Intellectual Capital Performance in Higher Education Institutions: Evidence from Public Universities

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Abstract
Research has proven that success at universities depends on their intellectual capital. Intellectual capital is an intangible asset that supports an organization's growth and advancement.   The research aims to investigate the role and relationship of intellectual capital on the performance and efficiency of Malaysian public universities. The education sector, particularly public universities, was chosen due to its roles in building society and the development of human capital in the knowledge-intensive economy. The current study applies three components of intellectual capital, namely human capital, structural capital, and relational capital as the independent variables, while university performance is the dependent variable. Structured questionnaires were distributed to management teams of public universities in Malaysia. With the application of SPSS, the results demonstrate that all three components have a significant effect on the university's performance. Among the four perspectives of the balanced scorecard which is the measurement of performance, intellectual capital was found to be most significant to the internal processes at the university. In dealing with the crucial issues faced in the current era, it is recommended that the university strategize its investment in intellectual capital to strengthen its performance. A model to measure intellectual capital in universities is crucial to ensure quality services are provided to the various stakeholders inclusive of the students, policymakers, and the taxpayers.

Introduction
Higher education sector faces many challenges in this new era. The international context of higher education institutions nowadays have 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 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). With the knowledge-based view (KBV) development, knowledge was recognized to be one of the most important resources (Oksana, 2016). In context to higher education, universities are the institutions where knowledge creation and transfer takes place. This makes universities the centre of a knowledge-based economy (KBE). The key element of a KBE is reliance on intellectual capabilities.

Intellectual capital (IC) is now central to the operation and administration of universities. To become a source of wealth and core competitiveness, universities must accelerate the development of human capital, structural capital, and relational capital and select effective management models to promote intellectual capital (Zhang, 2021). This is a competitive advantage for universities and the key to becoming a top-tier institution in the nation and even the world. Therefore, universities' performance in achieving their objectives should place a premium on intellectual capital. IC 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 university's procedures, rules and regulations, network of relationship 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 in order to sustain quality services provided by the universities and to ensure its future viability. Thus, it is important to conceptualise the measurement of intellectual capitals in universities as their key resources to deliver good quality services to the stakeholders and enhance their performance (Chatterji & Kiran, 2022).

Most studies have dealt with university 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 government of these countries. On the contrary, developing countries are still accumulating the prerequisite human and social capital needed 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 Malaysian scenario, the government has pursued to increase 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 the Malaysian public universities. On top of that, Malaysian Higher Education landscape has changed since the shift of production based economy to knowledge based economy. These changes are drove from globalisation factors that creates more demand on more efficient human capital and skilful employees (Shariffuddin et al., 2017; (Grapragasem et al., 2014). University transformation programme (UniTP), (MOHE, 2017a) has come out with 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), expand global sourcing and standard of procedures, review talent value to ensure competitiveness, create more opportunities for professional development (innovation and structural capital), enhancing University Board Governance and monitor quality. All the guidelines and strategies stated are related with the elements of intellectual capitals embedded in human capital, structural capital and relational capital in public university. Situations of sustainability and performance on higher education institution raise red flag to Ministry of Higher Education Malaysia to ensures the continuance excellence in their public university (Hadijah, 2019). In light towards achieving this vision, 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. It will be necessary to further investigate the element of intellectual capitals specifically for public university in order to achieve national aspiration to transform Malaysia higher education as a hub for international higher education excellence.

Overall, the identification and measurement of intellectual capital can help evaluate the alignment of result 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 in process the performance such as financial, customers, internal process and learning and growth. Performance is an important aspect of the university that can be used to measure the institution's success. Measurement of university performance is based on academic excellence attained. In accordance with the paradigm shift of higher education in the era of globalisation, the university must change its orientation from a "national, analogue, industrial economy" to a "global, digital, and information-based economy," as stated by (Hughes, 2013). Facing these challenges, Malaysian universities should improve their academic and administrative performance. In higher education, performance measurement has increased the demand for accountability.

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 its vital role to inculcate innovation culture in ensuring continuous development of new ideas and knowledge, the main objective of this paper is to explore the influence of intellectual capital on university's performance in Malaysia. In addition, 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 next section elaborates on the methods applied in this study and followed by the section that

presents the results and discussion. Finally, this paper ends with the study conclusion and suggestions for future work.

