

The Effect of Transformative IT Capability on Sustainable Competitive Advantage

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Abstrak-This research recalls the resource base view of the firm theory that argues that return above the average is not only determined by the external factors but it is also determined by the internal factors. Instead of talking at lower order of IT Capability, this study pays attention at corporate level strategy that . At this level of analysis, IT is not considered as operational tools only, further, IT is positioned as an strategic internal capability that is enable to drive organization transformation process in responses to the changes of the organization actual context.

It is supposed to be an alternative argument in describing the relationship between IT capability and sustainable competitive advantage, instead of the controversy opinions which are often found in literature. Some authors argue that the IT capability impacts on competitive advantage, but some others argue that IT capability has no effect on the competitive advantage..

With triple-loop learning approach, IT capabilities are then analyzed and classified into tree levels of capabilities to find a capability which has close relation to sustainable competitive advantage. The empirical evidences provide an important foundation to develop a comprehensive theory for formulating the role of IT capability on organizational innovativeness leads to sustainable competitive advantage.

Management should develop capability to provide infrastructure for information exchange, to operationalize new conception, and to reconfigure IT resources . This new dynamic and contextual IT capability, then called as Transformative IT Capability.

This basic research applies a causality model to explain the relationship between IT Capability and organizational innovativeness impacts on competitive advantage. All of those latent variables are revealed through a set of indicator variables that can be measured through a survey. Sample are collected from 210 Telkom's managers who are responsible in achieving business targets, and analyzed using SEM Lisrel 8.80 software.

Key words: *Resources-based View of the firm, Transformative IT capability, triple-loop learning, organizational innovativeness, sustainable competitive advantage.*

I. INTRODUCTION

The discussion of sustainable competitive advantage (SCA) is an interest theme to both researchers and strategic decision makers because it is able to explain how companies

generate and improve long-term performance. Resource-based view (RBV) of the firm theorize that the success of the company is not only determined by the external factors but also by internal factors [10]. Sustainable competitive advantage (SCA) is achieved when companies have and use their resources and competence which are valuable, rare, difficult to be imitated, and there is no substitution [1]. As an internal resources, IT can be viewed as a strategic asset that is able to cope with the dynamic changes of the external environment in order to sustain competitive advantage [[4], [15]]. The evidence shows that in many companies eventhough have had a set of sufficient IT resources, however, they still failed in sustaining their competitive advantage.

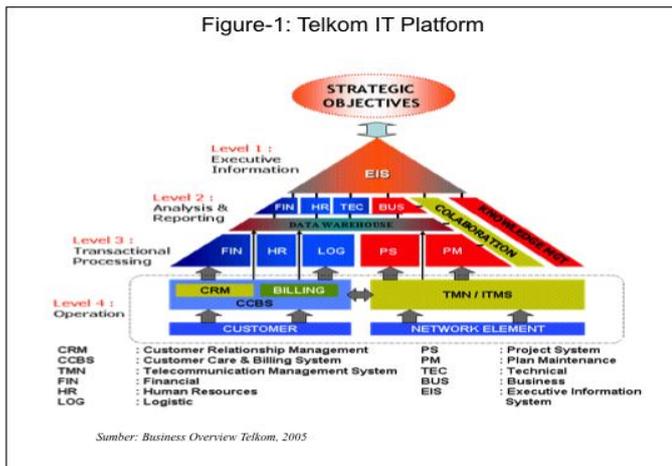
This research took Teece's dynamic capability approach [18] on IT construct to build a dynamic IT capability. By using triple -loop learning approach [[8],[16]], IT capability construct then be analysed and be classified into three levels of capability that are operational level, framework level, and transformative level capability. This study proposes the concept of Transformative IT Capability as a strategic resource of the firm that is able to transform the company's new conceptions into framework and operational measures that 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.

A. Research Problem

In the effort to support the business of Plain Ordinary Telephone Service (POTS) since the early of the year 2000, PT Telekomunikasi Indonesia, Tbk (PT Telkom) had enhanced the development of IT capabilities. In order to realize its vision to become "the leading INFOCOM player in the region" in 2009, Telkom transformed its business from previously only telecommunications business (in terms of connectivity) into a new business that consisted of telecommunication, information, media and edutainment.

To enter a new business that was oriented on high information technology, PT Telkom of course, should firstly equip itselves with the IT capabilities significantly. The internal capabilities in IT of a companies can be identified by the complexity of the platform their use. The height of IT capabilities owned by PT Telkom could be traced from the Telkom's IT platform as shown in Figure-1. By the such IT architecture below allowed Telkom to manage the business

measurement, analysis and performance improvement, business process integration, and knowledge management organization.



