Determinants of Profit Efficiency among Small and Medium-Sized Enterprises in Indonesia

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Abstract. Small and medium-sized enterprises (SMEs) are essential to the world economy as they create employment and support economic growth [1]. This study estimated the profit efficiency of SMEs and its determinants by analysing the data samples from 106 companies across the industry sector in Indonesia with eight-year observation. There was a total of 848 data analysed in this study. The aim of this study is to understand the current condition of the efficiency level of SMEs and identify the factors that affect profit efficiency. The stochastic frontier analysis (SFA) and the model formulated by [2] were utilised to estimate the profit efficiency of the observed SMEs. The results showed that the average profit efficiency of SMEs in Indonesia was 15.65%. The findings also revealed that the size and age of the company have a negative effect on profit efficiency. Conversely, labour productivity, export activity and digitalization have a positive effect. Government assistant, however, did not affect profit efficiency since it was proven to be statistically insignificant. Finally, this study also has possible limitations and proposes strategic implications of the findings for policymakers, SMEs managers, and future studies

Keywords: Profit Efficiency, Profit Inefficiency, Stochastic Frontier Analysis, Small and Medium Sized Enterprises.

1 Introduction

Companies are currently facing uncertainty due to the rapid changes in the business environment, such as the digitalization and current covid-19 pandemic [3]. [4] reported that global trade begins to plunge as the pandemic devastates the economy globally and reducing revenues of the firm significantly [5]. Companies such as Small and Medium-sized Enterprises (SMEs) have an essential role in supporting the world economy by creating employment and supporting economic growth and social development [1]. [6] [8] prove how SMEs give away to social development such as employing lots of generations not only in a country or region level, but also internationally. In addition, [9] reported that SMEs contribute over 60% of Gross Domestic Product (GDP) in most members' countries of the Organization for Economic Cooperation and Development (OECD) and its key partners. It is crucial to pay attention to this situation since OECD countries represent about 80% of world trade and investment.

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SMEs could adapt better than large companies in terms of internal and external changes [10]. Internally, SMEs possibly have faster decision making in their operational activity without complicated procedures compared with large companies. Externally, SMEs are more flexible adopting advanced technology as well as following the market trend. Large companies may indeed adopt advanced technology easier as they have more resources, including financial and human capital. However, the external changes that must bring new technology could not be separated from the internal changes, which is hard to implement change as it correlates with organizational culture, especially for large organizations with fancy corporate governance [11]. Accordingly, SMEs possibly have a simpler procedure to align the external and internal changes, since SMEs is one of the engine of the economy and SMEs need to consider the importance of remaining sustainable during crises [12] and maintain their good performance and efficiency. Efficiency concepts explain the best possible use of existing inputs to achieve the maximum obtainable output by a company [13]. Therefore, measuring efficiency became essential to know the companies' performance to ensure their resources are well-managed and maintain their objective accomplished [14].

There is extensive literature analysing SMEs efficiencies, such as the study by [15]–[19]. However, all of them addressed cost efficiency, which studies cost expenditure by companies compared to the best-practices company as a benchmark in reducing the expense to produce outputs or cost minimization. The cost efficiency is only a partial measurement of efficiency compared to the profit efficiency that considers the distance between the company's current profit and its possible optimal profit frontier. Research on profit efficiency in SMEs is still rare and often focus on analysing one industry, such as the banking sector [20]–[22], the agricultural sector [23], [24] and the food or livestock sector [25]–[27]. In addition, a recent article examining profit efficiency is a study by [10], analysing profit efficiency and its determinant of SMEs. However, the data sample is limited to the food industry in Spain. Considering the food industry is only contributing around 4% to the world gross domestic product [28], it is far away to generalize the result to other industries, and the result might not be relevant to implement other than in the food industry. Accordingly, it is needed to conduct further research that analysing profit efficiency in SMEs across industry sectors.

In the case of determinants of efficiency, there is also inconsistency of the result from previous studies, including the article by [10], [15], [29], [30]. They found a different result of factors such as employee qualification, owner experience, type of company, capital-labour ratio, export orientation, and government support, which both positively and negatively affect efficiency.

