Knowledge Transformation amongst Engineers within Medium-sized Manufacturing Enterprise in Indonesia
The Road to Sustainability
Laura Oktaviani Jusuf*, Henny Prawata and Oki Sunardi

Department of Industrial Engineering, Faculty of Engineering and Computer Science, Krida Wacana Christian University, Jl. Tanjung Duren Raya 4, West Jakarta, 11470, Indonesia
*e-mail: laura.2013ti009@civitas.ukrida.ac.id

Abstract— As one of the most promising developing countries, Indonesia is lack of qualified young engineers, especially young engineers who involve in the development of medium-sized enterprises. Engineers, as the main human capital in manufacturing industry, play significant role to the sustainability of the enterprises. This paper tries to investigate the factor that play significant role to enterprise sustainability among engineers within medium-sized manufacturing enterprise in Indonesia. This paper aims to conceptualize the relationships of factors such as knowledge transformation, process innovation, adaptability, and productivity, with trust and commitment as enabling factors.

Keywords— adaptability; enterprise; engineers; knowledge transformation; medium; sustainability; process innovation; productivity

I. INTRODUCTION

In today’s knowledge economy, the present of knowledge management (KM) has shown its ability to improve the competitiveness of organizations [1]. Previous studies reflected that KM process within the organizations had the capability to encourage new ideas and innovations, which are the main sources of organization sustainability [2]. However, the present of KM seems to affect more to large enterprises, while most of small and medium enterprises (SMEs) consider KM as cost. This perception is reflected by the fact that the application of KM in SMEs has been relatively low, which caused disadvantages comparing to large enterprises [3].

Previous studies in regards to knowledge management role to SMEs competitiveness had been conducted in many ways. However, it is hardly to find research with emphasized on how engineers in SMEs utilize KM to enabling the organization sustainability. Sustainability has become a crucial concern to most of SMEs in Indonesia. Interestingly, when the economic crisis hit Indonesia in 1997, as well as in 2007, medium enterprises were identified to survive better than large enterprise, especially those in the manufacturing business. The ability of medium-sized manufacturing enterprises to survive better is reflected by several reasons: they use less imported materials, they relied heavily to local human capital, and they use less technology compared to large enterprise [4]. As the motor of the organization, local human capital, as most manufacturing enterprises were depend on, were seem to have significant contribution to the ability of medium enterprises to survive better [5].

However, compare to large enterprises, most medium enterprises are struggling to gain more influence in global competition because of the lack of connections and experience. The ability to introduce new products and service became rather overlooked issue for the medium-scale enterprises [6]. The development of medium enterprises, especially in Indonesia, is also faced by several fundamental problems, such as low productivity, limited access to productive resources, low quality of institutions and cooperative organizations, and the lagging performance of cooperativeness. These problems are rather similar to other developing countries.

Previous arguments emerged which identified as the sources of the problems, as previously mentioned. Nevertheless, the existence of qualified engineers was argued to be one crucial aspect that affecting the sustainability of manufacturing industry in developing countries. The needs of young qualified engineers are mandatory in developing countries.

As one of the most promising developing countries, Indonesia is lack of qualified young engineers. Developing countries actually need young engineers to develop their industry [7]. Since the growth rate of new industrial nations is increasing, the number of engineers needed is also in demand [8]. But in fact, Indonesia has not been able to meet this requirement, since Indonesia is lack of skilled engineers. Therefore, many companies in Indonesia employ engineers from India, Vietnam and
Knowledge integration works with a lot of knowledge sharing activities, and focus on understanding the transfer of knowledge from an expert to a novice [18]. Knowledge integration is believed as a key to develop innovation or create new integrated knowledge that can be used to make decisions and solve problems [19]. Knowledge creation requires trust and a commitment to develop innovations [20], as well as collectivism [21].

Previous studies on knowledge transformation, knowledge acquisition, knowledge sharing, knowledge integration, and knowledge creation were mostly focused on the processes. It is rarely discussed the results or the impact of the process to enterprise sustainability. Thus, this study aims to conceptualize the importance of knowledge transformation towards sustainability and the results desired by an organization associated with adaptability, innovation and productivity concerns. Figure 1 represents the relationship of knowledge transformation and enterprise sustainability concerns.

![Figure 1. Conceptual Framework](image)

A. Adaptability

Adaptability represents the “capability of organizations to modify their methods, process, and strategy appropriately due to technological and environmental change” [22]. Engineers’ ability to adapt to technological and environmental changes determines their ability to deal with “trouble”. Trouble from the work is very influential, it depends on the level of tension of each person, but the impact of the trouble could be a positive on someone because of their adaptability challenges and curiosity, which can lead to their new comprehension [23]. Adaptability is important since many key engineers tend to leave the organizations when they were not able to deal with trouble. Previous studies identified when the key person leaves the organization, the organization will likely to shut down also. The main premise is how top managers/owners keep their knowledge so that when they left, the organization is not in jeopardy.

Previous study also identifies that to foster knowledge sharing among key persons, trust environment should be first built within the organization [1].

Figure 1: Conceptual Framework
B. Process Innovation and Productivity

Due to environmental and technological changes, organizations need to change their production processes. Changes in production process involve innovation [24]. Innovation requires intensive knowledge transformation. At the early stage of knowledge transformation, knowledge acquisition is emerged. In this process, engineers might perform a variety of technique to acquire knowledge. For example, by asking the engineers or scientist. Secondly, after obtaining the required knowledge, the knowledge will be shared to fellow engineers in order to increase his knowledge. One example of the big company in Thailand cultivates knowledge sharing by writing on the board which they called "innovation wall". By reading this knowledge from fellow employee, it triggers each employee to combine their knowledge, by writing their own on the same board.

Third, during the knowledge integration, the new knowledge will bring new knowledge among the employee. Fourth, new ideas emerged which is an innovation in the form of product or process.

The innovation process has a direct impact on productivity growth [24]. Proving that the new innovation process will increase the company's productivity by an average of 22% [25]. In addition to increasing productivity, technology-based innovation also helps companies to improve skills and knowledge of the employee, reduce costs and improve product quality. Knowledge transformation can help companies improve productivity through the process innovation undertaken. Increasing the productivity of the company will make the company achieve more sustainability.

III. CONCLUSIONS

In pursuit to achieving organizational sustainability, organizations, especially medium-sized manufacturing enterprises which employ significant number of local engineers, should be able to foster knowledge transformation climate among engineers. To implement knowledge transformation organizations should first encourage trust and commitment among engineers. Knowledge transformation is believed to be affecting organization ability to innovate, as well its ability to be more productive and adaptive to environmental and technological changes.

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