Asian Research Policy
# Asian Research Policy

## Volume 10 Issue 2
December 2019

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R&D Enhancement Strategy for Small and Medium Enterprises’ Development in Korea*

Mun Su Park**, Jungje Yoo

Abstract

The purpose of this study is to suggest the limitations of R&D support system for SMEs, and a policy plan for expanding performance. In order to accomplish the purpose, we investigate the way to expand performance through in-depth analysis and evaluation of the existing R&D support programs for SMEs. This paper examined the items of research expenses and the current condition of research misconduct. That is to say, the paper analyzed that the investment type of support expenses and scrutinized the R&D programs targeting SMEs. In addition, the paper verified whether there is an outflow of support expenses from government to SMEs.

The results of statistical analysis proved that the expenditure structure of personnel expenses in the support project of SME technology development is relatively small. The expenditure on personnel expenses is actually low on the support projects of the technology development. And the total number of unjustifiable execution sanctions is higher, such as a relatively larger number of restricted participation on the basis of the total number of organizations and figures compared to other ministries. This suggested that the wrong execution of the support projects of SME technology development are still pernicious, and it should need some efforts to politic supplementation. Policy implications can be suggested as follows by focusing on the systematization of the performance evaluation and management of the technology R&D support projects for SMEs.

1. Introduction

The support for R&D has grown in importance because it is directly connected to SMEs’ growth and development. The innovation in SMEs through R&D is the only means and method of government support. As the role of SMEs for economic growth has been emphasized, SME R&D expenditure and support scale have steadily increased. Small and Medium Business Administration was reorganized and expanded into the Ministry of SMEs and Startups in 2017. After JongHak Hong was appointed the Minister of SMEs and Startup in the same year, the first Ministry of SMEs and Startups(MSS) is a government organization whose objective is to strengthen competitiveness and support innovation of Small and Medium-sized Enterprises (SMEs) and Micro Enterprises (MEs). It shows that the Korean government recognizes the importance of SME policy by changing its name and expanding its scope of activates.

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* This paper was extracted and developed based on the contents of this report (Hee Sun Kim and Mun su Park. (2018). “Data-Based Innovation Measures for SMEs’ Research Funds Management System.” Korea Small Business Institute Report).

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The government invests about 14 trillion-won in R&D projects each year, and the subsidies for SME R&D have annually increased to nearly 3 trillion won. The R&D support scale for SMEs has steadily expanded, Korean support scale won the second place after the United States among OECD countries. According to the budget trends of the central and local governments for SME R&D (Lee, 2018), 46.5% grew from 1.96 trillion won in 2013 to 2.88 trillion won in 2017. The number of projects also increased by 17.5% over the last four years. The Ministry of SMEs and Startups provided approximately 3,857 billion won to a total of 34,064 projects between 2013 and 2017. In particular, after the launch of the new government, the size of R&D support fund organized by the Ministry of SMEs and Startups amounted 1.17 trillion won and increased by 62.2% from last year in 2017, as the Small and Medium Business Administration was upgraded to the Ministry of SMEs and Startups.

However, although national R&D investment in SMEs continues to increase in volume, its quality is not high. Although the success rate of the technology development is maintained at 90%, it is not leading to the actual commercialization because the commercialization rate is roughly 50%. In other words, about 50% of SMEs that received R&D support from the government are unable to promote the commercialization. Consequently, the R&D projects for SMEs, which cost about 1.2 trillion won in 2016, continue to be unused on a large scale or without its performance (Kim et al., 2017).

The low performance of the corresponding R&D support has shown manifold problems about the current R&D support system. The concerns have been raised, mainly including short-term performance- oriented R&D planning, selection and evaluation methods only biased in technology, R&D performance evaluation and management system without considering the characteristics of SMEs and their R&D ecosystems, supplier-oriented judgment, distorted taxation upon licensing fees, lack of connection with private investment, etc. (Ministerial Committee on Economic Relations, 2018). In particular, with regard to the current R&D evaluation system, because R&D projects with different characteristics are evaluated with the identical evaluation indicators, there is the criticism that the large-scale projects for achieving formal and nominal results just to satisfy the numbers of the projects are indiscriminately produced. Since it consists mainly of the technical evaluation to check whether the technical-oriented targets are achieved and the evaluation committee with lack of experience about the market determines the R&D business possibility of R&D projects, the R&D judgment system is also criticized for not developing the results of the projects into technology transfer and commercialization, despite the high success rate of technology development. The proportion of tasks in which patents are linked to technology fees or commercialization is not only relatively small, but that of papers leading to commercialization is not very high (Hong, et al, 2018). According to Kim (2018), the failure of commercialization of national R&D projects is due to the lack of strategic consideration in the planning stage, insufficient system after successful commercialization, and outdated legal and institutional support system. Because the high technical success rate of government-funded R&D projects means that the projects with low technology orientation are mainly selected whether it could be a successful job creation or a contribution to society is open to doubt (Yoon and Yang, 2013).

Given this background, a variety of research questions can be answered. Why is SME R&D weak in performance creation and is performance management not organized? To be specific, is support expenses from the government systematically invested in SMEs, after analyzing the investment type of them and scrutinize the R&D programs that the government supports targeting SMEs? Is there any outflow of support expenses from the government to SMEs? Thus, the purpose of this study is to suggest the limitations of R&D support system for SMEs, and a policy plan for expanding performance.
In order to accomplish the purpose, we investigate the way to expand performance through in-depth analysis and evaluation of the existing R&D support programs for SMEs. This paper examined the items of research expenses and the current condition of research misconduct. That is to say, the paper analyzed that the investment type of support expenses and scrutinized the R&D programs targeting SMEs. In addition, the paper verified whether there is an outflow of support expenses from government to SMEs.

2. Literature Review

2.1. The Comparison of the Performance Evaluation and Management System of Korean R&D Projects with that of SME

2.1.1. Performance Evaluation and Management System of Korean R&D Projects

According to Act on The Performance Evaluation and Management of National Research and Development Projects, etc., the Performance evaluation and management of national R&D projects represents the details of the Establishment of Performance Objectives and Performance Indices, which systematizes how to create the great performance of national R&D projects. The Establishment of Performance Objectives and Performance Indices is expected to utilize the standard performance indices that reflect the characteristics of both the types of R&D and the technical fields including basic research, applied research, development research, etc. After an objective of a national R&D project is established by detailed project unit, a mid- or long-term object is continuously set for the corresponding R&D project. The reasonable performance objectives are set by taking into account project types. The performance objective should be set to be challenging, creative or realistic in consideration of the type of projects, the deadline, the size of the fund, the capacity, and so on. When setting the performance objective, the performance evaluation and management system of Korean R&D projects should be specified after coming to an agreement with stakeholders including the related departments, the management agencies, researchers and evaluators, etc., which helps the feedback on accountability and evaluation results are being strengthened throughout the project life cycle. The national R&D projects allow both qualitative and quantitative performance indices to be established, and the indices should be set in consideration of the core content of each project's performance objectives to objectively measure their achievement. The integration of only quantitative indices such as the number of patents, the number of papers and so on should be basically avoided, and the performance indices are set to focus on the results of careful calculation based on the project level. The performance indices should have the principle of setting the indices suitable for the level of the project progress, taking into account the period project under the participation of the project's stakeholders.

The performance evaluation and management
system of national R&D projects is conducted throughout the logically established model by project as a basic framework (see Figure 1). The performance evaluation and management system for national R&D projects is conducted stage by stage. The first step is to decide the core elements of a project and the items of the performance evaluation and management such as resource input, project execution, calculation process, and expected performance. After the second step is to determine the type of the corresponding project, the third step is to set its performance objectives, and in this case, they should be considered as the type of the project and the characteristics of its technology sector. The last step is to set up performance indices for performance evaluation and management system. Here, the performance indices should be set in consideration of the relevance and core of the performance objectives and the target number that meet the performance objective.

2.1.2. Problems of Performance Evaluation and Management System of Small and Medium Enterprises

Korean Management System of Performance Analysis for Small and Medium Enterprises has a legal force in a similar way to the performance evaluation and management system of national R&D projects. We extract the part of the performance analysis contents emphasized in the promotion of technology innovation of SMEs due to the similarity of the performance evaluation and management system of national R&D projects. Thus, this paper is reconstituted based on Operation Guidelines for Technology Development Support Projects for Small and Medium Enterprises (Ministry of SMEs and Startups, 2018).

The technology development outcomes are in the property of the corresponding organization for the technology development and support projects for Small and Medium Enterprises like national R&D projects. In case of technology development support projects for SMEs, outcomes from the technology development are an exclusive possession of the corresponding organization, but if the outcomes are jointly developed, they are supposed to be owned communally after consultation under the operation guidelines, which is similar to the performance evaluation and management system of national R&D projects. Article 26 of the operation guidelines guarantees the above principle, but there could be severely conflicting claims of proprietorship between organizations because rather than its own technology, industry, university and institute collaboratively develop one technology. After the completion of a SME technology R&D support project, the company can apply for and register intellectual property rights based on the technology development support for SMEs. It is based on the following procedure. In case of applying for an intellectual property right, it can be in the name of a business, not a project manager or a participatory researcher.

Figure 1. Basic Form of Logic Model

<table>
<thead>
<tr>
<th>Production Steps</th>
<th>Input</th>
<th>Activity</th>
<th>Output</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Logic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R&amp;D Program or Policy</th>
<th>Results Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Term</td>
<td>Impact</td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Long-Term</td>
<td></td>
</tr>
</tbody>
</table>

Source: Standard Performance Indices for National R&D Projects (Ministry of Science and ICT, 2014)
In this context, the government tries to help SMEs to have the ownership of intellectual property rights as a main body of an act rather than as an individual. The head of an execution organization prevents the tangible and intangible outcomes from technology development support projects for SMEs from being disposed before the payment of the full technology fee. In regards to the technology development support projects for SME, the utilization and the follow-up management of the technology development outcomes are regulated for continuous performance management by submitting the proposal for how the outcomes could be applied.

The problems of the management system of performance analysis for SMEs concerning the technology development support projects have been continuously denounced in terms of the limitations of performance creation and the lack of performance management. The management system of the technology development support projects has been criticized for the low-efficiency of the operations because of its fragmentary and unconnected approach. According to a specific evaluation report of the technology development support projects for the commercialization of SMEs (KISTEP, 2013), since the top 5 accounted for more than 50% of the total purchases amount, the performance evaluation and management system came under criticism for a number of possible loopholes including the polarization of the performance within SMEs. It was confirmed that the performance evaluation and management system has been different from the original goal of improving technology competitiveness and promoting business stability of SMEs regarding the technology development support projects. Similarly, there are some cases of the lack of performance creation such as poor performance of R&D cooperation fund in making the cooperative investment in the technology development support projects through the public private partnership. In addition, according to a specific evaluation report of the technology R&D projects for the commercialization of SMEs (KISTEP, 2014), the special projects for promoting the global small hidden champions in relation to such representative support projects were found to lack a systematic panning involved in the performance evaluation and management system. Although it is necessary to establish performance objectives, index development, and performance evaluation and management plan, there is a lack of the performance evaluation and management system in terms of the performance objectives and indices directly related to technology development, export commercialization of strategic items. It is the time to review the performance indices and the performance evaluation and management system for the entire R&D process including R&D project selection, management, performance creation, etc. of the technology development support projects for SMEs.

There are also criticisms on the government-supplier-oriented rigid research management system and the collective performance management system that do not reflect the characteristics of technology and market regarding the technology development support projects for SMEs. Based on the evaluation of the 3rd SME technology innovation promotion plan of National Science and Technology council (2014), the limitation of the supplier-oriented technology R&D support structure is criticized as a problem. Far from being just the carrying out of projects. Too many documents for submission are considered in applying and evaluating what they do and the standards for using the expenses for research are extremely severe. The method of selecting tasks by the evaluation committees composed of professors and researchers for the fair selection also did not discover the creative and challenging projects suitable for SMEs. Because there is the insufficient consideration of the demander (companies) and the market and the lack of reflection of the characteristics of SMEs like the evaluation of tracking the success or failure of the technology
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development project goals, the performance evaluation and management system is stretched to its limit. The decision on the success or failure of the performance goals no relation to the marketability makes the corresponding projects to become a real business despite its highest rate of success in developing technology from them (92%). The performance evaluation and management system shows a limitation encouragement to cooperate with representative companies, universities and institutes. According to the Survey of the Descriptive Statistics of SMEs (Small and Medium Business Administration, 2013), they prefer to develop their own technologies (84.2%), while the joint development (or outsourced development with external agencies) is still lower (14%). Although 75% of the governments R&D budget is being spent on universities and public research institutes, there is little support for SMEs.

There are also questions about the overall performance evaluation and management system; establishing key indices, connecting performance objectives with the indices, monitoring performance achievements, etc. The research and analysis results of the middle and long term plan in the field of science and technology pointed the limitations, and recommend revising them on the performance evaluation and management system (Presidential Advisory Council on Science and Technology, 2017). The results represented that the technology R&D support projects should be revised to correct the policy direction, departmentalize the subjects, and set the objects and indices suitable for the characteristics of SMEs. It is necessary to select the indices that meet the objectives of the plan, and to set the reasonable targets based on the corresponding objectives (Ratio of R&D investment to sales, the number of globally innovative SMEs, etc.). It is also needed to select the performance indices that can show the policy effects of implementing the plan, and set the sensible targets on their objectives. In order to increase the effectiveness of the technology development support projects for SMEs, it is essential to periodically check the performance of the projects and to monitor their implementation plan. The annual implementation plan for consistent policy implementation and performance monitoring should be systematically established and managed. A feedback process to collect the opinions of stakeholders and reflect them in the policy should be facilitated. The process should be prepared to collect the opinions of various policy, and reflect the collected opinions in the policy by strengthening the functions of support organizations such as the customer advisory groups for SEM technology development or politic exchange meeting like the annual project implementation plan. The efforts in human resource expansion and empowerment of specialized organizations involving Korea Technology and Information Promotion Agency for SMEs should be made to ensure timely performance management for the technology R&D support projects for SMEs. The specialized organizations need to strengthen their roles and functions in planning, management, and evaluation of R&D projects between the government and SMEs.

2.1.3 Implications of the Problems about the Performance Evaluation and Management of SME R&D Program

This chapter analyzed the current status and the characteristics of the R&D management system of SMEs. Based on this analysis, the performance evaluation and management system of SMEs and the performance indices are summarized as follows. The technology R&D support projects of SMEs are operated within the scope and the principle of setting performance objectives and performance indices of national R&D projects. Based on the Act on the Performance Evaluation and Management of National Research and Development Projects, the technology development support projects of SMEs are running
with consistency. Although the principle is similar to that of other ministries, it has failed to establish the performance evaluation and management process such as specialized performance objectives and performance indices on technology, industry, business type of SMEs.

The national R&D projects and the technology development support projects have similarities but some differences in the performance evaluation and management system. The regulations related to technology development support projects for SMEs, unlike the autonomous and creative management system of national R&D projects, strictly emphasize the desirability of responsibility and research management. To be specific, the SME R&D innovation plan suggests strengthening responsibility and research management by securing fairness of SME R&D support, making up for the enforcement of the autonomous prevention of unjustifiable use, and tightening the sanctions against companies that use research expenses in April, 2018. It is for this reason that the direction of the regulations of the technology development support projects for SMEs would be focused on strengthening the management such as fair distribution, prevention of wrong use, and sanctions to compensate for its unfairness and inequality. In order to prevent a lopsided support for a certain company, the gradation system only by Ministry of SMEs and Startups is expanded to all departments and the number of times supposed is accumulated and managed. The public notice reporting function for whistleblowers has been implemented in the Online Assessment System SME Technology for Small and Medium Enterprises (SMTECH) by utilizing the Nudge method such as pop-ups, text messages, letters by authority of the Minister, and so on. The list of the malicious companies which use research expenses for an unjustifiable purpose and are limited to participate in the support projects is disclosed.

Unlike the national R&D projects, the technology development support projects for SMEs are strengthening the support system such as labor costs to foster professional manpower. Since science and technology manpower is a factor that enables national competitiveness and economic growth, training the workforce can determine the standard of living of the people (Ryoo, 2004). According to Operation Guidelines for Technology Development Support Projects for Small and Medium Enterprises, a project execution organization has established a support system for stronger manpower by enacting a regulation that raises more than 30% of the project cost to the personal expense that can be cashed. In this way, the policy of increasing the labor cost is suggested to emphasize the connection of job expansion with the national keynote. If 30% of the 1 trillion won in a new R&D budget support for SMEs is used for new recruits, more than 10,000 jobs at a salary of 30 million won a year will be created. In accordance with the intention of enhancing the technology capacity through SMEs’ professional personnel, new personnel expenses, external personnel expenses, fees for consultation of specialists, etc. are recognized as an item of expenditure.

There is an additional limitation of the performance evaluation and management system because the unique performance evaluation and management system of SMEs and its performance indices are not consistently established. According to the analysis results of the technology R&D support projects of SMEs at the ministry-wide level, the performance evaluation and management system is the limitation for unsystematic approach in the performance analysis framework and its performance indices based on the type of SMEs or their technological characteristics. The R&D projects targeted for SMEs may differ in the direction and characteristics of the performance analysis results depending on the type of SMEs, the form of cooperation, and the features of research. Moreover, although the projects are managed systematically, there is the need for
a general statement of the performance analysis and its performance indices that SMEs can easily understand. It is the time to review the performance evaluation and management system and its performance indices about the entire process of project selection, management and performance creation of SMEs R&D. Due to the overly rigid guidelines for execution and a lot of the documents in applying and evaluating a project, it has a hard time writing out them for submission, rather than consuming energy to complete it. The method to select the projects thought the committee members including professors and researchers based on fair selectin has the limitation in finding creative and challenging projects, and a lack of the consideration for companies and market without reflecting the characteristics of SME R&D centered only on the success or failure of the project objectives. It was criticized that there is a lack of specificity and sustainability of establishing objectives and setting indices by type of SMEs. As a result, the R&D support by the government can be said to be the key to the company’s innovative efforts and the expansion of its business ecosystem, the process of the evaluation and management of the research and its performance for the technology development support projects of SMEs should be established.

Despite the shortage of SME technical manpower, the utilization ratio of personnel expenses is not high in the support projects for technology development, resulting in a mismatch. SMEs which participated in the support projects are found to have a low rate of using personnel expenses to foster technical manpower. When it comes to the research expenses of the support projects for technology development, the average personnel expense is only 20% of the total research expenses (the equipment and material costs are up to 55% of it). Many existing reports and SMEs’ requirements have suggested that the limitation of human resource development, but the results of the analysis proves that personal expenses are not properly utilized in the actual use of research expenses. This is because the SMEs which participated in the support projects have not systematically used the corresponding projects to foster new manpower. If the personnel expenses are divided into internal and external ones, the internal ones are higher. In the comparison between internal and external personnel expenses the ratio of internal personnel expenses is relatively higher than that of external ones, which means that SMEs are considered to lack the capability to take advantage of external experts, and expand collaborative research with other outsiders. In other words, since the characteristics of the support projects of SME technology development are too focused on solving SMEs own difficulties, the role of training, nurturing and maintaining professional manpower is lack. Thus, in considering that the current utilization rate of personnel expenses is around 20%, according to this revised 「Operation Guidelines for Technology Development Support Projects for Small and Medium Enterprises」 it would not be a big problem to raise the ratio of personnel expenses by up to 30% in case of more than 100 million won in research expenses. We analyzed the effective policing in the manpower utilization and the expansion of new recruitment now that SMEs which participated in the support projects are found to invest more in utilizing equipment and materials than inadequate manpower.

3. Methodology and Results

This paper examined the items of research expenses and the current condition of research misconduct. That is to say, the paper analyzed that the investment type of support expenses and scrutinized the R&D programs targeting SMEs. In addition, the paper verified whether there is an outflow of support expenses from government to SMEs.