This study uses Indonesian firms categorized as SMEs, both public and private, representing all industries. The reason for choosing Indonesian data is because Indonesia has diverse industry sectors among SMEs and has the highest quantity compared to other countries [31]. Having approximately 65 million SMEs [32] allows Indonesia to support the world economy by increasing the GWP. In addition, Indonesia, a Group of Twenty (G20) member and one of the OECD's key partners, has recently had an interesting economic trend. Even though its GDP fell 2.1 per cent in 2020, it was a minor downturn than other countries in the Asia-Pacific region [33]. As of Quarter 3 2020, Indonesian GDP has risen at over 3% and had continuous growth of 2.2% in Quarter 4.

In addition, in Quarter 1 2021, it has 1.6 per cent growth which is higher than most G20 members.

Nevertheless, in 2021, The Bank Indonesia reported that 93.2% of Indonesian SMEs still faced a problem with their sales due to the pandemic [34]. In 2020, it was also reported that 84% of its SMEs were suffering from a decline in revenue [35]. This condition could be one indication of the inefficiency in SMEs. Therefore, apart from validating the result of previous studies, this research seeks to analyse the efficiency of SMEs among the overall industry sector and evaluate its determinants. The result will provide more robust evidence to take into consideration by SMEs manager in achieving efficiency.

2 Method

This research uses a quantitative method and is analysed using regression techniques. As the same companies are observed overtime, panel data analysis will be employed. Panel data combine the inter-individual differences (cross-section data) and intra-individual dynamics (time-series data) to give greater capacity capturing the complexity of diverse company behaviour and involve larger datasets [36]. In addition, because this study uses panel data regression with the balanced panel method, which requires the data to be equal or balance, companies that do not routinely report their financial statements or did not have sufficient data will be discarded. Secondary data were collected from the Thomson ONE database (profit efficiency estimation), the Indonesian Stock Exchange (determinant of profit efficiency), and company websites (supporting document). Based on the criteria for identifying firms as SMEs, 131 companies between 2001 and 2020 were identified and will form the basis of analysis for the study. This gives a total of 2,620 observations (20 years x 131 firms) out of 65 million. However, due to the lack of companies' consistency in providing reports from 2001 to 2020, the observation period was shortened to eight years (2013-2020). Also, 25 companies were removed as they identified have incomplete data. Therefore, the total final data are 848 (8 years x 106 companies). This reduction aimed to obtain consistent and balanced data for each company as required for the panel data processing [37]. As a result, the estimated model obtained was more accurate in describing the actual conditions.

Hypothesis testing used in this research is panel data regression analysis. It is a multiple regression analysis with panel data. This technique provides several advantages over standard cross-section and time-series approaches, such as providing more informative, varied, lower collinearity between variables and a greater degree of freedom. Moreover, it allows studying more complex behavioural models such as economies of scale and technological change. The regression analysis results are the coefficients for each independent variable that will explain their effect on the dependent variable [36].

2.1 Profit Efficiency Estimation Variables

As [38] and [39] explain, the basic function of profit efficiency estimation takes profits as the dependent variable and incomes as outputs as well as costs as inputs as independent variables. This model assumes that company outputs are constant, whereas inputs vary freely and affect profit. The model can be written as:

$\pi_{it} = f(y_{it}, w_{it}) \exp(v_{it}) \exp(-u_{it})$
i = 1,…., N companies, t = 1,….., T periods

where i is the companies, t is periods, π_{it} is the profit of company or SME i in period t, f represents the functional form chosen, y_{it} is the outputs vector, w_{it} represent the price vector of the inputs, v_{it} is the random error and u_{it} is the inefficiency term.

