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# IMPACT OF INTELLECTUAL CAPITAL ON PERFORMANCE OF THE INFORMATION TECHNOLOGY SECTOR IN MALAYSIA

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## ABSTRACT

This study aims to investigate the impact of intellectual capital on the financial performance of the information technology sector in Malaysia. Three dimensions of intellectual capital have examined human capital, structural capital, and capital employed.
A total of 28 companies have involved in this study over the period 2011-2016. The finding of this study revealed a significant impact from human capital, structural capital, and capital employed on the performance of the information technology sector.
The limitation of the business dimension for the exploitation and exploitation of knowledge management and consequent modification, it is evident that this does not prevent medium-sized companies from practising it, at least empirically, in view of the growth-related needs that arise, for example, the use of knowledge in their daily activities.
The result of this study provides evidence of the impact of leadership, organizational responsibility, and green technology and techniques on implementing the green building concept by the Libyan construction companies.

## 1. Introduction

The Malaysian government has identified the significance of IC and takes into consideration many procedures toward boosting the Malaysian economy by boosting the private IC. Further, strengthen the human development has attended in the tenth Malaysian plan, the government has encouraged the private sector to focus more on the human capital, which ensures high sustainability for the long-term (Nawaz, Haniffa, & Hudaib, 2014). In the new economy, also referred to as knowledge-driven economy, the strength of globalization has emerged so strongly that communication and knowledge have become the essential materials for a company (Chen, Liu, & Kweh, 2014). The upheaval in globalization, data innovation and computerization required a quick need to recognize intellectual capital (IC) or immaterial in the organization's money related reports. Unfortunately, conventional corporate money related proclamations dependably supply the majority of the unmistakable resources and in this manner disregard impalpable resources. This issue has been questionable, as non-acknowledgement of elusive resources has expanded the hole between the market esteem and book estimation of the organization (Amin, Saringat, Hassan, & Ismail, 2013).

The information technology (IT) is considered as one of the main dimensions of the country GDP. The contribution from the IT sector has increased rapidly during the last five years, as shown in figure (1). The IT sector of Malaysia has gained a reputable position in the global market. Malaysia becomes a host for several IT companies from around the world, besides the local IT brands that distribute globally. Intellectual capital as a reflection of the innovation and creativity, has played a vital role in developing this sector globally. Malaysia as one of the Asian modern technology leading has paid more attention toward enhancing the concept of the intellectual capital within the IT sector. This study is a unique study that investigates the impact of intellectual capital on the IT sector.



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## 2. Literature Review

Intellectual capital is a strategic intangible capable of generating a sustainable competitive advantage and superior financial performance in companies that work in the new economy and that, unlike financial and physical assets, is difficult to imitate by competitors, which makes it a powerful source of competitive advantage to achieve success. The studies on the valuation of the IC are divided into two positions: the first focuses on the determination of its value for incorporation in the financial statements, and the second, on improving its management to achieve the creation of value. In both positions, multiple attempts are made to solve the difficulty of valuation of the IC, due to the strict requirements of accounting regulations and, in large part, to the lack of reliable indicators that allow decision-making based on the value it creates. Recognized researchers such as Edvinsson and Malone (1997), Pulic (1998) argue that traditional measures of performance of a company, which are based on conventional accounting principles, may be incorrect in the knowledge economy and can lead investors to make inappropriate economic decisions. It is considered that the current conventional

accounting and performance measurement systems do not provide much help, because they are strongly inclined towards financial and physical resources, despite the fact that intangible assets are the driving force driving success in the global, dynamic and complex business environment (Nawaz et al., 2014).

In addition to the valuation of the IC, it is possible to measure its efficiency in the creation of value through the Value Added Intellectual Coefficient (VAIC) model, developed by Pulic (2000) and refined by his colleagues at the Austrian Intellectual Capital Research Center, which guides the Managers understand the conversion of intellectual resources into wealth and assess whether or not performance is improving or deteriorating. Different works have seen light showing this relationship (Meyer, Skaggs, & Youndt, 2015).