3.1. The Ratio of Manpower Utilization of Technology Development Program for SMEs
3.2. Status of Misconduct on the Part of the SMEs’ Research Expenses

As a limitation of SME R&D promotion, misconduct in the support projects of SME technology Development is still not eradicated. After the national R&D project is commonly completed, the balance of the research expense and a sum of misconducted money are recovered. The support organization can even ask the corresponding company to calculate to a nicety again and conduct a spot inspection in order to recover a sum of money misconducted. According to Article 9 of Regulations on the Management, Etc. of National Research and Development Projects, Standards for recovery of wrongfully executed amount is stated. Although the standards for recovery of wrongfully executed amount explicitly include adherence to the research period, execution based on the items of research expense, documents for executing the research expense, false payment and so on, the education and promotion on the standards for SMEs should be required in the future due to too many recovered cases by their misunderstanding. As the embezzlement of research expenses is continuously happening in addition to the inefficient use of research expenses, the government should evaluate and manage them.

According to Regulations on the Management, Etc.

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Personnel Expense</th>
<th>Direct Cost</th>
<th>Indirect Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal</td>
<td>External</td>
<td>Total</td>
</tr>
<tr>
<td>WC300 R&amp;D</td>
<td>8.6</td>
<td>0.0</td>
<td>8.6</td>
</tr>
<tr>
<td>Technological Fee Project</td>
<td>27.1</td>
<td>1.5</td>
<td>28.6</td>
</tr>
<tr>
<td>Support Project of Technology Development for Overcoming Trade Technical Barriers</td>
<td>0.9</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Technology Development Project of Industry-University-Institute-Collaboration (TIPS)</td>
<td>66.9</td>
<td>3.8</td>
<td>70.6</td>
</tr>
<tr>
<td>Technology Development Project for Commercialization</td>
<td>13.7</td>
<td>0.5</td>
<td>14.2</td>
</tr>
<tr>
<td>Market Creation Type of Creative Technology Development Project</td>
<td>21.2</td>
<td>0.0</td>
<td>21.2</td>
</tr>
<tr>
<td>Technology Development Project of Product Process Improvement</td>
<td>5.7</td>
<td>0.3</td>
<td>6.0</td>
</tr>
<tr>
<td>Technology Innovation Development Project of SMEs</td>
<td>21.2</td>
<td>0.4</td>
<td>21.6</td>
</tr>
<tr>
<td>Technology Development Project of SME Conversion</td>
<td>12.4</td>
<td>0.5</td>
<td>12.9</td>
</tr>
<tr>
<td>Technology Competitiveness of Middle-Standing &amp; SME</td>
<td>1.5</td>
<td>4.0</td>
<td>5.5</td>
</tr>
<tr>
<td>Technology Development Projects of Startup Growth</td>
<td>30.4</td>
<td>1.3</td>
<td>31.6</td>
</tr>
<tr>
<td>Mean</td>
<td>19.1</td>
<td>1.1</td>
<td>20.2</td>
</tr>
</tbody>
</table>

of National Research and Development Projects, the balance of research expenses and a sum of misconducted money are recovered after the support projects of the technology development are commonly completed, and a sum of misconducted money can be recovered though on-site inspections and resettlement in the national research and development projects. However, in the past five years from 2013 to 2017, the disclosure number of recovery of wrongful use in the support projects, investigated by Ministry of SMEs and Startups, was 476, and the amount of the retrieval was 35.9 billion won. The 56 cases of ‘Payment of Research Expenses without Product Supply or exaggeratedly’ were highest (8.8 billion won), and ‘Use of Materials and Parts for a Wrong Purpose (33 cases, 1.9 billion won)’, and ‘Withdrawal of Research Expenses without Permission (26 cases, 1.7 billion won)’ were ranked next.

Based on the current state of the restricted participation in national R&D projects by department (see Table 3) the number of the restricted participation declined from 2013 to 2017, which means the number of unjustifiable use tends to decrease, as well. In general, however, the total number of unjustifiable execution sanctions is higher, such as a relatively larger number of restricted participation on the basis of the total number of organizations and figures compared to other ministries. This suggested that the wrong execution of the support projects of SME technology development are still pernicious, and it should need some efforts to politic supplementation.

The cases of wrong execution confirmed by the Ministry of Trade, Industry and Energy, and Ministry of SMEs and Startups indicated that the problem with the wrong execution is happening under the item of research expenses. There were the cases of the wrong execution of research expenses in terms of personnel expenses, costs for research activities, costs for research equipment and materials, support expenses for utilization of performance, and so on (see Table 4). These cases represented that the evaluation and management of research projects of technology development of SMEs compared with other ministries, although Ministry of SMEs and Startups’ sincere policies and efforts have continuously reduced the wrong execution of national R&D projects. Because SMEs often lack a dedicated department or have insufficient capability related the national R&D projects there would be many cases of misconduct on it. In particular, a lot of the wrong execution has occurred because of a lack of both management ability and full knowledge, rather than deliberate falsification. This minor execution should be accompanied by implementing various supportive policies such as continuous education and public relations, establishment of collaborated management system though joint research with Industry-University-Institute, research consultation, etc. These policies could reduce the number and the case of wrong execution, and push forward many different kinds of support projects of SME technology development.

**Table 3. Recovery and Unpaid Amount of SMEs by Year**

<table>
<thead>
<tr>
<th>Year</th>
<th>Recovery</th>
<th>Unpaid Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Amount</td>
</tr>
<tr>
<td></td>
<td>Closure</td>
<td>Deterioration</td>
</tr>
<tr>
<td>2013</td>
<td>48</td>
<td>58.4</td>
</tr>
<tr>
<td>2014</td>
<td>50</td>
<td>53.0</td>
</tr>
<tr>
<td>2015</td>
<td>229</td>
<td>98.6</td>
</tr>
<tr>
<td>2016</td>
<td>64</td>
<td>39.4</td>
</tr>
<tr>
<td>2017</td>
<td>85</td>
<td>110.4</td>
</tr>
<tr>
<td>Total</td>
<td>476</td>
<td>359.8</td>
</tr>
</tbody>
</table>

Source: Database from the Ministry of SMEs and Startups
4. Conclusion and Implication

The results of statistical analysis proved that the expenditure structure of personnel expenses in the support project of SME technology development is relatively small. The literature review and the analysis results suggested that the lack of excellent manpower is the most important problem, but the expenditure on personnel expenses is actually low on the support projects of the technology development. Thus, the R&D support projects of SMEs should be revised to strengthen their technology development capacity by investing in outstanding human resources.

In addition, Ministry of SMEs and Startups’ institutional and politic efforts have continuously reduced the wrong execution of national R&D projects, but the number of the cases from its wrong execution of national R&D projects are relatively more than other ministries. Accordingly, we suggest that the continuous management of SME technology development research is essential to improve the current situation of the Korean small and medium enterprises. Because SMEs often lack a dedicated department or have insufficient capability related the national R&D projects there would be many cases of misconduct on it.

In spite of the necessity of the examination of the system, more detailed consideration should be needed about how it could be specifically improved like the example of research misconduct. Overly segmentalized regulations on all of the sources in the research expenses can be expected to be a constraint factor in the creation of outcomes from the project by limiting the autonomy of the participating organizations. Project planning and implementation will need to be done by integrating the autonomy of the execution of project expenses. That is, administrative simplification and systematization of research management should be carried out by considering on-site difficulties of SMEs inversely with the inverse ratio of tight regulations to personnel expenses.

The results of the analysis show that major innovation in research programs is needed for small and medium-sized enterprises with huge support for technology development. Policy implications can be suggested as follows by focusing on the systematization of the performance evaluation and management of the technology R&D support projects for SMEs.

The systematization of the performance management and the research management of the support projects of SME technology development should be needed. First of all, the administrative procedures and the regulations of the support projects should be simplified and amended by considering bottleneck factors in a field of SMEs in the dimension of research management. The research management system should be continuously improved so that the support projects of the technology development can be

### Table 4. Restrictions on Participation in National R&D Projects by Department

<table>
<thead>
<tr>
<th>Department</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig</td>
<td>Org</td>
<td>Fig</td>
<td>Org</td>
<td>Fig</td>
<td>Org</td>
<td>Fig</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Ministry of Science and ICT</td>
<td>17</td>
<td>6</td>
<td>29</td>
<td>15</td>
<td>43</td>
<td>32</td>
</tr>
<tr>
<td>Ministry of Trade, Industry and Energy</td>
<td>584</td>
<td>597</td>
<td>662</td>
<td>559</td>
<td>353</td>
<td>311</td>
</tr>
<tr>
<td>Ministry of SMEs and Startups</td>
<td>1,266</td>
<td>1,164</td>
<td>850</td>
<td>758</td>
<td>744</td>
<td>645</td>
</tr>
<tr>
<td>Ministry of Environment</td>
<td>11</td>
<td>9</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>2,007</td>
<td>1,791</td>
<td>1,584</td>
<td>1,367</td>
<td>1,203</td>
<td>1,025</td>
</tr>
</tbody>
</table>

Source: National Science and Technology Information System (2017)
systematically carried out. Secondly, in order to systematize the performance management of the support projects of SME technology development, key indices (like HRD and commercialization performance) should be set and project objectives should be connected to the indices at the same time. Also, outcomes from the support should be regularly observed. To be specific, the indices that can meet the objectives of each support project of SME technology development should be selected and the targeted levels should be reasonably set up. In addition, the implementation performances and the implementation plans should be periodically inspected and consistently monitored for their higher effectiveness. Finally, a feedback process should be established to collect the opinions of stakeholders, and reflect them in the policy. The economic and social achievements of the support project of SME technology development should be continuously informed and promoted. The federal agencies and other public organizations should screen best practices and content guidelines, promote good outcomes from the support, and open them to the public by including the projects organized by Ministry of SMEs and Startups as well as the Korea Small Business Innovation Research Programs (KOSBIR) together.
References


Regulatory Sandboxes and Regulation Innovation for SMEs in Taiwan

Yong-Hyun Cho

1. Overview

There are three main ministries that are currently related to the supervision of sandbox in Taiwan. The first one is finance being related to regulatory sandbox; the second one is unmanned vehicle application; the last one is for all kinds of innovative applications of Small & Medium Enterprise (SME).

The Sandbox for FinTech is being supervised by 「The Financial Supervisory Commission」 (applicable since May, 2018) and the main regulation is according to the Financial Technology Development and Innovative Experimentation Act.

The Sandbox for unmanned vehicle technology and application is being supervised by 「Department of Industrial Technology, Ministry of Economic Affairs」 (Not ready for application) and the main regulation is according to the Unmanned Vehicles Technology Innovative Experimentation Project.

The Sandbox Focus on SME with no restriction on applications is being supervised by 「Small and Medium Enterprise Administration, Ministry of Economic Affairs」 (Applicable since Jan, 2018) and the main regulation is according to Innovative Regulatory Sandbox Project.

2. The system of FinTech Regulatory Sandbox: Financial Technology Development and Innovative Experimentation Act

Figure 1. Taiwan’s regulatory sandbox and relevant competent authorities

Source: Industry, Science and Technology International Strategy Center(ISTI)/ITRI(2019.08)

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2.1 Outline

Executive Yuan passed ‘Financial Technology Development and Innovative Experimentation Act’ (also known as FinTech Regulatory Sandbox) on 4, May, 2017 to promote technology innovation and the act was passed the third reading by Legislative Yuan on 29, May in the same year.

The origin of ‘Financial Regulatory Sandbox’ is from children’s playground, where kids can try creative ideas safely. It is proposed by UK’s Finance Conduct Authority (FCA) in 2015 and was put in action in Apr, 2016. Subsequently, Singapore, Hong Kong, and Australia followed FCA’s idea, but they only promoted the financial sandbox under guidelines or in a non-legislated way. Taiwan is the first country to pass the act for FinTech sandbox.

The main points of FinTech sandbox regulation is to create methodology for innovative experiment encouraging FinTech development.

Financial industry is no more the only sector to anticipate, so any charted enterprise who leverages IT, Internet, or other technologies is regulated under this act.

2.2 Architecture

The Main Points of FinTech Regulatory Sandbox such as the following points:

1. To establish a safe financial technology innovation experiment environment to promote the development of inclusive finance and financial technology with technology Develop innovative financial goods or services.

2. To implement participation and protection for those involved in innovation experimenters and financial consumers.

3. To applicate innovation and experimentation in the development of financial technology innovation.

4. To review and evaluate the feasibility and effectiveness of innovative experiments in a professional manner, the competent authority should have a special unit to handle related matters.

Figure 2. Financial Technology Development and Innovative Experimentation Act Architecture in Taiwan

Source: Financial Supervision Sandbox encourages new business opportunities, Financial Technology Development and Innovation Center (2018.10.29)
2.3 Application qualification

A natural person, sole proprietorship or partnership business, and corporation or similar legal entity (herein referred to as “Applicants”) may request approval to conduct Innovation Experimentation by filing an application with the Competent Authority; such application shall be accompanied by the following documentation:

Table 1. Requesting information of the application form

- The following information regarding Applicant:
  
  1. A natural person: documentation showing the Applicant’s or his/her agent’s domicile or residence in the Republic of China.
  2. A sole proprietorship or partnership business: documentation proving its business as well as the identity of its representative principal and the representative principal’s or his/her agent’s domicile or residence in the Republic of China.
  3. A corporation or similar legal entity: documentation showing the formation and registration of the entity, bylaws, or limited partnership agreement as well as the identity of the relevant representative principals, such as the member of the board of directors, general partner, supervisor, or independent director of the board.

- An Innovation Experimentation plan discussing
  
  4. The source of funds.
  5. The financial activities to be conducted during the Innovation Experimentation.
  6. The explanation of the purported innovation, which may be technology innovation or business model innovation.
  7. The scope, time period and scale of the Innovation Experimentation.
  8. The information regarding the key persons who will be managing the execution of the Innovation Experimentation.
  9. The important items discussed in the contract with Participants.
  10. The measures to be used to protect the Participants.
  11. The potential risks involved during the term of the Innovation Experimentation and the management protocol to control the risks.
  12. The assessment of risks regarding money laundering and terrorism financing, and the measures to be adopted to lower such risks, which shall be created according to risk-based principles.
  13. The explanation as to the information system and security management procedures to be used for the Innovation Experimentation and the countermeasures in response to risks.
  14. The guidelines to be used to evaluate the estimated effectiveness and the actually-achieved effectiveness of the Innovation Experimentation.
  15. The voluntary or involuntary termination of the Innovation Experimentation, such as self-withdrawal, cancellation or revocation by the Competent Authority, or expiration of the term.
  16. The patent-related documentation if any patent related to financial technology is involved.
  17. The cooperation agreement and the explanation as to the respective rights and obligations [of the Applicant and the third party] if the Innovation Experimentation is to be jointly conducted with other natural person(s), sole proprietorship(s) or partnership business(es), or corporation(s).

- Other documents required by the Competent Authority.

Source: Industry, Science and Technology International Strategy Center(ISTI)/ITRI
2.4 Application Process

To conduct the examination on the application for Innovation Experimentation, the Competent Authority shall call a meeting, and the participating members of such meeting shall include expert(s), scholar(s), and representative(s) of the relevant organization(s) or agency(ies).

When the Competent Authority examines an application for Innovation Experimentation to facilitate the development of financial technology and to safeguard the public interest, it shall consider the following factors in light of the scope, time period, and scale of the intended Innovation Experimentation:

1. Financial activities which fall under the categories that require approval, permit, or license from the Competent Authority.
2. Degree of Innovation.
3. Being able to effectively enhance the efficiency of financial services, reduce operating and use costs, or promote the interests and benefits of financial consumers and enterprises.
4. Whether the potential risks have been taken into consideration and the countermeasures have been adopted.
5. Protection measures to be employed to protect the Participants and preparation in advance to properly compensate for damages.
6. Other relevant items must be evaluated.

The examination of an Innovation Experimentation application must be completed within 60 days from the acceptance of such application and the Competent Authority shall either approve it or reject it and notify Applicant in writing.

If the Innovation Experimentation application involves subject matter that fall under another organization’s or agency’s mission or responsibility, the Competent Authority shall consult the relevant organization or agency.

And then the Competent Authority shall not allow more than a one-year term in its approval of an Innovation Experimentation and shall decide whether to approve such request for extension of term before the expiration of the original term of the Innovation Experimentation and notify the Applicant of its decision in writing.

After the Competent Authority approves the application for Innovation Experimentation, the Competent Authority shall publish the items of information on its website.

Applicant shall initiate Innovation Experimentation within three months after receiving the approval notification made by the Competent Authority.

If the Competent Authority revokes its approval in pursuant to the preceding paragraph, it shall publish on its website the effective date of such revocation as well as the reasons for revocation.

Within sixty days from the date the documents regarding the Innovation Experimentation’s results were fully provided, the Competent Authority shall complete its evaluation and feedback and notify the Applicant of its evaluation and feedback in writing. The notification to Applicant shall copy the relevant organization(s) and agency(ies).

The Competent Authority shall invite the Applicant to the evaluation meeting discussed in the first paragraph of this Article and the examination meeting discussed in Article 6, and may invite the relevant personnel to the meetings if necessary.

When the Competent Authority deems necessary to amend the relevant financial laws or regulations, within three months from the date the Innovation Experimentation was completed, the Competent Authority shall complete the preparation of the proposed amendments to the financial laws or regulations and submit the proposed amendments to the Executive Yuan of review.
Figure 3. Financial Technology Development and Innovative Experimentation Act Application Process in Taiwan

![Figure 3](image)

Source: Financial Supervision Sandbox encourages new business opportunities, Financial Technology Development and Innovation Center(2018.10.29.)

3. Unmanned Vehicles Technology Innovative Experimentation Project

In order to balance between industrial development and civil safety, ‘Unmanned Vehicles Technology Innovative Experimentation Act’ has passed the third reading by Legislative Yuan in 30, Nov, 2018. The goal is to encourage domestic companies invest innovative application for unmanned vehicle and to build a friendly and safe regulating environment for technology innovation.

Although ‘Unmanned Vehicles Technology Innovative Experimentation Act’ has been passed, the application is not open currently.

Table 2. Unmanned Vehicles Technology Innovative Experimentation Project in Taiwan

<table>
<thead>
<tr>
<th>Experiment Period</th>
<th>1 year in standard, with an extra year of extension if necessary; More extensions is possible for experiments need to modify regulations. The overall time span couldn’t exceed 4 years.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review Process</td>
<td>Ministry of Economic Affairs calls for review meeting and invites competent authorities, central and local governments, representations from relevant departments, legal experts, and academic researchers.</td>
</tr>
<tr>
<td>Review Items</td>
<td>Review innovativeness, background, qualification, safety and risk control of the experiment.</td>
</tr>
<tr>
<td>Safety Control</td>
<td>Applicants need to provide insurance plan and prepare declaration equipment in fields that are used for unmanned vehicle or experiment projects.</td>
</tr>
</tbody>
</table>

Source: Unmanned Vehicles Technology Innovative Experimentation Project, Department of Industrial Technology of MOEA.
4. Innovative Regulatory Sandbox: Accepting applications of innovative regulatory sandbox from SMEs

4.1 Outline

This is an innovative regulatory sandbox from SMEs, apply for the following three instructions:

1. SMEs who are ready to build new business models or domestic innovative applications but are stuck due to regulation restrictions.
2. SMEs who hope to ensure its business is risk free by experiment and who want to modify regulations for a smoother operation.
3. Teams who have enough capability and budget to carry out experiments and undertake potential risks.

Innovative Regulatory Sandbox platform welcomes application and look forward for a more innovative environment in Taiwan.

4.2 Application process

The Innovative Regulatory Sandbox application is divided into four steps:

1. Application: Possible to submit application form online.
2. Proposal Evaluation: Decide to accept the application will make a Application acceptance. Evaluated by experts whether to accept the application.
   The results will be divided into two categories: Referrals to other assistances or Assist in shaping the environment of innovative experiment.
3. Refine the experiment proposal: First, to arrange a team meeting to consult. Second, to Clarify the needs of the experiment. Then, to enter the regulations to clarify the operation to Refine the experiment proposal briefing.
4. Communication and coordination: Application acceptance to call the cross-authority coordination meeting, finally to start the experiment kick-off.