However, [40] argue that efficiency levels vary between companies and could change over time. If this is correct, it is logical to find out the factors that affect the variation in efficiency. Consequently, the above model could be less relevant to apply because of the changing trend among companies and possible different time scales. Later, [2] extend the basic stochastic frontier model and suggest that inefficiency determinants can be expressed as a linear function of explanatory variables representing the company characteristics. This model allows estimating the efficiency of each company and the factors that explain the differences in efficiency of SMEs in Indonesia. Accordingly, it is a better model to estimate profit efficiency [10], [14]. The model can be written as:

$$PEit = \frac{\pi it}{\pi max} = \frac{f(yit, wit)\, exp\,(v\pi it)\, exp\,(-uit)}{f\,(yit, wit)\exp(vit)} = \exp(-Uit)$$

Profit efficiency (PE) is estimated as a ratio of the actual profit of the i-th of a company (πit) and the highest profit that the company could achieve (πmax).

3 Result and Discussion

3.1 Descriptive Statistics

Table 1. presents the descriptive statistics of the parameters for profit efficiency. Concisely, the average value of EBIT of SMEs as a sample is IDR 3.86 billion with a maximum IDR 3,385 billion, and some companies experience a loss with a minimum IDR -7,757 billion. Furthermore, the outputs variables (revenues) have a minimum value of 0, which means that some companies do not earn money from sales and other operating activities in the observation periods. Finally, the price of labour was the highest proportion (0.97) among the mean cost component in this estimation.

Table 2. reveals the descriptive statistics of the factors affecting the profit efficiency of the observed SMEs in Indonesia. The average profit efficiency was 15.65%, with a maximum score of 59.16% and a minimum score was 0.10%. In addition, the average

labour productivity is relatively low (8.02%), with a maximum value of 87% and a minimum of 0.06%.

Table 1. Profit Efficiency Parameters

Variable	Mean	Maximum	Minimum	Std. Dev	N
EBIT(IDR)	3.86	3,385.84	-7,757.80	395.57	848
Net Sales (IDR)	195.84	4,037.22	0	380.25	848
Other Op. Rev (IDR)	7.45	529.71	0	37.37	848
Price of Labour (%)	0.97	87.46	8E-07	4.25	848
Price of Material (%)	0.06	5.67	7E-06	0.31	848
Price of Capital (%)	0.09	8.54	7E-08	0.53	848
Price of Op. Cost (%)	0.11	8.73	2E-11	0.52	848

Source: author's computation IDR (Indonesian Rupiah) in billion

Table 2. Determinant of Profit Efficiency

Variable	Mean	Maximum	Minimum	Std. Dev	N
Profit Efficiency (%)	15.65	59.16	0.01	13.06	848
Size (IDR)	1,023	17,212	728	1,808	848
Age (Years)	25.39	66	8	13.19	848
Labour Productivity (%)	8.02	87	0.06	12.19	848
Gov. Assistance (Dummy)	0.58	1	0	0.49	848
Export (Dummy)	0.3	1	0	0.46	848
Digitalisation (Dummy)	0.67	1	0	0.47	848

Source: Author's computation IDR (Indonesian Rupiah) in billion

3.2 Profit Efficiency of SMEs

The estimation result shows in Table 3. It is noted that five out of six parameters were statistically significant, meaning that the selection of variables was appropriate. This result also implies that the model and the data fit were good. However, the price of capital did not affect the profit efficiency as it was proven statistically insignificant. A positive coefficient means increasing profit efficiency. A negative coefficient means the opposite. As seen in Table 4.3, two variables had positive coefficients, e.g., Net Sales and Other Operating Revenue. This means that the profit efficiency will increase by 0.43% if the sales increase by 1%. Likewise, if the other operating revenue experiences an increase by 1%, the profit efficiency will increase by 0.17%. All of the other variables, on the other hand, had negative coefficients. Therefore, the rise of prices by 1% will decrease the profit efficiency by the percentage written for each of them.

