

Improving IT Performance through IT Innovation: A Conceptual Model

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Abstract- The use of IT in schools of informatics management and computing in Indonesia increases the needs of computing graduates with qualified skills. Most of IT uses in these schools can be recognized from the technical aspects of IT and factor management determining the success of IT application. There are 149 active private schools of informatics management and computing in Indonesia. However, only 6 (4.03%) of them were institutionally accredited with Grade B. The other 21 schools were institutionally accredited with Grade C (14.09%) and none obtained Grade A. Schools of informatics management and computing are holders of most study programs of computing and IT. The measurement of IT performance was conducted based on the aims on the use of IT, process performance, and IT outcomes. The result would be used to determine IT performance of schools of informatics management and computing. Therefore, the aims were on this aspect related to IT knowledge, IT strategy, IT alignment and IT innovation. This research used a causal-explanatory method. This research applied a mixed method (quantitative and qualitative method). It was based on the previous relevant studies on the relationships among these variables. It developed the conceptual framework and hypotheses showing these relationships. A conceptual and hypothetical model needs to be empirically tested through verifiable research.

Keywords- IT Performance, IT Strategy, IT Knowledge, IT Innovation, IT Alignment

I. INTRODUCTION

One of the indicators of schools' performance is graduates[1]. There are four gaps concerning Indonesian graduates' competence in the work fields (Source: www.penyelarasan.kemdikbud.go.id), i.e. a) the gaps between the number of graduates and the needs of jobs (quantity dimension); b) the gaps between graduates' competence and job requirements (quality dimension); c) areas that cannot attract local graduates or unavailability of graduates in certain areas (location dimension) and d) changes of economic conditions in local, national, and global scopes and lead time of education (time dimension).

It is believed that IT can grow creativity and innovation because it is critical in the management. This shows that organizations must immediately use new IT through conceptualization and innovative application development [2]. Innovative applications are used to change rules of the competition applied in industries. This matter is strengthened by research that at least fifty percent of the industrial

companies will disappear in a decade because of the failure in using first chances and taking actions [2].

Since 1990s, there has been a lot of manpower in Indonesia. There are various study programs, for example informatics engineering, information system, information management, and computing. IT graduates are generally skillful at using IT products or become good IT users. They are also good IT producers (Republika, 14 May 2013/humasristek). About five hundred thousand Indonesian IT graduates are needed every year (Kominfo). There are a lot of job applicants of IT having good academic scores. However, they cannot fulfill the needs of the companies (detikinet, 16/01/2010 18:08 WIB).

Schools are scientific institutions holding academic and professional education of a discipline (The Statute No 12/2012, Article 59 and Subsection 4). A school of informatics management and computing is an example. There are 149 active private schools of informatics management and computing in Indonesia. However, only 6 (4.03%) of them were institutionally accredited with Grade B. The other 21 schools were institutionally accredited with Grade C (14.09%) (Source: BAN-PT.Kemdiknas.go.id, July 2016).

Schools of informatics management and computing hold the study programs of computing, information system, informatics engineering, informatics management, computing system, and information technology. None obtained Grade A. Therefore, only those with Grade B are the best.

The government has legalized Substituting Regulation of the Statute No. 6/2001 for the use of ICT in education (Seamolec, 2008). However, 86% of the implementation of IT in private schools in Yogyakarta is at low and medium maturity levels [3]. There are a lot of schools applying IT to support their activities, for example private schools of informatics management and computing.

Until now, private schools of informatics management and computing in Indonesia have been utilizing Information Technology but only a few private schools of informatics management and computing optimize the performance of information technology. This is reflected in the rating by TESCA. TeSCA is a self-assessment program to measure the utilization of Information and Communication Technology (ICT) universities in Indonesia using the "ZEN Framework" that will measure a variety of components ranging from infrastructure, applications, human resources, up to the policy component and so on.

The interest in the benefits of using IT infrastructures of schools attracts various studies. For example there is positive correlation between investment rates and computing through the multifactor of productivity growth [4]. The second research shows that there is positive correlation between the use of IT and performance [5]. Based on the research, the use of IT infrastructures can strategically support the schools in increasing the profitability, one of performance indicators [6].

Various studies were conducted to prove how IT can contribute more to business performance when the goals are in line with companies' business strategies. Therefore, the better the alignment is, the more successful the companies are in achieving the business performance. The measurement of IT performance was conducted based on the aims on the use of IT, process performance, and IT outcomes. The result would be used to determine IT performance of schools of informatics management and computing.

