Pinning-Up Green IT for Competitive Advantage In Education Industries

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Abstract- Implementation of green IT in educational industry has not felt optimally. Perceived complexity becomes source of hesitation for Human Resource in implementing of green IT, in fact of green IT becomes source of educational industries in gaining competitive advantage. Reviewing from phenomenon, so study focuses on the correlation of perceived complexity, green IT and competitive advantage in educational industries. Quantitative research is conducted through questionnaire to 75 Human Resource of IT in educational industries, with using path analysis. Research finding is known that perceived complexity has negative correlation with green IT and competitive advantage. Besides that, green IT is found to be able to become mediation in trying to improve competitive advantage.

Keyword: Perceived Complexity, Green IT, Competitive Advantage

I. INTRODUCTION

Nowadays, industry has adopted generally to the environmental issue [1]. In recent years, Information Technology (IT) becomes apart released in facing environmental issue [2]. It supports the implementation of environmental problem through energy efficiency and other problems that relates to environment [3]. Although IT has contribution to environmental issue, but it is not often for human who is aware to those cases [4]. The phenomenon happened for IT and environmental issue is known as green IT. Green is associated with firms, systems, products and production processes that use less energy, recycle and reuse materials, reduce waste, water use, and pollution and preserve natural resources [5]. The use of green IT has already attached in academic and practical industries [6], because Green IT has important role in energy and living environment issue. It means that green IT impacts on environmental sustainability and it is not often used to improve competitive advantage of company [2]. Relating to activity of environmental sustainability, green IT is used in minimizing negative impact and optimizing positive impact from human behavior on environment when they use IT product. So in general, green IT is always related to three things, which is effective, efficient, and sustainability [3].

Educational industries, it is the same case with industry in general. It needs the benefit of green IT in effective, efficient, and sustainability from its operational. But, there is not a bit of educational industries in Indonesia has no full supporting from the implementation of IT [7]. It obstructs the practice of green IT and company competition. Educational industries get truly competition because there are two types of educational industries, such as private and public educations. But the most feel competition is private industry, like college [8]. Supporting IT through green IT becomes one of tools in facing competition, with the final purpose is competitive advantage [2]. In Indonesia, the main obstacle of green IT implementation is on perceived complexity of Human Resource of IT for the complexity of the application of green IT [3]. Because of environmental issue itself in Indonesia has not been implemented well. For example, there is still lower of customer’s choice for environmental product, and customer’s awareness for environment [9]. Perceived complexity which is assessed by Human Resource for implementation of green IT in industry generally does not have significant impact [3], however it needs to be reviewed from educational industry that has IT limitation.

Reviewing from phenomenon of green IT in educational industries, so this study focuses on the power of green IT in improving competitive advantage of educational industries. Evaluation of perceived complexity and implementation of green IT can give input on the strategy of educational industries in Indonesia which is IT-based.

A. Perceived Complexity of Green IT

Although society’s attention in Indonesia related to environmental issue has been increased, which is marked from the use of green marketing strategy in company [10], [11]. But company’s attention on the implementation of green IT is still lack, as regulation of energy efficiency or exploration of the use of tools more efficiently [12]. It is the same with...
educational industries with Human Resource inside, where it is careless about the rule of IT usage with its environment [13]. Those cases area part from perceived complexity which needs to be faced by company in order to the implementation of green IT. Perceived complexity is innovation level that is assumed difficult to be comprehended and used [14]. It means that perceived complexity depends on the ability of Human Resources of IT inside in comprehending and using IT. Some cases that is often become the evaluation of perceived complexity such as difficult to understand from a business perspective and technical perspective, also perceived of adopting IT is difficult [3].

B. Green IT for Education Industries

The concept of IT for environment or green IT, is a concept of IT usage that can encourage environmental sustainability [2]. It is known with IT for environmental sustainability’ and ‘environmental sustainability of IT’ [4]. Many people develop the concept of green IT, for educational industries green IT can be stated as the usage of IT resource in order to energy efficiency and effectiveness of company operational [15]. There are three main purposes of green IT such as pollution prevention, product stewardship, and clean technology [3]. All of the purposes can be applied in three different level which is individual, organizational, and societal [16]. It means that in educational industries, green IT can be evaluated from Human Resources level, organization through company leader or outside of company like students’ parent.