Telkom's IT capabilities that had been such advanced, were developed to support POTS, mainly Fixed Lines business. Theoretically, IT capability is a strategic asset that can be a source of sustainable competitive advantage [4]. But the facts show that Telkom's POTS business that was supported by such advanced IT capabilities was not able to prevent the declining of POTS business performance since the last seven years, in terms of operating revenue, number of customers and the level of use. See Table 1.

Tabel-1: POTS business Performance

Business Performance	2007	2008	2009	2010	2011	2012	2013
Revenue (B IDR)	19.683	16.709	14.286	12.940	11.619	10.662	9.701
Customer (kilo)	8.685	8.630	8.377	*8.624	8.946	8.303	9.351

Source : Telkom Annual Report 2007-2013

*) predicted.

POTS is a legacy business that provide connectivity since Telkom was established firstly. To overcome the decline in POTS business, Telkom extends its business with TIMES business that consist of, Telecommunication, Information, Media, Edutainment and Service business. This TIMES business is also stated exclusively in Telkom's vision. The Telecommunication, serves on connectivity, whereas the Information business comprises internet and data communication that topped them up on the connectivity business. This transformation allows Telkom sustains its revenue growth and market share.

At least there are two schools of thought that had controversy in concluding the relationship between IT capability and competitive advantage. The first faction concluded that IT capability impacted on competitive advantage [[21],[22]. IT capability was able to create uniqueness and therefore contributes to competitive advantage. The second group oppositely concluded that IT had no effected on sustainable competitive advantage due to IT capabilities were accessible to competitors and IT investments were easily duplicated by competitors as well.

The diversity of perspectives in IT study very likely to cause controversy in the relationship among them.

B. Purpose

This study aims to fill the concept gap about 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. The practical contribution of this research is providing recommendation in developing IT capabilities in firms that support the creation of sustainable competitive advantage.

II. LITERATURE REVIEW

Research on organizational capabilities is influenced by the RBV theory that argues that the company can gain a competitive advantage and superior long-term performance through the management of resources [1]. Capability has various attributes such as speed, consistency of process, agility, cross-functionality, and core competencies.

The source of IT-based competitive advantage is differentiated into value capability, competitive capability and dynamic IT capability. There are 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 [4]. In his research, Bhatt & Grover et.al [4] find 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 of relationship, the more positive and significant impact on the competitive advantage of the company.

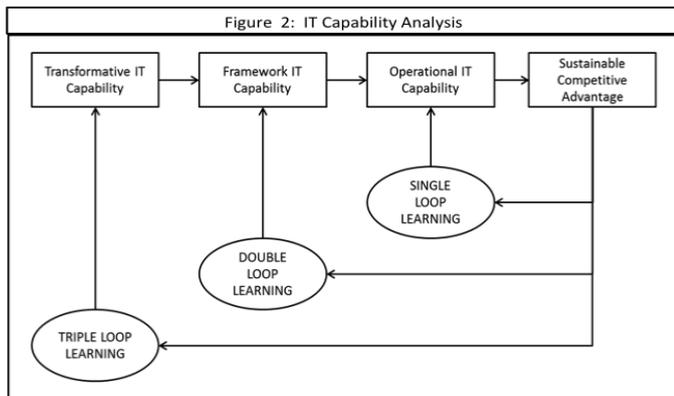
Ray, Muhana and Barney (2005) synthesized the IT process-oriented and resource-based theory (RBV) concluded that the key to successful use of IT on performance depends on the capabilities of the tacit IT capabilities that are socially complex. Explicit capabilities such as technical IT skills, and IT spending on generic can't be considered as a source of competitive advantage [24].

In terms of dynamic IT capabilities, Pavlou and El Sawy (2006) [14], added the IT capability 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 can be reconfigured. Selection priority is the main factor of IT usage and IT capability and competence development.

Regarding to dynamic enterprise IT capabilities, this study emphasizes that the key success factor of the competition is the ability to transform the original innovative thinking and the company context change into the framework and operational level. This ability is judged by the speed and accuracy of the company to understand the changing of

context, the agility to reconfigure, the speed of transforming into the operational aspects that support innovation. The competency of IT functional organization and enterprise IT users determine the amount of IT capabilities to support the transformation of the company: the ability to translate fundamental changes desired by the company into the framework and the operational level of a company's IT quickly and accurately.