In facing more competitions and uncertainty of business environment, the use of IT infrastructures are strategic responses that the schools need to recognize. The uncertainty of business environment can make decision makers need more information to evaluate various applicable strategies and innovate the products. The use of IT infrastructures is related to IT Knowledge, IT Strategy, and IT innovation.

IT adoption does not directly affect the competitive advantage of the private schools, but it can influence if strengthened by IT innovation and IS strategic planning. Variable IT innovation and IS strategic planning impact the competitive advantage of private schools. Based on these results, it can be concluded that IT innovation become a major factor in creating the competitive advantage of private schools [7].

This research aimed to develop IT innovation theories through the investigation of IT strategy influences and IT knowledge towards IT performance moderating by IT Alignment of schools of informatics management and computing in Indonesia. IT knowledge covers effective dissemination of information and achievement of IT innovation.

The studies of IT innovation includes exploration analysis and persistence of IT innovation [8]. IT innovation develops and is related to the idea network of organizations [9]. Organizations should consistently innovate with IT [10]. By seeing IT innovation as a process noting that IT is adopted, disseminated, and assimilated in organizations, a conceptual framework growing innovation through spiral innovation collaboration [11]. IT innovation needs more technical and communicative skills in facing many business cases [12]. The other research was on IT innovation impacts on companies' performance [13], [14].

Moreover, the studies of IT strategy includes IT Strategy and innovation are likely to improve the effectiveness of organizational knowledge management [15]. The failure to implement corporate strategy in general and IT strategy in particular can be the reason for lost opportunities, duplicated efforts, incompatible systems, and wasted resources and thus lead to a competitive disadvantage [16]. Other article, provide

an executive's guide to the new IT Strategy [17]. IT strategy in construction and engineering will incorporate economic incentives that overcome this barrier and make it worthwhile for individual actors to aid the whole supply chain [18]. IT strategy affects business strategies of companies [19]. Companies should manage different businesses and IT, and consider IT strategy [20] covering different plans and projects of IT use [20].

In addition, studies on IT knowledge include a study to determine perceived IT knowledge requirements for business professionals [21]. The study suggests that IT professionals in business have to be armed with a mix of knowledge in IT technology, management, and business operations [21]. The study about Information Technology Knowledge provides a foundation and methodology by which future researchers can measure whether, as an "emerging technology" matures, greater convergence will occur over time across cultures in factor analysis, as in the case of the more mature construct, general office automations [22]. Other article, provide the joint effect of IT knowledge and training in understanding the IT utilization [23]. It contributes to financial performance of organizations [24]. IT knowledge and IT infrastructures do not affect adoption and the rate of application use. IT knowledge should not only be related to applications [25].

Finally, studies on IT performance includes the ways to maintain more balanced relationships with the IT Performance which in turn will foster better long-run results in the design and operations of IT systems [26]. Other article, provide some light on the effects of decision rights on firms' IT performance and underscores the importance of organizational redesign accompanying IT investment [27]. Others were related to the relationship between IT and companies' performance [28]. Other research conducted research on performance measurement of management and use of IT in companies [29].

The novelty of this research discussed information technology performance of schools of informatics management and computing in Indonesia through IT innovation moderating by IT alignment influenced by two antecedents, i.e. IT knowledge and IT strategy.

The problem of research proposal was formulated to (a) produce a new research model regarding influences of IT strategy and IT knowledge on IT innovation moderating by IT alignment in improving information technology performance of schools; (b) create a hypothetical testing design to cognize influences of every variable in this research. The research aim was to produce a model and a hypothetical testing design to cognize influences of IT knowledge and IT strategy on IT innovation moderating by IT alignment in improving IT performance of schools.

II. LITERATURE REVIEW

A. IT Knowledge

The level of understanding of the technology, especially information that is owned by the top leadership of the organization, the business cannot be ignored in the deployment of information technology. If the improvement of infrastructure is regarded as an important step for the company

in entering the era of free competition, the improvement of skill and understanding of information technology, especially for top management and the managers of a company is a core prerequisite in achieving the efficiency, effectiveness and innovation capabilities in the business activities. An understanding of the information technology (IT Knowledge) there are indicators that affect product innovation, namely learning, research & development and technology transfer information.

B. IT Strategy

Information technology strategy is a strategy that focuses on establishing a vision of how technology can support in meeting the information needs of information and systems. IT Strategy is a strategy that aims to define the resources and the technology to be acquired, organized and developed so as to support business IS strategies. This strategy should also be able to adapt to the development of information technology today that can give rise to opportunities and constraints in the future. IT Strategy has focused on areas where change is very necessary, based on business needs, or to focus on new opportunities arising from advances and changes in technology, experience or capacities.

