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**THE ROLE OF TRANSFORMATIVE IT CAPABILITY ON INCREASING ORGANIZATIONAL INNOVATIVENESS TO SUSTAIN COMPETITIVE ADVANTAGE**

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**ABSTRACT**

*This basic research applies a causality model to explain the relationship between IT Capability and organizational innovativeness impact on competitive advantage. All of those latent variables are revealed through a set of indicator variables that can be measured through a survey. Data sample are collected from 210 Telkom’s managers who were responsible in achieving business targets, and analyzed using SEM Lisrel statistic software. There are at least two groups of controversial opinions in concluding the relationship between IT capability and competitive advantage. The first group argues that the IT capabilities have impact on competitive advantage because these capabilities help organizations to innovate, and those are able to create uniqueness. The second group concluded that IT capability has no effect on the competitive advantage due the fact that IT investment are easily duplicated by competitors. With triple-loop learning approach, IT capabilities are then analysed and classified into tree levels of capabilities to find a capability which has close relation to sustainable competitive advantage. The grand theoretical model and the empirical evidence provide an important foundation to develop a comprehensive theory for formulating the role of IT capabilities on organizational innovativeness leads to sustainable competitive advantage. Management should develop capability to provide infrastructure for information exchange, operationalize new conception, and reconfigurable IT resources. This new dynamic and contextual IT capability, is then called as Transformative IT Capability.*

**KEYWORDS**

transformative IT capability, triple-loop learning, organizational innovativeness, sustainable competitive advantage.

**1. INTRODUCTION**

Resource base view of the firm theorized that the success of the company is not only determined by external factors but also by internal factors (Grant, 1991). Sustainable competitive advantage gained when companies have and use their resources and competences which are valuable, rare, difficult to be imitated, and there is no substitution (Barney, 1991). As an internal resources, IT can be viewed as a strategic asset that is able to cope with the dynamic changes in the external environment in order to sustain competitive advantage (Bhatt & Grover, 2005). The evidence suggests that many companies despite having sufficient IT resources failed to achieve the sustainable competitive advantage.

This research took Teece (1997)’s dynamic capability approach on IT construct to build a dynamic IT capability. By using triple loop learning approach (Flood & Room, 1996; Peschl, 2007), IT capability construct then be analysed into three levels of capability that are operational level, framework level, and transformative level capability. This study proposes the concept of Transformative IT Capability as a strategic resource of a firm that is able to transform the company’s new conceptions into framework and operational measures that will improve their performance sustainability. Transformative IT Capability affects organization innovativeness in response to changes in the organizational context proactively. The increasing of the organizational innovativeness of company in turn will increase the capability of the organization to build a sustainable competitive advantage.

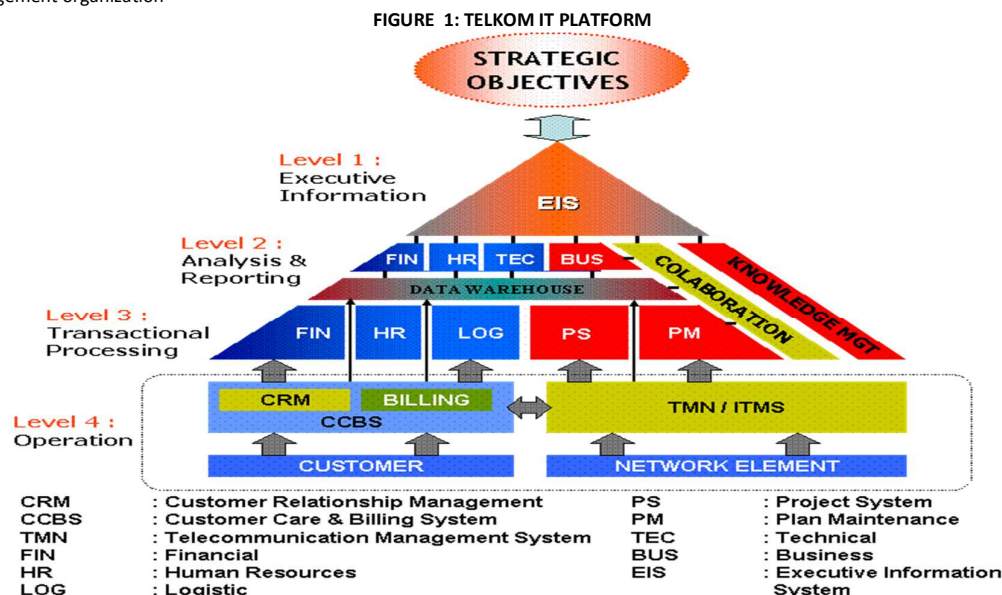
**1.1. RESEARCH PROBLEM**

**1.1.1. BUSINESS PHENOMENA**

The development of IT capabilities to support PT Telkom’s telecommunications business particularly Plain Ordinary Telephone Service (POTS) is an interesting phenomenon to study. In order to realize its vision to become "the leading player in the region infocom", in 2009 Telkom transformed its business from previously only telecommunications business (connectivity) into a new business that consisted of telecommunication, information, media and edutainment (Telkom Annual Report, 2010)

To enter a new business that was oriented on high information technology, PT Telkom of course, should first equip themselves with the IT capabilities itself. The internal capabilities of the company in the field of information technology, can be seen from the complexity of the platform it uses. The high IT capabilities owned by PT Telkom can be traced from the Telkom’s IT platform.