By using the triple-loop learning approach [9], IT capability is analyzed and classified into tree levels of capabilities to find a capability which has close relation to sustainable competitive advantage.



Source: Developed for this research

IT capability in the single loop learning is operational IT capability. The capability at this level allows the company to support operational innovations such as IT application project which is developed to fulfill customer service time. IT capability at this level is nowadays easily to get either by the innovation itself, by procurement or outsourcing processes, so it is not a source of differentiation in the long run for a competing company.

Double loop learning yield a higher IT capabilities. IT capability at this level doesn't work on the operational level but it does at company's framework level such as company business processes. For example, when a companies decides to go- international, to meet the requirements and regulations in the global market, the company then adopt a financial management system that is entirely new. Companies then modifies its finance management norms.

The single- loop and double- loop learning of Argyris and Schon's worked (1978) and Morgan interpretation (1997a) above are not enough to face fundamental environment changes, so Burgoyne (1995), Flood and Romm (1996), Snell & Chak (1998) completed them with triple- loop learning [9].. Changing is not on the cognition reflection again, but it touches on the existential reflection [15]. Management must reevaluate how to generate a mental map, to develop new ways to decide that something is true, reevaluate belief. Interpretation of the actual context of generating a new conception (new conception of the world that interprets the actual context) encourages company to replace it with a new action program which is followed up with changing in the production process

At the third circle, the IT capability is contextual, include the ability to rapidly translate new conception of the company, as a response to changes in the company context, in the form of transformation of business, infrastructure, organization, and corporate culture, into operational level. The IT capability is achieved through the involvement of IT human resources, especially managerial level in the triple - loop learning in the form of shared vision in learning group.

III. EMPIRICAL RESEARCH MODEL

The ability to understand the changes in context, perception, values and transforming the company into a framework and operationally IT action allows the company capable to reconfigure IT quickly, capable of selecting a technology platform that is efficient, 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 interactively, 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 is needed to facilitate interaction with stakeholders, such as customer service, service suppliers, service information to shareholders and the public information about the company. The need for internal information exchange accelerate 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 IT Transformative Capability Transformative

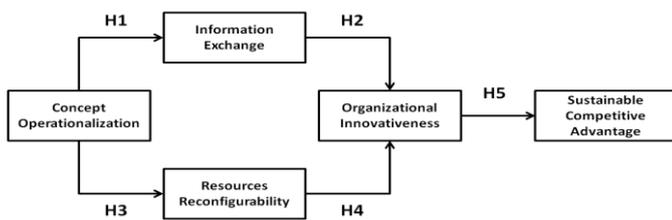
Regarding to sustainable competitive advantage, the ability to operationalize a new conception as a learning outcome of triple-loop learning previously mentioned is a necessary condition, and could be a source of competitive advantage if it is able to push organizational innovativeness and contextual proactively. This requirement can be met because Transformative IT Capability is the highest order of IT capabilities, not just the operational level capabilities. Operational IT Cpability has become generic one because almost all companies are able to have it.

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 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.

Transformative IT Capability is a latent variable that consists of a set of capabilities includes the capability to operationalize the new conception at the strategic level into frame work and operation level, capability to provide the information exchange that support internal and external processes. The third one is the capability to reconfigure IT resources to follow the desired changes by management. Figure-3 describing the interrelation of every dimension of Transformative IT Capability and its impact on organizationa innovativeness and sustainable competitive advantage.

**Figure 3 :
The Empirical Model of Transformative IT Capability**



Source: Developed for this research

All variables in this empirical model are latent variables, so they need indicators to measure. Each indicators are measured based on ordinaly responden perception. The effect of each variable and its consequencey is tested by the following hypothesis:

- H1: The capability to operationalize the new conception positively effects the capability to provide information exchange .
- H2: The capability to provide information exchange positively effects the organizational innovativeness.
- H3: The capability to operationalize the new conception positively effects the capability to reconfigure IT resources.
- H4: The capability to the capability to reconfigure IT resources positively effects the organizational innovativeness.
- H5: The organizational innovativeness positively effects the sustainable competitive advantage.

IV. RESEARCH METHODOLOGY

This study uses a model to look for the explanation of causality relations between concepts that are arranged in the form of four latent variables. Furthermore, each of these variables is measured by a number of indicators through surveys [8].

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.teguhwidodo.net. Every question is provided by 5 optional answers to be thicked by the respondent in accordance with the reponden’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.

