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THE EFFECT OF INTELLECTUAL CAPITAL ON HEPTAHHELIX MANAGERIAL PERFORMANCE AND ITS IMPLICATIONS FOR COMPETITIVE ADVANTAGE: A TNI AL SURVEY IN RIAU ISLANDS

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ABSTRACT

The objective of this research was to examine the effect of Intellectual Capital on Heptahelix Managerial Performance, the effect of Heptahelix Managerial Performance on Competitive Advantage, the effect of Intellectual Capital on Competitive Advantage, and the effect of Intellectual Capital on Competitive Advantage through Heptahelix Managerial Performance. The novelty of this research is that this research investigates the level of personal performance by combining the concept of Pentahelix and Technology and the concept of measuring Managerial Performance in the Indonesian Navy (TNI AL), Riau Islands Province, or what is referred to as Heptahelix Managerial Performance. It is expected that this research can create superior human resources in the Indonesian Navy in Riau Islands Province so that they can deal with illegal actions which are the main tasks and functions of the Navy to maintain defense and security in the Marine Territory of the Republic of Indonesia, especially in the Riau Islands Province. This research employed the associative method to see the relationship of effects and is explanatory from the existing theory by using the Structural Equation Modeling (SEM) method with LISREL Software.

KEY WORDS

Intellectual capital, heptahelix managerial performance, competitive advantage.

Indonesia has 17,499 islands and is recognized as the largest archipelagic country whose 70% of the area is the ocean. The status of Indonesia as an archipelagic country was proclaimed during Djuanda Declaration on 13 December 1957. International recognition of the sovereignty of the Republic of Indonesia as an archipelagic country was further approved in the United Nations Convention on the Law of the Sea 1982, which was subsequently ratified through Law Number 17 of 1985. The territorial waters reach 5.8 million km² or equal to 2/3 of the total area of Indonesia. It consists of an Exclusive Economic Zone (EEZ) of 2.7 million km² and a territorial sea area of 3.1 million km² (PPPGK, 2016). With a very wide waters area, Indonesia has a lot of potential for abundant marine wealth, yet is also vulnerable to criminal acts of piracy, illegal fishing, illegal mining, terrorism, narcotics trafficking, and environmental pollution because of its very wide marine waters. The area is estimated to store a wealth of fish resources of 6.4 million tons per year. However, overexploitation and illegal fishing by foreign fishermen continuously threaten this potential wealth. Since 2005, the operation of SDKP (marine fishery resources) surveillance ships have been successfully catching around 1,343 fishing ships for illegal fishing, consisting of 58 foreign fishing ships (KIA) and 585 Indonesian fishing ships (KII). Throughout 2016, KKP has inspected 4,326 fishing ships, whose 112 of them were arrested for alleged violations, consisting of 70 foreign ships and 42 were Indonesian fishing ships. Data on fishing boat arrests in the North Natuna Sea by Indonesian Navy (TNI-AL) investigators (Lanai Ranai) and the PSDKP Natuna Regency which were delegated to the Natuna District Attorney for trial in the Court the Ranai Fisheries Country can be seen in the following Table 1.

Table 1 – KIA Data investigated by Indonesian Navy (TNI-AL) and PSDKP

Year	Foreign Fishing Ships (KIA)	Investigators	
		TNI-AL	PSDKP
2019	16	11	5
2020	16	12	4
2021	11	9	2

Source: State Attorney of Natuna (2021).

Such condition certainly affects the income of Indonesian traditional fishermen, which can be seen from the decrease in the number of Indonesian traditional fishermen from 1.6 million to 864 thousand households ($\pm 50\%$) as well as the decrease in captured fisheries production in Riau Islands region from 225,469.00 tons in 2009 to 133,108.00 in 2014 (KKP, 2015), including economic losses due to the annual illegal fishing which reached IDR56 Trillion. In addition, a seaglider was found on Tenggel Island, Riau Islands in 2019. Yudo Margono (2021) revealed that he found a seaglider that allegedly belonged to China which was being used for oceanographic research without a permit (www.cnnindonesia.com). According to M. Haripin (Military and Defense Observer from LIPI), this seaglider was employed to find out Indonesia's underwater wealth. In addition, Lizz Derr stated that for the past 5 (five) years, Chinese ships have disposed of waste and human waste in the South China Sea (www.bbc.com). This certainly can contaminate the waters around the South China Sea, including the maritime border with Indonesia.