The VAIC model provides indicators that are relevant, useful and informative to all stakeholders. It is a measure, whose calculated ratios or proportions can be used to evaluate the trend and link it to traditional financial indicators that are commonly determined in business. From these reflections, this study contributes by providing the banks with a simple method to value and understand the IC, as well as the identification of the IC efficiency and its contribution to the creation of value. For this reason, the following research question is asked: in what way do the Skandia, and VAIC models complement each other to determine the value of the IC and measure its efficiency in organizations in the banking sector? The objective of this work is to value and compare the intellectual capital in its three dimensions in a company in the banking sector, applying the Skandia and VAIC models to identify the added value and efficiency (Dumay, 2016).

The concept of Intellectual Capital is relatively new, and its studies proper are close to the 90s, previously the concept of intellectual capital the economist John Kenneth, in 1969, already began to sketch, in the sense of an intellectual activity, that manages to create value, more than an accumulation of information and knowledge by itself. Henceforth several intellectuals and scholars of the subject have addressed the evolution of intellectual capital; intellectual capital is the combination of intangible assets that allow a company to work, what could be interpreted that defines it as the intangible asset that increases the value of the organization. On the other hand, intellectual capital, knowledge, information and experience can be used to create value, transforming it into raw material in a globalized world. Therefore it can be summarized from the documentation examined for the present research work that the authors on the subject analyzed, agree that intellectual capital is a set of intangible assets, based on knowledge as a producer of added value (Kianto, Ritala, Spender, & Vanhala, 2014).

In this sense, Maditinos, Chatzoudes, Tsairidis, & Theriou (2011) makes an analysis of different authors to affirm that the concepts of knowledge management and intellectual capital management can be treated in a similar way and that the difference lies in the methodological approach of each author. Specifically, the intellectual capital refers to the global and strategic perspective of the intellectual assets of a company; it is the sum of the knowledge of its members and the practical interpretation. It is a complex phenomenon that results from a collective practice that creates value through its relationships and interrelationships among resources, competencies and organizational capacities. Likewise, Martín-de- Castro, Delgado-Verde, López-Sáez, & Navas-López (2011) state that intellectual capital in the broad sense is used synonymously with terms such as: intellectual, intangible or hidden assets, goodwill, or intellectual property; very similar to what was defined by Dumay & Garanina (2013) referring to all those intellectual or knowledge assets of an intangible nature (such as the knowledge possessed by people, talent, ideas, inventions, patents, systems, applications and all kinds of creative work) that can be identified, defined, measured and valued for an organization.



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Operational knowledge according to Beazley, Boenisch and Harden (2003) is related to the ability to create an understanding of organizational processes in order to apply this understanding in favor of organizational improvement. Operational knowledge is understood as that consisting of understanding the process by which technical activities should be carried out in such a way that they generate value in the company, follow the efficiency criteria, meet the quality parameters established with success and, in addition, in the time required. Its use is present above all in the value chain of operations related to the production of goods and services. According to the definition given, it is highly related to the personnel that perform tasks that involve a high degree of technicality and that belong to the basic organizational levels of the companies. However, such attributes are not exclusive to this group, because senior management must also be able to understand this concept in order to manage it and generate the maximum possible benefit (Kianto et al., 2014).

## 3. Methodology

This study focuses on the IT sector in Malaysia. The time series of this study is between 2011 and 2016, which is considered as the first secession after the last financial global crisis from 2007-2009. The total IT listed companies in Bursa Kuala Lumpur is 30. The sample of this study will be 28 listed IT companies from the Bursa of Malaysia, selecting the IT companies will be based on the higher capital market of the 28 companies, determining the sample of this study based on Krejcie and Morgan (1970) sample size tables. This study will adopt the quantitative approach, which considered as one of the research approaches that use to examine the developed hypotheses. This study aims to identify the impact of HC, SC, and CE capital on the financial performance of the IT sector. The independent variable represents by the intellectual capital measures as follows: HC; represents the cost of human resource. According to Pulic (2000), human capital represents the provided benefits to the firm's employees, these benefits such as salaries, wages, insurance, and other financial benefits. SC; measures by deducting the cost of human capital from the value-added of the firm (Pulic, 2000) as follow:

SC= VA – HC
Where
SC= structural capital
VA= value-added
HC= human capital
The value-added can be calculated as follow (Makki, Lodhi, & Rahman, 2009):
VA = OP + EC + D + A
Where
OP = Operating Profit
EC = Employee Cost
D = Depreciation
A = Amortization
While the physical capital factor is represented by the capital employed:

CE; measures by deducting the intangible assets from the total assets of the firm (Pulic, 2000) CE = total assets – intangible assets

Meanwhile, the dependent variable of this study represents the firm performance measures as follows: ROA; measures by dividing net income over the total assets (Needles, Powers, & Crosson, 2013) ROE; measures by dividing net income over the total equity (Needles et al., 2013)

EPS; measures by dividing net income over the outstanding shares (Needles et al., 2013).