There is no clear legal norm, but there is a clear system acceptance process in The Innovative Regulatory Sandbox.

Figure 4. Accepting applications of innovative regulatory sandbox from SME Application Process in Taiwan

Source: Online application platform of Innovative Regulatory Sandbox
5. Conclusion

According to industry characteristics, there are three types of regulatory sandboxes such as FinTech, Unmanned Vehicles, and the other Industries in Taiwan. Although they are under the jurisdiction of the competent authority, only FinTech and Unmanned Vehicles are operated based on formal regulations.

In other words, there is a basis for sandbox experiments in these two specific industries. Therefore, companies can apply under the two experimental regulations.

On the other hand, the Innovative Regulatory Sandbox Project is not act on legal basis, even covering many industries, the result is difficult to achieve. The main factors are listed below:

- No legal and regulatory basis, no action basis.
- The competent authority (Small and Medium Enterprise Administration, Ministry of Economic Affairs) is not the competent authority of any industry regulation.
- Industry regulatory authorities usually have higher ranks, it's hard to make them willing to have a meeting.

But if there is no sandbox experiment plan for other industries (especially for innovative SMEs), Taiwan's innovation will be stagnated and it will hinder the economic development seriously.

Therefore, the following suggestions for the development of other industrial innovation experiments in Taiwan:

- Establish framework-based innovation experiment regulations applicable to all industries, so that all competent departments can apply the sandbox system of their own industries in a timely manner.
- Select several industries with significant innovation and development in the world, and formulate innovative regulations and sandbox experimental systems for the industry.

The above two points are under discussion for general framework act or ministry-specific act in Taiwan. These two kinds of acts have their own merits and disadvantages.

For the first one, it will be going to encourage more cross-discipline and innovative new business models with no industrial limitation. Nevertheless, cross-ministry negotiation will be the issue for amending the law by a different ministry.

For the other one, there will be no time-consuming negotiations. Its disadvantages will be that an individual ministry is concentrating more on the ministry-specific industry.

New Science and Technology promoted the renewal creative commercial model that we never imagined before. It means that cross-discipline innovations should be promoted more. Also, New Science and Technology look forward to the Taiwan government’s ability to act as soon as possible.
References


Industry, Science and Technology International Strategy Center(ISTI)/ITRI(2019.08).
SME Innovation and Policy in Indonesia

Donard Games

1. Introduction

Small and medium enterprise (SME) innovation has become a mantra for policy makers. Indonesia as an emerging market economy has proactively promotes innovation implementation among SMEs as it would lead to nation’s competitiveness. Indonesia has approximately 60 million business units that can be categorized as micro and small businesses, and this is a huge number even compared to 260 million Indonesia’s population. However, only small proportion of these SMEs is designed for innovation. Rather, they are mostly necessity driven SMEs which have a lack of strategy (i.e long term planning) and market expansion, for example, internationalization (Games, 2018). With this perspective in mind, policymakers need to have an appropriate approach that can exactly assist SME innovation in a more precise manner.

In general, innovation implementation is indeed dilemmatic for SMEs. As suggested by Sivadas and Dwyer (2000) innovation is costly and there is no guarantee that SMEs can successfully benefit from it. Many SMEs are having difficulties in terms of resources as they have limited resources, and innovation implementation such as digitalization and packaging innovation. However, they may not be rewarded financially in the short term, which will demotivate SMEs. In addition, SMEs in Indonesia also have to deal with an intense competition. This is also a double edged sword for SMEs. On the one hand, competition naturally will encourage SMEs to do better. On the other hand, it seems that they are having difficulties in dealing with it. For example, many SMEs are competing in a market that is sensitive to price. If competitors especially larger companies enter this market, many SMEs will lose their competitiveness. In short, SMEs have embedded issues that influence the way SMEs respond to innovation.

The objective of this paper is to examine SME innovation in Indonesia and relate the findings with Indonesia’s SME innovation policy. Problems and currently existing SME innovation would also be examined. Here the problems are derived from Global Innovation Index 2019. Further, the effectiveness of current SME innovation policy is also evaluated. Lastly, the emergence of business startups that are characteristically different from typical SMEs in Indonesia is briefly discussed.

2. Problems in SME innovation in Indonesia

2.1 Problems in SME innovation

Innovation has been found to significantly affect SME performance (Najib and Kiminami, 2011). That is why we need to specifically focus on the reason
why SMEs are reluctant to innovate or why they are unable to do so. As mentioned previously, problems in inhibiting SME innovation are derived from the Global Innovation Index 2019. Here, there is also a comparison between Indonesia and Malaysia. This is to show in which part Indonesia is actually lacking compared to Malaysia - a country that shares similar characteristics with Indonesia, but is able to successfully increase their rank in the Global Innovation Index.

Overall, Indonesia is behind Malaysia in every single item above. For example, in terms of ease of starting a business, Indonesia was ranked 102 and Malaysia 94; and ease of getting credit, Indonesia was ranked 40 and Malaysia 29. However, these are relatively not a big difference. This means that Indonesia may not have as much of a problem in this regards. In fact, ease of starting a business in Indonesia may be not as difficult as some people expected. In particular, this is because most of the policymakers in Indonesia see quantity of business owners or startup as important issue. Likewise, Information Communications Technology (ICT) use in Indonesia sooner rather than latter will significantly be increased as ICT penetration in Indonesia is fast.

More importantly, table 1 indicates that the biggest gap between Indonesia and Malaysia are indicators that strongly linked to knowledge and its outcomes as there has been significant gaps in terms of government expenditure on R&D, employment in knowledge-intensive services, university/industry research collaboration, state of cluster development, joint venture/strategic alliance deals, scientific and technical publications, and creative good exports. This means that there are more serious problems in relation to both knowledge input and output. R&D funding is not strongly supported by government. Furthermore, R&D that is conducted by industry is also not strongly developed. This may indicate their disbelief that R&D approach is needed and their inability to innovate continuously. Human resource quality is also an issue as knowledge workers are inadequate in SMEs. In turn, there is a lack of collaboration between SMEs and external actors that may assist them to innovate. In this case, they have limited access to, for example, universities as sources of innovation. They simply have no access

| Table 1. Some comparisons from Global Innovation Index- Indonesia and Malaysia |
|-------------------------------------------------|-----------------|-----------------|
| Regulatory quality                              | 75              | 40              |
| Ease of starting a business                     | 102             | 94              |
| Expenditure on education                        | 92              | 56              |
| GERD                                            | 109             | 23              |
| ICT use                                         | 77              | 47              |
| Logistic performance                            | 45              | 40              |
| Ease of getting credit                          | 40              | 29              |
| Employment in knowledge-intensive services      | 97              | 50              |
| University/industry research collaboration      | 34              | 8               |
| State of cluster development                    | 27              | 8               |
| Joint venture/strategic alliance deals          | 92              | 34              |
| Scientific and technical publications           | 125             | 59              |
| Creative good exports                           | 19              | 1               |

Source: Cornell University, INSEAD, and WIPO (2019)
and capacity to interact with researchers from universities. This is unfortunate as they mostly have no R&D and also no assistance from universities.

A part of this problem is also due to the nature of universities themselves. Table 1 shows that universities in Indonesia are still unable to maximize their potentials. In terms of scientific and technical publications, Indonesia’s universities are underperforming compared to Malaysia. This is one of the reasons why there is inadequate interaction, let alone, collaboration between industries and universities. Eventually, all of these lead to Indonesia’s lower ranking in the Global Innovation Index.

2.2. Knowledge management and risk taking

In a broader sense, a lack of knowledge is significantly related to SME innovation. This is also supported by a study by Games and Rendi (2019) that found that there are strong links between knowledge management and risk taking and SME innovation. Risk taking indicates SME owners’ mentality to pursue business opportunities even if they may fail. After identifying the root of all the problems in SME innovation in Indonesia, we need some insights from SMEs regarding the way they do things in this regards. The following table includes mean results of a survey regarding knowledge management and risk taking which are based on 165 respondents of SMEs in the creative sector in Indonesia from a study by Games and Rendi (2019). Items for knowledge management were measured from items by Lopez, Peon and Ordas (2005), while risk-taking was measured from items by Shoham et al. (2012).

**Table 2. Means (Knowledge Management and Risk Taking)**

<table>
<thead>
<tr>
<th>Knowledge Management</th>
<th>Strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>Strongly agree</th>
<th>means</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The company is open to cooperative agreements with other companies, colleges, etc.</td>
<td>2</td>
<td>3</td>
<td>30</td>
<td>89</td>
<td>41</td>
<td>3.99</td>
</tr>
<tr>
<td>2 The company is in touch with professionals and expert technicians.</td>
<td>0</td>
<td>3</td>
<td>25</td>
<td>94</td>
<td>43</td>
<td>4.07</td>
</tr>
<tr>
<td>3 There are systematic R &amp; D policies</td>
<td>1</td>
<td>2</td>
<td>42</td>
<td>88</td>
<td>32</td>
<td>3.89</td>
</tr>
<tr>
<td>4 New ideas and approaches on work performance are experimented continually</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>75</td>
<td>68</td>
<td>4.28</td>
</tr>
<tr>
<td>5 Meetings are periodically held to inform all the employees about the latest innovations in the company</td>
<td>2</td>
<td>3</td>
<td>35</td>
<td>86</td>
<td>39</td>
<td>3.95</td>
</tr>
<tr>
<td>6 There are individuals within the organization who take part in several teams or divisions and who also act as links between them</td>
<td>2</td>
<td>0</td>
<td>27</td>
<td>93</td>
<td>43</td>
<td>4.06</td>
</tr>
<tr>
<td>7 There are individuals responsible for collecting, assembling and distributing employees’ suggestions internally</td>
<td>3</td>
<td>1</td>
<td>42</td>
<td>77</td>
<td>42</td>
<td>3.93</td>
</tr>
<tr>
<td>8 Teamwork is a very common practice in the company</td>
<td>0</td>
<td>1</td>
<td>17</td>
<td>86</td>
<td>61</td>
<td>4.25</td>
</tr>
<tr>
<td>9 The company develops internal rotation programs so as to facilitate the shift of the employees from one department or function to another</td>
<td>2</td>
<td>4</td>
<td>45</td>
<td>74</td>
<td>40</td>
<td>3.88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Taking</th>
<th>Strongly disagree</th>
<th>disagree</th>
<th>neutral</th>
<th>agree</th>
<th>Strongly agree</th>
<th>means</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 We believe that higher risks are worth taking for high payoffs</td>
<td>1</td>
<td>5</td>
<td>33</td>
<td>78</td>
<td>48</td>
<td>4.01</td>
</tr>
<tr>
<td>2 Encourages innovative strategies, knowing well that some will fail</td>
<td>0</td>
<td>3</td>
<td>39</td>
<td>82</td>
<td>41</td>
<td>3.97</td>
</tr>
<tr>
<td>3 Looking for new opportunities</td>
<td>0</td>
<td>2</td>
<td>39</td>
<td>84</td>
<td>40</td>
<td>3.98</td>
</tr>
</tbody>
</table>

Source: Games and Rendi (2019)
As can be seen from table 2, as respondents come from creative sectors such as culinary and handicraft, they had higher scores in openness to changes and teamwork. Lower scores come from items such as systematic R&D policies, individuals who are collecting and distributing knowledge, internal rotation programs, and risk-taking strategies, even if they may fail. This means that even in creative sector SMEs, it seems there is a problem in internal knowledge acquisition and risk-taking strategies. A lack of people who are responsible for acquiring and distributing knowledge represents a huge problem in innovation diffusion and implementation. There is little formal system and organizational structure that support innovation implementation as suggested by infrequent meeting and discussion regarding strategic planning. Inflexibility is also an issue in SME innovation as there is a problem in internal rotation which may indicate limited skills in human resources in SMEs.

3. SME Innovation policy

This paper identifies SME innovation policies by dividing them into two: general SME innovation policy and digital and technology startup policy. The latter represents the majority of SMEs in Indonesia. For example, tempe (traditional Indonesian food from soybean) have been produced by SMEs for a long time in Indonesia, but as suggested by Suharti, Sogiono, and Purwati (2013), there were no massive changes or product innovation for tempe even if it simply involves low-technology procedures. For digital and technology startup, there should also be different approaches and this is worth a brief discussion.

3.1 SME Innovation policy in general

Having identified the essence of problems in SME innovation in Indonesia, it is important to formulate SME innovation policies that offer appropriate solutions. First and foremost, it has been identified that there is a vicious cycle of inability to benefit from external assistances. Internal SME capabilities to innovate have slowed down SME innovation. As a result, there is a lack of SME internationalization, especially in creative good export; a lack of knowledge including a lack of knowledge workers. Some policy’s principles that are expected to overcome these problems are discussed as follows:

3.1.1. Quality rather than quantity

Previous approaches from policymakers generally see SME in Indonesia as numbers rather than specific business entities. As a result, there is one-size-fits-all approach in which top-down strategy is implemented rather than bottom-up approach. In this case, policies are designed to prolong mediocrity as the same approach applied for all. Shane (2009) has warned the danger of quantity approach in entrepreneurship policy as quantity does not really matter in entrepreneurship. Sixty million business units of SMEs in Indonesia have not resulted in increasing the level of Indonesia’s innovation and competitiveness. It is important to have a more specific approach for specific small businesses. They should be grouped into distinct categories, and are assisted based on their real and existing needs.

3.1.2 Assisting in business strategy

Previous approaches were heavily focused on financial and marketing issues. This is indeed big issue in SME development. However, a study by Games (2018) has suggested the importance of SME owners as strategic thinkers. He has found that SME owners, for example, have no business model that anticipated technological changes and social changes. Many of them have no right target market
or were not willing to take risk to reach a wider market. Even if they have access to working capital, a lack of strategic thinking will reduce its benefits. Indonesia has a fast growing middle class with more demanding products. For example, more consumers demand halal and toyyiba (permissible and healthy as well as delicious). This requires highly standardized products that are systematically embraced by SMEs. In brief, SME innovation should be based on business strategy, and if this cannot be provided by internal SMEs, outsiders should do. External assistances, for example, by academicians and or social entrepreneurs who bridge the gap between SMEs and market demands, could be highly beneficial.

3.1.3 Focusing on skilled and knowledge workers

While Indonesia can no longer rely on cheap labor, there is a shortage of knowledge workers. This situation represents unclear strategy for a nation’s competitiveness. This does not mean that government is not committed to education. Perhaps this is merely about not focusing heavily on increasing skills and knowledge. For example, government expenditure on education is relatively high, but inability of higher education institutions to significantly enhance their performance signifies the ineffectiveness of human resource quality policies. Malaysia has its own strategic path which is shown by Global Innovation Index, showing that they focus on science and engineering in which Indonesia was ranked 68th and Malaysia 8th (Cornell University, INSEAD, and WIPO, 2019). This means that investment in human resources is justified even if it is a long-term investment because business innovation including SME innovation simply needs knowledge workers.

3.1.4 University as a source of innovation: incubation and science techno park

University as a source of innovation in Indonesia is manifested through the recent development of business incubators and science techno parks. These two institutions can complement each other. Business incubators strengthen startups and science techno park bridges the gap between university and industry. These two have something in common: technology based companies or startups. Having realized that university based startups are having difficulties to get working capital and continuous incubation, government should issue more incentives for technology-based startup companies. Incubators mainly those who are based in universities would help developed that are designed to conduct businesses that are derived mainly from university’s research. Additionally, nineteen science techno park in universities in Indonesia have been revitalized.

3.2 Policy for Startup

This section fully focuses on a brief discussion regarding startup policy in Indonesia. This is a different perspective compared to general discussion of SME innovation in Indonesia. The emergence of startup, to be precise, technology and digital startup in Indonesia is an unprecedented phenomena. Many of Indonesia’s startups have been inspired by the story of “Go-Jek” which is the Indonesia’s decacorn as their valuation has reached US$10 billion (Salna, 2019). While universities have contributed positively to technology-based startups as the government has also targeted approximately 4000 startups were born from universities in 2024, it is safe to say that startups
in Indonesia primarily has created their own path. “Young, independent, and open to changes” are the main characteristics of these startup founders and they represent the emergence of new generation (Games, 2018). Indonesia will soon be experiencing demographic bonus as currently nearly 70% of Indonesia’s population aged between 15 and 64 years old. These startup founders were inspired by Go-Jek, Tokopedia, and Traveloka, to name a few, and tried to locally validate their own digital app or IoT. From 2017 to 2018 there were about 20 digital startups that initiated their business in Padang, which is not the main source of economic growth in Indonesia. In 2019, of 20 digital startups, only three of them are survived with no sufficient revenue streams. This is to illustrate the hard path of startups in Indonesia.

The hardest challenge for startup teams is to transform their creativity to innovation. They characteristically are creative people, but may not necessarily able to enter the market phase. In this case, policymakers need to pay attention to this period. As far as author concerns, technology based startup mostly work in isolated groups. Many of them are also disconnected to business incubators and science techno parks. These startups also need working capital, but they typically have different characteristics compared to general SMEs because they most probably have no cash inflows in their first year. This is a moment of survival for them. Because of that, the government needs to provide access including financial access as they may not be compatible with conventional bank’s standard. Policymakers also need to help provide a good market ecosystem for startups. Cooperation is significantly related to SME innovation in industry clusters (Najib and Kiminami, 2011). This means that industrial clusters or innovation clusters need to be promoted in order to enhance the effectiveness and communication among stakeholders such as SMEs, academician, and government. In many cases, clusters are not designed to innovate. In short, policymakers need to recognize the unique characteristics of startups and approach them based on their necessities as well as facilitate resources to these SMEs.

4. Conclusion

This paper emphasizes the importance of knowledge and risk taking especially in pursuing business opportunities in dealing with SME innovation. SME need to make the most of abundant business opportunities in Indonesia. In this regard, universities can play a greater role because of their identity as a source of innovation. They need to revitalize themselves by focusing on innovation performance primarily by promoting business incubators and science techno parks. On the other hand, SMEs need to also proactively approach universities and external assistances as they have a lack of capacity to innovate.

Policymakers need to provide solutions rather than create new problems. Policymakers in Indonesia can use some principles that are identified in this paper. These are focusing on quality of SMEs rather than quantity; assisting SME business strategies, focusing on human resources quality, and maximizing the existence of universities as sources of innovation. It was also identified that the emergence of technology based startups that represent the new cohort in Indonesia’s demographic bonus era. They may also represent the future of business innovation in Indonesia. In this case, different approaches can be taken such as promoting open innovation and business partnership as well as providing access, especially for startups that are entering their first year of operation.

All in all, SME innovation in Indonesia needs a strategic path that can lead to better innovation performance and this is primarily contributed by knowledge aspect and how SMEs can seek external assistance which should be taken into consideration by policymakers.
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Micro Small and Medium Enterprise (MSMEs) Ecosystem and Government Measures to Promote MSME Innovation in Indonesia

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Abstract

Micro small and medium enterprises (MSMEs) have been known as a catalyst of social and economic growth due to its ability to increase employment rate and increase local economy. For these MSMEs, innovation activity is crucial, especially in this era of globally competitive environment where product life cycle is getting shorter. This paper aims to extend the discussion about the topic of MSMEs and innovation by providing empirical evidence from previous research the drivers and/or the barriers to innovate for MSMEs. Then, we describe the state of MSMEs innovation in Indonesia, specifically regarding the policies that have been implemented by Indonesian government to promote growth and innovation among MSMEs. Lastly, we investigate whether the policies are able to close the barrier gap of innovation among MSMEs in Indonesia, and provide recommendations of future actions that shall be carried out to support innovative MSMEs.

1. Introduction

An innovative micro small and medium enterprises (MSMEs) are one of the elements needed for a national economy to grow and prosper. It is because MSMEs can drive the growth of local economy which may lead to the greater employment opportunity in the region. Furthermore, the total number of MSMEs can be so large (in certain countries, MSMEs accounted for more than 95% of total number of companies) which makes them a formidable force to increase national economy. A recent development in technology has change the overall landscape of business environment. Companies, including MSMEs, must compete in this increasingly challenging business environment by keeping up with the trends and innovate. Micro small and medium enterprises (MSMEs) need to continuously introduce new products and/or processes, especially in an environment where product life cycle gets shorter, and they also need to exploit new market opportunities to stay abreast of competition (Strobel and Kratzer, 2017).