IT architecture that’s shown at Figure-1 below allowed Telkom to perform the measurement, analysis and performance improvement, business process integration, knowledge management organization



Source: Business Overview Telkom, 2005



Telkom's IT capabilities that had been advanced, were developed to support POTS business. Theoretically, IT capability is a strategic asset that can be a source of sustainable competitive advantage (Bhatt & Grover *at. al*). But the facts show that Telkom's POTS business that was supported by such advanced IT capabilities was not able to prevent the declining POTS business performance since the last five years, both in terms of operating revenue, number of customers and the level of use.

TABLE 1: POTS BUSINESS PERFORMANCE

POTS Performance	2006	2007	2008	2009	2010
Revenue (B IDR)	16.467	19.683	16.709	14.286	12.940
Customer (1000)	8.709	8.685	8.630	8.377	8.303

Source: Telkom Annual Report 2010.

### 1.1.2. EFFECT OF IT CAPABILITY ON SUSTAINABLE COMPETITIVE ADVANTAGE

At least there are two schools of thought that had controversy in concluding the relationship between IT capability and competitive advantage. The first faction was Farrel (2003), Wheeler (2002), Zahra (2002), Sambamurthy (2003) who concluded that IT capability impact on competitive advantage. Bharadwaj (2000), Dehning & Stratopoulos (2003), Mata, Fuerst, Barney (1995), Santhanam & Hartono (2003) gave a more specific reason that IT capability was able to create uniqueness and therefore contributes to competitive advantage. The second group was derived from Clemons (1986), Carr (2003), Kettinger, Grover, Guha & Fresh (1994) researches, oppositely concluded that IT had no effect on sustainable competitive advantage due to IT capabilities was accessible to competitors and IT investments easily duplicated by competitors as well. The diversity of perspectives in IT study very likely to cause controversy in the relationship among them.

The phenomenon of business and research gap above shows that the persistence of the problem of the relationship between IT capability and sustainable competitive advantage that needs to be further investigated. The gap provides an opportunity for this research to find the form of IT capability that could potentially increase the organizational innovativeness as a firm strategic resource. It creates the uniqueness and socially complex so It's difficult to be imitated, hence impact on sustainable competitive advantage of the firm.

### 1.2. PURPOSE

This study aims to fill the view gap of the influence of the IT Capability on Sustainable Competitive Advantage by testing the conceptual model presented in Figure 4. This study utilizes a triple-loop learning approach to classify IT capabilities and choose transformative IT capability as a strategic resource that can drive organizational innovativeness that lead to sustainable competitive advantage. As a practical contribution of this research is providing recommendation in the development of IT capabilities in firms that support the creation of sustainable competitive advantage.

## 2. LITERATURE REVIEW

Research on organizational capabilities is influenced by the resource-based views of the firm (RBV) theory that argued that the company can gain a competitive advantage and superior long-term performance through the management of resources (Barney, 1991). Capability reflects the company's ability to combine resources so as to achieve superior performance. Capability involves not only the ability to produce efficiently, but also to gain knowledge of a variety of activities such as the capability to increase productivity, to understand the process and product design, ability to build production facilities efficiently and to keep abreast of changes in information technology. Capability has various attributes such as speed, consistency of process, agility, cross-functionality, and core competencies (Stalk, et al., 1994).

Feeny and Willcocks (1998) said that there were nine capabilities that form the foundation of the company, namely: leadership, business-systems-thinking, relationship building, architectural planning, contract facilitation, run information technology, monitoring contact, the purchase was formalized, and vendor development. Capabilities include know-how of the entire process, cognition, and minimal essential routines for running a productive process (Christensen, 1994; Barney, 1999; Bharadwaj, 2000; Byrd, 2001). Routines are continuously improved through the learning process. The interaction between the organization and its external environment can bring new know-how, innovative product, process or organizational management. The ability to make things run in a different way that can be understood as an internal innovation capabilities that no other company is the technological capabilities of the organization.

Teece (1992) used the term organizational capability refers to the ability of the company to organize, manage, and coordinate a set of activities. Capability is the capacity of the company to do a combination of assets through organizational processes to effect the desired end goal.

Lado (1992) as cited by Agusty (1998) in conceptualizing sustainable competitive advantage from the perspective of the resource-based theory (RBV), submitted four components of a company's distinctive competencies which include managerial competence, competency-based resources or inputs, process competence or transformation, and product-market competence or competency-based output. These competencies emerged in the form of innovative capabilities can be a source of sustainable competitive advantage. These will be difficult to imitate by competitors when forming a complex relationship with the company's distinctive capabilities and resources.

Dynamic capabilities focuses on strategic response to environmental change (Winter, 2003). Included in this sense is the ability to transform existing resources into the company resources that create new value in changing environmental conditions (Eisenhardt and Martin, 2000). Teece, Pisano and Shuen (1987) proposed the concept of dynamic capabilities as an alternative model of RBV because it reflects an organization's ability to achieve the new innovative forms of competitive advantage in the hypercompetitive environment.

Technological capabilities is the ability to absorb the specific technology companies to solve technical problems (Nicholls-Nixon, 1995). Cohen and Levinthal (1990) looked at the absorption capability as the company's ability to evaluate, assimilate and utilize external knowledge for commercial purposes. Technological absorptive capability can encourage product innovation activities (Jones et al, 2000). Capabilities of an enterprise can not be replicated by another enterprise because those capabilities can not be explicitly defined and codified. Organizational capability is a set of skills, routines, and complementary assets and is a part of the tacit knowledge and non-formal, which is based on procedural knowledge, and not easily transferred (Nelson, 1991 as cited by Vogel et.al).