To achieve the objectives of this study, SPSS version 23 will be used to perform the required analysis; three statistical tools will be used. The descriptive statistics will be used to illustrate the sample criteria, while the correlation test will be used to study the relationship between the study variables. The regression test will be used to predict the contribution of HC and SC in the financial performance of IT sector companies; three regression equations will be tested as follows:

Model 1

$$ROA = a1 + \beta 1.HC + \beta 2.SC + \beta 3.CE + \varepsilon \quad (1)$$

Model 2

$$ROE = a1 + \beta 1.HC + \beta 2.SC + \beta 3.CE + \varepsilon \quad (2)$$



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Model 3

$$EPS = a1 + \beta 1.HC + \beta 2.SC + \beta 3.CE + \varepsilon \quad (3)$$

Where:
ROA= return on assets
ROE= return on equity
EPS = earnings per share
HC= human capital
SC= structural capital
CE= employed capital
E= standard error

## 4. DATA ANALYSIS AND RESULTS

The mean score for the human capital variable was 13.98 implying that data on average information technology sector were close to each other, as the data mean, minimum, and maximum close to each other, which clarifies that the IT sector share close concern toward the importance of human capital. Furthermore, the standard deviation for the subscale variable was 0.424. The mean score for the structural capital variable was 15.10 implying that data on average information technology sector were close to each other, as the data mean, minimum, and maximum close to each other, which clarifies that the IT sector share close concern toward the importance of structural capital. Furthermore, the standard deviation for the subscale variable was 0.871. The mean score for capital employed variable was 19.75 implying that data on average information technology sector were close to each other, as the data mean, minimum, and maximum close to each other, which clarifies that the IT sector share close concern toward the importance of the physical capital. Furthermore, the standard deviation for the subscale variable was 0.32.

The mean score for the return on the asset was 1% implying that a low average return on assets for the sector over the assigned period, with high volatility within the sector, resulted from the large difference between the minimum (0.7%) and maximum (11.25%) return on assets over the period. Furthermore, the standard deviation for the subscale variable was 0.0016. The mean score for the return on equity was 12% implying that a good average return on equity for the sector over the assigned period, with moderate volatility within the sector, resulted from the large difference between the minimum (9.8 %) and maximum (14.82%) return on equity over the period. Furthermore, the standard deviation for the subscale variable was 0.017. The mean score for the earnings per share was 52.7 cents implying that a good average of profit sector over the assigned period, with high volatility within the sector, resulted from the large difference between the minimum (28.69 cents) and maximum (69.28 cents) over the period. Furthermore, the standard deviation for the subscale variable was 14.51.

Table 1: Descriptive Statistics

| Construct | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| HC | 28 | 13.22 | 14.55 | 13.9880 | .42465 |
| SC | 28 | 14.05 | 16.15 | 15.1031 | .87140 |
| CE | 28 | 19.38 | 20.25 | 19.7517 | .31847 |
| ROA | 28 | .0075 | .1125 | .010483 | .0016939 |
| ROE | 28 | .0986 | .1482 | .125485 | .0172896 |
| EPS | 28 | 28.69 | 69.28 | 52.7901 | 14.50739 |

Pearson correlation has used to find out the relationship between the study variables. There is a positive and significant relationship between a human capital variable and return on asset, because of human capital factor correlation (P≤0.01), the significant level at (r= 0.634). There is a positive and significant relationship between structural capital and return on asset, because of structural capital factor correlation (P≤0.01), the significant level at (r= 0.502). There is a positive and significant relationship between capital employed and return on asset, because capital employed factor correlation (P≤0.01), the significant level at (r= 0.321). There is a positive and significant relationship between a human capital variable and return on equity, because of human capital factor correlation (P≤0.01), the significant level at (r= 0.053). There is a positive and significant relationship between structural capital and return on equity, because of structural capital factor correlation (P≤0.01), the significant level at (r= 0.117).