Studies have found that innovation could increase the likelihood of competitive advantage and market share growth (Pearce II and Michael, 2006; Smith, 1982 in Strobel and Kratzer, 2017). It is also known

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as a driver of a firm’s profitability, survivability, and productivity (Lachenmaier and Rottmann, 2011; Rosenbusch et al., 2011 in Strobel and Kratzer, 2017). Failure to innovate might result in reduced competitiveness for a firm, and the business world has provide us many examples of companies that going bankrupt because of this reason.

In this paper, we define innovation as both technological and non-technological aspect of innovation activity, also including both incremental or radical type of innovation (Love and Roper, 2015). In a broad term, innovation means any new development in firms, which can include forging or re-engineering products to meet consumer demand, new processes to improve productivity, apply new marketing activity to increase sales, and organizing new management system to increase operational efficiency (Organisation for Economic Cooperation and Development (OECD), 2000).

Before delve deeper in a discussion about innovation among MSMEs in Indonesian context, it is important to acknowledge that MSMEs consist of firms with different type of business, ranging from small grocery shop in the traditional market to a relatively high technology firms (Callan & Guinet, 2000). For the high technology firms, innovation means new products or processes which were created with the intense use of science-based knowledge, and expensive research and development (R&D) process. However, most MSMEs do not have the access to formal R&D inputs and investments, hence, they innovate without using one. For the second type of MSMEs, they need more advice on non-financial matters. They mostly need government to close the knowledge gap between the vast amount of latest technology information (from universities, research institutes, customers, suppliers) available and their day-to-day business operation.

In Indonesia, MSMEs accounted for 99.99% of all businesses in Indonesia in 2017, with approximately 62.9 million MSMEs (The Ministry of Cooperatives and Micro Small and Medium Businesses Republic of Indonesia, 2019). Hence, MSMEs play a significant role for the growth of Indonesian economy. Nevertheless, there has been less discussion on the topic of MSMEs and innovation within the sector, while in fact, the two words (MSMEs and innovation) are intricately connected. The aim of this paper is to present empirical evidence from previous research the drivers and/or the barriers to innovate for MSMEs. Then, we describe the state of MSMEs innovation in Indonesia, specifically about the policies that have been implemented by Indonesian government to promote growth and innovation among MSMEs. Lastly, we investigate whether the policies are able to close the barrier gap of innovation among MSMEs in Indonesia.

2. Literature Review

There are ample of previous research which discuss the factors that may either enable or hinder the innovation performance of MSMEs. Most often, the papers discussed how degree of innovation is related to the size of firms such that small firms have advantages to innovate as they can conduct rapid decision making, have willingness to take risks, and more flexible in responding to market opportunities while large firms have advantages due to their wider access to finance and skills needed to innovate (Love and Roper, 2015). In short, the advantages of small firms are more related to behavioral aspects (e.g., flexibility, motivation, entrepreneurial dynamism) whilst for large firms it is more pertinent to material (e.g., finance and technological resources, economies of scale and scope) (Love and Roper, 2015). In general, those factors could be divided into two broad types which are external factors and internal factors (Strobel dan Kratzer, 2017)

2.1 External Factors
Strobel and Kratzer (2012) subdivide the external factors into three different elements: demand, supply, and environment related. Supply obstacles are those factors that relate to technological information, raw materials, or capital needed for innovation. Demand obstacles consist of market limitation and customer needs, while environmental obstacles concern governmental regulations, bureaucracy, and other policy-related actions (Hadjimanolis, 1999).

In general, research and development (R&D) capability has been found to be the determinants of innovation as it is almost always strongly associated with innovation output (Crepon et al., 1998; Love et al., 2009; Roper et al., 2008 in Love and Roper, 2015). In larger firms, R&D generally organized within specialized department. For smaller firms, R&D activity is more often informal and opportunistic, and less likely to be organized within specific department (Blackburn, 2003; Griffith et al., 2003; Freel, 2005 in Love and Roper, 2015). The implication is that innovation in smaller firms is less dependent by R&D activity internally and more dependent on knowledge obtained from external source, such as through partnerships or spillovers (Ganotakis and Love, 2011; Piergiorgianni et al., 1997 in Love and Roper, 2015).

Because of their size, MSMEs have limited access to financial resources required to conduct R&D activities. It is riskier to invest in R&D projects established by small firm than big firm because often times small firms have less competencies and experience complementary to R&D. Yet, it is critical for company to have internal and external finance available because innovation implore a large and uncertain sunk cost for company. In order to compensate this shortage, MSMEs could establish a linkage with other companies in each stages of production process.

It is known from previous research that regulatory framework and bureaucracy constitute one of the most significant obstacles during the innovation process (Piatier, 1984; Hadjimanolis, 1999 in Strobel and Kratzer, 2017). Although globalization reduces the freedom of government policy responses, government still has power to encourage MSMEs to innovate through appropriate regulation, incentives, and organizational learning. For example, government supportive financial policies and intellectual property (IP) protection could accelerate R&D activities among MSMEs. At the same time, market entry regulation, wages policy, social insurance policy can have negative impact on innovation (Strobel and Kratzer, 2017). The government support financial programs might also fail to boost innovation if the regulation require complicated administrative procedures as it will hinder MSMEs willingness to.

2.2 Internal Factors

Following previous research, internal factors that could support or impede innovation activity for MSMEs including organizational structures, knowledge, human capital (i.e., skilled personnel). Organizational structure imply a task configuration within organization as well as written rules and procedures (Skivington and Daft, 1991 in Strobel and Kratzer, 2017). Furthermore, it is widely accepted that organization’s knowledge is the most important source of firm’s sustainable competitive advantage (Conner and Prahalad, 1996; Grant, 1996; Kogut and Zander, 1992; Nonaka et al., 2000; Zheng et al., 2010 in Strobel and Kratzer, 2017). Firm needs technical, marketing, and “integrative” competences in order to turn its innovative idea into profitable product. They also supposed to have knowledge on most recent scientific or technology development in a given field to increase their innovative capabilities. Regarding human capital, it is employees who have to fulfill innovative tasks within organization, including turn up with innovative ideas. Therefore, lack of skilled personnel might inhibit firms in creating efficient innovative teams and the firms might also suffer from the lack
Apart from the three factors mentioned above, Strobel and Kratzer (2017) also pointed out that organizational culture plays an important role in shaping firm’s innovative behavior. Certain norms, values, and behavior can facilitate information exchange and knowledge transfer within firms, which eventually lead to desired behaviors such as innovation (Hogan and Coote, 2014; Tellis et al., 2009 in Strobel and Kratzer, 2017). Several dimensions of organizational culture are team work fostering, importance of information flow in the innovative process, risk taking, tolerance for mistakes and easier communication within firms, improvisation in using the organizational knowledge (Amabile, 1988; Baker and Freeland, 1972; Binnewies et al., 2007; Caldwell and O’Reilly, 2003; García-Morales et al., 2011; Moorman and Miner, 1997; Sonnentag and Volmer, 2009 in Strobel and Kratzer, 2017). Another dimension of organizational culture mentioned by Hogan and Coote (2014) in Strobel and Kratzer (2017) is openness and flexibility which facilitates idea generation and disparate thinking that enable problem identification and flexible implementation (Amabile, 1988; Howell and Boies, 2004; Khazanchi et al., 2007; Mumford et al., 2002 in Strobel and Kratzer, 2017).

3. Government Measures to Support MSMEs Innovation: case study of Indonesia

In similar fashion with other emerging countries, MSMEs are particularly imperative in supporting social inclusion and economic growth in Indonesia (OECD, 2018). It is said that MSMEs are the backbone of Indonesian economy. According to the Ministry of Cooperatives and SMEs Republic of Indonesia, MSMEs are estimated to account for 97% of domestic employment and 56% of business investment in Indonesia (OECD, 2018). Furthermore, more than 99% of total business enterprises in Indonesia comprises of MSMEs (see Figure 1).

**Figure 1. Structure of Business Enterprises in Indonesia**

Source: Ministry of Cooperatives and SMEs (2018) in (Indrawan, 2019)
However, despite the large number of MSMEs in Indonesia, only less than 0.1% of research and development (R&D) spending is conducted by MSMEs, far below the OECD average of 2.3% (The Jakarta Post, 2018), which implicates that the rate of innovation among MSMEs in Indonesia is still very low. Thus, government has a crucial role in stimulating innovation and providing the best ecosystem for MSMEs to flourish through policy actions. In Indonesia, the main government institution who is responsible improving MSMEs competitiveness is Ministry of Cooperatives and SME. Moreover, other ministries and government institutions also take part in the development of MSMEs, ranging from opening market access, financial access, standardization and certification of products and services, to giving training to upgrade the skills of MSMEs owner. Some important initiatives in the national levels to stimulate MSMEs development and innovation in Indonesia including:

3.1 Establishment of programs to increase access to finance

One of the significant measures Indonesian government take to increase MSMEs access to finance is to require all banks to allocate 20% of their business loans to MSMEs. Furthermore, the government also established a program called people business credit (KUR). People business credit (KUR) is a government-backed loan program with a subsidized interest rates. This program is not necessarily intended to scale up innovation among MSMEs, although, its main objective is to widened MSMEs access to capital, particularly the micro-size firms. There are also other types of loans designed to fulfill capital needs of ultra-micro size entrepreneur, which are Mekaar and UMi. Both loan products are offered by non-bank financial institutions, but with a directive from Ministry of State Owned Enterprises (SOE). It suggests that those programs are also part of government initiatives to scale up the business of ultra-micro entrepreneurs by giving them access to capital. However, these government-backed financing schemes might not be suitable for the “high-tech” firms as high-tech firms are more likely needed financing from venture capital in order to fund their R&D activities, and it is not yet widely supported by Indonesian government. As for export-oriented MSMEs, Indonesia Exim Bank also offered micro credit program called KURBE. In terms of the size, this program is rather small compared to other government-backed loan programs as it funded only 665 MSMEs by the end of 2018. Nevertheless, it is necessary to provide specific channel to provide financing for MSMEs who are eager to compete internationally as exporting also highly correlated with innovation and growth of MSMEs (Love and Roper, 2015). Other measures taken by government to develop innovation and provide alternative sources of finance including; offering grants and advisory services, taking regulatory measures to facilitate peer to peer lending, simplifying procedures for MSMEs to make initial public offering (IPOs), and introducing incentives for private equity investors. But the common fiscal incentives (e.g., R&D tax credits) are still underdeveloped.

3.2 MSMEs digitalization as a priority of government

Digital economy offers enormous opportunity for MSMEs. It has been said that to develop and boost MSMEs sector, technology adoption and digitalization is a key (Baziad, 2015). If MSMEs are capable of doing their business digitally, it is expected that the yearly growth of Indonesian economy will increase even more (Deloitte Access Economics, 2015). Inadequate knowledge about or access to technologies also hinders the ability of MSMEs to keep abreast of innovation.

From a total of MSMEs in Indonesia, only 18%
of them are currently engaged in e-commerce through the use of website and social media to conduct their business (OECD, 2018). Hence, many government agencies have provided support in the form of programs aimed at increasing MSMEs involvement digitally. These programs include support related to human resources, production, general management, quality control, technology, industry clusters and MSME innovation centers. The biggest program to advance MSMEs presence in e-commerce is E-Commerce Roadmap which mainly operated by Ministry of Communication and Informatics, together with Ministry of Cooperatives and SME. The main objective of the program is to facilitate MSMEs to be able to compete in a larger market. Other than that, the government also launched a collaboration with six online marketplaces operated in Indonesia to promote MSMEs in their platform (Association of Southeast Asian Nations (ASEAN), 2019).

There also other programs created by various ministries and government agencies which ultimately have the same goal of increasing MSMEs competitiveness, involvement, and presence digitally such as Certification, Copyright, and Trademark Registration Facilitation programme which aims to ensure the products and operational procedures of MSMEs are in compliance with international standards (Association of Southeast Asian Nations (ASEAN), 2019). However, in general, those programs were not yet effectively implemented because there is often an overlap between the institutions and each programs tends to have limited scope (Deloitte Access Economics, 2015). Thus, the government still needs to improve coordination and create strong partnership between agencies to improve the effectiveness of existing programs to support the development of MSMEs.

Furthermore, since businesses with advanced online capabilities are 17 times more likely to be innovative (for example experiencing a major change in the way they did business last year) than offline businesses, increasing broadband access is also a matter that needs to be prioritized. Internet access in Indonesia is still relatively expensive and slow, thus, improving broadband access and service quality will encourage the adoption of digital technology by MSMEs and will improve the performance of existing technologies. Indonesian government has established The Indonesia Broadband Plan (IBP), a national plan to improve broadband infrastructure development, to increase the broadband requirement in Indonesia. Nevertheless, this plan should only be the first step in order to realized the digital economy in Indonesia.

### 3.3 Progress in the ease of doing business

The government of Indonesia form a one-stop shops (OSS) or commonly known as the One Stop Integrated Service Center (PTSP), which can reduces the need for MSMEs to obtain permits from several local government agencies. This measure is an essential step in resolving administrative problems for MSMEs. Nonetheless, despite the efforts to provide one stop shop, the business license and permit system still remains fairly complex which contributes to Indonesia 144th position in the World Bank Doing Business indicator of “starting a business”. To overcome that problem, Indonesia government started to implement e-government system by developing online single submission system to centralize licensing procedures from all levels of government in one single website (OECD, 2018). Although it is relatively new initiatives and might takes some time before it becomes fully operational, this effort signals positive development of simplifying business process in Indonesia.

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3. They have three main programs which are Go Online Programme, One Million id. Domain Programme, and the 1000 Digital Start-up Programme
3.4 Workforce training

Workforce training falls under the responsibility of Ministry of Manpower and Transmigration. They operate 22 MSME Productivity Centres that deliver technical training to improve the productivity of MSMEs workforce. It has been mentioned in previous section that human capital has important role in improving and realizing innovative activity within firms. Nonetheless, the workforce training among MSMEs remain sporadic; only 5% of firms in Indonesia offers formal training to their personnel (OECD, 2018). In addition, Indonesia Exim Bank, collaborates with relevant ministries, also create a program to train export-oriented MSMEs called Coaching Program for New Exporters (CPNE) which offer trainings in production, management, and finance for small businesses. The knowledge transferred through this training mainly related to basic export knowledge such as packaging, export cycles, and export destination countries’ requirement and logistics (Mufti, 2019).

Furthermore, state-owned enterprises in Indonesia is encouraged by Ministry of SOE to build “Rumah Kreatif BUMN”4. Rumah Kreatif BUMN (RKB) is built to assist MSMEs in increasing their competence, increase their marketing access, and facilitate MSMEs access to capital. One of the assistance provided by RKB is digitalization and e-commerce, in which MSMEs are given a training on listing their products in e-commerce website, using search engine optimization (SEO), and promoting their products via social media.

4. Discussion

From the previous section, it has been known that MSMEs sector accounts for more than three quarters of national employment in Indonesia, even more than any OECD country. The share and contribution of MSMEs to Indonesian national economy is utterly enormous. Thus, it is only logical to expect that Indonesian government should prioritize the implementation of policies that are able to boost MSMEs development and innovation.

It is also important to acknowledge that MSMEs are heterogeneous, so the policies too must be targeted to meet the specific needs of each segments. For example, although more than 99% of all business enterprises in Indonesia are MSMEs, most of them are micro-size firms. This has implication to the type of regulations or policies needed by these firms. For the micro-size firms, access to finance is often the major problem. Therefore, the requirement of at least 20% of loans within banks is disbursed to MSMEs, as well as the establishment of people’s business credit, might be a good policy to support their growth. However, it is only the initial step as our goals in the long term is to advance their innovation rate to increase their competitiveness in this globally competitive environment. Thus, it is also vital for government to start catering the needs of other segments of MSMEs, such as the export-oriented MSMEs and high-tech MSMEs.

For export-oriented MSMEs, the number of alternatives for export financing is still highly limited. Indonesia Exim Bank, a government institution mandated to provide export financing, can only provide finite amount of loan facility for export-oriented MSMEs, and loan facility provided by conventional banks is not friendly enough for these relatively new small exporter (Mufti, 2019). Therefore, Indonesian government should encourage conventional banks to provide financing for export-oriented MSMEs so that they can enter international market. It is also worth to mention that increasing the number of export-oriented MSMEs should be one of priority of Indonesian government as businesses who are able to compete

4. The English translation is “Creative House of State-Owned Enterprises”
Internationally are highly likely to have innovation capability. For the “high tech” one, the government should increase the lack of well-functioning venture capital or seed finance markets to support their research and development efforts, or their investments in innovations (OECD, 2000).

Overall, regarding the access to finance, the type of financing available for MSMEs should vary according to their respective lifecycle (Berger and Udell, 2006 in Wellalage and Fernandez, 2019). In Indonesia, the finance program to close the financial gap are mostly intended to fulfill the needs of the early stage micro and small entrepreneurs. In other words, the country is not lacking in terms of alternative options to increase access to finance, especially for micro and small entrepreneur, as there are several government-backed loan programs. For these micro and small entrepreneurs, the government should focus more on programs or policies intended to accelerate their growth, not only focusing on providing access to capital. Thus, apart from fulfilling their financial needs, the policies should better address their non-financial innovation needs such as consulting services; how to recruit skilled personnel, awareness of innovative ideas and latest technology, and platform for exchanging knowledge and improving collaboration within MSMEs networks and clusters (Callan & Guinet, 2000). Also, access to capital is likely needed to fund another lifecycle of MSMEs (not only the early stage one), such as the high tech and export-oriented MSMEs. Furthermore, it is important to also expand MSMEs access to investment. In order to achieve digital MSMEs, it requires a combination of domestic and international sources of investment. The potential for MSMEs to develop will be reduced if government still provide barriers for accessing investment. Investment policies must be open to all sources and types of capital so that MSMEs in Indonesia will benefit from wider access to online microfinance tools.

Regarding the innovation activity itself, MSMEs have several advantages over large firms in innovative activity; they have less bureaucratic constraints to take a risky R&D, mainly because the decision is made by a small number of people, while in large firms the decision is often has to go through several organizational layers of resistance. However, in order to successfully innovate, it is not only the case of whether the firms are small or large in size, external environment (e.g., industry and environmental characteristics) will also influence capability of MSMEs to innovate. The linkages or network within industry can enhance the knowledge base of MSMEs which provide basis for innovation. The opportunity is greatest when MSMEs are operating in a strong innovation industry. Government should encourage or support the cooperation between MSMEs within industry by providing a platform in which MSMEs are given greater access to cooperate with other MSMEs, or better access to government-supported research centres including, for example, universities.

Indonesian government has also aware the benefit of increasing MSMEs involvement digitally. Thus, many government policies has been directed to accelerate the utilization of the digital economy - especially through increasing broadband access and through increasing coordination of existing government programs, access to investment, and facilitating access to new digital devices that are more affordable (Deloitte Access Economics, 2015). Expanding e-government services electronically is also part of the plan to increase digital presence. Government services through online platforms are far more effective and efficient. More online government services can build consumer confidence in future online activities and services, which may benefit MSMEs in the long term. It is also important to set the target for broadband deployments at a steady pace and follow regional and global trends, since broadbands are the platform for the digital
economy to work. For example, other countries are targeting a greater increase in national broadband (ie Korea 93%, Singapore 87% and Malaysia 73%), far higher than Indonesia’s target of 30% (Deloitte Access Economics, 2015).

Lastly, in our efforts to establish new policies to boost innovation capacity among MSMEs, we need to recognize that policies, especially the one which targeted for MSMEs, will require a lot of trial and error. The recipes for success in one country might not be applicable in another country. Thus, experimentation and learning are important elements before those policies could be succeeded.
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Firm Size, R&D and Innovation: Evidence from India

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Abstract

This study examines research and development (R&D) activities of SMEs and large firms. Using the World Bank Enterprise Survey, we find that the percentage of medium-sized firms investing in R&D activities is higher than that of small and large-size firms. Further, we explore the productivity of R&D in terms of introduction of a new product or process into the market. We find that the percentage of firms that introduced a new product or process does not vary in terms of firm size.