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; 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, the intellectual capitals 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 non-scientific staff of the university. Torres (2006) defined human capital as the knowledge, skills, etc of individual in the university. She further classified human capital as teaching skills, researching skills and personnel relationships. Teaching skills refer to the updated programmed learning, class preparedness, coordination of programmed learning and dissemination of research result. Researching skills refers to percentage of researching and teaching staff that has PhD in the department and percentage of researching economic complements in the department. While personnel relationships refer the personal relationship, the 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, researches, PhD students and administrative staff) would take with them if they left the institution (Sanchez et al., 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 university may consists 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). It is the knowledge that 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 manual to guide students' learning. Research management refers to the production of PhD, the size of research group 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 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); Charteji and Kiran (2022) asserted structural capital as the universities regulations, programs and routines. Lu (2012) stated that structural capital is a structure that determines how knowledge leads to better product. 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 in order 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 comprise 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 economical, political and institutional relationship developed and maintained by universities. All the resources linked to the external relationships of the institution such as customers, suppliers, R&D partners, government and etc. consider as 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 in order to be competitive in this knowledge-based economy since university main input and output is knowledge which embedded in human as human capital, structural capital and relational capital. The identification and measurement of intellectual capital can help evaluate the alignment of

result 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 in process the performance such as financial, customers, internal process and learning and growth. Therefore, it will be necessary to further investigate the element of intellectual capitals specifically for public university in order to achieve national aspiration to transform Malaysia higher education as a hub for international higher education excellence.

Research Framework and Hypothesis Development
Theory Resource Based View (RBV)
This study is grounded in the theoretical frameworks of the Resource Based Value (RBV). 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, 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 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.
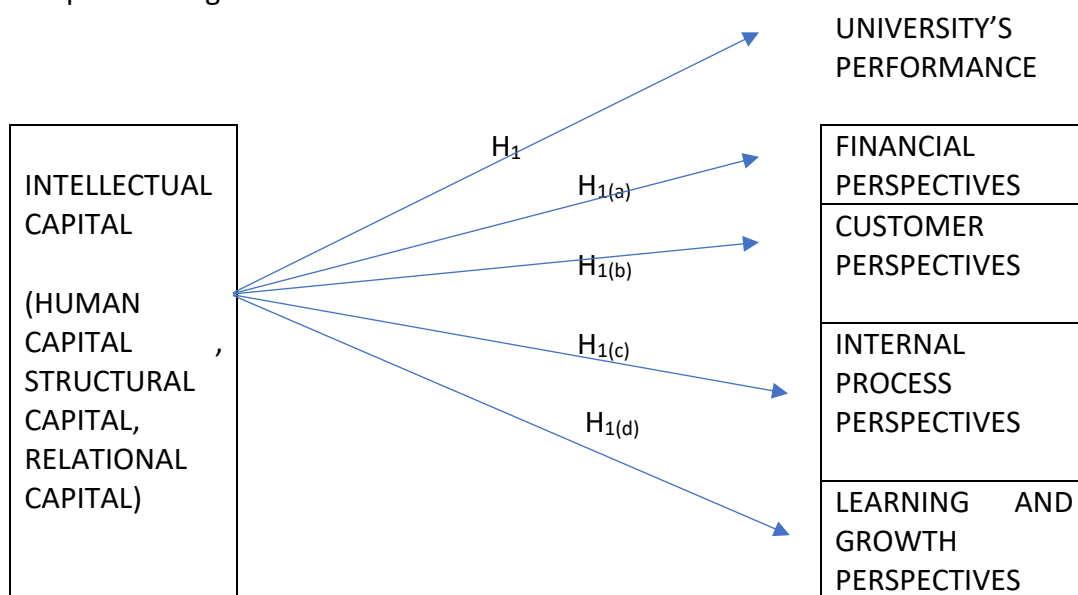

Figure 2.1: Research Framework

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 have a significant negative impact on organisations performance. The findings seemed to suggest a common sense contradictory to the theory on the benefits of IC. Investigations of IC and performance also have been conducted mainly in the commercial sector. Not much research has been done on university's performance (UP) and IC. In context to universities, there were few authors (Maltseva et al., 2018) have made similar observations and proposed that institutional researchers play the most important 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 component of IC ; structural capital also has highlighted 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 essentially focus on to enhance performance. Universities are also looking forward to their alumni, especially in the wake of reduced state funding (Weerts et al., 2010; McDearmon, 2013). Relational capital also contributes to university performance by influencing the effect that peer relationship has on academic performance of students. Academic network exposes students to several sources of support and knowledge that helps them perform better (Tomas-Miquel et al., 2016). Hence, this study aims at bringing 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 university's performance.

