

Study on Process Innovation at Indonesia State-Owned Enterprises

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Abstract

This study aims to identify factors affecting the success of process innovation at State-Owned Enterprises (SOEs) of Indonesia. Delphi method was used to reach consensus among 14 (fourteen) members of an experts panel selected from industries, a Director General of Ministry of Research and Technology, a former of Head of The Agency for the Assessment and Application of Technology and a university professor were selected as expert panels. The respondents were asked to respond the questions on input, process, output, outcome, diffusion, innovation strategy, culture, knowledge, definition of process innovation, successful process innovation experience, as well as pull and push factors of process innovation. The respondents' answers to the questionnaire of first cycle consisting 15 (fifteen) open-ended questions were varied. This is due to the heterogeneity of backgrounds of the respondents i.e. state-owned enterprises, policy makers and a university professor. Of the 15 (fifteen) questions, 105 (a hundred and five) factors affecting the success of process innovation were obtained. The second cycle of questionnaire will reduce the number of factors affecting performance through respondents' consensus.

Keywords

Process Innovation, Performance Measurement, and Delphi Method.

1. Introduction

Innovation has been a widely researched topic to be examined by researchers from universities, industry, and government agencies in the last decade (Kunz 2007); (Porter 1990); (Angelmar 1990). The World Economic Forum states that innovation can drive a country's economic growth (World Economic Forum 2017). Therefore, innovation is a top priority for companies to increase profits and for countries to increase their economic growth. Innovation can take various forms including product innovation, process innovation, marketing innovation, and organizational

innovation (Organisation for Economic Co-Operation and Development 2005). While a lot of researches on innovation have been conducted, research related to process innovation in Indonesian State-Owned Enterprises (SOEs) was not found by the authors.

In a Working Meeting with Commission VII of the DPR of the Republic of Indonesia on December 2, 2019, the Minister of State Enterprises of the Republic of Indonesia emphasized the contribution of the Indonesian State-Owned Enterprises to the Indonesian economy. The SOEs Minister's report stated that the total SOEs profit reached IDR 210 trillion in 2018. The highest (76%) profit was contributed by 15 SOEs even though there were 7 SOEs that suffered losses. This shows the amount of room for improvement in state-owned companies, one of which is related to innovation. Of the various forms of innovation carried out by Indonesian SOEs companies, the most widely carried out process innovations are related to the application of new or significantly improved techniques, equipment and/or software to speed up the process, increase revenue, reduce costs or improve quality (Organisation for Economic Co-Operation and Development 2005).

This study focuses on process innovation in Indonesian state-owned companies. There are 4 (four) objectives to be achieved in this research, they are: (i) identifying the factors that determine the success of implementing process innovation in SOEs, (ii) designing a process innovation performance measurement system for SOEs, (iii) proposing recommendations to SOEs in implementing process innovations, (iv) proposing recommendations to the Ministry of SOEs in implementing process innovations in SOEs. The present research has not been completed. Of the 4 (four) research objectives as mentioned earlier, the research is currently in the stage to achieve the first goal, i.e. is to identify the factors that determine the success of the innovation process in SOEs. The answers to the first research objective will be used to answer the rest of the research objectives.

2. Literature Review

The Organization for Economic Co-Operation and Development (OECD) defines innovation as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (Organisation for Economic Co-Operation and Development 2005).

Innovation has been an object of research since more than 50 years ago. Kunz (2007) and Steil *et al.* (2002) examined the relevance of innovation to improving economic performance. Some researchers have been interested in researching innovation as a source of competitive advantage (Kunz 2007); (Porter 1990); (Alper *et al.* 2013); (Lim *et al.* 2010); (Brem *et al.* 2016). Some authors examined in more detail about innovation, for example about the factors that determine the success of innovation. Nam *et al.* (2017) obtained the following factors: awareness of innovation, innovation strategy and policy, organization for innovation, HR for innovation and building capabilities is determining the success of innovation. While Storey *et al.* (2015) found that team communication, market competition, market volume were the factors that determined the success of innovation.

In addition to factors that determine the success of innovation, some researchers have been also interested in examining how to measure innovation performance (Kuczarski 2000); (Tin 2005); (Birchall *et al.* 2011); (Detecon Consulting 2013); (Ivanov and Avasilcǎi 2014); (Saunila 2017); (Fortuin *et al.* 2007); (Ismail *et al.* 2012); (Joubert and Belle 2012). Table 1 shows the indicators or criteria used by various authors to measure innovation performance.