Keywords:
SMEs; Research and Development (R&D); Innovation

1. Introduction

Small and medium enterprises (SMEs) are considered as one of the drivers of economic growth (Acs and Armington 2006; Baumol 2002). According to a recent study from the Organisation for Economic Co-operation and Development (OECD, 2018), the micro firms accounts for 75-90% of the total enterprises. In addition, 45% and 33% of total employment and GDP rely on MSMEs respectively (OECD, 2016). In India, based on the recent information, SME sector contribute 29% and 32% to the GDP and gross value added (GVA) respectively (GOI, 2019). It is also interesting to note that the growth of employment in the manufacturing and service sectors are 18% and 34% respectively (GOI, 2014).

Since SMEs are vital to the growth and development of the Indian economy, it is important that they should be competitive in both domestic and global markets. A principal determinant of SMEs’ competitiveness is innovation (Marshall and Parra, 2019). In a developing economies like India, it is necessary that the government should take active involvement in fostering SMEs. As a result, in 2006, the Micro, Small and Medium Enterprises Development (MSMED) Act 2006 is passed for the developments of the SMEs and which intended to improve their competitiveness. Since the enactment of the MSME Act, many other programmes were introduced to with the purpose of fostering the development of MSMEs-the Manufacturing Competitiveness Programme, the Micro & Small Enterprises - Cluster Development Programme, the Credit Link Capital Subsidy Scheme for Technology Upgradation are notable policy measures.

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In this regard, the objective of the current study is to compare the R&D investment between SMEs and large firms. Since the Government of India introduced several policies to boost SMEs in the economy, it is important to investigate whether small firms are able to catch-up with larger firms in their innovation activities. This analysis is extended to map the industries in which SMEs invest actively in R&D. Further, we explore the link between R&D activities and productivity of research efforts. To be precise, we investigate whether the R&D spending firms were able to generate new products or new process into the market (Ugur et al., 2020). The introduction of a new product is regarded as an outcome of innovation (Gault, 2010). Since innovation is one of the key drivers of economic growth and development (Schumpeter, 1934), it is vital to examine the success of investment in innovation activities. To achieve our objective, we rely on a unique firm level survey data on Indian firms obtained from the World Bank Enterprise Survey (WBES). We find that the medium-sized firms are more R&D intensive compared to the small and large-sized firms. However, our research productivity analysis indicates that there is no significant difference between the performance of medium and large-sized firms.

The remainder of the paper is organized as follows. Section 2 describes the data employed in the study. Section 3 examines the size distribution of R&D investing firms. Section 4 investigates the productivity of R&D investing firms. Finally, section 5 concludes the study.

2. Data and variables

For the empirical purpose, the data is sourced from the World Bank Enterprise Survey (WBES). The WBES carries out a survey on non-agricultural firms on an irregular interval. WBES data is obtain data from 135 countries and uses a standardized questionnaire, uniform sampling methodology for easy comparison across countries. Since 2010, the WBES survey include a module on the innovation activities of the sample firms in conformity with the Oslo Manual definition of innovation outcomes. In the case of India, the recent survey was conducted in 2014 and we use the same in our analysis. The survey covers 9270 firms which belong to the manufacturing and service sectors.

To get an overview of the distribution of firm size in the sample, Figure 1 depicts the number and percentage of small, medium and firms in the data. We follow the World Bank classification of firm size based on the number of employees. We consider small-sized firms are those enterprises with number of employees less than or equal to 19. Enterprises with the number of employees between 20 and 99 are considered as medium-sized firms while large firms are those with more than or equal to 100 workers. From the firm size distribution, we observe that our data is predominantly dominated by medium-sized firms (44%), followed by small (34%) and large-size firms (23%).

![Figure 1. Size-distribution of sample firms](image_url)

Source: Authors’ calculation using World Bank Enterprise Survey.

To capture whether the firm is investing in R&D activities, we rely on survey question “During the last three years, did this establishment spend on formal research and development activities, either in-house or contracted with other companies?” The firms that report yes are considered as R&D investing
firms and firms those which report no are treated as non-R&D firms. To get a glimpse of firms investing in innovation activities, Figure 2 illustrates the number of firms that invest in research and developments (R&D). It indicates that a more than one third of the sample firm report engaging in R&D activities. The statistics show that 35% of firms conduct innovation activities.

**Figure 2. R&D and non-R&D firms**

Source: Authors’ calculation using World Bank Enterprise Survey.

In order to account the R&D productivity of the firms, we examine whether a firm has introduced a new product or a new process in the market (Castellacci, 2015). To capture the introduction of new product, we use the survey question “Were any of the new or significantly improved products or services also new for the establishment’s main market?” whereas the survey question “During the last three years, has this establishment introduced any new or significantly improved methods of manufacturing products or offering services?” (Chundakkadan and Sasidharan, 2019). Figure 3 show the percentage of firms introduced new product and new process into the market. It shows that 44.91% of firms in our sample have introduced new product whereas the percentage of firms introduced new process is registered as 47.95.

**3. Size and R&D investments**

We begin our empirical analysis by examining the size distribution of R&D firms. Figure 4 presents the number and percentage of R&D firms which belong to each size classification. The figure shows that 24% of R&D firms belong to smaller firms while large firms accounts for 32%. It is also interesting to know that the majority of R&D firms in our sample are medium-sized firms (44%). This result indicates that the R&D investment is not uniformly distributed across firm size; rather, there is a clear disparity between the three groups in R&D spending. This result is not surprising since small firms given the human and financial constraints may not be in a position to devote more resources for R&D. This finding is also in line with Cohen and Klepper (1996) argument that due the smaller scale in production, small firm may find it difficult to appropriate returns from R&D which may limit their ability to invest in R&D activities.

**Figure 3. Firms introduced new product and new process**

Source: Authors’ calculation using World Bank Enterprise Survey
Further, we extend our analysis to investigate the industry-wise distribution of R&D firms. We plot the percentage of R&D firms in each industry in Figure 5. This figure helps to understand the percentage of R&D firm in each industry. We observe the highest share of R&D firms in the leather industry (50.52%). In the manufacturing sector, other industries that account for a higher share of R&D firms are recycling (50%), electronics (48.03%), precision instruments (48%), garments (47.14%), transport machines (47.08%), Chemicals (43%). In the service sector, the highest share of R&D firms belongs to information technology (IT) (41.77) and hotel & restaurant (39.89) industries. One can also infer that manufacturing sectors are more engaged in R&D activities than the service sectors.

The above analysis helped to understand the industry-wise distribution of R&D firms. However, since the aim of our study is to understand the same from the viewpoint of SMEs, we proceed to examine the participation of SMEs in R&D activities. We plot the industry-wise distribution of R&D spending SMEs in Figure 6. It shows that the majority of innovative activities is carried out by SMEs in most of the industries. The large firms have the upper hand only in the IT industry. In the manufacturing sector, SMEs are dominant in recycling, wood, and paper industries.
So far, we analysed the R&D spending of the Indian firms. However, one of the pertinent questions is whether these firms are successful in the innovation outcomes. To evaluate the performance of R&D spending of firms, we examine how many firms introduced new product and process into the market. In Figure 7, the left side shows the percentage of R&D investing firms introduced a new product into the market whereas the right side shows the percentage of R&D firms introduced new process into the market. It shows that 63% of small R&D investing firms have introduced a new product into the market while 74% and 72% of medium and large firm introduced a new product into the market respectively. In the case of the new process, 74%, 81% and 82% of R&D investing small, medium and large firms respectively find success in their investment. It is also interesting to observe that even though the percentage of large firms investing in R&D is relatively lower than medium-size firms, their R&D productivity indicators are similar to medium-sized firms.
Figure 7. R&D productivity

Source: Authors’ calculation using World Bank Enterprise Survey.
4. Conclusion

This paper explores the role of SMEs in innovation activities in India. We begin our study by investigating the R&D investment of SMEs and large firms. For the purpose, we use recently available World Bank Enterprise Survey data for India. We further extend our analysis to explore how productive R&D spending firms are in terms of introducing a new product or process into the market. In order to capture the R&D investment and introduction of new product & process, we rely on the survey questions. Our finding suggests medium-sized firms are investing more in R&D activities, followed by large firms. We also observe that the percentage of the firms which introduced new products and processes into the market is almost similar between SMEs and large firms.
References


Industry 4.0 Innovations for Indian SMEs in Real Estate Sector

Nomita Sharma

Abstract

The advancement in technology reshaped the basic nature of real estate sector in India. There is a shift from traditional real estate to smart-technology based real estate sector. Smart technological innovation has resulted in change in the real estate sector. It has added lot of innovations in the real estate that offers better value to the consumers. The use of computers and automation has resulted in the autonomous systems that can control itself. These innovations are fueled by data and machine learning. These smart technological innovations can be in the form of automatic door with sensor or security systems or even conveniently aligned walls of the house or even robotic mason, that can built a wall on its own with little support human intervention. In this paper, industry 4.0 innovations like big data, artificial intelligence, augmented and virtual reality and real estate building technology and real estate operations automation are correlated with effect on the small and medium enterprises (SMEs) in real estate sector. This paper is an attempt to understand the innovations in the fourth industrial revolution on the real estate sector. Some regional examples representing effect of industry 4.0 on real estate are presented to provide better perspectives of the study. The paper is supported by three company specific examples from real estate sector. It concludes that industry 4.0 has started its flight in Indian real estate sector and small and medium enterprises can increase value additions from industry 4.0 innovations.

1. Introduction

The next industrial revolution after industry 1.0, 2.0, 3.0 is industry 4.0. It is often described as smart manufacturing or industrial internet of things (IIOT), (Epicor, 2019). It is related to interconnectivity, automation, machine learning and real-time data. It heavily relies on innovative approach of digital technology. It combines the physical production with digital technology, (Epicor, 2019). Industry 4.0 has the capacity to modify behavior and adapt on its own in order to fit within environment. It may be a database, web, wireless access, or sensors (IGI, 2019). Though computer, robots and automation has been in the business environment but internet and its application has extended their applications, (Monostori, 2014, Deloitte, 2015; Geissbauer, et. al. 2016).

There are different examples where use of digital technology can be seen, like in the plant pots where pots indicate the level of water required by the plant. It can be seen in the mobile phones that can sense wireless internet connection on its own. The smart technology relies on the use of internet to provide...
better connectivity. It may also be a combination of devices, internet and artificial intelligence. Industry 4.0 has provided smart systems providing better access to data and connectivity. There are smart classrooms that provide better and efficient education to students. The attendance of the students can be monitored with the sensors in an educational institute. Smart watch can not only tell time but it also allows the wearer to check emails or even click photographs. In the real estate sector, there are now smart houses and smart cities that are equipped with better technologies like sensors, automatic devices etc. to provide better housing service and overall, better quality. The focus of the study is to explore the industry 4.0 innovations SMEs in Indian real estate sector. SMEs are acting as support facilitators for big real estate developers.

The real estate sector is considered as a major source of employment generation. It also generates income in both the organized and unorganized sectors. The sector has become the preferred destination for investment (ibef, 2019). Smart technology aims at providing end-to-end connectivity in managing resources. In the words of Peter Williams, CEO, Deloitte Digital, said “Real estate agents will not be replaced by technology but by agents with technology”. People are likely to spend more on smart technology. Industry 4.0 provides benefits like increase in value of resources in which it is used, can attract more tenants or buyers or sellers, consumer has to spend less time in the market, and transform marketing real estate. This can also result in the emergence of new smart developments. Due to increase in economic and social changes, real estate sector will go through a transformation by 2020 as per a report by PwC, (2014). Consumers prefer comfort and security when they decide to buy home. There has been strong relation between lifestyle and real estate. Real estate and communities that intentionally put people’s health at the center of design, creation and redevelopment are the next frontier in residential real estate, (Global Wellness Institute, 2017).

Technology has impacted our lives to a great extent and improved lifestyles as well. Now consumers don’t just want a home but they want a smart home. Innovations in smart technology has certainly created a revolution in real estate sector. Oyster (2018) in the study by ABI Research suggests that spending on smart home products will increase in future. This will be around $123 billion by 2022. Due to potential growth in the smart home sector, many competitors are trying to gain early impact. The effect of industry 4.0 on real estate sector may be direct or indirect. This may be in the form of increase in value of property, increase in the sales, or improvement in the culture in itself or use of technology in constructing new structures.

The paper starts with the brief introduction about the topic. This is followed by methodology to be followed in the paper. Next part of the paper is the analysis which includes extensive literature review to answer the issues in the study. This further helps in industry 4.0 innovations that SMEs in the real estate sector can use. This is followed by discussion. This part discusses the findings and analyses the paper. The second last section concludes the study and is followed by limitations and future scope of the research study.

2. Methodology

This section outlines the research methodology used in the study. It starts with an evaluation of literature on the topic. The analysis of the literature provides a systemic review of the industry 4.0 innovations in Indian SMEs in the real estate sector. Globally, real estate sector is one of the most recognized sectors. It is expected that contribution of real estate sector to country's GDP will be 13% and market size will be US $ one trillion by 2030.
Science and Technology Trends

The industry 4.0 technologies are studied in categories—big data, artificial learning, the internet of things, building technology, augmented/ virtual reality and real estate operations automations. These innovations can be used by Indian SMEs in the real estate sector.

The study explores industry 4.0 innovations for Indian SMEs in the real estate sector. They have potential to result in better value of property or increase in sales or better overall culture. In the past research studies, previous industry revolutions i.e. industry 1.0, 2.0 3.0 have been studied. But there is paucity in the study of industry 4.0 innovations in the Indian SMEs in the real estate sector. The paper is an attempt to address the research gaps through literature review relating the dependent and independent variables through some specific regional examples. Apart from literature review and specific examples from Indian real estate market are also considered for better analysis of the paper. Few informal interviews are conducted with real estate property developers and property dealers in order to understand the importance of industry 4.0 for SMEs on the real estate sector. The selected sample for interview is from New Delhi, NCR. The time period for the interview is from July 2019 to Nov 2019.

The selection of the literature is on the basis on time period and topic analyzed in the paper. The time period of the research papers studied is in the range 2014 to 2019. Conscious decision is made to analyze recent papers in order to have current research perspectives. The research papers are selected from journals from the area of real estate technology, industry 4.0 and its attributes, effect of industry 4.0 on the real estate sector.

3. Analysis

The study is an attempt to explore relation of industry 4.0 attributes on the real estate sector. This part has two sections, the first section presents literature review on the topic and the second section presents the region specific examples from Indian real estate market. At the end, section also presents three specific examples of real estate sector companies and their views on effects of industry 4.0 on real estate sector.

3.1 Literature Review

There will be increase in demand for new types of warehousing, especially the ones that are closer to the customer. There will be willingness to use smart data for adding value. Smart technology can be used to verify and monitor information regarding tenant. This will help property owners make better decisions. Moreover, the advance technologies have potential to contribute towards greener buildings, (PwC, 2014). In case of Kenya, developers are promoting internet ready homes. In future, it is also estimated that internet of things (IoT) will be used in home searches. In India, internet of things has enabled consumers to search home as per convenience. Websites like magicbricks.com, 99acres.com and many more are providing easy mode of search, buy and sell options to the prospective consumers. Voice-driven applications that are embedded on phones will allow automatic communication with the buyers and sellers. The future certainly belongs to low-cost, sustainable and environment friendly housing. In Kenya, real estate developers are focusing on innovative ways of building houses. Companies like BlackRhino VR in Kenya are commercializing the potential of virtual reality. The customer can experience the property through the power of virtual reality. In 2014, 3D printed house was pioneered by Winsun, a company based in China. It resulted in 80% construction cost and 60% labour cost, (Cytonn Technologies, 2019). This is because of increase in housing cost globally. House Affordability
has declined due to rising housing cost in comparison to the income level. The other factors include supply of houses, shortage of land, change in the demographics, population growth, ageing and change in household composition (World economic forum, 2019).

Alhowaish, (2015) has investigated the relationship between construction flow and economic growth for Saudi Arabia during the 1970–2011 period. The real estate sector has linkages with other economic sectors (Bon and Pietroforte 1990; ILO 2001; Ewing & Wang 2005; Jackman, 2010). According to Hillebrandt (2000), general economic situation and expectations about future changes are the two factors affect construction demand. Due to changes in economic conditions globally, the real estate sector has undergone through diverse change. According to Rene Van Berkel, (2019) from UNIDO, Indian SMEs need to first standardize their procedures and operations rather than merely following industry 4.0 innovations, (Economic Times, 2019).

3.1.1 Industry 4.0 and its Building Blocks

The advancement in technology in the form of industry 4.0 has the potential to transform the production. It results in better efficiencies and relationships among suppliers, producers, and customers. Different report have suggested different building blocks of industry 4.0. A report by BCG (2019) suggests nine technology trends that form the building blocks of Industry 4.0. They are big data analytics, autonomous robots, simulation, horizontal/vertical system integration, the industrial internet of things, cyber-security, the cloud, additive manufacturing and augmented reality. Report by Deloitte (2016) suggests three main technologies of industry 4.0 are artificial intelligence, augmented reality and virtual reality and online to offline intelligence.

Table 1. Building Blocks of Industry 4.0

<table>
<thead>
<tr>
<th>Building Blocks</th>
<th>Benefits</th>
</tr>
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<tbody>
<tr>
<td>Artificial Intelligence</td>
<td>Artificial intelligence is used by companies to engage with customers online. It can be used to collate information to make efficient decisions. Companies are deploying AI technologies around their products, solutions, and services to facilitate a natural-language Q&amp;A dialogue with customers online and through mobile applications. AI-driven platforms can aggregate information across systems to make recommendations based on a broad swath of data regarding customers, applications etc.</td>
</tr>
<tr>
<td>Augmented and Virtual Reality</td>
<td>Augmented reality and virtual reality has indeed motivated consumers to visit showroom so that they can physically experience a product. Moreover, it has also helped customers to take product trials and focus on the preferred features in a product. Virtual reality gives a virtual feelings to the customers.</td>
</tr>
<tr>
<td>Big Data</td>
<td>Big data helps customers and property dealers to find building as per requirements of consumers. It also appraises the profitability of the property for the buyer. With big data and analytics, property developers or even customers can review patterns to judge property as a good investment. The frequency patterns of the buyers can be analyzed to create a model for better demand forecasting.</td>
</tr>
<tr>
<td>The Internet of Things</td>
<td>The internet of things is technological infrastructure with combination of physical systems like thermostats, plumbing, electrical devices etc. that are connected with internet. This activates the ‘smart functions’ of these devices. It has profound impact on the real estate sector as it has redefined the way properties are bought, sold or owned. The IoT helps in increasing energy efficiency and also in automating and resolving building maintenance issues. This results in convenience for property buyers and sellers, (Fisher, n.d.).</td>
</tr>
<tr>
<td>The Cloud</td>
<td>An online property exchange network company, Private Exchange Australia (PEXA), is providing innovative solutions. It facilitates legal and finance professionals in transferring the required paperwork to the land registries.</td>
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</table>
According to three technologies will play a pivotal role in the real estate sector. The three technologies are virtual reality, the cloud and blockchain. A report by GfK (2018) indicates that one-third of consumers in US have two or more smart devices. They further state that 27% of US consumers have more than three smart home devices. Almost 50% of the people were found to have at least one smart home technology. Moreover, the results also hint that 58% of the people think that smart homes will result in change in their lives in the future. As per Deloitte (2018), there will be expansion in the market for real estate service providers towards the area of complex, high-tech services. Therefore there is an opportunity to link smart technology with the new ways to serve in the real estate sector.

The third industrial revolution is characterized with large industrial and manufacturing complexes that are interconnected. The industry 4.0 will result in a major change in real estate sector resulting in flexible and multifunctional buildings. The focus will be on the modular type of properties. These can be used as per the requirement of business ranging from warehouse to even R&D facility. The effect can be further studies in three real estate parameters: building fit-out and architecture; locational factors; building function (BEOS, 2014).