Therefore, this condition requires the role of the TNI-AL in guarding the Indonesian Sea area as the implementation of its main duties, as referred to Article 9 of the Law of the Republic of Indonesia Number 34 of 2004. The TNI-AL cannot stand alone to maintain the defense and security of the State of the Republic of Indonesia. Thus, TNI-AL needs to collaborate with other institutions such as BAKAMLA, the Ministry of Defense and Security, the Ministry of Marine and Fisheries, and the assistance of other parties to overcome the problems that occur as stated in Law No. 17 of 2011 concerning State Intelligence³ Therefore, contributions from other agencies are needed by TNI-AL in order to carry out its main tasks and achieve personal Managerial Performance of the TNI-AL. In order to achieve managerial performance from within TNI - AL personnel, it should be focused on the Intellectual Capital (IC). Through this IC, it is expected that in TNI will have an advantage in competing in the future in order to maintain the defense and security of the State, especially in the Navy. This study integrates the concept of Managerial Performance with the concept of Heptahelix which is the novelty of this research. The concept of Heptahelix Managerial Performance has never been studied by previous researchers. The Heptahelix concept applied in this study combines the Triple-helix Concept ((Etzkowitz, 2008); Merchan et al. in (Peris-Ortiz et al., 2016) as quoted from Etzkowitz & Leydesdorff (2000), the Quadruple Helix Model Concept (Carayannis & Campbell, 2009), Quintuple-helix (Carayannis & Campbell, 2009), Carayannis et al. (2012), Provenzano et al., (2016), Peris-Ortiz et al., (2016), Beugre (2017) and Pentahelix (Muhyi et al., 2017), (Cohen & Levinthal, 1990) with Technology ((Nam and Pardo 2011a), (Al-Hader et al., 2009), Harrison et al., (2010), (Ihde, 2009; Verbeek, 2006), Goeminne & Paredis, 2011), (Rosenberger & Verbeek, 2015, 31). Meanwhile, the concept of Managerial Performance applied in this study uses the definition of the performance of individual members of the organization, which should be in accordance with their respective authorities and responsibilities in managerial positions in order to achieve organizational goals (Lau et al., 1997). Furthermore, Otley (1999) stated that performance refers to something that related to the activity of doing work in this case includes the work achieved. Managerial performance is defined as the systematic integration of effort, monitoring, and evaluation, finance, and employee performance within an explicit framework related to corporate objectives (Russel Jr, 1984).

Managerial performance measurement used in this study adopted from personal performance covering eight aspects, those are planning, investigation, coordination, evaluation, control, supervision, staff management, and representation (Mahoney, 1963). In order to achieve maximum managerial performance of Heptahelix, it certainly must be

focused on the Intellectual Capital so that it is expected to excel in the future competition. Thomas A Steward (1998) claimed that a healthy company is a company that has intellectual capital and networks rather than an organizational hierarchy is a good organizational design. Human capital is an important component (Edvinsson & Malone, 1997; Sveiby, 1997b; Roos & Roos, 1997) and a driving force for relational and structural components. Brooking et al., (1998) further added that intellectual capital consists of intangible assets that include markets, intellectual property, infrastructure, and human-centered assets. McElroy's intellectual capital model is based on human capital, structural capital, and social capital (McElroy, 2002). Meanwhile, Ismail argued that intellectual capital is based on human capital, customer capital, structural capital, and spiritual capital (Ismail, 2005). In 2006 (Bueno et al., 2006) suggested that intellectual capital includes human capital, organizational capital/structural capital, technological capital, social capital, and business capital/customer capital. To overcome the scattered opinions about the concept and application of intellectual capital (Khalique et al., 2011), an integrated intellectual capital model (IICM) is proposed. IICM model is based on human capital, customer capital, structural capital, social capital, technological capital, and spiritual capital.