IT capability is a capability at the enterprise level in using information technology to differentiate its competitors (Henderson and Venkatraman, 1993). Bharadwaj (2000) as cited by Lee & Anderson, 2006 further defines IT capabilities as a firm's ability to mobilize and hold IT-based resources in combination with other resources and capabilities (Bharadwaj, 2000, p. 171). Bharadwaj examine the relationship between IT capability and firm performance by conceptualizing the IT capabilities as consisting of (1) IT infrastructure components; (2) IT human resources; and (3) intangible IT-enabled resources.

Capabilities include the ownership and control of IT hardware, software, executive systems, proprietary software, shared services, IT human skills, and the process is the capability of the elements that are internally integrated and interrelated with business goals (King, 2002). Internal IT capability will be a source of competitive advantage if it has a value that is tested, rare, and imitabilitasnya (Prahalad & Hamel, 1990; Stalk, et al., 1994; Wernerfelt, 1984).

IT capabilities generate a competitive advantage if it is able to produce products and services by: (1) low cost so the price is competitive. (2) The added value of creating a product / service that offers the features / functionality that is different and very attractive, (3) Quick to execute the process, (4) Nimble and quick in adapting the needs of a changing market, (5) Innovation: continuous supply of creative products and services of value to customers, and (6) Customer service: Improve responsiveness to customer needs (Barney, 1995, 1997; Bharadwaj and Varadarajan & Fahey, 1993; Clemons, 1986; Dehning & Stratopoulos, 2003; Feeny, 1988).

Internally, IT capability directs to the goal of efficiency through process integration, efficiency, streamlining the value chain strategy. IT capability should also be measured based on internal functional efficiency and cost reduction of functional processes. The effort to reduce costs is done by integrating the value chain and supply chain, eliminate redundant processes or processes that don't have value-added to reduce the cost (Stalk et al., 1994; Sethi & King, 1994). Externally, IT capabilities aimed to add value to the customer and the service.

Competence consists of the ability of IT to integrate IT functions such as IT for business applications, the central support (helpdesk) and present it to the customer as an added value for customers (Prahalad & Hamel, 1990). IT competence is also greatly contribute to the execution of the strategy, providing differentiated products and services. Competitors are not easy to imitate and replicate the IT competence (Christensen, 1992).

IT capabilities can be used to build cooperative relationships between individuals and groups within a department and between a company and its partners. When an organization has the capability of IT that is directed to establish a better activity than its rivals, then the capability of IT has become a distinctive IT competency and be a potential competitive advantage (Christensen, 1999).

IT capability has three main dimensions: (a) the acquisition of IT resources, such as technology assets (Rose et al, 1996) IT objects (Tippins and Sohi, 2003) and the entire IT infrastructure (Bharadwaj, 2000, Fenny and Wilcocks, 1998); (b) Development of IT resources through close to relationships IT business, such as IT business partnership (Rose et al, 1996), a partnership of IT (Bharadwaj et al, 1999) and (c) Leveraging IT resources such as technical IT skills (Mata et al, 1995, Tippins and Sohi, 2003 Ray et al, 2005) and IT resources.

On the basis of this three-dimensional Bharadwaj et al, 2004 defines IT capabilities as the company's ability to acquire, hold, and boost its IT resources to establish and support the business strategy and value chain activities. The third dimension is the result of the analysis of the construct of IT capabilities at the corporate level, and from the standpoint of the IT unit itself.

Monideepa Tarafdar & Steven R. Gordon (2005) found that IT capability affects the organization's ability to innovate, and the different aspects of IT capabilities influence the innovation process. Study of Farrell (2003), Wheeler (2002) and Zahra (2002) stated that IT plays a role in encouraging and directing the formulation of business strategies and as a tool to achieve growth and create competitive advantage. Besides, Sambamurthy (2003) added that IT capability helped organizations to innovate.

By adopting the RBV theory, Bharadwaj (2000) conceptualized and classified IT capabilities into three dimensions: (1). IT Infrastructure in the form of physical IT assets such as computers, software, hardware, communication technology, database and shared technical platform (sharable technical platforms); (2). IT human resources in the form of technical IT skills such as programming skills, managerial and leadership skills of IT functions such as IT project management; (3). Infrastructure IT-enabled intangible benefits of IT in the form of hidden, which indirectly increase organizational effectiveness, such as customer orientation, knowledge assets and synergy.

Bhatt and Grover, (2005) parsed source of IT-based competitive advantage with IT capabilities differentiate into capability value, competitive capability and dynamic IT capability. Based on the identification of Bhatt & Grover, (2005) et.al. they suggested four dimensions of IT capability, namely: (1) the quality of the IT infrastructure, (2) IT business experience, (3) infrastructure relationship, and (4) organizational learning as an antecedent of competitive advantage.

In his research Bhatt & Grover, (2005) et.al found a variety of IT impact on competitive advantage: (1) The higher the quality of the IT infrastructure is not a positive influence on the company's competitive advantage. (2) The higher the IT business experience a weak effect on the company's competitive advantage. (3) The higher the infrastructure relationship had positive and significant impact on the competitive advantage of the company.

Ray, Muhana and Barney (2005) synthesized the IT process-oriented and resource-based theory (RBV) concluded that the key to successful use of IT on performance depends on the capabilities of the tasital IT and IT capability were socially complex. Explicit capabilities such as technical IT skills, and IT spending on generic can not be considered as a source of competitive advantage.

Dynamic IT capabilities which were developed by Pavlou and El Sawy (2006), which added dimension with reconfiguration capabilities to keep pace with changing environment. So the dynamic IT capability consists of four dimensions, namely (1) IT infrastructure, (2) IT human resources, (3) IT-enabled intangible and (4) IT that can be reconfigured. Selection priority is the main factor of IT usage and IT capability and competence development (Sanders and Premus, 2002).