This studies focusing on measuring university's performance using the Balance Score Card (BSC). The literatures on Balanced Score Card and its 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 established as one of the world's highest performance excellence measures. Specifically, the value of IC towards the specific perspective of BSC need to further analysed to strengthened the area that should be sustained if there is significant relationship exist.

Therefore, the related hypotheses are as follows:
H1 (a) Intellectual Capital has a significant positive relation with university performance; financial perspective
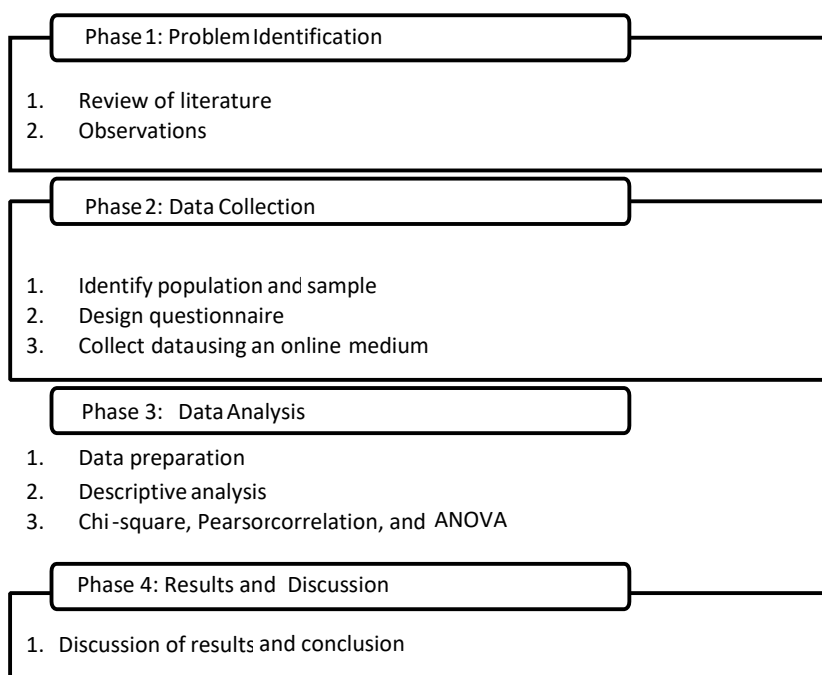*H1 (b) Intellectual Capital has a significant positive relation with university performance; customer perspective*
H1 (c) Intellectual Capital has a significant positive relation with university performance; internal process perspective
H1 (d) Intellectual Capital has a significant positive relation with university performance; learning and growth perspective

Research Methodology

This study identified the relationship between intellectual capital and university's performance in Malaysian public universities. The four phases deployed in this study was problem identification, data collection, data analysis, results, and discussion. Figure 1 illustrates the four phases process.

Phase 1: Problem Identification
1. Review of literature
2. Observations

Phase 2: Data Collection
1. Identify population and sample
2. Design questionnaire
3. Collect data using an online medium

Phase 3: Data Analysis
1. Data preparation
2. Descriptive analysis
3. Chi-square, Pearsor correlation, and ANOVA

Phase 4: Results and Discussion
1. Discussion of results and conclusion

The study decided to use quantitative approach method. The target population for the study was public universities in Malaysia. Online questionnaires were used to collect data because they are more efficient, faster, and less expensive. Our sample was comprised of university's management team such as deans, rectors and others. Because the population of managers is unknown, we utilised the method of purposive sampling, specifically quota sampling, to

collect samples. According to Sekaran and Bougie (2016, p. 248), quota sampling can be employed when cost, time, and the need to adequately represent minority elements of the population are taken into account.

The target respondents were among the most appropriate representative because they possess sufficient knowledge and confidence in answering questions pertaining measuring of intellectual capitals in university. The list of public universities was obtained from Ministry of Higher Education in Malaysia. There are 20 public universities in Malaysia. The respondents of the study consist of 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 regression approach.

The sample consisted of 10 public universities out of the total 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 which 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 (Kucharþikovaa et. al., 2015; 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 variables relationship and full structural model.