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There is a positive and significant relationship between capital employed and return on equity, because capital employed factor correlation (P≤0.01), the significant level at (r= 0.316). There is a positive and significant relationship between a human capital variable and earnings per share, because of human capital factor correlation (P≤0.01), the significant level at (r= 0.890). There is a positive and significant relationship between structural capital and earnings per share, because of structural capital factor correlation (P≤0.01), the significant level at (r= 0.882). There is a positive and significant relationship between capital employed and earnings per share, because capital employed factor correlation (P≤0.01), the significant level at (r= 0.753).

Table 2: Correlation Coefficients

| | | HC | SC | CE | ROA | RO | EPS |
|---|---|---|---|---|---|---|---|
| | Correlation | 1 | | | | | |
| | Sig. (2-tailed) | | | | | | |
| | Correlation | .890* | 1 | | | | |
| | Sig. (2-tailed) | .001 | | | | | |
| | Correlation | .851* | .958* | 1 | | | |
| | Sig. (2-tailed) | .002 | .000 | | | | |
| ROA | Correlation | .634* | .502* | .321* | 1 | | |
| | Sig. (2-tailed) | .049 | .025 | .000 | | | |
| ROE | Correlation | .053* | .117* | .316* | .775* | 1 | |
| | Sig. (2-tailed) | .000 | .003 | .000 | .008 | | |
| EPS | Correlation | .890* | .882* | .753* | .836* | .319 | 1 |
| | Sig. (2-tailed) | .001 | .001 | .012 | .003 | .369 | |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Linear regression was tested to predict the return on asset-based on three independent variables (human capital, structural capital, and capital employed). The regression test results that are shown in tables (4, 5, 6) show a significant regression equation was found (F 0.728) = P<.000), with R2 of (0.728). The study data predicted the return on the asset is equal to (0.118) unit for return on asset, when all of the variables are measured in units, the return on asset level increase (0.004), (0.022), and (0.010) for each unit respectively.

Table 3: Regression Coefficients – the first model

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | .118 | .059 | | 1.999 | .093 |
| | HC | .004 | .160 | .889 | 4.907 | .005 |
| | SC | .022 | .032 | 1.564 | 2.837 | .006 |
| | CE | .010 | .004 | 1.934 | 2.609 | .040 |

a. Dependent Variable: ROE



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Linear regression was tested to predict the return on equity based on three independent variables (human capital, structural capital, and capital employed). The regression test results that are shown in tables (4, 5, 6) show a significant regression equation was found (F 0.632) = P<.000), with R2 of (0.632). The study data predicted the return on equity is equal to (1.873) unit for return on equity, when all of the variables are measured in units, the return on equity level increase (0.030), (0.008), and (0.134) for each unit respectively.

Table 4: Regression Coefficients – the second model

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.873 | .702 | | 2.667 | .037 |
| | HC | .030 | .022 | .739 | 3.362 | .002 |
| | SC | .008 | .020 | 1.588 | 2.602 | .006 |
| | CE | .134 | .047 | 2.466 | 2.858 | .029 |

a. Dependent Variable: ROE

Linear regression was tested to predict the earnings per share based on three independent variables (human capital, structural capital, and capital employed). The regression test results that are shown in tables (4, 5, 6) show a significant regression equation was found (F 0.931) = P<.000), with R2 of (0.931). The study data predicted earnings per share are equal to (429.107) unit for earnings per share, when all of the variables are measured in units, the earnings per share level increase (17.162), (24.804), and (50.172) for each group respectively.

Table 5: Regression Coefficients – the third model

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 429.107 | 255.047 | | 1.682 | .143 |
| | HC | 17.162 | 8.022 | .502 | 2.139 | .036 |
| | SC | 24.804 | 7.145 | 1.490 | 3.472 | .013 |
| | CE | 50.172 | 17.013 | 1.101 | 2.949 | .026 |

a. Dependent Variable: EPS

Previous empirical tests have shown that intellectual capital has a fundamental and intrinsic impact on performance. The mostly read-based assets recommend that the dominant corporate performance will be independent of asset restructuring and the combination of existing or likely adaptive assets to respond appropriately to mechanical renewable air. This view is reinforced; performance varies from one company to another because Triple Crown societies May approach the principal assets (physical, human, hierarchical) of its competitors. These measurement box types seem to

