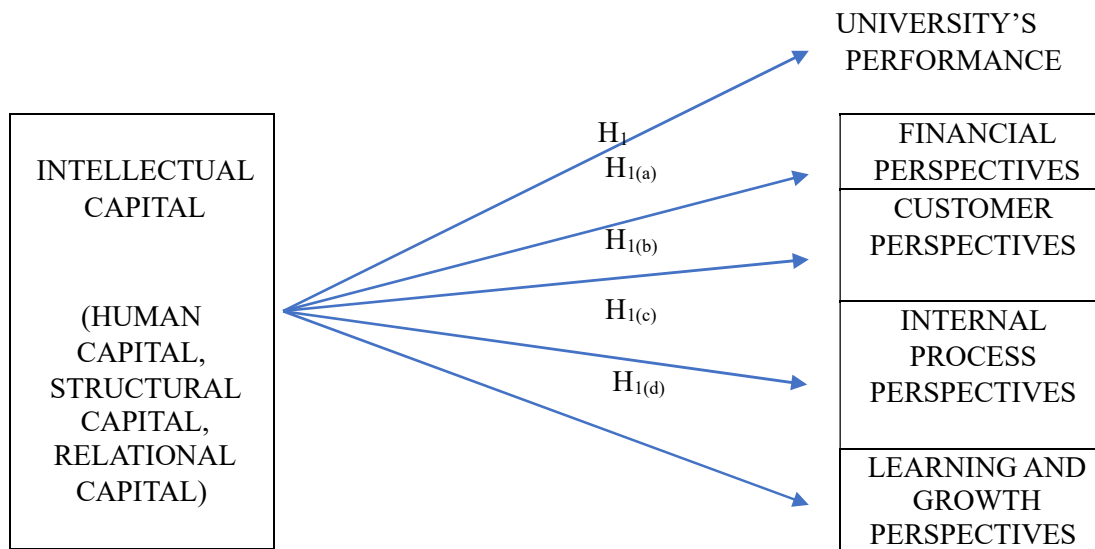

Figure 2.1: Research Framework

2.3.2 Intellectual Capital and University's Performance
Studies have observed that IC has a practical foundation, as evidenced by ideas about understanding the value and nature of intellectual capital in organisations to improve value creation management (Petty & Guthrie, 2000) and develop a competitive edge (Brennan & Connell, 2000).

However, Wei et al. (2020) stated that IC's benefits to organisations' performance are arguable because of their diverse effects on performance. Wei et al.'s research objective was to provide evidence of the effect of changes in IC on changes in organisations' performance based on the concept of pay-performance relation. They used the data envelopment analysis to measure OP and the value-added intellectual coefficient (VAIC™) to assess IC. Their results revealed that capital employed efficiency and overall IC efficiency significantly negatively impact organisations' performance. The findings seemed to suggest a commonsense contradictory to the theory on the benefits of IC. IC and performance investigations have also been conducted mainly in the commercial sector. Not much research has been done on the university's performance (UP) and IC. In the context of universities, few authors (Maltseva et al., 2018) have made similar observations and proposed that institutional researchers play the most crucial role in generating, managing and transferring knowledge in universities.

According to Chen et al., 2021, they have proposed that human and social capital strongly mediate the relationship between human resource practices and organizational performance. The study brings out the intellectual capital-based view of firm or Resource Based View, highlighting the significance of human capital. Other than that, another study on the component of IC, structural capital also has highlighted a strong connection between knowledge infrastructures, like science parks and incubators, and research output and brought out the importance of knowledge sharing (Akhavan and Khosravian, 2016; Zhang et al.,2016). Another researcher Secundo et al. (2017) highlighted that relational capital emerged as more significant as compared to structural capital in influencing university performance. It was revealed that access to information, networking ability and quality of interaction between the faculty and students were the areas that policymakers have to focus on to enhance performance essentially. Universities also look forward to their alumni, especially after reduced state funding (Weerts et al., 2010; McDearmon, 2013). Relational capital also contributes to university performance by influencing the effect of peer relationship on students' academic performance. Academic network exposes students to several sources of support and knowledge that help them perform better (Tomas-Miquel et al., 2016). Hence, this study aims to bring out the underlying factors of intellectual capital and their effect on performance by the following hypothesis:

H1.   Intellectual capital has a significant positive relation with a university's performance.