Sharabati et al., (2010) proved that good intellectual capital management will positively affect an organization's performance. W.-Y.Wang & Chang (2005) further added that intellectual capital mainly determines a company's current and future competitiveness as well as future growth of company value. However, Huang & Liu (2005) revealed a negative relationship between innovation capital and business performance in examining the relationship between innovation, IT, and performance. Firer & Williams (2003) also detected a negative relationship between HIC and the intellectual value-added coefficient in South Africa. On the other hand, other studies revealed that there was no relationship discovered between specific components of IC and performance (Joshi et al., 2013). Meanwhile, an organization obtains competitive advantage when it widens or acquires a set of attributes which can make it to perform better than its challengers (H.-L. Wang, 2014).

Lin (2003) further suggested that technology transfer (TT) can be a significant source of competitive advantage for firms in developing countries with limited R&D resources. TT is conceptualized in terms of technology learning performance, organizational intelligence, causal ambiguity, firm specificity, complexity, maturity, employee qualifications, and innovation orientation. Global extensive empirical literature contributes to the individual intellectual capital elements to firm performance in different industries, but the results are somewhat mixed. For example, W.-Y.Wang & Chang (2005) found that all intellectual capital elements directly affect competitive advantage in the information technology industry in Taiwan, with the exception of human resources. de Pablos (2004) found among the three elements of intellectual capitals, structural capital is the only important element in predicting an organization's competitive advantage in Irish steelworks. Chen(2008) further also observed that green intellectual capital positively affects organizational competitive advantage. Chahal & Bakshi (2015) further discovered that there was a direct and positive relationship between IC and competitive advantage, in which organizational learning acted as the moderating variable. Many research projects have revealed that there was a significant relationship between competitive advantage and performance (Ma, 2000; Fahy, 2000). Organizational performance and its competitive advantage depend on knowledge sharing, information technology, teamwork, organizational culture, trust, and employee motivation to share their knowledge (Dasgupta & Gupta, 2009; Lin et al. 2009). Klein (2002) stated that it is not easy to achieve a competitive advantage and there was a relationship between competitive advantage and an organization's performance. High sustainability of performance can be determined and is closely tied to competitive advantage (Powell, 2001). Then, Kamukama et al., (2011) also pointed to the need to investigate the mediating effect of competitive advantage on the relationship between intellectual capital and business performance. Barra-Cisneros et al. (2020) found that there was a significant and positive effect of human capital, structural capital, and relational capital on organizational performance and furthermore competitive advantage mediates the relationship between intellectual capital and organizational performance. Most of the previous literature concerning

IC has ignored the importance of competitive advantage on the relationship between intellectual capital and organizational performance (Chang & Lee, 2008 ; Bontis & Fitz-enz, 2002). Tovstiga & Tulugurova (2009), Barney (1991), Kamukama et al., (2011) claimed that there are further asserts that a firm's competitive advantage and performance are significantly affected by intellectual capital.

de Pablos (2004) found that among the three elements of intellectual capital, structural capital is the only significant element in determining an organization's competitive advantage. Chen (2008) further also observed that green intellectual capital affects the competitive advantage of organizations positively. Chahal & Bakshi (2015) then added that there was a direct and positive relationship between IC and competitive advantage, in which organizational learning becomes the moderating variable. Kamukama et al., (2011) also pointed to the need to investigate the mediating effect of competitive advantage on the relationship between intellectual capital and business performance. Kamukama (2013) said their order of importance in explaining the variance in competitive advantage (based on their standard beta values) is: structural capital, human capital, and relational capital.