Enterprise information technology strategy related to its role in making information technology as part of the strategic response of companies the free trade deal. It basically makes the strategy is a process of adjusting the internal resources of the organization with the opportunity and environmental risks to achieve goals [30]. The importance of compatibility between information technology strategy and overall corporate strategy relating to how the company looked at existing information technology in the enterprise will be tailored to the opportunity and risk environment, how their interaction affects the innovation process [31]. Further, that information technology strategy shows the company's priorities in developing the technology [31]. It can be oriented to the actions of the company in the future on issues of information technology, such as technological resources (have the technological resources internal or external), intensity, and focus on R & D. The emphasis in the preparation of the strategy is the need for the preparation of an integrated framework that considers aspects of the strategy in the deployment of information technology and its implications for organizational learning.

C. IT Innovation

Innovation as an economic success thanks to the introduction of a new way or a new combination of ways - the old way of transforming inputs into outputs (technologies) that resulted in major changes or drastic in comparison between use-value perceived by the consumer on the benefits of a product (goods and / or services) and the price set by the manufacturer. Then innovation in a broader context that successful innovation means not only economic success but also social success. Successful innovation is an innovation that creates great value for consumers, for the communities, and the environment at the same time.

Innovation is a combination of activities pushing into new, marketable products and services and / or production and dispatch of new systems [32]. These new product innovations associated with product innovation capabilities [33]. Definition of product innovation capabilities is a comprehensive series of characteristics of an organization that facilitates and encourages innovation that produces a creation and introduction of products that are completely new, or the modification of other existing products [34].

D. IT Performance

Performance is a difficult concept, both in definition and measurement. Performance measurement is a complex [35] and is the biggest challenge for researchers, because as a construct, the performance is multidimensional and therefore, performance measurement using a single dimension is not able to provide a comprehensive understanding so that the measurement of performance should be using or integrating the diverse dimensions of measurement [36].

Research on the relationship between information technology and corporate performance alone cannot boost company performance and competitive advantage [37]. The variables of human resources, business resources and technology resources to see the impact of information technology on business performance [38]. The results showed that the technology resources have no significant correlation with the performance of information technology. But if the technology resources combined with human resources and business resources will be able to explain the performance of information technology and improve company performance [38].

E. IT Alignment

IT Alignment is the suitability of IT planning overall good leadership, organizational structure, hardware and software with the company's objectives. Syncing between IT and business is an effort with the aim that IT can generate values that correspond to business needs. The practice of alignment is divided into three parts, namely Strategic Alignment, alignment and Functional Internal Alignment [39].

III. PROPOSED RESEARCH METHOD AND HYPOTHESIS

This research used a causal-explanatory method. It was based on the previous relevant studies on the influences of the variables of IT knowledge, IT strategy, IT innovation and IT alignment towards IT Performance. Then, to support the research framework, a relationship pattern of the factors was created. The literature of this research consisted of research results, international seminars, proceedings, internet and books on IT knowledge, IT strategy, IT innovation, IT alignment and IT performance. Finally, the supporting literature was organized systematically based on the writing needs.

The unit of analysis in this study was schools of informatics management and computing in Indonesia, so that the respondents in this study were schools of informatics management and computing in Indonesia leaders, the Chairman or vice chairman. Schools of informatics

management and computing number of universities in Indonesia are scattered in 14 Kopertis a total of 147 universities (forlap.dikti.go.id).

Sources of data or information in this study were collected through two sources, namely primary data and secondary data. The primary data source on empirical research conducted, the questionnaire collected directly from the results of a survey that has been filled out and sent back from the respondents, while the secondary data collected and obtained from various sources, such as data taken from forlap.dikti.go.id, Ban-pt. Kemdiknas.go.id, APTIKOM and from various sources related.

A conceptual framework used in this research was discussed in this section. This proposed research model had novelty through its focus on the five important variables such as IT knowledge; IT strategy, IT innovation, IT alignment, and IT performance of schools of informatics management and computing in Indonesia (see Figure 1). Figure 1 showed the relationships of the variables. It was supported by relevant theories. Statements of hypotheses were written afterwards.