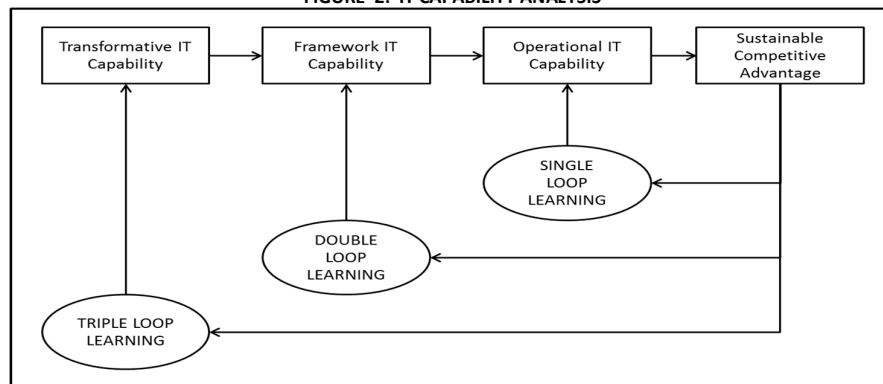
To achieve the desired results of an organization, working on the basis of the context, framework and action. Action is reciprocal elementary reactions companies on the operational level, while the framework and context touches conception changes lead to changes in the norms and mental maps. Dynamic capabilities included specific processes and organizational strategic value of the company that gave birth to transform existing resources into a resource company that created new value in changing environmental conditions (Eisenhardt and Martin, 2000).

With regard to dynamic enterprise IT capabilities, this study emphasizes that the key success factor in the competition is the ability to transform the IT companies in the original innovative thinking and fundamentals of a change in the context of the company into the operational framework and measures of IT companies. The ability is judged by the speed and accuracy of the company to understand the changing of company context, the agility of the new configuration, the speed of transforming into the operational aspects of the IT company that support innovation. Competency of IT functional units in the enterprise and IT users determine the amount of IT capabilities to support transformation process of the company: the ability to translate fundamentals changes desired by the company into the framework and the operational level of a company's IT quickly and accurately.

IT applications play an important role in the quality assurance processes, for example by adopting a particular application such as service level guarantee, then variance can be detected. This low-order adoption of IT application creates an innovation, but it doesn't change the existing norms. Higher order adoption of IT applications such as to collect information on customer preferences to develop a new perception of the market. This application enables the company see the market clearly, i.e. to segment the market based on a particular way and choose a specific segment for targeted marketing. Information market modify the mental map of strategic marketing decision makers. Changes in strategic level of course must be articulated with it down into the level of action, such as changing the procedure.

The first instance of IT application above, is used to keep the operation runs correctly (the thing right) but doesn't necessarily have the right things. In the second example the application helps the company to choose the right things and new, then followed up by the action level correctly. The change in government policy on competition (changes context), threatens the corporate performance in the long term because it will encourage the potential competitors to entry, so company must respons it properly, by transorming to the new business for example. The IT application should facilitate the business transformation in the context of changes.

FIGURE 2: IT CAPABILITY ANALYSIS



Source: Developed for this research

IT capabilities on the first loop is operational IT capability. Capabilities at this level allows to support operational innovations such as IT capabilities to accelerate customer service time. Unfortunately IT capability at this level is now easily obtained either by the innovation itself, by procurement or outsourcing, so it is not a source of differentiation in the long run for a competing company.

The second circle of IT capability makes it possible to support the company's business process changes resulted from changes in the frame work of company that is in effect. For example, if the company wants to increase the valuation of foreign markets, then company adopts a new financial management system based on a particular system. IT capabilities on the this IT Capability circle is named frame work capability.

The third circle is the capability of the IT contextual which include the ability to rapidly translate new conception of the company as a response to changes in the context of the company. The company response can be change in business, infrastructure, organizational and corporate culture that must be executed until the operational level. The ability is achieved by the involvement of IT human resources, especially managerial level in the triple - loop organizational learning in the form of shared vision in the learning group. The learning activity that enables IT management directly involved in the formation of mental maps together with other organizational functions in order to solve the company's strategic problems. This mental map is a guideline for the next IT management in formulating future strategic planning of IT within the context faced by the company.

The ability to understand the changes in context, perception, values and transforming the company into a framework and operationally IT action allows the company able to quickly reconfigure IT, capable of selecting a technology platform that is effective and efficient in supporting the transformation of the company. IT support to the company's transformation also can be extracted from its ability to provide the infrastructure that encourages the exchange of external and internal information in an interactive way, data storage and enterprise strategic information that is easily accessible in accordance with the authority, in accordance with the data processing and applications used to realize business processes and administration and on-line management information systems. Administration and business process changes as a result of the company's transformation can be done quickly and accurately.