Table 3. Profit Efficiency Estimations

Variable	Coefficient	Standard Error	t-ratio
Beta 0	4.06	0.43	9.55
Beta 1 (Net Sales)	0.43	0.04	12.07
Beta 2 (Other Op. Revenue)	0.17	0.03	5.46
Beta 3 (Price of Labour)	-0.37	0.06	-5.77

Variable	Coefficient	Standard Error	t-ratio
Beta 4 (Price of Material)	-0.40	0.07	-5.65
Beta 5 (Price of capital)	-0.01	0.04	-0.18
Beta 6 (Price of Op.Cost	-0.38	0.08	-4.98
Sigma-squared (σ^2)	30.15	3.00	10.06
Gamma (y)	0.81	0.005	15.34
Log likelihood function =		-2323.11	
LR test of the one-sided error =		7.1984229	
Mean Profit Efficiency		15.65%	

Source: Author's computation from Frontier 4.1 result (Testing the significant level is by comparing t-ratio to the t-table (if the t-ratio > t-table = significant). The t-table for 5% significance level, df: 842=1.96)

The value of the sigma-squared (σ2) was also significant. This means that the estimation parameters were statistically significant; if the coefficient score is > 0, there is an inefficiency effect. The Gamma (y) score, which is the parameter's estimated value representing the ratio of the variances in inefficiency and composite error, was also proven significant with a coefficient of 0.81. This indicates that most of the distances or variances between the companies and their optimal profit frontier were due to inefficiency, with only a small part (0.19) of them being caused by random errors. Finally, the LR test had a coefficient of 7.19; higher than 2.70 (by 5% significance level with the number of restrictions 1), the model has an inefficiency effect. This confirmed the sigma-squared result.

As shown in Table 2 and Table 3, the average profit efficiency was 15.65%, which is considered relatively low. The maximum score for the profit efficiency was 59.16%, while the minimum score was 0.10%. This means that on average, 106 SMEs in Indonesia observed in this study were less efficient or wasting 84.35% of their potential profit for an average EBIT of IDR 3.86 billion or around EUR 230 thousand. In other words, they could increase their profit by 84.35% if they worked at an efficient frontier. The average maximum profit was approximately IDR 24 billion, calculated as the ratio between the average current profit (3.86 billion) and the overall profit efficiency (15.65%). In addition, the result showed that the sample companies were losing around IDR 20 billion in their operation. This amount was obtained by multiplying the maximum profit by the profit inefficiency

3.3 Panel Data Regression Analysis

Table 4 shows the panel data regression analysis of the common effect model using the cross-section weight method. Among the six variables affecting profit efficiency, five of them were statistically significant. This means that those five variables, namely size, age, labour productivity, export, and digitalization, have a significant impact on the profit efficiency levels of SMEs. On the other hand, the profit efficiency was proven unaffected by the Government Assistant variable.

The coefficient score explained the relation between the variables and the profit efficiency. Due to the inefficiency effect, the positive coefficient means the variable decreases the profit efficiency, while the negative coefficient means the opposite. The

result shows that the size, age, and government assistant variables had positive coefficients towards inefficiency. This implies that if the size of the company (total asset) increases by 1%, the profit efficiency will decrease by 0.01%. Similarly, when the age of the company increases by 1%, the profit efficiency will decrease by 0.07%. In contrast, labour productivity, export orientation, and digitalization variables had negative coefficients to the inefficiency. This means that if the labour productivity increase by 1%, the profit efficiency will also increase by 0.04%. Likewise, if the export orientation and digitalization variables increase by 1%, the profit efficiency will also experience an increase by 3.31% and 0.75%, respectively.

Table 4. Panel Data Regression Analysis

Variable	Coefficient	t-Statistic	Prob
Size	0.01	6.218114	0.0000
Age	0.07	7.988532	0.0000
Labour Productivity	-0.04	-2.085176	0.0374
Gov. Assistance	1.24	1.922458	0.0549
Export	-3.31	-6.480043	0.0000
Digitalisation	-0.75	-2.344447	0.0193
C	13.78	18.09785	0.0000
R-Squared	0.01		
Adjusted R-Squared	0.07		
S.E. of Regression	-0.04		
F-Stastistic	1.24		
Prob(F-statistic)	-3.31		

