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The Influencing factors Relationship towards Technology Readiness and Innovation

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Abstract - *Measuring technology readiness is essential pre-stage for a firm before start adopting a technology. In this paper, we present a literature review followed by a conceptual framework. This research purpose to examine the relation of indicators towards technology readiness and innovation. In order to make the aim feasible, an online questionnaire was conducted and analyzed by partial least square. The contribution of this research is focused on the manufacture industry sector, considering it has a decisive contribution to the Indonesia economic growth. After analyzing the relationship of each factor, the finding reveals that only organizational has a significant relationship towards technology readiness. Furthermore, the technology readiness has positive relationship towards the innovation but not substantial.*

Key Words: **Technology Readiness, Innovation, Manufacture industry, Indonesia, PLS**

1. INTRODUCTION

Indonesia's economic growth is influenced by three dominant industries, namely agriculture, mining, and manufacturing [11]. Manufacturing industries is an industrial sector that has a decisive contribution to Indonesia's economic growth. To continue to give a contribution and compete, the manufacturers need to seek the new technology and adopt it. As the information technology which is becoming the technology to support the business organisation's performance to face global competition [9].

However, previous research in Indonesia was highlighted, that many phenomena show that industry type and company size does not guarantee the availability of adequate technology as a tool in doing business [10]. In terms of size, in general, a manufacturer is considered as a big company who always aware of the new advanced technology, yet the management will be cautious in-regards the result after adopting the technology. Therefore, it is necessary to measure the readiness of manufacture industries while adopting a technology. Technology readiness (TR) has previously been investigated within the manufacturer–retailer dyad [16] [17] [18], but these studies conceptualized and validated different outcomes of TR to those on which this study focuses [20]. The only limited extant research investigates the components of technology readiness, so knowledge about technology readiness at the firm level is still lacking [20]. As TR at the firm level implies that the firm possesses the inclination to embrace, and the ability to use, relevant new technological assets [13] [18].

Additionally, assessing the readiness of a firm to adopt new innovation is an essential prerequisite for evolving and keeping abreast of market demands in today's volatile environment [1]. This study aim is to examine the relation of indicators towards technology readiness and innovation. We concentrate on manufacturing industries as our contribution for reducing their concerns in making a decision when adopting the technology. The next section of this paper is construct as: a literature review with an output of the conceptual framework, a methodology that the researchers are using and followed with the result of data analysis.

2. CONCEPTUAL BACKGROUND

2.1 Organizational and External Factor

The environment of firms was undeniable as one of the firm successful factor to compete with others firm. The environment in this term has mentioned in Nugroho [9] research which state relate to the theories regarding technology adoption that has been developed, yet focus in internal and external only. Follow the previous research, the paper of this study is covering both factors as shown in Fig-1. The first environment factor came from the internal side. The definition of the internal refers to the organizational factors as well as top management support, leadership and culture.

Bring in new technology into the firm and accepted by all employee is need a great effort. Therefore, support from all level is necessary. Nevertheless, the previous research explains that the top management support for the adoption of a technology is especially important [3]. It also applies when creating an idea become an innovation as top management has the most prominent role in decision making.

Subsequently a proper leadership has the potential to promote organizational innovation by motivating employees and fostering a conducive atmosphere for the development of their creative and innovative skills which eventually lead to enhanced innovation capabilities and superior competitive advantages for the organization [8] [19] [21] [22]. Eventually, a proper leadership is needed, in order to avoid misunderstanding and slow learning by the employee when adopting new technology.

Another essential factor in organizational is the culture that develops inside the firm. A convenient working culture affects the employee performance. During the last two decades, corporate culture has been acknowledged as an important component of organizational success [23]. Culture in this term is defined as, beliefs, values, habits, norms and behavioral patterns of a group of people in a community [7].

H1. Organizational factor has positive relation towards technology readiness

H2. Organizational factor has positive relation towards innovation

The second environment factor comes from the external. The external pressure can affect an organization to decide to innovate or adopt information technology [6]. The external factors are pressure for competitor and support from the government. Alongside, many manufacture industries try to change their strategies in order to survive the competition. Competitor pressure can be technology innovation which is conducted by the competitor and the IT users in the same industrial sector which causes the competitor to get the competitive excellence [9].