3.2 Specific Examples from Indian Real Estate Market

In India, government has developed a smart city mission to transform traditional cities into smart cities. The efforts are initiated to provide better connected and automated systems. For example, there is plan to start uniform smart card that can be used across different systems like transportation, education, hospitals etc. The uniform card can be used by passengers on different modes of public transport. The same card can be used for attendance of students in class and also as a library card to issue books or pay fine. The library building will be equipped with automated systems to implement this plan. In order to create awareness, government has started round of competitions among states. States like Dadar and Nagar Haveli, Tamil Nadu have secured first and second positions as smart cities. The smart cities will promote mix use of land, expand housing opportunities, create walkable space, develop online services for better governance and citizen-friendly city, use of mobiles for better implementation and developing e-groups for better communication, having online control systems and cyber tour of worksites, (Smart Cities Mission, Government of India, 2018).

3.3 Views of Key Players in Indian Real Estate Sector

NBM Media’s publications NBM&CW that publishes on building and construction industry has compiled views of the prominent players in the real estate sector. The advancement in the technological innovations has potential to reshape real estate sector in India. Three enterprises have shared their view on smart technologies and real estate sector (NBM, n.d.).

3.3.1 Transcon Developers

Artificial intelligence, along with machine learning in real estate helps in managing cost, risk of mechanical systems. It further results in increased returns. Due to these reasons, AI has wider scope and ability to reduce operational cost, enhance customer service, in maintaining competence and in managing resource depletion within the industry. There are indicators of the positive response of real estate companies to address changing needs of their customers. There are different ways in artificial intelligence is modifying the real estate sector. Some of them are discussed below:
Table 2. Benefits of Artificial Intelligence

<table>
<thead>
<tr>
<th>Chatbots</th>
<th>Many real estate companies in India have started deploying chatbots on their websites. These digital transformations have helped in bringing the overall cost down for customer services, and optimized the time intervals spent on answering customer queries.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Analytics</td>
<td>Revenue and growth targets can be set by the property investors. They can then evaluate the risk involved in the property through intellectual robots. These robots can evaluate the investment parameters and suggest the necessary modifications to benefit the customers.</td>
</tr>
<tr>
<td>Forecasting Loan Defaults</td>
<td>This can help in forecasting loan defaults which results in increased profit. The risk valuation process becomes more organized. It focuses on the profitable investments.</td>
</tr>
<tr>
<td>Deal Matching</td>
<td>The investment criteria can be set by buyers and matched with the other deals.</td>
</tr>
<tr>
<td>Construction Automation</td>
<td>There are tools used by companies to obtain quality material at best price from the best suppliers. The robots can act as a chief technological driver that increases profits and reduces cost.</td>
</tr>
<tr>
<td>Property Management</td>
<td>Another area where artificial intelligence can be used in property management. It can help in observing and planning the maintenance systems. Even the rental trends can be traced and updated on the basis of geographical zones.</td>
</tr>
<tr>
<td>Intelligent Search Platforms</td>
<td>Use of AI by the major search engines has provide major support to the users in getting more information about the property. There is refined search available now with detailed properties like information about neighborhood, available facilities etc.</td>
</tr>
</tbody>
</table>

Source: (NBM, n.d.)

3.3.2 Synergy Property Development Services

They have given importance to use of 'Drones' in building smart cities in a cost-effective, faster and safer manner. Drones will play a leading role in futuristic buildings. As per industry report UAVs (unmanned aerial vehicles) will have a fastest growing market in India. It is expected to reach 885.7 million USD. The usage has seen growth of 239% globally. This is higher than any other commercial sector. In the real estate sector, use of drones can increase the value of a project throughout its lifecycle. They can help in completing huge projects on timely basis and provide better finishing.

Table 3. Benefits of Drones

<table>
<thead>
<tr>
<th>Improved quality and thermal imaging</th>
<th>High resolution cameras in drones can help in investigative tool building specific applications, for examples in case of inspection of roof insulation. They can also project energy inefficiencies graphically, help in identification of wet insulations in roof. They can display changes in the temperature within the building.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drones integration with BIM</td>
<td>Drones are the main assets in case of for data-driven approach. They can play main support in BIM (Building Information Modeling) workflow. They provide scalable point cloud scanning and photography during the different stages of construction.</td>
</tr>
<tr>
<td>Highly cost-effective in topographical surveys</td>
<td>Drones can also carry inspection or surveys in a cost effective manner. They can cut cost by half in case of topographic survey.</td>
</tr>
<tr>
<td>Ensuring completion of projects</td>
<td>The operational sites can be shut down for maintenance or inspection of pipes, flare stacks through use of drones. They can also help monitoring overall view of the work site. This will speed up the projects delivery and reduces unnecessary delays.</td>
</tr>
<tr>
<td>Reducing risk and keeping people safe</td>
<td>Their usage results in zero on-site incidents. The inspection work that a laborer does at a certain height, can be easily done by drone. Inspection can be safer, faster and more accurate. They can support the work of safety managers.</td>
</tr>
<tr>
<td>Compact and intelligent results</td>
<td>A smart camera can be installed on the drone. This camera can take digital photos. This provides a compact representation of the site. Even enhancement and maintenance plans can be carried out on the model generated through the camera.</td>
</tr>
</tbody>
</table>

Source: (NBM, n.d.)
3.3.3 **ANAROCK Property Consultants**

Real estate sector has seen many disruptions in many facets due to technological changes. Innovative technologies like automation in construction, innovative designs, sustainable solutions, application of prefabricated material and recently, online marketing initiatives, are generating better values for the products.

4. **Discussion**

Industry 4.0 has caused ripples across the business environment. The application of smart technology has changed the way real estate sector operates. It has resulted in more greener and sustainable buildings. Use of technology is resulted in cost saving, better alternatives and efficient management practices. Industry 4.0 is all about implementing a right kind of infrastructure. It has flexible cost, smart, reliable, fast wireless communications and robust control systems. The paper has explained the industry 4.0 innovations like big data, artificial intelligence, building technologies, real estate operations automation, internet of things, augmented and virtual reality on real estate sector. Smart technologies provide better, convenient and more options to the both buyers and sellers. It can provide an innovative way of letting a prospective buyer to view property or buyers and sellers can search each other on internet and make profitable deal. Document verification can be done efficiently. Innovative building technologies provide housing that is environment friendly and sustainable. The environmental friendly building technologies that use greener building material can be used to develop affordable housing. Three real estate parameters like building fit-out and architecture, locational factors and building function. Industry 4.0 would result in flexible buildings where buildings can be utilized for multi functional purpose. The storage building can be used as production facility and vice versa. The multi-storey building can be utilized for office space in day time and for evening clubs by evening. In Gurgaon, (Delhi, NCR (India), several property owners are generating better value from their
property. Also, real estate developers have rented individual rooms for different purposes to different organizations from different sectors. Government has plans to transform some old cities into smart cities. The smart city will provide a better environment to live with less air, land and water pollution. It will make use of online services to provide better governance. There will be use of automated systems connecting different areas like transportation, education, health etc. The informal interview with the real estate developers and property dealers revealed that the effect of industry 4.0 on real estate sector will not just due to industry 4.0 rather it will depend on the cost of technology. And Indian SMEs will face challenges like, cost, skilled manpower etc. to implement industry 4.0 innovations. They further suggested that high cost of technology will deter individuals from buying high technology based properties. Different type of the property i.e. commercial, residential or agricultural properties with respective criteria’s may be listed on the dashboard for better deals. Three corporate examples highlight the benefits of industry 4.0. They have given stressed on the benefits of artificial intelligence and machine learning, drones and other technological innovations in real estate sector. In future, real estate companies are going to reap benefits from technologies like 3D printing, building information modelling (BIM), artificial intelligence and machine learning. Virtual and augmented technology has changed the way safety trainings are given to workers. Drones are helping in site inspection and measuring accurate specifications. The best industry 4.0 innovation is the creation of ‘Construction Robots’ that can be used as semi-automated masons. They result in faster and precise construction work. But there will be always cost barrier for small and medium enterprises.

5. Conclusion
The study has tried to understand the Industry 4.0 innovations for Indian SMEs in the real estate sector. Industry 4.0 technologies like big data, internet of things, building technology, augmented and virtual reality have facilitated better services to the prospective buyers and sellers. It has provided a better platform to both buyers and sellers to complete and control transactions faster. The process of purchase has been eased. Now there is no need to physically check the property in the initially stages of buying property. Customers can take virtual tours of the property and make decisions accordingly. Greener building technologies are used to provide eco-friendly and affordable housing for everyone. Big data can help in analyzing customer life cycle in the real estate sector. Few specific examples from Indian real estate market are presented in paper to provide better understanding of the topic. In India, the government plans to focus on smart cities that will see increased use of industry 4.0. This will provide better connectivity and automated systems to the citizens. Cost of technology is considered as a main factor deciding effect of industry 4.0 on the real estate sector. This is suggested by real estate developers and property dealers who are approached for the study. The SMEs in the real estate enterprises see a bright future through use of industry 4.0 technologies in creating value additions for customers. Moreover, Indian SMEs need to first use standardized operations rather using ‘jugaad operations’ before embracing industry 4.0 innovations.

Limitations of the Study
The study is limited by the selection of single sector. The impact of industry 4.0 can also be studied in the different sectors like education, automobile, healthcare etc. The study is relies on the secondary data. This can be extended to the other continents also. This will provide the global perspective of the study. Last, quantitative analysis can be done to ascertain the degree of effect of industry 4.0 innovations on the Indian SMEs in the real estate sector.
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Moving To The Cloud: A Small And Medium Enterprises Perspective

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Abstract

Small and Medium Enterprises (SMEs) are a core component of any strategy designed to achieve inclusive economic growth in Asia. While SMEs recognize the benefits of technology, the sector is slow to embrace such solutions. Cloud computing has been viewed as a promising platform for such organizations. Real-life cases have shown the positive impact of cloud computing, particularly cloud enterprise resource planning (cloud ERP) on global operations. While literature expresses the potential benefit of cloud ERP for SMEs, a formal study of its adoption issues has yet to be conducted particularly in the Philippine context. This is crucial because 99.6% of the Philippine economy is comprised of SMEs.

This work aims to uncover these issues, viewed using the Technology-Organization-Environment Theory by employing a qualitative, multiple case study approach. In-depth interviews with the chief executives were conducted. Findings indicate that the drivers are supplier's influence, level of maturity towards technology adoption, cost as free while the barriers are government control and influence, telecom industry/infrastructure, cost, knowledge, and data security. This study also revealed that cost is both a driver and a barrier from a Cloud adopter and a non-adopter perspective.

Keywords: Cloud ERP, Cloud Computing, small and medium enterprises, ICT adoption

1. Introduction

In the Asia-Pacific region, 97% of businesses are micro, small, or medium enterprises. It accounts for 70% of all jobs, but only accounts for 35% of annual global exports. SMEs are businesses engaged in any business activity in an industry, agribusiness and/or service. The definition of SMEs varies from country to country, but in the Philippines, it is based on size and assets (excluding land). Based on the 2015 statistical data provided by the Philippine Statistics Authority (PSA), there are 900,914 establishments in the Philippines. Of these, 99.5% (896,839) are micro, small, and medium enterprises (MSMEs) and the remaining 0.5% (4,075) are large enterprises.

However, SMEs are faced with challenges related to innovation such as ICT, the lack of ability to be globally competitive, to market products and solutions based on customer needs and their inability to fully leverage the benefits provided by the digital and internet economy (APEC, 2016)]. Small businesses are typically slow to consider ICT

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solutions, and therefore fail to take advantage of opportunities to scale as it operates in a digital economy (Asia Cloud Computing Association, 2015).

The Asia-Pacific Economic Cooperation held its Small and Medium Enterprises Ministerial Meeting in Vietnam in September 2017 which focused on how SMEs from member countries can improve its competitiveness and innovation. It opines that technologies can create huge opportunities for startups like cloud computing, connectivity, artificial intelligence, and big data. More recently, APEC discussed that SMEs need to adapt, thrive and participate actively in the digital transformation which is needed for inclusive economic growth. They have cited digitization initiatives on online to offline channels, mobile-commerce, sharing of economy and Internet of Things (IoT).

In the field of ICT, there is now a growing interest in the researchers, the business community and professional organizations on the importance of using cloud ERP and assess the value of cloud ERP. Most of the academic articles lack a theoretical basis (Rodrigues et al, 2014) while early cloud ERP research papers are descriptive study. Since Cloud ERP is an emerging technology, longitudinal studies are still not available. There is also a need for practical and empirical research directly pointing to cloud ERP (Grubisic, 2013).

In addition, many of the early cloud ERP research is descriptive studies (Haddara et al, 2014; Rodrigo et al, 2014) in their analysis. There is a need for practical and empirical research on cloud ERP to avoid pitfalls and misinterpretation in the adoption of cloud ERP (Gide, 2015). While the majority of the researchers agree on the benefit of cloud ERP for SMEs in a global context (Lewandowski, 2013; Johansson, et al, 2015; Salim, 2013; Grubisic, 2013; Rodriguez et al, 2014), it is important to see how such technology can be used in the local context, as Philippine business is largely composed of SMEs.

The use of theories in SaaS business applications' impact on SMEs is also very limited and calls for more theory use. Though both Cloud ERP vendors and IT researchers agree that Cloud ERP is the next big thing, SMEs are still reluctant to adopt due to some barriers (Rodrigues et al., 2014).

Recent studies show the impact of Cloud ERP based on vendor’s perspective (Chen, Liang & Yu Shu, 2014; Grubisic, 2013; Johanson & Ruivo, 2013; Seethamraju, 2014; Garverick, 2014; Johansson, Alajbegovic,& Alexopoulos, 2015) or from an IT professional perspective and not on the user’s perspective such as the SMEs. It is important to understand how SMEs can embrace cloud ERP and its impact on their business, especially on the point of view of the owners and key decision-makers.

This study revealed that SMEs will adopt Cloud ERP when the subscription is free and there is pressure from an external third-party organization such as its Principal Supplier (PS). The PS’ pressure on distributors to adopt cloud ERP to integrate into its supply chain is a major factor in cloud ERP adoption. This is part of the PS’ goal to improve supply chain management, quickly respond to change based on customer's demand and preference, improve product quality and lower production cost. For a more organized-structured SME, the level of maturity of technology adoption within the organization and its key decision-makers drives the Cloud ERP adoption.

On the other hand, cloud non-adopters admit that it is a big challenge to understand the technology and the investment cost for successful adoption. However, SMEs are open to undergoing a free-trial period to understand and appreciate the benefits of cloud ERP.

Both the adopters and non-adopters agreed that the country needs to significantly improve its telecom infrastructure, as cloud ERP is heavily dependent on a secure and reliable internet connection. Respondents believe that the role of government
is crucial in ensuring this service is provided.

An Awareness-Adoption Road Map for SMEs using the Cloud ERP-Process View Approach is proposed to usher SMEs to the 21st century’s digitally-enabled business environment. Focusing on the Awareness Stage, a road map both for the SME owners and end-users will be formed in partnership with the government, Academia, IT industry, large corporations, financial institution, and telecom companies.

2. Theoretical Framework

Some earlier studies on SaaS was a combination of Diffusion of Innovation (DOI) and TOE. In a study to explore the key factors impacting cloud-based service adoption in Indian SMEs (Gide & Sandu, 2015), the Diffusion of Innovation (DOI) theory and the Technology-Organization-Environment (TOE) framework were used as the theoretical framework. However, it failed to present the methodology used in the study. The factors described are based on previous studies as supporting literature. Though the paper served as a guide for the Indian SMEs, it failed to identify which factors are applicable to Indian SMEs.

There is another cross-sectional field study using multiple case studies on the adoption of SaaS-based ERP in India (Seethamraju, 2014) for four SMEs using the same Cloud-based ERP software. The paper was grounded on the Technology-Organization-Environment (TOE) framework and Diffusion of Innovation (DOI) theory. The study collected data from senior managers of the enterprises and implementation consultants and representatives of the software vendor who were involved in the implementation of SaaS ERP at those firms. However, the study has two limitations: (1) it is focused on one SaaS ERP vendor, and (2) the use of a cross-sectional study suffers from the limitation of drawing definitive conclusions and findings that are embedded in context.

On the other hand, there are also related studies that focus on Technological, Organizational, and Environmental (TOE) Framework (Tornatzky & Fleischer, 1990) as the sole underlying theoretical framework. The TOE framework was used in the identification of critical success factors in the adoption of cloud computing in developing countries like Taiwan (Lian et al, 2014).

Since the identification of factors is the prime focus of the study, the author used the TOE framework as it sets a generic set of factors as the basis to predict the likelihood of technology adoption. The TOE framework is a broadly applicable theory that can be used in the study of SaaS Readiness Researchers can choose the different factors, but it is dependent on the researcher which variables to use.

TOE encompasses areas in the context of technology, organization, and environment on the firm level. The technological context deals with the internal and external technologies that are important in conducting its business process that creates value. This can be owned by the organization and sourced externally through purchase, acquisition or lease. Organization context deals with the formal and complex structure of the organization, availability of human resources and related skills and the availability of slack resources. Environment context refers to the external context to which the organization operates. This includes pressure from the competition, the availability, and readiness of the institution in which they operate like government policies, economic policies, and technological infrastructure.

3. Methodology

This research employed the discovery of new factors
related to Philippine SMEs; making use of the qualitative, multiple case study approach (Yin, 2009). In choosing the respondents in this study, the following criteria were used: (a) use of ICT in the organization, and (b) respondent must be a key decision-maker in the adoption of technological innovation in their organization. Based on a preliminary quantitative study of the Philippine Franchise Association, a voluntary organization who shares the vision that SMEs are part of the inclusive growth through franchising. Out of the 245 PFA members, three cloud ERP adopters (CEA) and three cloud non-cloud ERP Adopters (CENA) were chosen to provide insights on their experiences while implementing cloud ERP.

The Philippines’ National Economic Development Authority (NEDA) recognizes the value of franchising for developing local industries. NEDA mentioned that franchising is a means of accelerating the development of small and medium-sized enterprises (SMEs). As part of the PFA’s mission, they are supporting the development of SMEs through incubation centers, make franchising affordable to SMEs, and expand the franchising concept nationwide.

CEAs are those who had implemented Cloud ERP for the last two years while CENAs are those who have not implemented nor heard about cloud computing technology. For the qualitative data collection, an in-depth interview with the Chief Executives/Managing Director was conducted.

4. Presentation and Analysis of Data

4.1 Cloud ERP Adapters

This study aims to determine the factors that will influence Philippine SMEs to adopt or not to adopt Cloud ERP. The barriers to adoption are identified as both internal and external (Tarute & Gataustis, 2014). External barriers are brought about by political and cultural issues while internal barriers are those that easily change due to progress (Ashrafi & Murtaza, 2008).

4.1.1 The Case of CEA1

Cloud ERP Adopter (CEA1) is a pharmaceutical distributor covering the metropolitan area, where SMEs account for the majority. The National Capital Region (NCR) belongs to the top five industries in terms of the number of MSMEs in 2017. CEA1 was appointed by a Filipino-multinational pharmaceutical company with operations within the Southeast Asian Region.

4.1.1.1 Drivers

External Pressure. Drawing on the TOE perspective, environment pressure was the main reason why CEA1 adopted Cloud ERP. In CEA1’s case, it was a result of a coercive pressure from their PS. The project’s objective was to monitor their distributor’s inventory, sales, and receivables. In addition, this was done to ensure that the distributor’s sell-out is within their coverage area to avoid overlap among each other.

Support from external parties is an important factor that influences adoption (Salim, 2013). From the point of view of CEA1, external pressure from their PS had a strong influence to push for Cloud ERP adoption.

Cost. A concern of SMEs is that they do not have the financial resources to invest in sophisticated software for their operation. Unless an external entity shoulders the software, they will not consider Cloud ERP.