Source: Author's computation from Eviews 9 result

As seen in Table 4. some of the hypotheses were rejected and the else were accepted. The t-value of the size variable was 6.21, higher than the t-table (1.96) and significant at a 1% level. Therefore, the Size variable positively affects the profit inefficiency, and the first hypothesis in this study was rejected. Regarding age, the t-value was also higher than the t-table ($7.98 > 1.96$), with a probability of 0.000, meaning that the age variable positively affects the profit inefficiency. Therefore, the second hypothesis in this study was also rejected. The t-value for the labour productivity variable was lower than the t-table ($-2.08 < 1.96$), meaning there was no correlation between labour productivity and profit efficiency. However, its probability score was 0.037, which is lesser than 0.05. This proved that the labour productivity variable negatively influenced profit inefficiency, and the third hypothesis was accepted. The t-value obtained for the government assistant variable was lower than the t-table ($1.92 < 1.96$). This implies no correlation between government assistance and profit efficiency, supported by a probability score of 0.054, which is higher than 0.050. Therefore, the government assistant variable did not influence profit inefficiency, and the fourth hypothesis was rejected. The obtained t-value was lesser than the t-table ($-6.48 < 1.96$) in export activity. Consequently, export activity showed no correlation to profit efficiency. However, with the probability score of 0.000, lower than 0.05, the export variable was proven to influence profit inefficiency negatively. Thus, the fifth hypothesis was accepted. Finally, the t-value for the digitalization variable was lower than the t-table ($-2.34 < 1.96$). However,

its probability score was lesser than 0.05, which was only 0.01. Therefore, the Digitalization variable negatively influenced profit inefficiency, and the sixth hypothesis was accepted.

3.4 Discussion

The Effect of Company Size on Profit Efficiency. The coefficient of this variable was 0.012, with a significant level of 1%. The positive coefficient towards inefficiency means that the bigger the company, the higher the profit inefficiency. In other words, if the company size increases by 1%, it will decrease the profit efficiency by 0.012%. This result revealed that bigger companies tended to have lower profit efficiency compared to smaller ones. This finding is in line with previous studies by [17], [36], [41]–[45]. A separate test also proved that, on average, small-sized enterprises in Indonesia had a higher profit efficiency level (95%) than medium-sized ones (16%).

This result is contrary to the proposed hypothesis. According to [17], the possible explanation for this is that small firms are more flexible and adaptable to meet ever-changing markets than bigger companies. Take an example; the big firm is often challenging to adjust the changes in the adoption of technology and the customers demands to the mass production applied in big companies. Therefore, even though small companies may be resource-constrained, they could benefit from being more flexible to quickly diversify and adjust their activities and become more efficient [43].

The Effect of Company Age on Profit Efficiency. The age variable had a positive coefficient with a value of 0.07 and was proven significant at the level of 1%. This means that the older companies tended to have higher profit inefficiency than newly-established ones. This result showed that the younger companies had a higher profit efficiency compared to the older ones. Several prior studies also found similar results, such as those of [10], [43]. [46] stated in their study that older firms may have more experience and can achieve the best performance from learning by doing. However, they may have old equipment, machinery, and outdated technology, which give them disadvantages in the fast-changing business environment [47]. At the same time, younger companies come up with more modern facilities and new innovative projects that can better meet customers' demands. In addition, new companies often have more educated employees who can support the existing technology without spending more money on training. This makes a higher level of profit efficiency achievable through lower costs [43].

The Effect of Labour Productivity on Profit Efficiency. Labour productivity had a negative coefficient with a value of -0.04. This means that the increase in labour productivity will decrease the profit inefficiency. In other words, companies with higher labour productivity tended to have higher profit efficiency. This aligned with the proposed hypothesis that labour productivity will increase the company's efficiency. This signifies the importance of training for the employees since high-quality and well-

trained employees will boost up the company's innovation, leading to increased revenue through the optimal uses of its resources [17]. This result also supported a previous study by [10], which argued that labour productivity benefits from resource utilization and ensures consistent marketing of the company's products and services meet customer expectations.

The Effect of Government Assistance on Profit Efficiency. Government assistance had a positive coefficient of 1.24, showing a negative effect on profit efficiency. This implies that companies that receive aids from the government tended to have lower profit efficiency. It is in contrast with the results of several previous studies by [10], [15], [29], which showed a positive relationship between government assistant and profit efficiency. They argued that public aids would improve profit efficiency. Regarding the negative effect of government assistance on profit efficiency, the possible explanation is that efficient companies no longer needed government support such as loans or financial aids since they can already survive on their own. Meanwhile, inefficient companies will still need supports from the government to run their businesses; otherwise, they will not be able to operate optimally [48]. Therefore, it can be concluded that companies that received government assistance tended to be less profit efficient than those without public aids. However, this study proved that government assistance statistically did not affect the profit efficiency level of the observed SMEs.