This study measures university performance using the Balance Score Card (BSC). The literature on Balanced Score Card and their iterations over the years (Karathanos and Karathanos, 2005; Nazari-Shirkouhi et al., 2020) have brought out the significance of BSC as a performance management tool, more than a performance measurement tool. Hence, BSC is a more strategic measure to assess the performance of any organization. Literature (Ferrer and Morris, 2013; Pick et al., 2012; Stephenson et al., 2016) has brought out the increasing significance of neoliberalism in universities because of which their performance needs to be not just measured but managed like that of a corporation so that universities can be more accountable to stakeholders. Moreover, Karathanos and Karathanos (2005) described how the Baldrige education criteria for performance excellence adapted the concept of BSC to higher education. The Malcolm Baldrige National Quality Award is a prestigious award established by the US Congress in 1987 and is one of the world's highest performance excellence measures. Specifically, the value of IC towards the specific perspective of BSC needs to be further analysed to strengthen the area that should be sustained if

there is a significant relationship.

Therefore, the related hypotheses are as follows:

> *H1 (a) Intellectual Capital has a significant positive relation with university performance; financial perspective*
>
> *H1 (b) Intellectual Capital has a significant positive relationship with university performance; customer perspective*
>
> *H1 (c) Intellectual Capital has a significant positive relationship with university performance; internal process perspective*
>
> *H1 (d) Intellectual Capital has a significant positive relation with university performance, learning and growth perspective.*

3.0 RESEARCH METHODOLOGY

The study decided to use a quantitative approach method. The target population for the study was public universities in Malaysia. Data were collected by distributing questionnaires to the university's management team. The target respondents were among the most appropriate representatives because they possess sufficient knowledge and confidence in answering questions pertaining to measuring intellectual capital in university. The list of public universities was obtained from the Ministry of Higher Education in Malaysia. There are 20 public universities in Malaysia. The respondents of the study consist of the deputy vice chancellor, directors, deputy directors, registrars, dean and deputy deans, head of programs, lecturers and administrative staff. The hypotheses of the study will be using a regression approach.

The sample consisted of 10 public universities out of the 20 public universities in Malaysia. Out of 500 questionnaires distributed, only 56 usable and complete questionnaires were retained for further analysis. According to Hair et al. (2018), the minimum sample required to perform sample to variable ratio analysis is at least 5:1, but ratios of 15:1 or 20:1 are preferred. Accordingly, even though a minimum of five respondents must be considered for each independent variable in the model, 15 to 20 observations for each independent variable are strongly advised. The current study examines three variables that satisfy the 15:1 ratio requirement for a more suitable sample size.

The questionnaire consisted of four main sections, in which Section A, B, and C requests the respondents to respond to the questions related to intellectual capital and four university's performance perspectives. Section D entails the demographic profile of the respondents. The measurement scale ranged from 1 (Strongly disagree) to 5 (Strongly Agree) for intellectual capital and university's performance. The items of Human Capital, Structural Capital and Relational Capital which represents Intellectual Capital have been adopted from previous studies (Kucharþíkováa et. al. (2015) and Salinas et al. (2020). Meanwhile items of the construct of university's performance were adopted from important study of balance scorecard comprises of four perspectives; financial, customers, internal process and learning and growth by Zangoueinezhad & Moshabaki, (2011). Finally, data has been analyzed using SPSS version 24 starting from screening data analysis until regression analysis on the variable's relationship and full structural model.

4.0 RESULTS AND DISCUSSION

4.1 Normality Test
Normality test is the analysis to determine the relationship involves the use of test of significant correlation and regression. The appropriate statistical tools for this depend on the normality or nonnormality of observation values. A normality test was carried out using the Skewness and Kurtosis Test on IC and UP. The summary statistics are presented in Table 4.1.