LITERATURE REVIEW

Current research applied *Grand Theory*, *Middle Theory*, and *Applied Theory*. The *Grand Theory* applied in this research is Organization Theory, *Middle Theory* is Organization Life Cycle Theory, while *the Applied Theory* is Resource-Based Theory. The *grand theory* applied in this study is the theory of organization as proposed by Jones (2001). Managers' knowledge of organizational theory creates the ability to analyze the structure and culture of the organization, diagnose problems, and by utilizing the organization's design process, adjustments can be made that assist the organization in achieving its goals. For every organization, the right organizational structure can provide an effective or responsive response to the environment, technology, or human resources. Relevant organizational theory is the theory of organizational structure in which there is complexity an organization regarding to the differentiation level within an organization. These differential levels include (Robbins, 1994) as follows: horizontal differentiation, vertical differentiation and spatial differentiation. The *Middle Theory* applied in this research is *Organization Life Cycle*. Jones (2001) mentioned the stages in the *Organizational Life Cycles* include *birth*, *growth*, *decline*, and *death* stages, so it can be considered that the Organizational Life Cycles are the stages of an organization starting from its birth, growth, maturity, and death. In this case, Jones defined organizational growth as: "the stage of the organizational life cycle where the organization is able to develop creation and competence values so as to obtain additional resources. This growth allows organizations to increase the division of labor and specialization as well as to develop competitive advantages. According to Randolph (1985), the benefits of understanding organizations based on Life Cycle Stages are "*past the decisions of management and past events in the organization's history have a direct influence on the present and future events and decisions in the organization's life.*" In this case, the idea of the organizational life cycle stages is often associated and ascribed to the marketing literature that discusses the *Product Life Cycle* (Wright & Robbins, 1987). The idea of *Organizational Life Cycles* has actually been discussed for more than 40 years. This can be traced from the writings of Lippitt & Schmidt (1967), who mentioned that there are three stages of organizational development evolution, including birth, growth, and maturity. This cycle is changed according to developments by Oakley and Krug & Oakley (1991), who called it the "phases of renewal stage", and Jones (2001) further named it as *Organizational Life Cycles* which includes birth, growth, decline, and death stages. Greiner (1972) stated that there are four stages of the organizational life cycle including *birth stage*, *growth stage*, *renewal stage*, and *death stage*. The growth stage is further divided into four stages including the *creativity stage*, *direction stage*, *delegation stage*, and *coordinate stage*, while the renewal stage is divided into maturity stage and decline stage. Greiner (1972) explained that the evolution/development of an organization is characterized into five stages, including *creativity*, *directing*, *delegation*, *coordination*, and *collaboration*, in which organizational

always occurs in each stage. Continuing Greiner's thinking is the possibility of a crisis in every collaboration, which is the possibility of organizational obsolescence or organizational inertia as a result of the presence of group think and as a result of a chronic conflict between them that should work together.

Group think is a situation where the collaboration is too close so that it is no longer objective to criticize the opinions of others. Meanwhile, conflict means that there is a conflict between individuals or groups who work together. Overcoming organizational obsolescence and sluggishness as a result of group think and chronic conflict, requires professional collaboration and openness to continuous learning. The application of theory in this research is *resource-based theory* (RBT) which is a further development of *Ricardo's Economic Rent theory*, and *Porter's structure-performance-conduct* (J. B. Barney & Clark, 2007). This theory emerges due to the question raised of why a company can outperform other companies and have *sustainable superior performance*. Companies that can build and can control their own resources will have the ability to maintain their advantages compared to if the company buys or obtains resources from outside the organization. Unique resources referred to in RBT are resources that have characteristics of *useful/valuable*, *rare*, *inimitable*, and *non-substitutable* (J. Barney et al., 2001). Wernerfelt (1984) further explained that according to resource-based theory, companies will excel in business competition and obtain good financial performance by owning, controlling, and utilizing important strategic assets (tangible and intangible assets). Riahi-Belkaoui (2003) added that a potential strategy to improve company performance is to combine tangible assets and intangible assets. Based on the *Resource-Based Theory approach*, it can be concluded that the company's resources affect the company's performance which ultimately excels in competition.

METHODS OF RESEARCH

This research was carried out through an associative method that examines the effect of the relationship between the variables studied with a theoretical explanation study. The research was conducted using qualitative surveys through questionnaires and then transformed into quantitative ones using an ordinal measurement scale. The population in this study was all TNI-AL work units in the districts/cities of the Riau Islands Province. Furthermore, the sampling was done purposively in which the samples were selected randomly based on certain criteria in this case is in *Middle Management* in the TNI-AL, Riau Islands.