The Effect of Export Activity on Profit Efficiency. This study indicated a negative relation between the export activity variable and profit inefficiency, with a coefficient of -3.31. This means that companies with export orientation tended to have higher profit efficiency than those without export activities. It is because international markets usually are more competitive than domestic ones. Therefore, companies working in international markets received more pressure to watch over their expenses and manage their costs more efficiently [49]. In addition, [10] stated that joining the international market will broaden the horizon of knowledge, creating more ideas for product innovations. This idea, combined with the latest adopted technology and the company's ability to cut costs, will lead to high revenue and increase profit efficiency. This is in agreement with the results of prior studies by [50], [51].

The Effect of Digitalisation on Profit Efficiency. Digitalisation had a negative coefficient with a value of -0.75, meaning that companies with more digital operations had decreased inefficiency. In other words, the level of profit efficiency was higher in companies with advanced digitalisation in their operations. It is because digitalisation will ease the company's operation in various ways, such as in tracking financial activities (income and expenses), and a more rapid flow of information will optimise workplace communication [52]. Digitalisation make the interaction between external stakeholders, from purchasing raw materials from suppliers to selling products to customers, will also be much easier and quicker. [53] argued that the connection between customers and

employees also get better with the presence of digitalisation, compared to the application of traditional operation. Eventually, digitalisation will improve the company's performance by discontinuing unnecessary activities existed within its operation [54].

4 Conclusion

This research is the first attempt to analyse the profit efficiency and its determinants of SMEs in Indonesia using data across industry sectors. Using the SFA method and the model proposed by Battese and Coelli, the results reveal that SMEs' mean profit efficiency in Indonesia is 15.65%. The study also found the negative effect of company size and age on profit efficiency. Contrarily, labour productivity, export activity and digitalisation positively affect the SMEs profit efficiency.

Based on hypothesis testing, three hypotheses were accepted, and the rest were rejected. Regarding the determinant of profit efficiency, five from six variables were significantly proven to affect profit efficiency. The first two variables, company size and age, are diverse from the hypothesis presumed to have a positive effect. Initially, with the increasing of company size and years they operate, they will perform better than the small and new companies as prior studies such as[10], [55], [56] explained in their findings. However, the fact that company size and age have a negative influence to profit efficiency is also supported by [17], [41]–[43]. The negative effect means that smaller and younger companies tend to have a higher profit efficiency level than big-sized and old companies.

In contrast, the other three variables, labour productivity, export activity, and digitalization, support the hypothesis that positively affects SMEs' profit efficiency. It means that companies with high labour productivity, export activity, and advanced digitalization tend to have higher profit efficiency than companies without those specifications. Finally, even if previous research found that government assistance affects profit efficiency, this research found that it does not affect the profit efficiency of SMEs. The possible explanation is that there is no guarantee that the company will use the government aid properly, for instance, the financial support they got. Research by [57] also found that government support only helps low firms' productivity, such as helps employment welfare and have no impact on firm-level productivity related to making a profit.

The limitations of this study are mainly related to the observed data, which is limited to 106 SMEs with eight years of the observation period. Thus, studies on bigger and different data from other countries might bear different results. In addition, this study employed the common-effect model, which assumes that there is no difference in the data of SMEs in various periods. Meanwhile, different conditions may apply for each company in real life. Also, each company may utilise a different production technology in their operation. Therefore, it is suggested for future studies to work on more disaggregated data of more companies in an extended range of time, which represent the better population. It is also advisable for further studies to take samples from other Asian countries to confirm the result of this study. Moreover, the other model, such as the fixed-effect model of panel data analysis, can also be a better alternative to figure

out the differences in the behaviours of SMEs, rather than treating them as if they possess the same characteristics. Nonetheless, the author believes that these limitations will not significantly diminish the importance of the findings of this study.