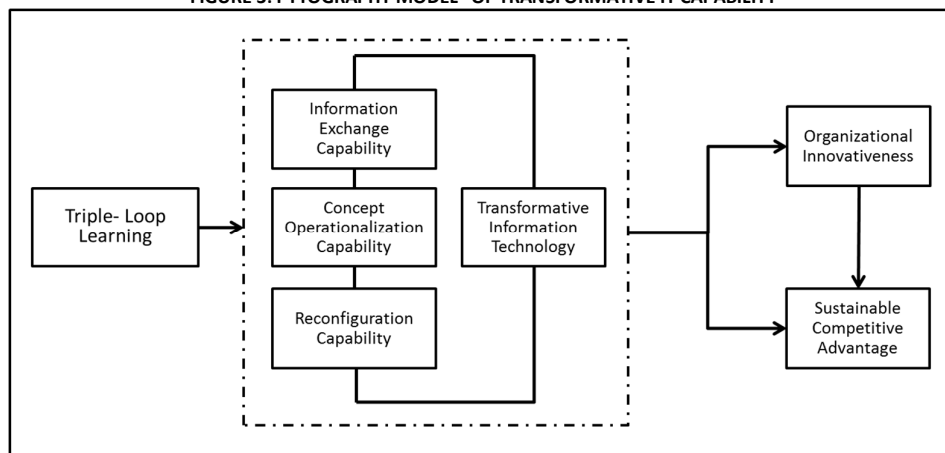
The exchange of external information in an interactive web-based information is needed by the company to facilitate interaction with stakeholders, such as customer service, service suppliers, service information to shareholders and the public information about the company. The need of internal information exchanges accelerates the exchange of information between levels of management from top to bottom and vice versa and exchange of information horizontally to support administrative and business processes itself. A set of IT capabilities which consists of the ability to roll up the new concept, the ability to provide a means of exchange of information and the ability to reconfigure that IT capability, forms a new concept of IT capability called by the Transformative IT Capability Transformative that is propositionized as follows:

**PROPOSITION**

*Transformative IT Capability is a bundle of IT capability that emphasis on the capability to transform the new conception of the firm, produced by triple loop learning, to the operational level, capability to reconfigure the IT resources easily, and capability to provide information exchange infrastructure.*

*These capabilities able to drive organizational innovativeness, hence, perform a strategic resource of the firm, and create a sustainable competitive advantage.*

**FIGURE 3: PYTOGRAPHY MODEL OF TRANSFORMATIVE IT CAPABILITY**

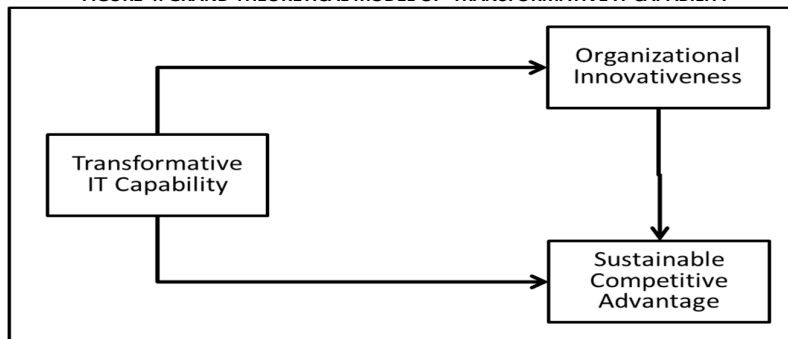


Source: developed for this research

**3. GRAND THEORETICAL MODEL & HYPOTHESIS**

By using triple-loop learning, IT capability is classified into Operational IT Capability, Frame-work IT Capability and Transformative IT Capability. This research propose the nation Transformative IT Capability, the capability which produces the valuable product or service and is difficult to be imitated so it is strategic resources. This capability is hypothesized influence either sustainability competitive advantage directly or through organization innovativeness.

**FIGURE 4: GRAND THEORETICAL MODEL OF TRANSFORMATIVE IT CAPABILITY**



- H1: Transformative IT Capability effects on Organizational Innovativeness positively.
- H2: Transformative IT Capability effects on Sustainable Competitive Advantage
- H3: Transformative IT Capability effects on Sustainable Competitive Advantage positively.

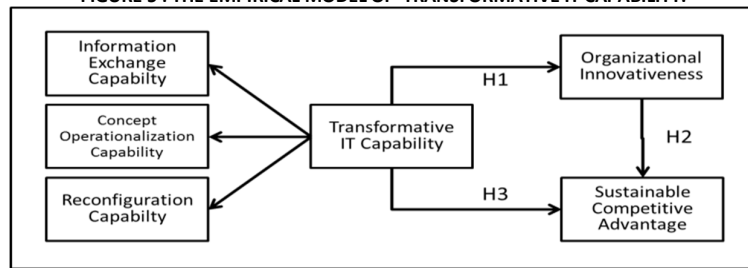
**4. EMPIRICAL RESEARCH MODEL**

Tarafdar & Gordon (2005) found that the capability of IT affects the organization's ability to innovate and the different aspects of IT capability affects the innovation process. Pavlou and Sawy (2006) developed a dynamic IT capabilities by adding dimension reconfiguration capability to follow the changes in the environment. Effect of dynamic IT capabilities to sustainable competitive advantage rests on the study of Wheeler (2002), Zahra (2002) and Farrell (2003) who stated that IT plays a role in encouraging and directing the formulation of business strategy and as a means to achieve growth and create competitive advantage. With regard to sustainable competitive advantage, the ability to operationalize a new conception as a learning outcome of triple-loop learning previously mentioned is a necessary condition, and could be a source of competitive advantage if it is able to push proactive organizational innovativeness and contextual.

This requirement can be met because Transformative IT Capability is the highest order of IT capabilities, not just the operational level capabilities which has become generic because of almost all companies are able to have it, and can be solved by outsourcing.

Transformative IT Capability is the driving factor for the development of new products and services, procedures and systems, which are used to achieve the goals and objectives of the company in order to maintain competitive advantage. Within this framework the ability to operationalize of a new conception is positioned as driving factor which able to transform the updated mental model of triple-loop learning outcome into the company capability in the form organizational innovativeness which is proactive and contextual.

FIGURE 5 : THE EMPIRICAL MODEL OF TRANSFORMATIVE IT CAPABILITY.