RESULTS AND DISCUSSION

This research applied Structural Equation Modeling (SEM) to answer the research hypothesis. This study employed latent variable scores using the First Order Model (Jöreskog et al., 2006 and Tippins & Sohi, 2003) where the sample size is 100 according to the number of variable dimensions involved in this study at a significance level of 0.05 using a purposive random sampling method. This means that the samples were selected randomly based on certain criteria in this case is in Middle Management at TNI-AL in Riau Islands. The analysis stages were carried out in this study refers to the process of SEM as follows: Model specification, Model Identification, Model Estimation, and Model Fit Test. The Structural Models in this study include:

$$\eta_1 = \gamma_{11}\xi_1 + \zeta_1, \eta_2 = \beta_{21}\eta_1 + \zeta_2, \eta_2 = \gamma_{22}\xi_2 + \beta_{21}\eta_1 + \zeta_2$$

The research data were tested using 3 (three) evaluations including the evaluation of the measurement model, the evaluation of the validity of the measurement model, and the evaluation of the reliability of the measurement model. The purpose of this study was to confirm the theory, so the SEM technique used was *covariance-based structural equation modeling* (CB-SEM) with LISREL. This can be seen in Figure 1 below:

Figure 1 – First Order Model “The Effect of Intellectual Capital on Heptahelix Managerial Performance and its implications for Competitive Advantage”.

This research is expected to be able to answer the problems that occurred through this research hypotheses. The hypotheses raised in this research were to test the significance of the direct and indirect effects. The variable in this study is *Intellectual Capital* (ξ_1) towards *Heptahelix Managerial Performance* (η_1) and its Effect on *Competitive Advantage* (η_2). Based on the research hypothesis, there are 4 statistical hypotheses which were tested using the t-test. The test criteria is that H_0 is rejected if the p-value is less than the value of the significance level ($p_v < \alpha$). On the other hand, H_1 is rejected if the p-value is greater than alpha ($p_v > \alpha$). The hypothesis of this research was carried out with a two-tailed test. H_0 is rejected if the p-value is smaller than the significance level α .

Direct Effect:

- Hypothesis 1: The effect of *Intellectual Capital* is positive or negative towards Heptahelix Managerial Performance;
- Hypothesis 2: The Effect of *Heptahelix Managerial Performance* is positive or negative towards Competitive Advantage;
- Hypothesis 3: The Effect of *Intellectual Capital* is positive or negative towards Competitive Advantage.

Indirect Effect. According to Hair et al. (2014: 35), indirect effect is a relationship that involves several associations between constructs and is usually referred to as a mediating effect. The statistical hypothesis of indirect effect in this study consists of 1 statistical hypothesis:

- Hypothesis 4: Intellectual Capital has an indirect positive or negative effect on Competitive Advantage through Heptahelix Managerial Performance.

CONCLUSION

It is expected that this research can answer the research objectives described in the formulated research hypotheses, including:

- There is a positive or negative effect of Intellectual Capital on Heptahelix Managerial Performance;
- There is a positive or negative influence of Heptahelix Managerial Performance on Competitive Advantage;
- There is a positive or negative effect of Intellectual Capital on Competitive Advantage;
- There is a positive or negative effect of Intellectual Capital on Competitive Advantage through Heptahelix's Managerial Performance.

In addition, it is also expected that this research will contribute to creating Superior Human Resources through the measurement of Heptahelix Managerial Performance so that

TNI-AL personnel have a competitive advantage in carrying out their duties and functions in the field of defense and security in the territorial waters of the Indonesian Waters, especially in Riau Province.

It is expected that this research can provide input to the current law in accordance with the duties and functions of the TNI-AL in the field of defense and security in the territorial waters of the Indonesian Waters, especially in Riau Province.

SUGGESTION

It is expected that the suggestions based on the results of this research can be further implemented by the Government of the Republic of Indonesia in developing Superior Human Resources in order to provide benefits for TNI-AL personnel in maintaining defense and security in the Indonesian Waters, especially in Riau Province.

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