References

1. International Labour Organisation (ILO), "The Power of Small: Unlocking the Potential of SMEs," 2019. https://www.ilo.org/infostories/enGB/Stories/Employment/SMEs#power-of-small (accessed Jul. 09, 2021).
2. G. E. Battese and T. J. Coelli, "A model for technical inefficiency effects in a stochastic frontier production function for panel data," *Empir. Econ.*, vol. 20, pp. 325–332, 1995.
3. McKinsey & Company, "COVID-19: Implications for business," 2021. https://www.mckinsey.com/business-functions/risk/our-insights/covid-19-%0Aimplications-for-business (accessed Apr. 03, 2021).
4. World Trade Organisation, "Trade set to plunge as COVID-19 pandemic upends global economy," 2020. https://www.wto.org/english/news_e/pres20_e/pr855_e.htm (accessed Apr. 03, 2021).
5. Organisation for Economic Co-operation and Development, "Financing SMEs and Entrepreneurs: An OECD Scoreboard. Special edition: The impact of COVID-19," 2020. https://www.oecd.org/ (accessed Apr. 03, 2021).
6. R. Doern, "Investigating barriers to SME growth and development in transitionenvironments a critique and suggestions for developing the methodology," *Int. Small Bus. J.*, vol. 27, no. 9, pp. 275–305, 2009.
7. C. Harvie, "SME clustering and networking and its contribution to regional development and competitiveness: an overview of the key issues," *SMEs a Glob. Econ. Conf. 2007 Responding to Glob. Challenges Oppor.*, pp. 1–30, 2007.
8. I. Hussain, M. Hussain, and S. Hussain, "Public private partnership and SMEs development: the case of AJ&K Pakistan," *Int. Rev. Bus. Res. Pap.*, vol. 5, no. 5, pp. 37–46, 2009.
9. International Labour Organisation (ILO), "Financing Small Businesses in Indonesia Challenges and Opportunities," 2019. https://www.ilo.org/infostories/enGB/Stories/Employment/SMEs (accessed Apr. 03, 2021).
10. P. Perez-Gomez, M. Arbelo-Perez, and A. Arbelo, "Profit efficiency and its determinants in small and medium-sized enterprises in Spain," *BRQ Bus. Res. Q.*, vol. 21, pp. 238–250, 2018.
11. S. . Levine, "Why Is Implementing Change So Hard?," 2017. https://stuartlevine.com/articlesbystuart/why-is-implementing-change-so-hard/ (accessed Apr. 03, 2021).
12. Enotes Editorial, "What is the role of business in the economy?," 2016. https://www.enotes.com/homework-help/what-role-business-economy-716463 (accessed Nov. 28, 2020).
13. B. Carlsson, "The Measurement of Efficiency in Production: An Application to Swedish Manufacturing Industries 1968," *Swedish J. Econ.*, vol. 74, no. 4, pp. 468–485, 1972.
14. A. Arbelo, M. Arbelo-Pérez, and P. Pérez-Gómez, "Profit Efficiency as a Measure of Performance and Frontier Models: A Resource-Based View," *Bus. Res. Q.*, vol. 24, no. 2, pp. 143–159, 2021.
15. W. J. Barchue and J. Aikaeli, "Efficiency of small and medium sized enterprises in Liberia: the case of Monrovia," *Bus. Manag. Rev.*, vol. 18, no. 2, pp. 1–20, 2016.