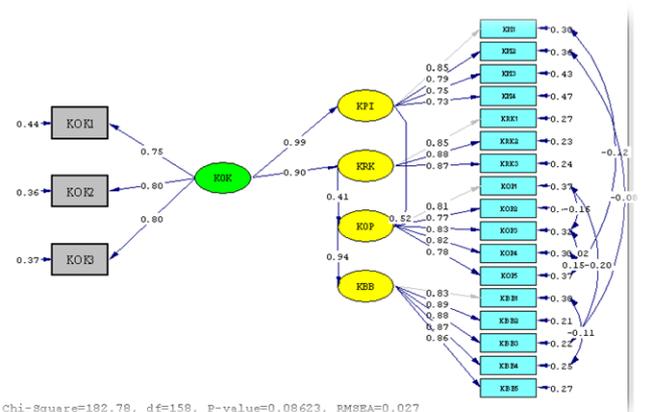
The causal relationship between variables that form the structural equation is solved by using SEM. Data are processed by the LISREL 8.80 application with Maximum Likelihood (ML) methode. The following table is summarized from validity and reliability tested by LISREL 8.80:

Table 2: Validity and Reliability Test

Variables	Indicators	Std. Loading Factor (λ)	T - Value	Std. Loading Factors(λ) ²	Errors	Construct Reliability	Variance Extracted	REMARKS
KPI	KPI1	0.85	3.39	0.72	0.33	0,88	0,65	Valid & Reliable
	KPI2	0.79	18.05	0.62	0.31			
	KPI3	0.75	16.75	0.56	0.31			
	KPI4	0.73	16.4	0.53	0.34			
KOK	KOK1	0.75	17.38	0.56	0.45	0,81	0,58	Valid and Reliable
	KOK2	0.8	23.39	0.64	0.45			
	KOK3	0.8	21	0.64	0.41			
KRR	KRR1	0.85	3	0.72	0.19	0,86	0,67	Valid and Reliable
	KRR2	0.88	17.89	0.77	0.41			
	KRR3	0.87	18.77	0.76	0.5			
KOP	KOP1	0.81	4.11	0.66	0.51	0,86	0,54	Valid & Reliable
	KOP2	0.77	17.25	0.59	0.72			
	KOP3	0.83	18.71	0.69	0.48			
	KOP4	0.82	19.74	0.67	0.51			
	KOP5	0.78	16.71	0.61	0.48			
KBB	KBB1	0.83	3.36	0.69	0.48	0,88	0,60	Valid & Reliable
	KBB2	0.89	21.29	0.79	0.52			
	KBB3	0.88	21.65	0.77	0.48			
	KBB4	0.87	21.04	0.76	0.65			
	KBB5	0.86	20.13	0.74	0.39			

The strength of the relationship between variables in the path diagram is measured by the path coefficient. Coefficients are significant if value-t ≥1,96. Lisrel 8.80 also provides a variety of measurements to test the goodness of fit of model. The path diagram following diagram is produced by LISREL 8.80

Figure 4: Path Diagram



Chi-Square=182.78, df=158, P-value=0.08623, RMSEA=0.027

Note:

- KOK = Capability to operationalize concept
- KRR = Capability to reconfigure IT resources
- KPI = Capability to provide information exchange
- KOP = Proactive Organizational Innovativeness
- KBB = Sustainable Competitive Advantage
- KPI1 ... KPI4 = indicator variables of KPI
- KOK1...KOK3 = indicator variables of KOK
- KRR1...KRR3 = indicator variables of KRR
- KOP1 ... KOP5 = = indicator variables of KOP
- KBB1 ... KBB5 = indicator variable of SCA

The goodness of fit indices are summarizes below:

Tabel -3: Goodness of Fit Test

GOODNESS OF FIT INDICES	CUT-OFF VALUE	RESULT OF THIS RESEARCH	REMARKS
Absolute Fit Indices			
χ^2 Significance Probability	≥ 0.05	0.086	Fit
GFI	≥ 0.90	0,82	Marginal
RMSEA	≤ 0.07	0.027	Fit
RMR	≤ 0.08	0.046	Fit
SRMR	≤ 0.08	0.046	Fit
$\chi^2 : df$	< 3	1.16	Fit
Incremental Fit Indices			
NFI	≥ 0.95	0.99	Fit
TLI (NNFI)	≥ 0.95	1.00	Fit
CFI (RNI)	≥ 0.90	1.00	Fit
Parsimony Fit Indices			
AGFI	≥ 0.90	0,76	Marginal
PNFI	≥ 0.50	0,82	FIT
PGFI	≥ 0.50	0,62	FIT

The hypothesis is acceptable if the relationship between variables has t-value $\geq 1,96$ as a cut-off value. Output of application shows that all paths have the t-value is greater than the cut-off value, means that each antecedent variable has a positive and significant effect on its consequence variable, or in other words the whole hypothesis are accepted.