By special arrangement on cost-sharing, the PS shoulders the Cloud ERP subscription cost while CEA1 shoulders the internet subscription, thereby, this becomes an attractive scheme for SMEs. The
cost-sharing scheme benefits both the PS and distributors because they can monitor inventory movements, sales, receivables and eliminate territorial conflict due to the geographical separation.

Cloud-based ERP makes it easier for all parties within the supply chain to get visibility, no matter their location or relationship with the Principal Supplier. Moreover, sales issues could be accomplished automatically over the cloud. Due to the integration of Cloud ERP, it is easier to connect different parts inside and outside the enterprise (Elmonem et al, 2016).

Having PS and distributor in the supply chain allows them to focus on products that are fast-moving, forecast sales accurately and create a promotion for slow-moving products. In the same manner, distributors can improve their business process and adhere to the industry’s best practices, thus, achieving operational efficiency. This is a competitive advantage over other SMEs, which allows them to be exposed to advanced software solutions in the cloud. These extend their marketability to other products and services.

4.1.1.2 Barriers

The barriers are factors that prevent SMEs to adopt Cloud ERP. In the case of CEA1, security is of primary concern, followed by internet infrastructure.

**Security.** CEA1 perspective of Cloud ERP security is about ensuring that data is kept private, with no leakage of information, trade secrets or best practices. These are confidential information that provides them leverage among their competitors. Their primary concern is protecting the confidentiality and non-disclosure of company information from their competitors, such as customer information, product offerings, pricing, and pricing structure. Part of documented best practice in the cloud-based ERP implementation is considering security concerns like data residency, user provisioning, authentication, authorizations, and single sign-on, user activity and access monitoring, security vulnerabilities management, disaster recovery planning, due diligence, and service level agreements and incident response Cloud Security Alliance, 2017).

Examples of such confidential information are a list of customers, product offerings, pricing, and pricing structure. When the idea of Cloud ERP implementation was presented to them by the PS, CEA1’s management was worried about the accessibility of the Cloud ERP software. There was an impression that once the user name and password is disclosed, people outside of the organization can access it. However, the PS assured CEA1 that identity management and access control will be in place for security purposes. Security questions and authentication credentials are examples of these.

During the first year of implementation, CEA1 encountered problems with data protection. There were frustrating employees who had access to the data who tried to threaten the management. To solve this problem, CEA1 decided to restrict access to managers in the inflow/outflow of information from their network making their Cloud ERP more secure. As part of the security policy, lower-level employees were given access to the inflow/outflow of information internally, but they cannot send information outside of the organization. A firewall was installed to protect the application from external IP addresses.

**Internet Infrastructure.** Another challenge that CEA1 encountered is the country’s network infrastructure. In the Philippines, internet connectivity is a problem. Unlike other countries like Singapore, Hongkong, and the US, the internet is fast and stable. CEA1 subscribed to two major telecommunication companies. However, when copper wires are disconnected due to theft (Phil star, 2018), or the telco itself encounters a problem, CEA1’s operations are badly affected, in particular, sales operations.
Even though the major telecom companies already deployed fiber optic cables, CEA1 still encounters problems with internet reliability and downtime (Schneider, 2016). To overcome this problem, the use of pocket-WiFi as a source of internet back-up became handy.

On the other hand, CEA1 thinks that the flexibility of having an on-premise ERP allows any business to have more control, the ability to customize, and the system can be customized based on their unique business requirements. Because the market is dynamic, SMEs requires ERP software that is easily customizable. However, an on-site ERP requires SME to invest in hardware resources and hire IT staff, which translates to a higher cost of operations.

4.1.2 The Case of CEA2

CEA2 is a franchisor of a chain of drugstores nationwide that offers quality, affordable, generic medicines.

4.1.2.1 Drivers

In a separate, deep interview with the Chief Technology Officer of CEA2, the level of maturity among the decision-makers are the primary reason why their organization implemented Cloud ERP smoothly. CEA2’s chief executives and senior managers believe that innovation is one of the keys to gain a competitive advantage. For CEA2, it was not difficult to convince the management to adopt ERP deployed over the cloud. The project was supported by organizational needs, budget and timeline, security control, and implementation strategy.

4.1.2.2 Barriers

Technology Maturity. CEA2 shared that there is a need to understand the level of maturity of the Philippines when it comes to technology adoption. As compared to a developed country like the US, Japan, China, (PNA, 2018), the Philippines is far behind with respect to innovation. The Philippines remained 73rd of 126 economies in 2018 (Philippine News Agency, 2018).

Education. The CTO observed that the country lacks targeted education programs that encourage entrepreneurship and digital transformation of businesses. While there has been an uptake on technology incubation units with the support of the Department of Science and Technology (DOST), this has not reached critical mass. This affects the appreciation of technology’s effect on business transformation and innovation.

Readiness. CEA2 also perceived that Philippine SMEs are “not into technology”. For example, SMEs in the metropolitan area does not use any technology equipment/gadgets such as a laptop or smartphones in running their businesses. They are focused on the business livelihood or being an entrepreneur to make it more sustainable in the market.

From the CTO’s point of view, the use of technology will start on the economic status followed by the adoption of technology in the mainstream. With the use of technology in running the business, it is expected that new opportunities will be available for SMEs.

4.1.3 The Case of CEA3

A pharmaceutical distributor located in the southern Philippine island of Mindanao. They were also appointed by a large multinational pharmaceutical company to distribute pharmaceutical products.

4.1.3.1 Drivers

Demand. For CEA3, Cloud ERP adoption was a demand from their Principal Supplier. Product evaluation, pre-qualification and awarding were
carried out by their PS and were handed down to CEA3 to implement Cloud ERP. Similar to CEA1, the subscription cost is shouldered by the PS.

**Ease of Use.** Currently, they are using two systems: Cloud ERP which includes Purchase Order (PO), Receiving of Delivery, Accounts Receivable (AR) and Accounts Payable (AP), Credit Memo for Purchasing and their own system. Comparing both systems, they can easily extract data from Cloud ERP while their local system can only provide raw data. Extracting data is cumbersome and requires further manipulation to get the information that they need. In addition, information such as a sell-out, inventory movement, and stocks are available in the system.

4.1.3.2 **Barriers**

**Internet stability.** CEA3 conducts its business in a highly urbanized city on the island of Mindanao. Surprisingly, telecommunication companies offered 100MBPS using fiber-optic. Like CEA1, internet downtime is experienced and alternatively uses Wi-Fi as a back-up internet connection.

4.1.4 **Summary for CEA**

Based on the deep interview conducted with chief executives and owners who adopted cloud ERP, the TOE factors in Cloud ERP adoption can be summarized using Figure 1.

Technology factors include (1) data security, quality of internet service, complete cloud ERP package, and telecom infrastructure while organizational factors include: (1) organizational resources, (2) cost, (3) level of maturity of decision-makers on technology adoption, and (4) knowledge on Cloud ERP. For the environmental factors, it includes (1) supplier’s influence, (2) level of maturity of the country on innovation and (3) level of maturity of SMEs on technology adoption.

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**Figure 1.** Cloud ERP Adoption Factors

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4.2 Non-cloud ERP Adopters

4.2.1 The Case of CENA1

A franchisor in the pharmaceutical retail industry in the Philippines. They have three hundred franchises nationwide which offers generic, affordable medicines to the Filipino people.

4.2.1.1 Driver

**Competition.** CENA1 feels threatened because their competitors that use IT in its operation. They have attempted to approach the franchise on this issue, however, their franchises still prefer to use the old system as compared to a new system. CENA1 as the franchiser is optimistic that PFA and other government agencies can look at Cloud ERP and provide awareness on the benefits and costs involved in adopting such technology.

4.2.1.2 Barriers

**Lack of IT Strategy.** When it started, the use of information technology was not part of its business strategy. The staff used email and private messaging to communicate with franchises, and use productivity software such as Word, Excel, PowerPoint, and use Google for research. This affirms NSO/DICT’s study that SMEs only uses ICT for productivity using tools like spreadsheet and word processing (DICT, 2008)

**Cost.** It deploys a stand-alone Point of Sale (POS) to all franchises to monitor inventory and purchasing. Since the franchise are SMEs, it avoids “additional” costs such as internet subscription fees. Even if the Franchiser would like to set an infrastructure that will connect all the franchises, the cost is a major concern unless the franchise expressed intention to implement and have enough investment in IT.

**Security.** According to the Managing Director, publicized incidents of hacking and other compromises, prevent them to consider cloud-based applications. Both the government and private sectors experienced a cyber-attack which includes hacking and defacement, slowdowns, and distributed denial of service. Ensuring trust is very important, especially the confidentiality of their financial data.

4.2.2 The Case of CENA2

In a separate deep interview with CENA2, a Filipino-owned franchiser of store chains with 200 stores, 80 convenience stores, 30 big format stores, and 10 supermarkets. For CENA2, there are several reasons why SMEs are still reluctant to adopt Cloud ERP due to security issues.

4.2.2.1 Barriers

**Internet Stability.** The country’s internet is unreliable because the telecom providers are not reliable and not yet ready. The internet is not secure because there is no redundant power systems supply available. It has upgraded its internet subscription, but this is costly and requires subscribers to maintain on a “per rack basis on a per megabyte” use. However, these limitations on the internet prevent them from rolling out their “on-premise” ERP to their convenience stores. The telecom providers have home-fiber, but the current coverage is not wide enough to satisfy the requirements of the convenience store.

**Lack of Telecom Players.** Even though the Philippines passed a law that prohibits monopoly, RA 10667, it is difficult for NTC to implement such a law. Currently, there are only two major telecom players in the country. Another law, the Foreign Investment Act of 1991 (RA 7042) only allows foreign-owned companies to own a maximum of 40 percent of the equity capital of the enterprises engaged in the foreign investment negative list. More recently, a third player in the telecom industry, was
awarded by the government to provide faster-reliable internet service.

Cost. SMEs have a limited budget. When SMEs are engaged, they need to consider load balancing, intrusion detection, cloud monitoring, VPN security, and when combined, this is expensive for SMEs. CENA2 believes SMEs are not yet ready for Cloud ERP. The package should be cost-effective to be offered to the SMEs and should be complete. This is a huge capital expenditure for them. SMEs cannot compromise their business name and credibility and a Cloud ERP project on a “piecemeal” approach will not work.

4.2.3 The Case of CENA3

CENA3, a franchisor of ink refilling stations in the Philippines with 12 franchises within the Philippines.

4.2.3.1 Barriers

Control. Like CEA1, control is important with CENA3. For them to use a system, control should be in place. Currently, CENA3 has a website secured with SSL to establish an encrypted link between their website and browser. So far, they have not encountered a virus on their website.

Lack of knowledge. CENA3 admits that they still lack knowledge about cloud technology and its potential. However, they are open to learning about the technology to understand the advantages/benefits of using the Cloud. Consequently, they can consider and use it.

Internet Stability. They noticed that transactions become very slow at 6 pm. CENA3 operates in a highly urbanized area in National Capital Region but still experienced the internet and application slow down. During the deep interview, it can never be avoided to compare the country’s internet speed with Singapore. The upload/download speed can easily be experience of the user. Also, the customer experience is very important. It is observed that customers are not patient when the system does not respond due to unstable internet. Telecom companies always offer faster internet, but never improved.

Culture. Another customer characteristic is being impatient. Unlike before, people are still relaxed and can take a few moments to sit down. In earlier days, people can afford not to have a mobile phone. In fact, having a mobile phone makes a person experience more stress due to immediate concerns like family and work matters. When the mobile phone rings, the attention is diverted, and an individual cannot concentrate anymore. There is a change in lifestyle brought by technology.

While the respondent grew and studied in Europe, he observed that the lifestyle is different. Developing countries like the Philippines tried to implement a system that is primarily for Western countries. Reasonably, it is so difficult to implement such a system. He observed that European businesses have a more structured business process, that’s why technology adoption is a lot easier.

4.2.4 Summary of CENA

From the point of view of the 3 CENAs who participated in the study, technology factors include the following: (a) data security, (b) quality of internet service, (c) complete Cloud ERP package, and (d) telecom infrastructure while organization factors include the following: (a) lack of knowledge, (b) lack of understanding of the business value of Cloud ERP, (c) cost, (d) organizational structure, and organization resources while environment factors are: (a) customers influence, (b) government and private support, (c) culture, (d) and government control (Figure 2).

4.3 Common Factors Between Cloud ERP Adopter and Cloud ERP Non-Adopter
The common technological factors found between CEA and CENA are: (a) data security (b) quality of internet service, (c) complete Cloud ERP package and (d) telecom infrastructure. The organization factors are (1) organizational resources, (2) cost, (3) knowledge about Cloud ERP, and (4) business value of Cloud ERP. And lastly, environment factors include: (1) telecom industry, (b) government control, and (c) influence (customers and suppliers) (Figure 3).

**Figure 2.** Cloud Non-ERP Adopter Factors

**Figure 3.** Common factors between Cloud Adopter and Cloud Non-ERP Adopter Factors
5. Conclusion

Philippine SMEs always view themselves as a growing company that is responsive to the changing of the business environment. Admittedly, the majority of them have not considered IT as a tool that should be part of their competitive advantage. The barriers and drivers have a strong influence on the adoption of Cloud ERP in the Philippine context.

6. Recommendation

This study recommends an Awareness-Adoption Road map (AAR) for the SMEs to adopt Cloud ERP. Using the Cloud ERP Adoption-A Process View Approach (Salim, 2013), which clearly explains the transitional factors that an SME will undergo when deciding whether to adopt or not adopt Cloud ERP. Also, Salim’s process view was made specifically to develop a process framework for cloud ERP adoption. However, the recommendation will be focused on the Entering Phase, the internal and external awareness (Figure 4).

Below are the transition phases:

First, the SME will realize an external awareness (information provided by vendors or business affiliations) and internal awareness (recognition of the firm’s needs). Presence of a lack of knowledge of the owner or manager. Afterward, curiosity begins and understanding the business benefits, business process and strategic planning are considered enough indicators.

Second, an inquiry from the organization’s representative (business, manager or project champion) will begin to gather relevant information. The organization’s representative starts to become familiar with the product/s, pay attention to the advertisements, and find the most appropriate vendor and product so that they can ask more specific questions.

Third, SME will become inquisitive and more specific and informational questions will be asked. The potential ERP and cloud vendor will be asked to provide the product demonstration. A demonstration is needed to introduce some of the
most important functions, ensure the compatibility of the system with the firm’s business model, and answer specific questions in relation to the product. Queries regarding estimation costs, support, and other system functions will also be raised during this phase.

Fourth, a short Listing will happen where the firm’s representative will attempt to screen available product and vendor choices.

Fifth, the SME will enter a commitment where the firm members will express their agreement to buy and adopt the system.

The Internal Awareness Phase involves collaboration with the PFA, DTI-BSMED, and the academia to educate the SMEs about the Cloud technology adoption, and business benefits while the External Awareness involves participating in the Global Value Chains which may involve their Principal Supplier’s participation in terms of financial support on the subscription cost for the Cloud ERP, which is like the experience of CEA1 and CEA3. Buy-in support of the Chief executives can be through CEO/CEO/CTOs Forums organized by well-known SMEs advocates like GoNegosyo and PFA with the help of CEA2.

The Adoption Phase will involve the IT Industry, Telecom Players, and Financial Institutions to come-up with the implementation approach and financing scheme for the SMEs. The IT Industry can propose an implementation methodology that is fit to the SME skills and capabilities, a Cloud ERP software that addresses the basic requirements but flexible enough to address future requirements. ISP/Cloud ERP vendor to provide a secured data center that protects the confidentiality of data. The telecom industry can come-up with a stable-cost effective Internet subscription plan with back-up options for continuous operation in case of internet disruption. Financial institutions can propose a financing scheme that will allow SMEs to pay for the subscription cost.

Following on Singapore’s Infocomm Media Development Authority’s SMEs Go Digital, a similar approach will be proposed (Infocomm Media Development Authority, 2019).
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Innovative Business Models of Social Enterprises in the Philippines

Raymund B. Habaradas

1. Introduction

Social enterprises refer to the growing number of organizations “that have created models for efficiently catering to basic human needs that existing markets and institutions have failed to satisfy” (Seelos & Mair, 2005, p.1). Their primary business goal is to create social value without sacrificing their economic viability.

In developing countries like the Philippines, it is not unusual for social enterprises to operate in poor, far-flung areas, or to cater to disadvantaged groups such as farmers, fishers, indigenous peoples, and the urban poor. This often results to higher operating costs, creating added pressure for the business owners and managers—especially of for-profit social enterprises—who must adopt and implement appropriate business strategies to keep their operations viable. To successfully scale up their operations, they need to come up with innovative business models that will allow them to overcome tough challenges associated with attempting to simultaneously achieve economic, social, and environmental goals.

2. Innovative and inclusive business models—Illustrative cases

The following cases illustrate how three for-profit Philippine social enterprises have fulfilled their social mission while remaining economically viable through their innovative and inclusive business models. These social enterprises are Bote Central, which sought to rationalize the coffee supply chain in the Philippines to benefit indigenous peoples in the uplands; ECHOstore, a high-end urban retailer that empowers rural-based women entrepreneurs; and The Circle Hostel, an eco-hostel that champions both environmental sustainability and community-based tourism.

2.1 Case 1 – Bote Central: Rationalizing the coffee supply chain to benefit upland farmers

It started out with an ambitious business plan formulated in 2007 by a Filipino couple who sought to address the various problems that plagued the coffee industry in the Philippines. After consulting with various stakeholders, they were repeatedly told how ‘complex’ and ‘impossible’ their business plan was. Vie Reyes and her husband Basilio, however, proceeded to pursue their vision by setting up Bote Central, and eventually proved the cynics wrong.

Bote Central is known to its customers as a coffee retailer. It has three main products that cater to different market segments: Alamid Coffee, Basilio Coffee, and 18 Days Coffee. It sources its coffee beans from farmers based in the uplands, many of whom are members of indigenous peoples such as
the B’laans and the Mangyans. To date, Bote Central sources its coffee from partner communities across the country, including Benguet Province and Mountain Province in Northern Luzon; Mindoro Island in Southern Luzon; and Cotabato in Central Mindanao.

Helping the upland coffee farmers, however, was not an easy process because in the mid-2000s, the coffee industry, according to Vie, was “messed up”. It was easy to blame the usual suspects – inefficient practices of local farmers, exploitative middlemen, limited government support, etc. – but the Reyes couple recognized the systemic nature of the problem. This led them to the idea of rationalizing the coffee supply chain. “There had always been a problem with the supply chain, especially coffee. It had always been skewed towards the retail front-end,” Vie said (Habaradas & Mia, n.d.).

Back when it was still a small business, Bote Central already knew that it had to start with directly helping the local coffee farmers through training and the transfer of technology. One of Bote Central’s early interventions was teaching coffee farmers basic accounting, and teaching them how to use a computer to record their transactions. This was done with the help of a management consulting and professional services firm that specialized in accounting systems. Unfortunately, the accounting system did not work out because the farmers were not ready for the new technology.

Unfazed by this setback, Bote Central decided to shift its attention to providing the farmers with more practical business knowledge. This meant assisting the farmers in communicating with the Department of Agriculture, proper handling of coffee beans to minimize damage and waste, and maximizing their earnings from their coffee. “Through the years, we learned what to do, and what not to do,” Vie recalled.

Departing from the usual arms-length transaction that typically characterizes the relationship between coffee producers and coffee buyers, the owners of Bote Central established a close relationship with the local farmers. They were able to do this in Sagada, a municipality in the Mountain Province, because Basilio had previously lived in the community for one year and developed a deep friendship with the locals. As a form of goodwill, Bote Central gave the Sagada farmers a coffee roasting machine that Basilio himself invented. This was meant to provide the locals the ability to roast their own coffee either for domestic consumption or for sale to establishments in the local community. The coffee roasting machine, however, was initially regarded with some suspicion.

Instead of forcing the machine on the locals, however, Bote Central “let them handle it” on their own terms. At that time, the Reyes couple frequented the Sagada community to immerse themselves and to get to know the locals better. To cut a long story short, the locals eventually warmed up to Basilio and Vie, and the coffee roasting machine. The Sagada farmers now sell their roasted coffee beans to restaurants in the local and neighboring communities. As a result, the Sagada community has benefitted in terms of increased income. This is a significant development, considering that, just a few years before, the people of Sagada did not even think that their coffee trees had any commercial value (Habaradas & Mia, n.d.).