The other external factor is government support. For manufacture industries, this kind of support is also important when they deal with all regulation. At times, government pressure can delay the productivity of the manufacturer. And the pressure may come from the government as the regulator and facilitator as well as a competitor in the form of more advanced innovations owned by a competitor or by the user of the information technology to support its business activities [9].

H3. External factor has positive relation towards technology readiness

H4. External factor has positive relation towards innovation

2.2 Technology Readiness and Innovation

Technology readiness is a measurement tool for the perception or thought about the technology, not as the measurement from someone's ability or capacity in technology [14]. The measurement using the four personalities which are innovativeness, optimism, discomfort and insecurity.

Optimism relates to a positive view of technology and a belief that it offers managers increased control, flexibility, and efficiency, while innovativeness refers to the tendency to be a technology pioneer and thought leader [13]. In order to become the technology pioneer, the manufacture industries need to bring the new ideas into reality, whether a process or product to achieve the cost efficiency. Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations [12].

Cited from Parasuraman [13], that discomfort was developed from perceptions that lack of control over technology and an overwhelmed feeling from it. Whereas distrust of technology and scepticism relating to its ability to work properly termed as insecurity. Manufacture industries need to aware the area of improvement that required to make the innovation successful. The anticipation of all possibilities needs to be prepared. Therefore the manufacture industries readiness of technology must be defined.

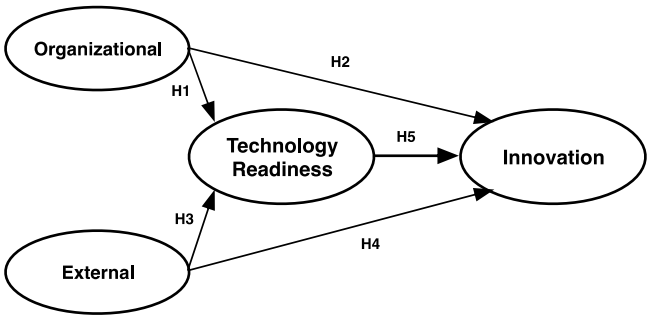

Fig -1: Stuctural Model

3. METHODOLOGY

3.1 Research Setting

The researcher selects one of the emerging markets which is Indonesia. The manufacture employees that become our respondents are working in West Java area especially in Bogor, Cikarang, Karawang, Bekasi and Bandung. Additionally, most manufacture industries located in those areas.

3.2 Data Collection

To achieve the aim of this paper, an online questionnaire was conducted. The respondents' selection was based on the researcher references. Once the data was downloaded, it transferred into a spreadsheet. The PLS-PM analysis was conducted using R. The critical criteria was filtered during the questionnaire, which is the respondents must be a manufacturing employee. By cleaning the data, from 48 respondents only 36 respondents are able to use. In Table-1, it is shown that male respondents were dominant. And half of the respondents are working in a big manufacturing company by seeing from the number of the employees.

4. RESULT

The technology readiness and innovation are the formative latent variables, and the analysis employs partial least square (PLS) method as it is more capable of handling formative constructs than traditional covariance-based SEM [15]. Since there are no criteria to assess the goodness of fit, only the reliability and validity was tested into the model.

Table -1: Sample characteristic

Characteristics	Number	%
Respondents		
Male	32	88.9%
Female	4	11.1%
Number of Employees		
0 - 50	1	2.8%
51 - 100	3	8.3%
101- 150	5	13.9%
151 - 200	4	11.1%
> 200	23	63.9%

The outer model reliability was evaluated by the DG.rho. According to Chin [4], Dillon-Goldstein's rho (DG Rho) is considered to be a better indicator than Cronbach's alpha which provides a lower bound estimate of reliability. There is a motion that mentioned the reliability will count to be acceptable if the return values are above 0,7 (for established constructs) or 0,6 (for early stages of study) [5]. Since this research not entirely taken from the prior research, the rule of thumb is taken as the cut off. In the following Table-2, shows the result of the reliability test of the framework.