Table 1. Indicators/criteria for innovation performance.

Authors	Indicators/Criteria
(Kuczmarwski, 2000)	Speed-to-market, R&D innovation emphasis, New product portfolio mix, Process Pipeline Flow, Innovation revenues/employee
(Tin, 2005)	Return on innovation investment, Cumulative profits, Cumulative revenues, Growth impact, Success rate, New product survival rate
(Birchall <i>et al.</i> , 2011)	Futures Focus; Market Impact; Capabilities and Image; Process; and Sustainability and Overall Effectiveness.
(Detecon Consulting, 2013)	Inputs, innovation process, output and outcomes, Knowledge, Innovation Strategy, Culture
(Ivanov and Avasilcăi, 2014)	The criteria used by the Balanced Scorecard, Malcolm Baldrige, Performance Prism and European Foundation for Quality Management (EFQM).

3. Methodology

To identify the factors that determine the success of innovation, Delphi method was used (Sourani and Sohail 2014); (Hsu and Sandford 2007); (Raskin 1994); (Trevelyan and Robinson 2015). Questionnaires of 3 (three) cycles were used to reach the consensus of respondents consisting of 14 (fourteen) innovation experts. Of the 14 (fourteen) innovation experts, 11 (eleven) experts were directors and senior managers of SOEs, one expert is the Director General of Innovation from the Ministry of Research/Brin, one expert is the former Chairman of BPPT (Head of The Agency for the Assessment and Application of Technology) in 2014 - 2019, and a professor from a university.

The first cycle questionnaires asked respondents to answer 15 (fifteen) open-ended questions referring to the Detecon Consulting Detecon Consulting (2013) system of measurement of innovation performance measurement related to: input, process, output, outcome, diffusion, innovation strategy, culture, knowledge, definition of process innovation, successful process innovation experience, pull factors of process innovation, push factors of process innovation as follows:

Questions for respondents from State-Owned Enterprise:

- What is process innovation for the SOE you lead?
- Give an illustration of the process innovation that was successfully applied to the SOE you led in the past year.

For respondents who are not from State-Owned Enterprise:

- Based on your knowledge and experience, what is the process innovation (especially for SOEs)?
- Based on your knowledge and experience, give 1 illustration of process innovation that has been successfully applied to SOEs!

For all respondents, the same questions are as follows:

- In general, what INPUTs should a company have to conduct innovation processes?
- What processes/programs are carried out to generate process innovation ideas?
- What process is carried out to select process innovation ideas?
- What process is performed so that process innovation ideas can become a reality (process innovation)?
- What outputs do you think are important for process innovation to produce?
- What are the important outcomes for process innovation? (for example, increase revenue, shorten processing time, improve quality, create invitational culture, etc.)
- How can process innovation be massively diffused (applied)?
- What innovation strategy should the company adopt?
- What innovation culture is important to be developed in the company?
- What knowledge must a company have in order to be able to carry out process innovations?
- What are the pull factors in the SOE you lead to carry out process innovation?
- What factors are the push factors in the SOE you lead to perform innovation process?
- What criteria/factors do you think are important to ask but are not listed in the above questions?

Respondents' answers to the first cycle questions were coded by the authors into more structured questions. Each question is complemented by a Likert scale from 1 (very unimportant) to 5 (very important) and distributed in the second cycle.

In the second and third cycles, respondents were asked to choose answers in the form of a Likert scale of 1 (one) to 5 (five). Consensus and confusion analysis Dixon *et al.* (1990) were used to check respondents' consensus about the factors that determine the success of process innovation. In principle, consensus and confusion analysis is done by calculating the mean and standard deviation of respondents' answers. It is expected that three questionnaire cycles are sufficient to gain consensus among respondents regarding the factors that influence the success of process innovation.

4. Results

As the research process is still ongoing to answer the first objective of the research i.e. to identify factors that influence the success of the process innovation, the results of the study cannot be fully presented. While the present paper was written, the first round of questionnaire distribution was in progress. Of the 14 (fourteen) expert respondents who received the questionnaires, 10 (ten) respondents have sent back the completed questionnaires. After going through the coding process, 105 (a hundred and five) of factors considered by respondents to influence the success of the process innovation were obtained. A sample of the answers to the open-ended questionnaire factors that can make innovation ideas turn to innovation is shown in table 2. There are 10 (ten) factors that are considered to make innovation ideas turn into innovations.