assume an essential part of the company's performance in terms of performance and utility. One of the assets of the association is intellectual capital, which includes venture capital and customer capital. Some of the investigations, for example, (Alipour, 2012; Clarke, Seng, & Whiting, 2011; Hsu & Sabherwal, 2011; Inkinen, 2015; Maditinos et al., 2011; Maji, Goswami, & Rammal, 2016; Wang, Wang, & Liang, 2014) have a remarkable impact on the performance of organizations. No matter how the company is most concerned about the promotion of IKE increase the company's performance; thus, in addition, gives greater management in the long run. Wei Kiong Ting and Hooi Lean (2009) consider the relationship between intellectual capital and the functioning of monetary institutions in Malaysia. The value-added technology of intellectual knowledge was linked to the assessment of intellectual capital

and its correlation to the return on assets (RWA). The results of this examination showed that there is a positive correlation between the three sectors of intellectual capital and the productivity of these institutions (Wei King Ting



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& Hooi Lean, 2009). Zéghal and Maaloul (2010) studied part of the important value listed as a file for measuring intellectual capital - its link to budget performance and market assessment of UK trade and mechanical organizations. The post-exploratory effects show a significant positive correlation between intellectual capital, financial funds and the financial performance of these organizations (Zéghal & Maaloul, 2010).

## 5. Conclusion

From the academic point of view on knowledge management, the existing literature, which will be developed in the theoretical framework, shows that there are mostly empirical studies on generation and transmission of knowledge. However, on the subject of coding, there are very few empirical cases, although this is a factor that makes the knowledge in the organization and the conditions for its transmission enduring. Therefore, when dealing with the subject of knowledge management with special emphasis on its codification, it is plausible for research to facilitate decision-making in an organization. The realization of this study is relevant for several reasons. The first reason comes from a sense of contribution to research. In general, the dynamics of knowledge management, and the codification of it, although they have been widely treated in the framework of large corporations at the international level, to date, compared to the literature reviewed, it is evident that they are still scarce the studies on the information technology companies on the way in which knowledge persists in an organization, which is transferred, in the same way, to the Peruvian case. On the other hand, it is necessary to build bridges between academia and the reality of one of the main business conglomerates in the country, such as the information technology companies in Malaysia, which may yield precedents for more representative measurements and more specialized studies on the subject of the use of knowledge management in information technology companies, starting with particular cases to observe and interpret the casuistry of the sector. Despite having the limitation of the business dimension for the exploitation and exploitation of knowledge management and consequent modification, it is evident that this does not prevent medium-sized companies from practicing it, at least empirically, in view of the growth-related needs that arise, for example, the use of knowledge in their daily activities. However, it is not enough to identify or use knowledge, since it is also necessary to transform it into assets that last in the organization and that generate value in it.

Knowledge management is understood as an important means that exerts positive effects on innovation and business performance. Similarly, it is relevant because it aims to provide an approach not only from an operational dimension, but also managerial and strategic in decision making and advancement of the organization to improve their internal capacities to manage their knowledge, which can then serve as references or background for other studies of particular cases in the sector. This is because it links the mission of the company with the level of acceptance of the market, where it can differentiate its products from the rest and, therefore, create advantages through the use of knowledge. For this reason, it is important, from the point of view of the decision-makers, to carry out a descriptive investigation of an operational process. In this way, the company can take advantage of the potential usefulness of the findings that will be obtained in the present investigation to identify aspects that previously did not know or performed differently around the process of making information. In addition, taking into account that the information technology industry in the country does not keep up with technological advances and still depends on capital employed in most of its activities, it is pertinent to analyze how the systematized knowledge in the organization can contribute. In the information technology company, to improve the productive factors of the process in order to generate competitive advantages. This analysis, then, revalidates the importance of describing how an organization applies knowledge management in its growth plans. From the point of view of the study sector, the research represents a vision with academic support on knowledge management, as a way to land the empirical advances and projections of the decision-makers of the company to enhance their intellectual capital and in their strategies to improve their operating processes in an ever-changing environment. For this reason, the thesis contributes to aligning the purposes of the organization in terms of managing their knowledge and can also serve as a reference for other companies in the sector.



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