Table 4.1: Summary Statistics of Skewness and Kurtosis: Test of Normality

Variables	Skewness value	Kurtosis value
Intellectual Capital	-1.309	1.994
University performance	-0.146	2.786

It can be seen that all the skewness and kurtosis values are in the range -2 to 2. This means that the mean scores of IC and UP are normally distributed. Following this conclusion, the study uses the parametric statistical tool in the following analysis.

4.2 Correlation Analysis
Correlation analyses were carried out to determine the relationships between variables of intellectual capital, its component HC, SC, RC and university's performance. The summary statistics of the correlation analysis are presented in Table 4.2. It shows that the results were statistically significant, moderate as the variable values were found to be normally distributed, the analyses were carried out using Pearson Coefficient Correlation, a parametric correlation tool. The summary statistics of the correlation analyses are presented in Tables 4.2 and are discussed as follows.

Table 4.2: Summary Statistics of Correlation Analysis between University Performance and Intellectual Capital

	IC	HC	SC	RC	University Performance
Intellectual Capital (IC)	1	.867**	.942**	.887**	.622**
Human Capital (HC)		1	.698**	.703**	.545**
Structural Capital (SC)			1	.762**	.573**
Relational Capital (RC)				1	.572**
Overall means for University Performance					1

** Significant at 0.01

It shows that university performance are positively and moderately correlated with human capital ($r = 0.545$; $p<0.01$), structural capital ($r = 0.543$; $p<0.01$), relational capital ($r = 0.572$; $p<0.01$), and Intellectual Capital ($r = 0.622$; $p<0.01$). To a moderate extent, an increase in a university's performance is associated with an increase in human capital, structural capital, relational capital and vice versa. However, the results show that university performance is highly correlated if the components of IC are combined as one variable.

4.3 Regression Analysis

A regression equation was estimated with university performance as the dependent variable and intellectual capital as the independent variable. Table 4.3 presents the summary statistics of the estimated regression equation.

Table 4.3: Estimated Regression Equation

Variable	Coefficient	t-value	p-value
Intellectual Capital	0.547	4.617	0.000**
F	17.325		0.000**
R^2	0.395		

** Significant at 0.01

The regression equation is statistically significant at 0.01 ($p<0.01$), implying that there is an association between university performance and independent variables. The r-square value being 0.395 means that the independent variable accounts for 40 per cent of the variation in the dependent variable (university performance). Hence, the effect of intellectual capital on a university's performance is moderate. However, consequently, other variables exert much more influence on university performance but are beyond the scope of this study. The coefficient of IC (0.547) means that an increase in IC will significantly increase the UP.

This study's results support previous research's findings that there are three dimensions of intellectual capital: human capital, structural capital and relational capital, which significantly affect a university's performance. Thus, hypothesis one is accepted. Another regression analysis into the individual perspective of UP is revealed in the following table.

Table 4.4: Estimated Regression Equation

Dependent Variable – BSC	Independent Variable	Coefficient	r-square	p-value	Hypothesis
Financial	IC	0.353	0.116	0.01**	Accepted
Customer	IC	0.577	0.062	0.064	Rejected
SInternal Process	IC	0.624	0.383	0.01**	Accepted
Learning and Growth	IC	0.693	0.435	0.01**	Accepted

** Significant at 0.05

A regression equation was estimated with university performance (financial, customer, internal process and learning and growth) as the dependent variable, and intellectual capital as the independent variables. Table 4.4 presents the summary statistics of the estimated regression equation. The first regression equation is statistically significant at 0.05 ($p<0.05$), implying that there is an association between university performance (financial, internal process and learning and growth) and intellectual capital. The r-square value of 0.116 means that intellectual capital accounts for only 12 per cent of the variation in university performance (financial). Hence, the effect of intellectual capital on university performance (financial) is low. It shows that the highest effect of the intellectual capital component is on learning and growth performance. Looking at the individual regression coefficient, the coefficient of intellectual capital is statistically significant at 0.01 ($p<0.01$). The coefficient of intellectual capital (0.693) means that an increase in intellectual capital

increases the university performance (learning and process). However, the regression equation is not statistically significant at 0.05 ($p<0.05$), implying that there is no association between university performance (customer) and intellectual capital. The university needs to find solution on how to improve the performance on measuring their stakeholders.