Drawing lessons from its experience in Sagada, Bote Central launched in 2007 the Kape’t Buhay (Coffee and Life) Program, an incubation program for community-based enterprises. Through this program, coffee farmers received training in coffee agribusiness, were given access to common-service facilities (e.g. dehuller, solar dryer, depulper, roasting machine, multi-purpose grinder), and learned to process and sell the coffee they produce to local communities. The goal was to transform poor communities in the rural areas into local dealers or retailers of coffee.

Bote Central later succeeded in securing a P2-million grant to offer technical assistance for setting up agribusiness systems and training modules
for 10 community-based coffee enterprises (CBCEs), as part of a CSR program of an international firm. In 2011, the Department of Agriculture funded 10 additional CBCEs through its high-value crop development program. An important feature of Kape’t Buhay is the development and establishment of community-based roasting facilities that are run, managed, and operated by farmer clusters and women’s groups in collaboration with existing NGOs (as interim, case-to-case basis) in strategic target areas (Kape’t Buhay, 2012).

Early studies done on Bote Central showed that as of January 2016, 51 CBCEs (including those established outside of the Kape’t Buhay Program) with 34,221 farming households benefitted from increased coffee margins resulting from activities from production down to distribution. Of the 20 CBCEs developed under the program, 18 are led by women, who occupied key positions in management, operations, and sales (Kape’t Buhay, 2012).

Just over a decade since Vie and Basilio wrote their ambitious business plan, Bote Central’s vision of integrating local coffee farmers into what it calls a “chain of happiness from soil to cup” is slowly but surely taking shape.

2.2 Case 2 – ECHOstore: High-end urban retailer empowering rural-based entrepreneurs

The ECHOstore Sustainable Lifestyle is the first green retail store in the Philippines. It was founded by Reena Francisco, Jeannie Javelosa, and Pacita Juan (also referred to as the ECHOtrio), who brought their collective corporate and entrepreneurial experience to an innovative venture that advocates sustainable living.

In September 2008, the ECHOtrio opened ECHOstore Serendra. Targeting the high-end urban market, the retail store provided space for home care, fashion, and personal care products, as well as for various gift items. It also carried natural, organic, and non-toxic goods, ranging from home cleaning products to staples such as organic rice, sugar, and other produce.

The ECHOtrio subsequently opened two related retail concepts: ECHOCafe (Culture, Community, Coffee) and ECHOMarket. They also established ECHOfarms, which became the primary source for ECHOMarket’s vegetables, and for the fruits used at the ECHOCafe. ECHOfarms’ produce are also sold at ECHOstore, which now has branches in major cities in the Philippines such as Makati, Mandaluyong, Quezon City, Cebu, Davao, and Cagayan de Oro.

As a social enterprise, ECHOstore fulfills its mission by serving as an outlet for products of women’s groups, cultural communities, and other marginalized groups. As stated in the ECHOstore web site, the ECHOtrio “wanted to help small producers, craftsmen, and artisans get to markets they have never served” (https://echostore.ph/pages/about-us-1). But instead of simply sourcing from these groups and paying fair-trade prices for their products, ECHOstore supports its suppliers by helping them gain valuable knowledge and skills in product design, packaging, and other important aspects of running a business.

As the pioneering retail store that focused on fair-trade products, ECHOstore began to attract community-based enterprises that wanted their products displayed for sale in the store. However, the ECHOtrio had to reject majority of the products because these were poorly designed and lacked visual appeal. They eventually worked closely with national non-government organizations (NGOs), which requested them to assist these small producers with their packaging and product design. The ECHOtrio volunteered their time and expertise to serve as mentors of these micro-entrepreneurs through the ECHOd design Lab (Habaradas & Aure, 2016).

The ECHOtrio eventually set up the ECHOsi (Enabling Communities with Hope and Opportunities Sustainable Initiatives) Foundation, which received
funds from individuals and institutions that wanted to support their advocacy and social mission. The establishment of the foundation allowed the ECHOtrio to receive support from government, and to work in partnership with various groups, especially NGOs, that are similarly concerned with developing communities. For example, they have worked with the Peace and Equity Foundation (PEF) and the Partnership and Access Center Consortium, Inc. (PACCII) in setting up ECHOVILLAGE stores throughout the country; and also with the Department of Trade and Industry (DTI) and the Philippine Commission on Women (PCW) for the GREAT Women Program. These partnerships allowed ECHOstore to spread its advocacy for sustainable living across the supply chain (Habaradas, 2016).

As was stated in the company’s web site, ECHOstore carries at least 3,400 products in various distribution points throughout the country. Working with more than 80 organizations and foundations, it has reached at least 131 micro-entrepreneurs, 8,000 households, and 34,420 beneficiaries (ECHOstore, 2011, as cited by Habaradas, 2016).

2.3 Case 3 – The Circle Hostel: Sustainable tourism for the common good

The Circle Hostel (TCH) was established in 2011 by childhood friends Julio Jose Gabriel Gonzalez and Rafael Dionisio. The idea for the eco-hostel occurred to Gonzalez while he was on a backpacking trip in Southeast Asia, during which he came across a business model that he thought can work as well in the Philippine setting: offering affordable accommodation where guests can freely interact with each other. Because of Gonzalez’s love for surfing, he thought of setting up TCH in a surfing destination that is close to Manila. Thus, the first TCH branch was built in Sitio Liwliwa, San Felipe, Zambales, which is less than three hours away by public transportation from the Philippine capital. Today, TCH also has branches in two other surfing destinations – La Union and Baler, Quezon.

TCH provides basic accommodation – bunk beds (PhP550/US$10.55), hammocks (PhP450/US$8.70), tents (PhP350/US$6.72), and daytrip use (PhP150/US$2.88) to a diverse group of guests. By offering accommodations without walls and making communal areas colorful and inviting, the hostel encourages its guests to interact with other guests so they can make new friends (Habaradas & Baquillas, n.d.).

When TCH was established in Sitio Liwliwa, the community mainly relied on fishing and surfing lessons for livelihood. Covering an area of 361,110 hectares, Liwliwa is a small area in the coastal town of San Felipe, which, along with other nearby municipalities, was buried in a meter-deep volcanic ash after Mt. Pinatubo erupted in 1991. In 2008, surfers started coming for the waves, boosting tourism activity in the area. Thus, a demand for accommodations emerged, an opportunity that TCH grabbed soon after.

The locals of Liwliwa were initially apprehensive, thinking that TCH will take away business from them. Instead, TCH decided to link up with members of the local community, opening up opportunities for micro enterprises to offer their products and services to its guests. Among those that have benefitted from the business brought in by TCH are locals who provide surfing lessons, neighboring restaurants that offer meals, local tricycle drivers who provide arranged trips to the waterfalls, and a local vendor who sells souvenir items.

Aside from encouraging economic activity in the area, TCH also promotes environmental sustainability. The hostel, for example, was designed to maximize ventilation, thus eliminating the need for air-conditioning. Guests are also constantly reminded to conserve water and energy.

One noteworthy initiative of TCH is The Plastic Solution (TPS), which encourages the public to fill plastic bottles with clean non-biodegradable waste
materials, turning them into eco-bricks. These eco-bricks are used as substitute for hollow blocks in construction projects, and are used in non-load bearing structures such as perimeter fences, compost pits, and benches. TCH in Zambales itself is fenced with eco-bricks, and serves as a showcase for those who are curious about how eco-bricks are utilized. This sets it apart from other hotels and accommodations in the area.

In addition, TPS is generating its own income by selling environment-friendly products such as bamboo straws and reusable bottles, and by offering consultancy services on waste management to corporate clients. This is all part of their attempt to encourage people to avoid single-use products.

Apart from imparting a friendly vibe, stimulating the local economy, and raising environmental consciousness, TCH also promotes community-based tourism through Tribes and Treks. Offered every Saturday in partnership with MAD (Make A Difference) Travel, Tribes and Treks is a whole-day activity that brings guests to the Yangil Aeta community to plant trees, and to interact with the locals. The goal is to provide a meaningful and interactive encounter between the hostel guests and the Aeta community.

After an hour of walking through the lahar-covered valley and crossing a few rivers, guests get to interact with the Aetas by sharing a meal with them, and by learning native archery, among others. They also participate in the community’s singing and dancing, which serves to revive and preserve the traditional songs and dances of the Aetas. When the community was hit with extreme poverty after Mt. Pinatubo erupted, the indigenous people stopped singing and dancing altogether – because they were too caught up surviving. Because of Tribe and Treks, younger Aetas are relearning their community’s culture and heritage, and are sharing these with others through their songs and dances (Habaradas & Baquillas, n.d.).

Because of the weekly visits, the Aetas are able to showcase their produce and handicrafts for sale – honey, organically grown fruits, bamboo straws, handmade bracelets, bamboo whistles, mini bow-and-arrow sets. With the help of TCH and MAD Travel, the Aetas get access to urban markets, especially corporate accounts, for their bamboo straws (Baquillas, 2019). This provides a steady source of income for the community, and perhaps a stronger reason to hope for a better tomorrow for the younger generation.

3. Cross-case analysis

As we assess the effectiveness and innovativeness of the business models adopted by the above-mentioned social enterprises, let us be guided by the business model canvas of Osterwalder and Pigneur, who defined a business model as “the rationale of how an organization creates, delivers, and captures value” (2010, p. 14). In the business model canvas, the four general components are: (a) value proposition, (b) value creation, (c) value delivery, and (d) value capture. Briefly, the value proposition is drawn from a product or service that satisfies customers’ needs and wants. Value is created and delivered by utilizing organization resources (e.g. people, equipment, facilities, distribution channels, cash, brands), and subjecting them to work processes that eventually become part of the organization’s culture. Value is captured through the returns generated by the organization (Chambers & Patrocinio, 2012).

3.1 Value proposition

For all three social enterprises, their social mission seems to be integral to their value proposition. Bote Central, for instance, is known for its efforts in rationalizing the coffee supply chain in the country, which is captured in its slogan: “Revolutionizing the Philippine coffee landscape.” Therefore, the value proposition for its customers is more than being
able to consume coffee, but knowing that these are fair trade coffee grown and produced by Filipino farmers all over the Philippines.

ECHOstore, on the other hand, is closely associated with “sustainable lifestyle”, which is translated into its line of eco-friendly and natural products sourced from small producers, craftsmen, and artisans all over the country. The value proposition it offers its customers, therefore, is more than being able to consume these eco-friendly products they buy from ECHOstore or consuming delicious food in ECHOcafe. By patronizing ECHOstore products, they take part in the ECHOtrio’s advocacy, which is caring for the Environment, helping the Community, promoting Health, and working with Organizations – ECHO, for short. This could explain why buyers are willing to pay a premium for these products.

Similarly, The Circle Hostel offers multiple value for its target customers. That it offers reasonably-priced accommodations might be enough for budget-conscious tourists; but it offers more in terms of providing meaningful experiences for its guests. As stated in its web site, “we are a sanctuary for the artsy as well as the adventurous and encourage our guests to express themselves amongst each other and on our walls” (http://thecirclehostel.com/). This is captured in its slogan: “There are no strangers.” Moreover, its commitment to environmental sustainability, which is evident in the hostel’s physical design, gives it a distinct image easily recognizable to its target market.

3.2 Value creation and value delivery

For two of these social enterprises (Bote Central and ECHOstore), the value creation and value delivery processes are complex because these are directed not only to their target customers but also to their target beneficiaries, who happen to belong to marginalized communities; and since the target beneficiaries also happen to be their suppliers, they are also involved in the value creation process as key partners.

In the case of Bote Central, the activities involved in the production and selling of its coffee products (Alamid, Basilio, and 18 Days Coffee) include the sourcing of coffee beans directly from various upland communities since the company does not want to get its raw materials from middle men. These coffee beans are then transported to its processing facility in Las Pinas City, Metro Manila, where the beans are sorted, dried, roasted, and packaged. Finished products can be bought in its retail outlet in Muntinlupa City, Metro Manila, or delivered to those who purchase online. Basilio Coffee, in particular, is also available in major stores and supermarkets throughout the country. Alamid Coffee, on the other hand, can be found in several specialty stores and cafes in the Philippines, and in a couple of stores in Paris, France and Tokyo, Japan.

For its target beneficiaries, Bote Central undertakes a different set of activities that complement the one described above. These activities involve several key partners and stakeholders. Bote Central, for example, seeks support from the Department of Agriculture (DA), especially the municipal agricultural officers, to help farmers improve their agricultural practices. It also works closely with several NGOs in the provision of training and technical assistance to coffee farmers, particularly those who are part of the Kape’t Buhay Program. These NGOs assist participating farmer cooperatives or women’s groups in managing their community-based coffee enterprises, even as Bote Central provides the target areas with its patented coffee roasting machines.

In the case of ECHOstore, there are activities that are within its direct control, given its farm-to-fork approach (vertical integration). Through ECOfarms, it is able to produce vegetables sold in its ECHOmarket and the fruits that are used in ECHOcafe. The farm’s produce must, of course, be regularly transported to its retail outlets to ensure their freshness, consistent with the expectations of the enterprise’s target market.
For its target beneficiaries-cum-suppliers, ECHOstore undertakes a different set of activities, mostly done under the auspices of ECHOsi Foundation. Worth mentioning is its involvement in the GREAT Women Project, a collaboration of national and local government agencies, women’s groups and private sector groups that seek to improve local business policy, projects and services for women businesses. It receives technical and funding assistance from the Canadian International Development Agency (CIDA).

GREAT Women, also known as Gender Responsive Economic Actions for the Transformation of Women, is an integrated platform that addresses gender issues by developing microenterprises, and by helping women entrepreneurs move up the supply and value chain. With support from Department of Trade and Industry (DTI) and the Philippine Commission on Women (PCW), the lead government agencies, ECHOsi took the lead on program design, preparing small producers for market access, and brand development (retrieved from www.echosi.org.ph/programs-great.asp, as of May 22, 2015).

In 2012, the GREAT Women Project provided training to participating micro-entrepreneurs in Bohol, Camarines Sur, Davao del Sur, Iloilo, Leyte, North Cotabato, and Quezon. With the technical assistance of product and design experts, the products of these women entrepreneurs were upgraded, and reached markets outside the municipalities in which they were produced (Philippine Commission on Women, 2013). Many of these products are sold in ECHOstore.

The case of The Circle Hostel is different because its value creation and value delivery processes are largely meant for its target clientele. As a budget-friendly eco-hostel, its activities are not much different from other providers of accommodations. These include guest reception, housekeeping services, and the maintenance of its facilities. While TCH is also involved in community-based tourism in its Zambales branch, through Tribes and Trek, the logistics involved in bringing guests to the Aeta community is largely done by its partner social enterprise MAD Travel.

### 3.3 Value capture

As for-profit ventures, all three social enterprises depend on the revenues that they generate from their products and services. It is important for them to turn in a surplus to sustain their operations. Working in favor of Bote Central and ECHOstore is that they are able to leverage on the resources of their partner institutions to support their respective advocacies. Because of this, they don’t have to draw heavily from their internal funds to finance their community development efforts.

It is worth noting, though, that Bote Central and ECHOstore take a slightly different stance towards their target beneficiaries-cum-suppliers, something that conceivably affect their ability to appropriate optimal value from their business operations.

In the case of Bote Central, it decided to buy both high-quality and low-quality coffee beans from its suppliers because it wanted to encourage the indigenous peoples in target communities to sustain their coffee farming activities. Because of the variable quality of coffee beans that it procures, Bote Central decided to introduce a wider product line that caters to different market segments. For its Basilio Coffee, for example, it offers three variants – Dalisay Blend (100% pure Arabica); Tinatangi Blend (60% Arabica, 30% Robusta, 10% Exelsa); and Muni-Muni Blend (90% Robusta, 10% Arabica) – each one sold at different price levels. Also, by providing target communities with coffee roasting machines under the Kape’t Buhay Program, Bote Central is foregoing additional business in local communities in favor of the community-based coffee enterprises.

In the case of ECHOstore, it took a hard stance that it will only carry products from community-based enterprises only if these meet their quality standards. This meant that not all of the recipients
of their technical assistance on product design and packaging were able to get shelf space in ECHOstore. This was essential for a business that sold products to a high-end market.

For The Circle Hostel, it only needs to ensure that it is able to attract a certain number of guests every month so that it will be able to generate revenue that will be sufficient to cover its costs. It helps that TCH only offers basic amenities for its guests, which means that it has a relatively smaller overhead compared to its competitors.

4. Key insights

Our cross-case analysis in the previous section has allowed us to generate valuable insights on how for-profit social enterprises can overcome the challenges of simultaneously achieving their economic, social, and environmental goals through innovative business models. Among these insights are the following: (a) that a social enterprise must create a brand identity that will distinguish it from its competitors; (b) that a social enterprise can enhance its value proposition by co-creating value with multiple stakeholders; and (c) that a social enterprise can augment its ability to achieve its social mission through cross-sector collaborations.

4.1 Insight 1: Creating a distinct brand identity anchored on its social mission

The classic differentiation strategy calls on a business to offer a product or service that is distinct from one’s competitors so that it can capture a particular segment of a market. For social enterprises, the differentiation can be derived from creating a brand identity that is anchored on one’s social mission. The products and services can then be used as vehicles to communicate this distinct brand identity. This is evident in all three social enterprises that we examined – Bote Central as the champion of an inclusive coffee supply chain; ECHOstore as the primary advocate of a sustainable lifestyle; and The Circle Hostel as an eco-friendly place where “there are no strangers”. Needless to say, social enterprises that bank on their brand identity must be able to deliver on their brand promise. Otherwise, their target markets will see through their false claims, and their business models will fall apart.

4.2 Insight 2: Co-creating value with multiple stakeholders

This departs from the dominant view that value creation happens only within the confines of an individual business through the production of its products and services. The experiences of our three social enterprises, clearly illustrated by the use of the business model canvas, tell us that creating value for customers and target beneficiaries can be done jointly with concerned stakeholders. The Circle Hostel’s brand promise of “There are no strangers”, for example, is actualized by the collective behavior of its guests, even if TCH itself set the stage through a smartly-designed hostel. The relaxed and friendly vibe is also reinforced by the behavior of the micro-entrepreneurs in Sitio Liwliwa, who serve as TCH’s partners in providing the visitors an overall pleasant experience during their stay in the community.

4.3 Insight 3: Leveraging resources through cross-sector collaborations

For social enterprises to achieve their social objectives, they need not depend solely on their own resources. Working with government and NGOs, as well as other social enterprises, enables them to leverage on the resources and expertise of other institutions. A good example is how ECHOstore (through the ECHOsi Foundation) took an active role in the GREAT Women Project, which was
spearheaded by DTI and PCW with funds provided by the Canadian International Development Agency (CIDA). Under this cross-sector collaboration, government mobilized the vast resources at its disposal to provide women entrepreneurs with access to credit, information, and skills training; LGUs expedite the business registration process and provide local support; while the private sector (including ECHOstore) contributed by offering their technical expertise, and by providing market access to the products of these micro-entrepreneurs.

5. Policy recommendations

The lesson is clear for government agencies tasked with formulating policies and establishing mechanisms that support small- and medium-scale enterprises (SMEs), including the increasing number of social enterprises in the Philippines. Providing support for cross-sector collaboration is the way to go if it wants to scale up interventions for poverty alleviation and microenterprise development in the country.

For social business incubators and other groups that seek to strengthen social enterprises in the country, it would help to introduce programs that will develop the competencies of owners of these social enterprises not only to manage resources of their individual businesses but also to engage business partners and other stakeholders in co-creating value for (and with) their customers and their target beneficiaries. Organizing in the 21st century can go beyond the parochial and self-limiting premises of “competitive advantage” and “profit maximization”. It is time for innovative business models that adopt a systemic and inclusive mindset consistent with the general principles of “human dignity” and the “common good”.

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