Source: Developed for this research

5. RESEARCH METHODOLOGY

This study uses a causality model built from variables in order to find a causal explanation of the relationship between some concepts or variables. These variables revealed through a set of indicator variables that can be measured through a survey (Ferdinand, 2006).

The population was taken from management of the unit that responsible for the achievement of the target of subscriber number, and revenue in accordance with the market segments that it faces. The population of 5487 people (consisting of 52% worked in business units, 48% on support unit) are sent an e-mail containing a request to fill out questionnaires contained in www.teguh Widodo.net. Every question is provided by 5 optional answers to be ticked by the respondent in accordance with the respondent's perception. The answers of each respondent is valid if all of 49 questions are answered completely during at least 10 minutes. Then the 210 from the 1000 valid answers are taken to be sample.

To meet the recommended Kart G. Joreskog (2002) the raw data is first converted into the asymptotic covariance matrix. Because of the ordinal data is still treated as ordinal data and only ordinal data contained in the raw data, the correlation matrix using polychoric correlation (Polychoric Correlations Matrix). Furthermore, the data processed using the method of Maximum Likelihood (ML). Processing data using SEM method, then according to Hair et al., (2006: 735-759) necessary to test the validity and reliability of two stages. Test the validity of the following stages:

- The validity of the measurement model. This phase is conducted to examine the relationship between the constructs (latent variables) with their indicators (observed variables). In the measurement phase of the model validity, the relationship between latent variables to the indicators tested using Confirmatory Factor Analysis techniques (CFA). Indicators as valid if it has a loading factor of  $\lambda > 0.5$  (Ferdinand, 2006: 23, Hair; 2006: 753-759).
- Structural Model Validity. This stage can only be done if the 'measurement model' have acceptable validity. Reliability test is intended to test the accuracy, stability and consistency in every measurement (Husein Umar, 2000). Reliability in this study uses the concept of construct reliability (CR) were also significant as the coefficient alpha. Constructs said to be reliable if  $CR > 0.6$  (Hair et al., 2006: 777).  $R^2$  value shown on each measurement equation is interpreted as a reliability indicator (Joreskog and Sorbon, 1993). While the estimated value (loading) is used as a validity coefficient.

The hypothesis tested models use Compliance Test Model (Hair et al., Joreskog & Sorbom, 1989; Long, 1983; Ferdinand, 2000) which includes: Chi-square, Goodness Of Fit Indices (GFI), Adjusted Goodness Of Fit Index (AGFI), Root Mean Square Error Of approximation (RMSEA), Expected Cross Validation Index (ECVI), Akaike's Information Criterion (AIC) and CAIC, Fit Index.

Test convergent validity of each construct is done through confirmatory factor analysis (CFA). According to Hair (2009) respondents who answer items that are indicators of the construct should converge or share variance proportionally (share a high proportion of variance). Regression coefficients (loading factors) of each indicator is used as an indicator of validity, which is valid if the indicators have a factor loading  $\lambda \geq 0.5$  (Hair; 2006: 753-759) with t-value  $> 1,96$ .

The reliability test is intended to test the accuracy, stability and consistency in every measurement (Husein Umar, 2000). Reliability in this study using the construct reliability concept which is calculated by the formula:

$$CR = \frac{\left[ \sum_{i=1}^n \lambda_i \right]^2}{\left[ \sum_{i=1}^n \lambda_i \right]^2 + \left[ \sum_{i=1}^n \delta_i \right]}$$

CR : Construct Reliability

$\lambda$  : Loading factor of each latent variables

$\delta$  : Measurement error in indicators of latent variables Exogenous

TABLE 2: REALIBILIT TEST

Variables	Indicator	Std. Loading Factor (λ)	T - Value	Std. Loading Factor (λ)/2	Std. Error (δ)	Construct Reliability	REMARKS
TIC	KPI1	0,68	12,08	0,46	0,33	0,94	RELIABLE
	KPI2	0,67	12,42	0,45	0,31		
	KPI3	0,67	11,03	0,45	0,31		
	KPI4	0,75	13	0,56	0,34		
	KOK1	0,82	15,18	0,67	0,45		
	KOK2	0,82	15,49	0,67	0,45		
	KOK3	0,81	13,34	0,66	0,41		
	KRK1	0,83	15,19	0,69	0,19		
	KRK2	0,83	15,96	0,69	0,41		
KRK3	0,86	15,04	0,74	0,5			
POI	KOP1	0,69		0,48	0,51	0,84	RELIABLE
	KOP2	0,69	13,49	0,48	0,72		
	KOP3	0,54	8,74	0,29	0,48		
	KOP4	0,75	13,23	0,56	0,51		
	KOP5	0,72	12,96	0,52	0,48		
	KOP6	0,71		0,50	0,56		
SCA	KBB1	0,65		0,42	0,48	0,88	RELIABLE
	KBB2	0,7	11,09	0,49	0,52		
	KBB3	0,66	14,29	0,44	0,48		
	KBB4	0,68	11,79	0,46	0,65		
	KBB5	0,59	9,88	0,35	0,39		
	KBB6	1,33	5,88	1,77	0,39		