Furthermore, all respondents' answers on factors affecting the success of process innovation are compiled and equipped with a Likert scale from 1 (one) to 5 (five) and sent back to the respondent in the second round to be answered. Through consensus and confusion analysis by calculating the mean and standard deviation of the respondent's answer, the factors considered by the respondent to determine the success of the process innovation are analysed.

Table 2. Responds of respondents on the question of what process or programs that can make innovation ideas are transformed into innovation.

1	Implementation innovation idea to a pilot project
2	Innovation clinic
3	Innovation project monitoring and evaluation
4	Reward system
5	Establishing a solid, competent team across units
6	Management support
7	Providing autonomy to the team
8	Project documentation
9	Budget support
10	Project monitoring and evaluation

5. Discussions

This research is currently in process of the first stage, i.e. to identify factors that determine the success of process innovation in Indonesian SOEs. The next stage will use the results of the first stage combined with the performance measurement model from Detecon Consulting (Detecon Consulting 2013). The final stage is to formulate recommendations for SOEs and the SOE Ministry in implementing process innovation programs or projects to be successful.

The distribution of an open-ended questionnaire on the first cycle was carried out on July 24, 2020 and the deadline for submitting answers to the questionnaires by respondents was August 7, 2020. Until August 3, 2020, out of 14 (fourteen) respondents, there were 10 (ten) respondents consisting of 8 (five) respondents were from state-owned companies, 1 (one) professor from a university, and 1 (one) was former Head of BPPT, sent back the completed questionnaire. Respondents from state-owned companies also come from different backgrounds, some were from the fertilizer industry, cement industry, railroad industry, aluminium industry, and goods loading and unloading industries.

Of the 15 (fifteen) open-ended questions, respondents who experts in the field of innovation are argued that there were 105 (a hundred and five) factors that determine the success of an innovation program or project. Table 2 above is a sample of respondents' opinions on the question of what process or program determines the ideas of innovation can turn into innovation. The respondents assumed that there were 10 (ten) factors that can make an innovation idea realized into innovation. The ten factors have passed coding process conducted by the researcher. Some respondents used different terms; some factors were mentioned by more than one respondent. The same method (coding) was carried out on 14 (fourteen) other questions.

The heterogeneity of respondents resulted in advantages and drawbacks. The advantage is that because the respondents have different backgrounds, they have different challenges and experiences, thus the answers to the questions given were also different. Respondents with a cement industry background have different challenges and experiences than those with a railroad industry background and even those with service industry background. With these, the authors could gain a wide range of information. On the other hand, the heterogeneity of the respondents also brought drawbacks that the research could produce applicable conclusions for all SOEs industries. Therefore, carefulness must be taken in designing a questionnaire, conducting the analysis, and drawing research conclusions.

In the second stage, each question will be equipped with a Likert scale 1 (very insignificant) to a Likert scale 5 (very important). Respondents will find it easier to answer the questions because they only need to choose numbers on the Likert scale. Answers to the second cycle of questions can provide information on what questions (factors) the respondent thinks are important and what questions (factors) the respondent thinks are not important. Based on these answers, the elimination of questions (factors) that are not important to be asked again in the third cycle will be carried out. The final conclusion about the factors that determine the success of the process innovation program or project will be determined after the third cycle of questions has been carried out and the results have been analysed. The second cycle of questions will be distributed on 28 August 2020 and the deadline for returning the answers is 4 September 2020. Furthermore, the third cycle questions will be distributed on 18 September 2020 and the deadline for returning the answers is 2 October 2020.