Table -2: Reliability Test Result

	MVs	DG.rho	Judgement
Organisational	6	0.809898	*Reliable*
External	6	0.819356	*Reliable*
Technology Readiness	2	0.6836942	*Reliable*
Innovation	2	0.7469768	*Reliable*

The next step was to assess the loadings of the indicators, based on Hair [5]the acceptable loadings value is above 0,6. As shown in Fig.2, the PLS-PM draw the loadings for each

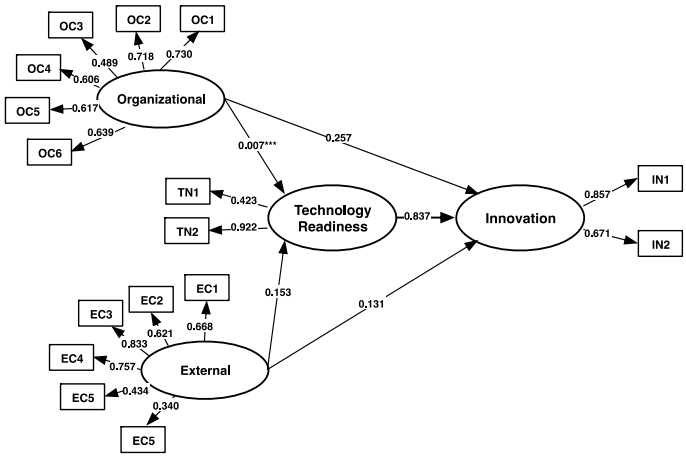

Fig -2: First loading analysis result

indicator. It shows that there are four indicators that under 0,6, they are included in organisational, external and technology readiness constructs. This results, those indicators are removed and run for the second analysis.

From the early evaluation, those of factor loadings under 0.6 was removed and run with the remaining indicators. The second run shows that all value was changed. And make another three indicators under organisational and innovation. But since in the first run they were above 0.6, the researchers assume that those indicators are still valid.

In Fig 3, the final result was mapped. For construct "*technology readiness*", the R2 shows that 31% of the share variance was able to explain in the model. And "*innovation*", the R2 shows that 17% of the share variance was able to explain the model. From this results, the hypotheses are supported by the positive correlation.

Thus, "*organisational*" has the significance relationship (path coefficient 0.007; p<0.001) towards the technology readiness. While the "*external*" has the positive relationship with "*technology readiness*" and "*organisational*", "*external*" has a positive relationship with "*innovation*". Furthermore, the impact of the "*technology readiness*" has a direct positive relationship but not significant.

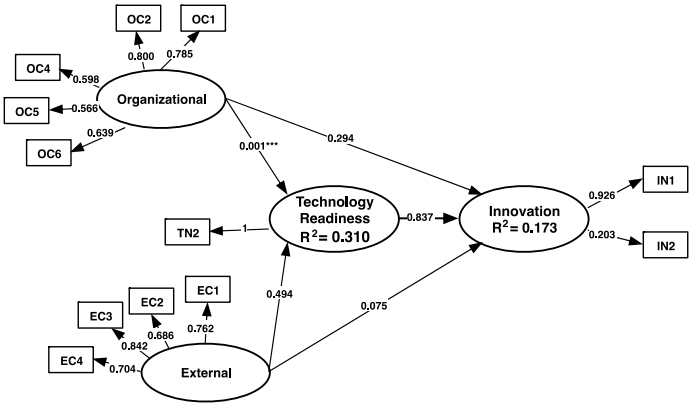

Fig -3: Second loading analysis result

Legend: ***: p-value < 0,001; **: p-value < 0,05; *: p-value < 0,1

5. Conclusion

Based on the literature review, it hypothesises that to achieve the readiness to adopt the technology, the manufacture industries need to well prepared on the organisational aspects. Regarding the external factors such as pressure from competitor and government support was not affected by the readiness of technology or even when creating an innovation. The critical finding is that the technology readiness has a relationship towards the innovation but not significant, in this means to produce an innovation the manufacture industries can do any time even without preparation.

This study was conducted within small respondents, the hypothesis does not represent the general manufacture industries. For further research should consider more extensive respondents within broader manufacturing industries and in other areas to see the pattern that might have.

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