5.0 CONCLUSION

This study's findings corroborate previous findings that there is a significant relationship between intellectual capital and university performance. The contribution of this study is to highlight the significance of measuring intellectual capital components in universities. The study empirically demonstrated intellectual capital's significance in enhancing university performance. The study also revealed the increased significance of intellectual capital from the financial, internal process, and learning and development perspectives of BSC. The study develops a model to explain the effect of universities' intellectual capital on their performance. In the future, the model can be expanded and tested in various countries as a component of the university-specific intellectual capital index.

6.0 ACKNOWLEDGEMENT

REFERENCES

Abualoush, S., Masa'deh, R., Bataineh, K. and Alrowwad, A. (2018), "The role of knowledge management process and intellectual capital as intermediary variables between knowledge management infrastructure and organizational performance", *Interdisciplinary Journal of Information, Knowledge and Management*, Vol. 13, pp. 279-309, doi: 10.28945/4088

Boisot (1999) Boisot, M.H (1999), *Intellectual capitals*, Oxford University Press

Boutchich, D.E.K. (2020), "Human capital in public research laboratories: a method proposal for assessing actual and target scores", *Journal of Applied Research in Higher Education*, Vol. 12 No. 5, pp. 1189-1208, doi: 10.1108/JARHE-05-2019-0107

Canibano, L. and Sanchez, M.P. (2009). Intangibles in Universities: Current Challenges for Measuring and Reporting. *Journal of Human Resource Costing & Accounting, 12(2)*. 96-104.

Chatterji, N., & Kiran, R. (2022). The influence of human, organizational and relational capital of universities on their performance: a developing economy perspective. *Journal of Intellectual Capital*.
https://doi.org/10.1108/JIC-03-2021-0087

Hadijah, A. (2019), "Transformation of Higher Education: A Stakeholder Perspectives in Private Islamic Higher Education Institution (IPTIS) in Malaysia", *Holistica* Vol 10 pp. 112-126

Handzic, M. And Ozturk, E. (2010). University intellectual capital: measurement model and application. *2nd International Symposium on Sustainable Development, June 8-9 2010, Sarajevo.*

Kamaluddin A, Ishak A, Saad a and Abu Smah S.A (2016), Governance of Research Fund: Modelling
Innovation capital of Malaysian Public Universities, International Journal of Economics and Management 10 (s2):445-461

Kamasak (2010) Kamasak R and Yucelen M. (2010) " The relationship between intellectual capitals and organizational strategy development ", *International Journal of Business and Management Studies* , Vol 2(2)

Karathanos, D. and Karathanos, P. (2005), "Applying the balanced scorecard to education", *Journal of Education for Business,* Vol. 80 No. 4, pp. 222-230.

Kok, A. (2007). Intellectual Capital Management as Part of Knowledge Management Initiatives at Institutions of Higher Learning. *The Electronic Journal of Knowledge Management,* Vol 5 No 2. pp. 181-192.

Kucharčíková, A., Tokarčíková, E., & Blašková, M. (2015). Human Capital Management – Aspect of the Human Capital Efficiency in University Education. *Procedia - Social and Behavioral Sciences*, *177*, 48–60. https://doi.org/10.1016/j.sbspro.2015.02.332

Leitner, K.H. (2002). Intellectual capital reporting for universities: conceptual background and application within the reorganisation of Austrian universities. *Conference on The Transparent Enterprise. The Value of Intangibles. Autonomous University of Madrid Ministry of Economy, Madrid.*

Leitner, K.H. and Warden, C. (2003). Managing and reporting knowledge-based resources and processes in research organisations: specifics, lessons learned and perspectives. *Management Accounting Research.* Vol 15. pp. 33-51.