The concept of green IT surely can be assumed from several things such as server virtualization, storage virtualization, storage consolidation, environment-friendly IT procurement policy, policy on managing electronic waste, and measuring the environmental impact of IT [3]. The purpose of those concepts evaluate the implementation of green IT from internal side of company and improve competitive advantage of company [2].

C. Gaining Competitive Advantage

In industry competition is known as competitive advantage [17]. Competitive advantage is specific activity that is developed by company in order to be outstanding compared with their competitors [18]. Company uses some strategies in order to improve competitive advantage, one of them are through the implementation of IT in company operational [19]. The implementation of IT always relates to three things are tangible technical components, human technical and managerial IT skills, and intangible IT [20]. Relating to sustainability from competitive advantage, those things from IT are usually connected with environment, which is green IT. So through the implementation of green IT becomes one of efforts in getting competitive advantage.

In evaluating competitive advantage, it can be conducted by Human Resource of company or company leader [21]. In industry that uses environmental issue in some dimensions which can be assessed for competitive advantage, such as quality, capable, position, profitability, management, and brand image [22].

II. QUANTITATIVE METHOD AND MEASUREMENTS

A. Quantitative Method and Case Study

This quantitative research was conducted to educational industries in Indonesia, with the sample towards one of colleges that was implemented of IT on its operational. Experiment used with case study to Human Resource who had correlation with IT in BSI colleges. All of them were IT staff and IT lecturer, with the number of respondent was 75 people. Data from respondent obtained through questionnaire with the answer that had determined before, like 1 for “strongly disagree” and 5 for “strongly agree”. Data obtained then processed through path analysis and analysis tools of SmartPLS, because the data less than 100

B. Measurements and Hypothesis

Variable used was perceived complexity, green IT and competitive advantage. Every variable was measured and assessed by respondent, the dimension from perceived complexity was difficult to understand from a business and technical perspective, difficult to implement from a business and technical perspective, also difficult to adopting IT [3]. In green IT, things assessed were server virtualization, storage virtualization, storage consolidation, environment-friendly IT procurement policy, policy on managing electronic waste, and measuring the environmental impact of IT [3]. While, for competitive advantage, the dimension used were quality, capable, position, profitability, management, and brand image [22]. Path analysis also used was reviewing the correlation between variables with detail was presented on Fig. 1.

In analyzing research data was used hypothesis test depends on research model (Fig. 1). Here was the research hypothesis test design as follows:

H1. Perceived complexity had negative correlation in the implementation of green IT.

H2. Perceived complexity had negative correlation in the improvement of competitive advantage.

H3. Green IT had positive correlation in the improvement of competitive advantage.
III. RESULT AND DISCUSSIONS

The research result was obtained the questionnaire from Human Resource who had IT background like IT staff and IT lecturer, with the total number was 75 data. From those data was known that 46% came from the background of IT lecturers, 25% was as technical support, 16% was as programmer, and 13% was as information system. Related to experience, it was known that 37% had experienced for 3-5 years in IT field, the rest was 33% had experienced for 6-10 years, 21% had experienced for 11-20 years and 9% had experienced for <2 years. It was concluded that most of them from Human Resources of IT in those educational industries (BSI College) had good experienced. Then, data found also processed again become the more useful information through SmartPLS application.

In path analysis from SmartPLS processing, it was known two of correlation values, which was negative and positive. For negative correlation was happened on the correlation of perceived complexity with green IT and perceived complexity with competitive advantage (Fig. 2, TABLE 1, TABLE 2). It marked that not all of variables correlation on research model supported the creation of gaining competitive advantage in educational industries.

![Fig. 2. Result Model](image)

**TABLE 1**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>t-values</th>
<th>Results</th>
</tr>
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<tbody>
<tr>
<td>H1</td>
<td>-4.866</td>
<td>Support</td>
</tr>
<tr>
<td>H2</td>
<td>-2.170</td>
<td>Support</td>
</tr>
<tr>
<td>H3</td>
<td>3.266</td>
<td>Support</td>
</tr>
</tbody>
</table>

Result from all of research hypothesis test was stated support (t-value > 1.69 or > -1.69) which was interpreted that research model test had been tested empirically and it could be generalized in others educational industries (TABLE 2). In this study was tested also the correlation between variables with indicator to get to know Loading Factors Values, it was known on each variables had differentiation of Loading Factors Values (TABLE 1).