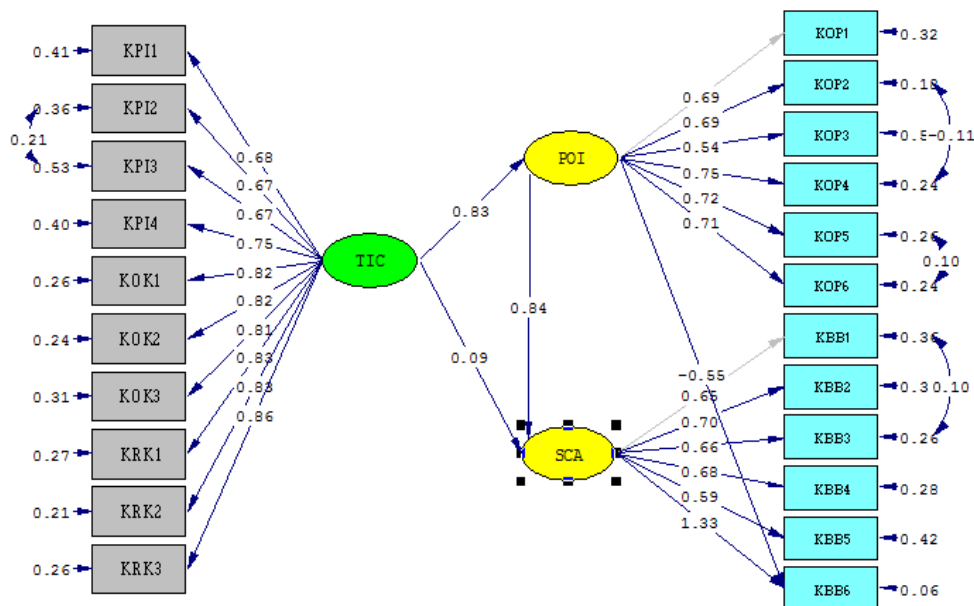
Source: Result of this study

The reliability was tested by means construct reliability (CR) to measure the reliability. Constructs said to be reliable if CR > 0.6 (Hair et al., 2006: 777). R<sup>2</sup> value shown on each measurement equation is interpreted as a reliability indicator (Jorekog and Sorbon, 1993). Result of testings above ( see Table 1) imply that the measurement model is a valid and reliable.

The triple-loop learning (PLT) and learning by sharing vasion (SHV) constructs are independent variable that are hypotesized effect respectively on proactive organizational innovativeness (POI) and sustainable competitive advantage (KBB) and that effects on KBB. Each construct then measured by its indicators. After all relationships have been set up in symplis, and then run them up, LISREL 8.8 performs path diagram, and many calculations for SEM solution.

The analysis of path diagram is based on the significance of the relationship between variables in the path. Paths between variables will be accepted if the relationship of these variables has a value of t ≥ 1,96. Figure-6 is describing the path diagram of all relationships in the SEM.

FIGURE 6 : PATH DIAGRAM



Source: Result from this research

**Note:**

- TIC = Transformative IT Capability
- POI = Proactive Organizational Innovativeness
- SCA = Sustainable Competitive Advantage
- KPI1 ... KPI4, KOK1...KOK3, KRK1... KRK3 = indicator variables of TIC
- KOP1... KOP6 = indicator variables of POI
- KBB1 ... KBB6 = indicator variable of SCA

From TIC to SCA has two paths, direct and indirect via through POI. The direct effect produced 0,09 path coefficient, and was not significant because the t-value 1,27 is less than t-table 1,96. The path TIC to POI produced 0,83 path coefficient and has the value of t (t-value) 11 and path from POI to SCA produced 0,84 path coefficient and 8,4 t-value so both paths are significant. The indirect effect of TIC on SCA will be the multiplication of the two path coefficients TIC to POI, it will produce  $0,83 \times 0,84 = 0,70$ .

The total effect will be the sum of path coefficient of direct effect and indirect effect, hence the total effect will be  $0,70 + 0,09 = 0,79$ . It means that TIC might not have an effect on SCA strongly until TIC pushed POI strongly and then POI drove SCA strongly as well. In other words POI played a role as an intervening variable which made TIC have an effect on SCA stronger than if it is without POI.

LISREL 8.8 also provides a set of measurement to test goodness of fit indices of the model. The table below is the result of those tests, showing that almost all indices are fit.

TABLE 3: GOODNESS OF FIT INDICES

GODNESS OF FIT INDICES	CUT-OFF VALUE	RESULT OF THIS RESEARCH	REMARKS
<b>Absolute Fit Indices</b>			
$\chi^2$ Significance Probability	$\geq 0.05$	0.0	*)
GFI	$\geq 0.90$	0,84	Marginal
RMSEA	$\leq 0.07$	0,07	Fit
RMR	$\leq 0.08$	0,03	Fit
SRMR	$\leq 0.08$	0,04	Fit
$\chi^2 : df$	$< 3$	2,154	Fit
<b>Incremental Fit Indices</b>			
NFI	$\geq 0.95$	0,97	Fit
TLI (NNFI)	$\geq 0.95$	0,98	Fit
CFI (RNI)	$\geq 0.90$	0,98	Fit
<b>Parsimony Fit Indices</b>			
AGFI	$\geq 0.90$	0,80	Marginal
PNFI	$\geq 0.50$	0,85	FIT
PGFI	$\geq 0.50$	0,67	FIT

\*) Fit indicator is not reliable because of sample  $> 200$  (Ferdinand, 2006:59), for sample  $> 250$  with 13-29 indicators,  $P \chi^2$  can be significant ( $< 0.05$ ) even though the model is fit (Hair et al, 2006:753)

Hypothesis testing measures the significance of the relationship between the hypothesized variables. The hypothesis will be accepted if the relationship of these variables has a value of  $t \geq 1,96$  so if  $t < 1,96$  the hypothesis is rejected. If the direct effect between the two variables investigated were not significant but the total effect is significant, then both are interpreted to have an indirect relationship, through intervening variables.