References

- Alper, G., Ozalp, V., and Nilufer, E., Gaining competitive advantage through innovation strategies: An application in warehouse management processes, *American Journal of Business and Management*, vol. 2, no. 4, pp. 304-321, 2013.
- Angelmar, R., Product innovation: A tool for competitive advantage, *European Journal of Operational Research*, vol. 47, no. 2, pp. 182-189, 1990.
- Birchall, D., Chanaron, J. J., Tovstiga, G., and Hillenbrand, C., Innovation performance measurement: Current practices, issues and management challenges, *International Journal of Technology Management*, vol. 56, no. 1, pp. 1-20, 2011.
- Brem, A., Maier, M., and Wimschneider, C., Competitive advantage through innovation: The case of Nespresso, *European Journal of Innovation Management*, vol. 19, no. 1, pp. 133-148, 2016.
- Detecon Consulting, *Innovation Performance Measurement: Assessing and driving the innovation performance of companies*, Detecon International GmbH, 2013.
- Dixon, J. R., Nanni, A. J., and Vollmann, T. E., *The New Performance Challenge: Measuring Operations for World-Class Competition*, Dow Jones-Irwin, Illinois, 1990.
- Fortuin, F. T. J. M., Batterink, M. H. and Omta, O., Key success factors of innovation in multinational agrifood prospector companies, *The International Food and Agribusiness Management Review*, vol. 10, no. 4, pp. 1-24, 2007.
- Hsu, C. C. and Sandford, B. A., The Delphi Technique: Making sense of consensus, *Practical Assessment, Research and Evaluation*, vol. 12, no. 12, pp. 1-8, 2007.
- Ismail, K., Leow, Y. R., Yong, C. Y., Abdul-Majid, I., Thwala, W. D., and Ajagbe, M. A., Critical success factors of new product development in technology based firms: A case study, *African Journal Of Business Management*, vol. 6, no. 33, pp. 9442-9451, 2012.
- Ivanov, C. I. and Avasilcăi, S., Performance measurement models: An analysis for measuring innovation processes performance, *Procedia - Social and Behavioral Sciences*, vol. 124, pp. 397-404, 2014.
- Joubert, J. and Belle, J. P. V., Success factors for product and service innovation: A critical literature review and proposed integrative framework, *Management Dynamics*, vol. 12, no. 2, pp. 1-22, 2012.
- Kuczarski, T. D., Measuring your return on innovation, *Marketing Management*, vol. 9, no. 1, pp. 25-34, 2000.
- Kunz V., *Joseph A. Schumpeter, Capitalism, Socialism, Democracy*, New York, 1942, In: Kailitz S. (eds)

- Schlüsselwerke der Politikwissenschaft. VS Verlag für Sozialwissenschaften, GWV Fachverlage GmbH, Wiesbaden, 2007.
- Lim, J. N., Schultmann, F., and Ofori, G., Tailoring, competitive advantages derived from innovation to the needs of construction firms, *Journal of Construction Engineering and Management*, vol. 136, no. 5, pp. 568-580, 2010.
- Nam, T. H., Tuan, N. P., and Minh, N. V., Critical successful factors for innovation in Vietnamese firms, *Journal of Industrial Engineering and Management*, vol. 10, no. 3, pp. 522-544, 2017.
- Organisation for Economic Co-Operation and Development, *Oslo Manual 3rd Guidelines for Collecting and Interpreting Innovation Data*, 2005.
- Porter, M. E., The competitive advantage of nations, *Harvard Business Review*, vol. 68, no. 2, pp. 73-93, 1990.
- Raskin, M. S., The delphi study in field instruction revisited: Expert consensus on issues and research priorities, *Journal of Social Work Education*, vol. 30, no. 1, pp. 75-89, 1994.
- Saunila, M., Understanding innovation performance measurement in SMEs, *Measuring Business Excellence*, vol. 21, no. 1, pp. 1-16, 2017.
- Sourani, A. and Sohail, M., The delphi method: Review and use in construction management research, *International Journal of Construction Education and Research*, vol. 11, no. 1, pp. 54-76, 2014.
- Steil, B., Victor, D. G., and Nelson, R. R. (eds), *Technological Innovation and Economic Performance*, Princeton (NJ) (Princeton University Press), pp. 480, 2002.
- Storey, C., Cankurtaran, P., Papastathopoulou, P., and Hultink, E. J., Success factors for service innovation: A meta-analysis, *Journal of Product Innovation Management*, vol. 33, no. 5, pp. 527-548, 2015.
- Tin, K. L., *Measuring Innovation Performance*, Information Services Division - National Library Board, Singapore, 2005.
- Trevelyan, E. G. and Robinson, P. N., Delphi methodology in health research: How to do it?, *European Journal of Integrative Medicine*, vol. 7, no. 4, pp. 423-428, 2015.
- World Economic Forum, *The Global Competitiveness Report 2017-2018*, Geneva, 2017.