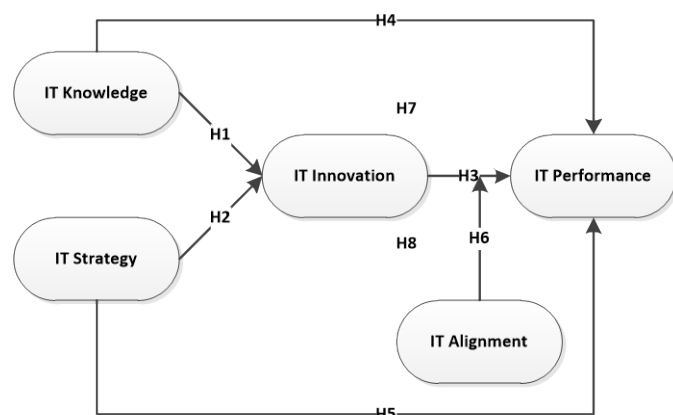


Figure 1. Proposed Research Model

Hypotheses tested in this research were as follows:

- a. H1: IT knowledge can make contributions of use and has direct influences on IT innovation of schools of informatics management and computing in Indonesia.
- b. H2: IT strategy can make contributions of use and has direct influences on IT innovation of schools of informatics management and computing in Indonesia.
- c. H3: IT innovation can make contributions of use and has direct influences on IT performance of schools of informatics management and computing in Indonesia.
- d. H4: IT knowledge can make contributions of use and has direct influences on IT performance of schools of informatics management and computing in Indonesia.
- e. H5: IT strategy can make contributions of use and has direct influences on IT performance of schools of informatics management and computing in Indonesia.
- f. H6: IT alignment able to strengthen the influence of IT innovation on IT performance of schools of informatics management and computing in Indonesia.
- g. H7: IT knowledge can make contributions of use and has direct influences on IT performance through IT

innovation of schools of informatics management and computing in Indonesia.

- h. H8: IT strategy can make contributions of use and has direct influences on IT performance through IT innovation of schools of informatics management and computing in Indonesia.

IT innovation and its flexible domain allow setting identification of opportunities and goals. This can provide a set of different solutions based on the basis of IT knowledge [40]. Every artifact has basic components of IT knowledge [40]. In this case, IT knowledge has a relationship with IT innovation.

IT strategy putting forward big investment and innovative IT can support continual economic growth [40]. Businesses need IT innovation to create competitive differences and to gain international acknowledgement [40]. Recognizing and applying IT innovation are two important activities performed to maintain and enhance competitiveness of the companies. IT that companies have can become business enablers and drivers if it is managed with systematic IT innovation. Frameworks and models of IT governance and IT management cannot describe how IT innovation management should be systematic, structured, and integrated with roles, tasks, processes, methods, and other areas, for example companies' architecture management, IT strategy, and portfolio management [38].

There are some study to enrich and expand the concepts of IT governance by identifying various combined configurations and integrated mechanism, and investigating IT performance effects [41]. IT performance can be improved by integrating innovative IT applications [41]. Another study provide the impacts on IT innovation towards companies' performance and innovation theories [13]. This study covered the comparison of IT innovation performance and industrial performance averages as well as the comparison of companies in similar industries and sizes [13]. By focusing on innovative use of IT, the research conducted by [42] was empirically about the relationship of IT innovation and companies' performance. By using the data of IT innovation, this research shows that the use of IT innovation is an important link of IT values [42].

With uncertainty of market environment and various customers' needs, there are a number of organizations applying IS to gain bigger profits. The companies make investment in the field of IT [43]. The roles of leadership in IT projects, strategic IT knowledge, and knowledge strategy business are needed to make IT strategies related to businesses [43].

The impacts of IT on companies' performance lead to IT productivity [43]. IT knowledge and strategic business knowledge and their interactions have significant influences on IT diffusion and IT assimilation in organizations [43]. In this case, IT innovation is related to IT performance.

The research by [41] and [13] showed the link of IT knowledge and IT performance. Therefore, the tested hypothesis connects IT strategy and IT performance mediated by IT innovation.

Lastly, [40] and [38] provided the concepts of the relationship between IT strategy and IT performance. Therefore, another hypothesis is on IT strategy and IT performance mediated by IT innovation.

IV. CONCLUSIONS

This research proposal generated novelty in the form of a new model on IT Innovation to improve information technology performance (IT Performance) of schools through influences of IT Knowledge and IT Strategy moderating by IT Alignment. The research novelty was on influences of the two antecedent variables. Information Technology performance of specific schools with accredited institutional was emphasized.

Based on the literature review and discussion, it can be concluded that there are direct relationships among IT knowledge, IT strategy and IT innovation towards IT performance. In other words, the development of a conceptual model for schools of informatics management and computing in Indonesia shows that there are some relationships towards IT performance.

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