Hypothesis-1 is that the transformative IT Capability has a positive effect on organizational innovativeness, acceptable because it produces a t-value of '11' is greater than t-table value of 1.96. Hypothesis-2 is that organizational innovativeness has a positive effect on sustainable competitive advantage, acceptable because it produces a t-value of '8.41', greater than t-table value of 1.96. Hypothesis-3 is that Transformative IT Capability has a positive effect on sustainable competitive advantage, is rejected because it produces a t-value of 1,27, less than t-table value of 1.96. It means that TIC has no direct effect on SCA, but it requires an intervening variable organizational innovativeness. Hence, the total effect of POI on SCA yields  $(0,83 \times 0,84) + 0,09 = 0,79$

TABEL - 4: HYPOTHESIS TEST RESULT

Hypothesis	Relationship	Path Coef	T-Value	Decision
H1	TIC → POI	0,83	11	accepted
H2	POI → SCA	0,84	8,41	accepted
H3	TIC → SCA	0,09	1,27	refused

Source: this research

## 6. RESEARCH FINDING

Associated with the relationship between RBV theory, especially information technology capability and sustainable competitive advantage, then construct of organizational innovativeness which has consequences on SCA must fulfill the criteria of strategic resources. In the discussion of RBV has been stated that in certain industries, such as telecommunications, the possession of high-tech infrastructure resources even though it has a high value but is not automatically could be a source of SCA for a period of time because it is easily substituted, traded, imitated, not rare, and easily transferable.

The information technology platform belong to telecommunication network service providers performs a high value, but not unique, easily imitated, so that it is clustered into competitive parity position because of the new technology does not guarantee to meet competitive advantage. The uniqueness can not be created through the dominant technological paradigm or the concept of appropriateness regime.

Therefore organizational innovativeness which is based on infrastructure resources would hardly be expected to be a source of sustainable competitive advantage. Innovativeness which becomes a source of sustainable competitive advantage should be innovativeness which covers strategic innovativeness, organizationally, proactivity, avoids competitive traps and within the context of competition faced by the company.

In order to maintain competitive advantage, the IT capability belong to the firm should include an ability to operationalize the new conception of the firm in responding to the environmental turbulence, ability to reconfigure the IT resources immediately, and ability to provide information exchange infrastructure significantly. In spite of those, this research confirmed that management should support organizational innovativeness to intervene the Transformative IT Capability effects on Sustainable Competitive Advantage.

Recall to the research problem, this research finds that IT capability construct must be broken down into more specific level of capability. The involvement of IT human resources in triple-loop learning (Flood & Romm, 1996), improves their capability to transform the new conception of the company and pushes innovation that impact on sustainable competitive advantage.

## 7. CONCLUSION

In business phenomenon, IT capability PT Telkom has positive effect on sustainable competitive advantage when capabilities include the ability as an exchange of information, the ability operationalizes new conception and ability to reconfigure IT resources fastly. Such capabilities will be valuable, unique, not easily replicated so that it becomes a source of sustainable competitive advantage. This contrasts with the IT capability at operational and framework level because those are easy to imitate, could be provided by market so it can not be used as a source of competitive advantage.

Ownership of Transformative IT capability will not improve the sustainable competitive advantage until it increases the level of organizational innovativeness first. Increasing the degree of organizational innovativeness in the later stages will increase the sustainable competitive advantage.

## 8. IMPLICATION

Correcting the findings of Bhatt & Grover (2005) research which states that the higher the quality of the IT infrastructure was not a positive effect on sustainable competitive advantage. Based on the results of the hypothesis explains that the direct effect was weak and not significant, but its total effect was strong and

significant due to the presence of indirect effect thank to an intervening variables included in the model, namely organizational innovativeness. This supported the previous researcers who stated that IT capability increased organizational innovativeness (Tarafdar & Gordon, 2005). In the other hand this study supported RBV theory and dynamic capability approach in developing IT resources as a strategic resources.

Transformative IT capability requires that firm should develop information exchange capability to support communication among individual or unit who are working in the firm, and to provide information to out side organization, mainly the key stake holder, to store the data the which is easy to access. Information exchange capability can be fulfilled by the following ways:

1. Developing on-line management information system integrated for the purposes of all stakeholders.
2. Providing the IT resources that support knowledge management.
3. Providing high-speed data access to and from the company's strategic data source.
4. Recording the desire of customers, employees, shareholders and the company's key community Transformative IT Capability also contains the ability to operationalize the company's transformation as a manifestation of a new conception of the company.

The concept of the operationalization capabilities requires the following matters:

1. Ability to integrate and combine existing IT resources into innovative combinations.
2. Ability to promote the role of IT resources as a factor enabling and driving the company's transformation
3. Encouraging IT resources to translate the new conception into a new business systems, procedures and IT operations.

To maintain a sustainable competitive advantage, the management should develop the ability to:

1. reconfigure IT resources to meet technologies changing and market requirement.
2. reconfigure IT to support business processes changings
3. reconfigure IT competence follows the new company norms

## 9. LIMITATION AND NEXT RESEARCH AGENDA

The samples was only taken from the population of a single organizations, public owned company, not included other telcos. Respondents were taken from the incumbent company, that were existed as a state-owned enterprise. Meanwhile, the new entrants in the telecommunications industry in Indonesia is a purely private company. This difference is likely to produce bias in the empirical implications of these findings when it will be applied to the overall telecommunications industry without adjustment.

This research has not put it 'time' as a variable in the model, so it is not able to describe the time lag about the effect of antecedent variables on its consequence variable. Some of this weakness is likely to be the cause of why the index of non-statistical fitness model, GFI and AGFI only reached at marginal levels, respectively of 0.84 and 0.80 lower than the reference index value vis 0.9.

The next research need to include either other telcos or other industries which intensively use IT and operating in a competitive market.

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