A. Unsupporting of Perceived Complexity

Perceived complexity is view of Human Resource value in implementing of IT [23]. This opinion can weaken the performance of IT [24]. In educational industries, perceived complexity is happened in academic process and academic information that use IT [25]. Research finding is known that perceived complexity has negative correlation with green IT and competitive advantage. It marks that the higher of perceived complexity, so the worst of its impact on the implementation of IT in educational industries. This finding is emphasized with the test result on research hypothesis (H1, H2), so it is needed mediation that can muffle perceived complexity in industries.

It is reviewed more deeply, seems that the negative correlation from perceived complexity with green IT is bigger than competitive advantage (Fig.2). It means that educational industries in Indonesia will have been implemented of green IT if the paradigm of Human Resource of IT for the implementation of IT is not considered to be good. So besides the ability of Human Resource of IT who needs to be noticed to be improved, the paradigm of Human Resources of IT needs also to be noticed. It needs there is paradigm change from Human Resource of IT through seminar or workshop related to the utilization of IT and green IT in the organization [26].

Things that need becomes attention in order to change the paradigm from implementation of IT on perceived complexity is related to the assumption that green IT is hard to be adopted by IT department and company. It depends on the assessment of loading factors that is highest impact on the creation of perceived complexity (TABLE 2). Part of this finding or the improvement of previous study, that perceived complexity needs to be faced by educational industries because it will block the development from IT company [3].
B. Mediation of Green IT

Green IT in this study becomes mediating variable between perceived complexity with competitive advantage. Based on the result of previous research model (Fig. 2) and hypothesis test (TABLE 1), it is known that correlation value from green IT on competitive advantage is bigger than direct value of perceived complexity on competitive advantage, it is in line with the previous mediating theory [27]. Those findings mark that green IT can be a good mediating between perceived complexity with competitive advantage.

Green IT is known to have obstacle on the implementation if it is not supported by perceived complexity. In green IT itself, there are some considerations which need to be noticed such as storage consolidation and environment-friendly it procurement policy (TABLE 2). Remember those of them are very determined the creation of green IT in industries. Green IT is actually closed related to storage media [28], because the effective and efficient of storage media as one of IT support efforts to environment. However, it is not enough. Particularly for developing country like Indonesia, it needs the existence of regulation support that encourages the implementation of green IT [15]. Because of government as external factor from industry that has important role in those operational industries.

Part of this study also explains that green IT has positive correlation with competitive advantage (H3). It is in line previous research, that competitive advantage is the general purpose of company that can be found through the implementation of green IT [2]. Educational industries need surely implementing of green IT as one of competition strategy between industries. Besides that as the effort of efficiency and effectiveness of company operational, it also encourages industries success. It is known that the impact which will be experienced by company in implementing of green IT such as inside on the improvement of quality, capable, position, profitability, management and brand image of company (TABLE 2).

III. CONCLUSION AND LIMITATIONS

This study reviews the correlation of perceived complexity of Human Resources, the implementation of green IT and gaining competitive advantage in educational industries. It is known that perceived complexity is Human Resources of industries’ view that can hide the development of green IT, and it does not support gaining of competitive advantage. It seems from correlation value which is not in line with green IT and competitive advantage. It is the most important thing in this study is known that green IT is the source of competitive advantage achievement. Remember the ability becomes the right mediation between perceived complexity with competitive advantage.

In green IT, the main thing which needs to be noticed is relating to storage media and the regulation of green IT. Both of them can be the main supporter of the green IT creation in an industry, included educational industries.

Every study has research limitation; it is the same with this study. This study does not use data source from all of IT elements like students or company’s leader. So it is suggested can be reviewed from the term of interpretation qualitative for Human Resource support in company to implementation of green IT. Besides that, it is known that green IT seems to be difficult developed by company without support from external factors like government [29]. So the study of regulation from government needs also becoming part of next research.

REFERENCES