Results and Discussion

Descriptive Analysis

Included in the profile of respondents are their respondents organisation, gender, age, and current employment. 42.9 percent of respondents are between the ages of 41 and 50, followed by 28.6 percent of respondents between the ages of 51 and 60, 23.2 percent of respondents between the ages of 31 and 40, and 5.4 percent of respondents between the ages of 21 and 30. A total of 69.6% of respondents are female, while only 30.4% are male. There are four distinct ethnic groups: Malay, Bumiputra Sabah, Iban, and others. The Malays made up majority of the sample (92.9%), followed by Bumiputra Sabah (3.6%) and Iban and others with 1.8% each.

The majority of respondents are from University Teknologi MARA (51.8%), followed by Universiti Utara Malaysia (UUM), Universiti Kebangsaan Malaysia (UKM), Universiti Islam Antarabangsa Malaysia (UIAM), Universiti Sains Malaysia (USM), and Universiti Sains Islam Malaysia (USIM). 33.9% of respondents are employed as lecturers, followed by 14.3% as deputy deans. Administrative, deputy director, and head of programmes positions accounted for 10.7% of the total, executive officer accounted for 5.4%, and Deputy Vice Chancellor, Dean, Director, and other positions accounted for 7.5% of the total.

Table 5.1
Respondent's Profile

Variables	No of Respondent (N=56)	Percentage %
University		
Comprehensive University		
Universiti Islam Antarabangsa Malaysia (UIAM)	4	7.1
Universiti Malaysia Sabah (UMS)	1	1.8
Universiti Malaysia Sarawak (UNIMAS)	1	1.8
Universiti Teknologi MARA (UiTM)	29	51.8
Focused University		
Universiti Utara Malaysia (UUM)	8	14.3
Universiti Sains Islam Malaysia (USIM)	2	3.6
Research University		
Universiti Kebangsaan Malaysia (UKM)	6	10.7
Universiti Malaya (UM)	1	1.8
Universiti Putra Malaysia (UPM)	1	1.8
Universiti Sains Malaysia (USM)	3	5.4
Gender		
Male	17	30.4
Female	39	69.6
Age		
21-30	3	5.4
31-40	13	23.2
41-50	24	42.9
51-60	16	28.6
61-70	0	0
Race		
Malay	52	92.9
Bumiputra Sabah	2	3.6
Iban	1	1.8
Others	1	1.8
Position		
Deputy Director	6	10.7
Clerk Officer	1	1.8
Administrative	6	10.7
other	4	7.1
Deputy Vice Chancellor	1	1.8
Rector/Director	1	1.8

Dean	1	1.8
Deputy Dean	8	14.3
Head of Programs/Unit/Department/Centre	6	10.7
Executive Officer	3	5.4
Lecturer	19	33.9

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 non-normality 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 5.2.

Table 5.2
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.

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 5.3. The analyses were carried out using Pearson Coefficient Correlation, a parametric correlation tool.

Table 5.3
Summary Statistics of Correlation Analysis between University Performance and Intellectual Capital

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

** Significant at 0.01

It shows that university performance is 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; $p<0.01$). That is, to a moderate extent, an increase of university's performance is associated with an increase in human capital, structural capital, relational capital and vice versa. However, the results shows that university performance is highly correlated if the components of IC combined as one variable.

Regression Analysis
A regression equation was estimated with university performance as the dependent variable, and intellectual capital as the independent variables. Table 5.4 presents the summary statistics of the estimated regression equation.

Table 5.4
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 as a whole account for 40 per cent of the variation in the dependent variable (university performance). Hence, the effect of intellectual

capital as a whole on university's performance is moderate. However, consequently there are other variables that 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 increases the performance of the university. The results from this study support the findings of previous research that there is three dimension of intellectual capital which is human capital, structural capital and relational capital that give significant effect on university's performance. Thus hypothesis one is accepted.

Another regression analysis into individual perspective of university's performance revealed in the following table.

Table 5.5
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
Internal 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 5.5 presents the summary statistics of the estimated regression equation.

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 being 0.116 means that intellectual capital account for only 12 per cent of the variation in university performance (financial). Hence, the effect of intellectual capital as a whole on university performance (financial) is low. It shows that the highest effect of intellectual capital component is towards learning and growth performance. Looking at the individual regression coefficient, the coefficient of intellectual capital are 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 need to find solution on how to improve the performance on measuring their stakeholders.

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 has empirically demonstrated the significance of intellectual capital 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 Balance Scorecard. 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.

Acknowledgement

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