Tabel -4: Hypothesis Test Result

Hypothesis	Relationship	Path Coef	T-Value	Decision
H1	KOK \rightarrow KPI	0,99	25,29	accepted
H2	KPI \rightarrow KOP	0,52	4,25	accepted
H3	KOK \rightarrow KRK	0,90	17,03	accepted
H4	KRK \rightarrow KOP	0,41	4,25	accepted
H5	KOP \rightarrow KBB	0,94	18,31	accepted

Source: Finding of this research

V. RESEARCH FINDING

This research emphasizes that IT capability must cover the requirement of corporate level strategy rather than just to fulfill requirement at operational level. The change of main context such as the changes of rule and regulation, customer preferences, technology platform, and all Porter's five force aspects as well, may bear the new conception of the world that interpret the actual contact [12]. The firms must response properly to sustain their competitive advantages. IT units should provide sufficient data that support management at corporate level to decide the right solution (to do the right things), hence, IT unit should be involved in organization learning intensively.

One of the learning outcomes of triple-loop learning in organization is mental map (Senge, 1992). The involvement of IT units in this learning process, allows them to improve their mental map align with other units in a company. In turn, it'll improve their capability to operationalize any new initiatives decided by top leader into framework and operational level. This capability allows company succeed in creating new business initiatives, launching it down and delivering to market. This variable effects both capability to provide information exchange facilities and capability to reconfigure IT resources significantly.

The exchange of information is one of key success factors for organization transformation process. This is a means of communication among organization member that is needed by company to support the change accelerate process. The new conception of the world that interpret the actual contact will impact on fundamental changes, it will replace the existing norms with the new norms. This breakthrough of course, must be followed by policies, and this will impact on the whole business processes and frame work of organization.

As a part of internal capability, IT must play role as an enabler to drive the changes happened. IT management should be able to reconfigure the existing resources to follow desired changes align with the new conception, framework and procedure. This reconfigurability of IT in turn, will facilitate innovative action that is required by organization to face the new problems that appear during organization changes process.

Hence, the capability of IT to provide information exchange and to reconfigure IT resources will grow up the innovation climate in organization and facilitate the bearing of strategic initiative that can be operationalized. The capability to operationalize the new concept, capability to provide information exchange and capability to reconfigure perform a powerful capability to enable and drive the organizational transformation. These all together perform a novelty of IT capability, called Transformative IT Capability.

The capability that drives organizational innovativeness enables to bear a new wave business. During the transformation process, there are many new difficulties and problems, and in this moment every organization member act as an agent of change to overcome them, hence, they force organization to learn the new things, force organization member to create the new initiatives, so that the new innovations happened. These all are tacit capabilities that are growing during organizational transformation process so these are unique and difficult to imitate. In short, these capabilities enable to create a new valuable and unique product and services, hence these create sustainable competitive advantage.

Organizational innovativeness that is based on the infrastructure asset resources would hardly be expected to be a source of sustainable competitive advantage. An innovativeness which is a source of sustainable competitive advantage should be able to 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 promote organizational innovativeness to intervene the effect of Transformative IT Capability on Sustainable Competitive Advantage.

VI. CONCLUSION

The IT capability belong to PT Telkom is a dynamic IT capability that is characterized by the ability to operationalize the new conception of the world that interpret the actual context, has a high capability to reconfigure their IT resources and capability to provide information properly. This capability doesn't effect directly on sustainable competitive advantage, but it enables to drive the organizational innovativeness. This tacit capability that produced by this combination allows PT Telkom is able to create the valuable new wave businesses resulted by innovations. IT capability that was assigned for fixed line or POTS in the past, in fact, was not able to sustain the competitive advantage of this legacy business, viz. the connectivity or telecommunication because it worked on operational capability level, it didn't consider the higher order of learning. The higher order of learning produces IT capability that is able to drive the innovation to bear the new wave business included the Information, Media and Edutainment (TIME). The IT capability that effects the organizational innovativeness that impacts on sustainability is a higher order capability. This capability should be developed by embedment of the management member in IT units at every moment of triple-loop learning process.

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