Lu, W.M. (2012). Intellectual capital and university performance in Taiwan. *Economic Modelling.* Vol 29. pp. 1081-1089.

Maltseva, A., Veselov, I., Lelchitskiy, I., Gridchina, A. and Maimina, E. (2018), "The role of university's intellectual capital in creation of scientific activity's results", *International Journal of Learning and Intellectual Capital,* Vol. 15 No. 3, pp. 204-218, doi: 10.1504/IJLIC.2018.094723 Ministry of Higher Education (2017a), "Enhancing academic productivity and cost efficiency. Retrieved from http://www.mohe.gov.my/muatturun/awam/penerbitan/university-transformationprogramme/88-the-unitp-silver-book

Mowery D.C & Sampat B.N.,(2010) Universities in National InnovationSystems, pp. 1-38.

Najim, N.A., Al-Naimi, M.A. and Alnaji, L. (2012). Impact of intellectual capital on realizing university goals in a sample of Jordanian universities. *European Journal of Business and*

Management. Vol 4. No. 4. pp. 153-162.

Nazari-Shirkoui, S., Mousakhani, S., Tavakoli, M., Dalvand, M.R., Saparauskas, J. and Antucheviciene, J. (2020), "Importance-performance analysis based balanced scorecard for performance evaluation in higher education institutions: an integrated fuzzy approach", *Journal of Business Economics and Management*, Vol. 21 No. 3, pp. 647-678

Nonaka et al. (2000) Nonaka, I., and R. Toyama and N. Konno (2000), "SECI and Leadership: A Unified Model of Dynamic Knowledge Creation", Long RangePlanning, Vol 33, pp. 5-34

Lentjušenkova, O., & Lapina, I. (2016). The transformation of the organization's intellectual capital: from resource to capital. *Journal of intellectual Capital*, *17*(4), 610-631.

Perez, S.E., Saritas, O., Pook, K. and Warden, C. (2011). Ready for the future? Universities' capabilities to strategically manage their intellectual capital. *Foresight*, Vol 13 No 2. pp. 31-48.

Ramirez, R., Lorduy, C. and Rojas, J.A. (2007). Intellectual capital management in Spanish universities. *Journal of Intellectual Capital.* Vol. 8 No. 4. pp 732-748.

Ramirez, Y. (2012). Towards improved information disclosure on intellectual capital in Spanish Universities. *Global Journal of Human Social Science.* Vol. 12 No. 5. pp. 1-16

Ramirez, Y. C., Penalver, J.F.S., and Ponce, A. T. (2011). Intellectual capital in Spanish public universities: stakeholders' information needs. *Journal of Intellectual Capital.* Vol 12 No 3. pp. 356-376

Salinas-Ávila, J., Abreu-Ledón, R., & Tamayo-Arias, J. (2020). Intellectual capital and knowledge generation: an empirical study from Colombian public universities. *Journal of Intellectual Capital*, *21*(6), 1053–1084. https://doi.org/10.1108/JIC-09-2019-0223

Sanchez, M.P., Castrillo, R. & Elena, S. (2006). Intellectual Capital Management and Reporting in Universities. *Paper presented at the International Conference on Science, Technology and Innovation Indicators. History and New Perspectives. Lugano.* 15-17 November.

Warden, C. (2003). Managing and reporting intellectual capital: new strategic challenges for HEROs.
IP Helpdesk Bulletin, No. 8. April/May. Available at: www.iprhelpdesk.org/newsletter/8/pdf/EN/N08_EN.pdf.

Wu, H.Y., Chen, J.K. and Chen, I.S. (2010). Innovation capital indicator assessment of Taiwanese Universities: A hybrid fuzzy model application. *Expert System with Application.* Vol 37. pp. 1635-1642.