16. D. Balios, N. Eriotis, A. Fragoudaki, and D. Giokas, "Economic efficiency of Greek retail SMEs in a period of high fluctuations in economic activity: a DEA approach," *Appl. Econ.*, vol. 47, no. 33, pp. 3577–3593, 2015.
17. T. Charoenrat and C. Harvie, "The efficiency of SMEs in Thai manufacturing: a stochastic frontier analysis," *Econ. Model.*, vol. 43, pp. 372–393, 2014.
18. R. Mohamad, N. A. Majid, N. F. Noh, and M. . Ahmad, "Technical efficiency (TE) of small and medium (SME) food enterprise in West Malaysia," *Econ. Technol. Manag. Rev.*, vol. 5, pp. 51–55, 2010.
19. G. E. Battese, D. S. P. Rao, and D. Walujadi, "Technical efficiency and productivity potential of firms using a stochastic metaproduction frontier," Armidale, 2001.
20. A. Akhigbe and J. . McNulty, "Profit efficiency sources and differences among small and large US commercial banks," *J. Econ. Financ.*, vol. 29, no. 3, pp. 289–299, 2005.
21. A. N. Berger, A. A. Dick, L. G. Goldberg, and L. . White, "Competition from large, multimarket firms and the performance of small, single-market firms: evidence from the banking industry," *J. Money Credit Bank*, vol. 39, pp. 331–368, 2007.
22. K. B. Cyree and W. P. Spurlin, "The effects of big-bank presence on the profit efficiency of small banks in rural markets," *J. Bank. Financ.*, vol. 36, no. 9, pp. 2593–2603, 2012.
23. F. Galawat and M. Yabe, "Profit efficiency in rice production in Brunei Darussalam: a stochastic frontier approach," *J. Int. Soc. Southeast Asian Agric. Sci.*, vol. 18, no. 1, pp. 100–112, 2012.
24. L. . Ogunniyi, "Profit efficiency among maize producers in Oyo state, Nigeria," *ARPN J. Agric. Biol. Sci.*, vol. 6, no. 1, pp. 11–17, 2011.
25. S. K. Nganga, J. Kungu, N. De Ridder, and M. Herrero, "Profit efficiency among Kenyan smallholders milk producers: a case study of Meru-South district, Kenya," *African J. Agric. Res.*, vol. 5, no. 5, pp. 332–337, 2010.
26. N. Purwanto, D. Manongga, and M. A. I. Pakereng, "Efficiency of small and medium sized Tofu enterprises (SME) in Salatiga using data envelopment analysis (DEA)," *Int. J. Comput. Appl.*, vol. 91, no. 12, pp. 44–50, 2014.
27. S. Bahta and D. Baker, "Determinants of profit efficiency among smallholder beef producers in Botswana," *Int. Food Agribus. Manag. Rev.*, vol. 18, no. 3, pp. 107–130, 2015.
28. World Bank, "Agriculture and Food," 2021. https://www.worldbank.org/en/topic/agriculture/overview (accessed Jul. 12, 2021).
29. T. Charoenrat and C. Harvie, "Technical efficiency of Thai manufacturing SMEs: a stochastic frontier analysis," *Australas. Account. Bus. Financ. J.*, vol. 7, no. 1, pp. 99–121, 2013.
30. F. Battaglia, V. Farina, F. Fiordelisi, and O. Ricci, "The efficiency of cooperative banks: the impact of environmental economic conditions," *Appl. Financ. Econ.*, vol. 20, no. 17, pp. 1363–1376, 2010.
31. H. R. Sari, "Jumlah UMKM Indonesia 57,9 juta, terbanyak dibandingkan negara lain," 2014. https://www.merdeka.com/uang/ (accessed Jul. 13, 2021).
32. F. E. Christy, "Jumlah UMKM di Indonesia," 2021. https://data.tempo.co/read/1111/jumlah-umkm-di-indonesia (accessed Jul. 23, 2021).
33. M. Kim and R. Koepke, "Indonesia Has an Opportunity to Boost Growth," 2021. https://www.imf.org/en/News/Articles/2021/03/03/na030321-%0Aindonesia-has-an-opportunity-to-boost-growth (accessed Jul. 12, 2021).
34. D. Saputra, "Survei BI: 87,5 Persen UMKM Indonesia Terdampak Pandemi Covid-19," 2021. https://ekonomi.bisnis.com/read/20210319/9/1370022/ (accessed Jul. 12, 2021).
35. R. Ranggasari, "BPS: 84% Micro Businesses Suffer Revenue Decline due to Covid-19," 2020. https://en.tempo.co/read/1386624/ (accessed Apr. 03, 2021).
36. D. . Gujarati and D. . Porter, *Basic Econometrics*, 5th ed. New York: McGraw-Hill, 2009.

37. P. N. Ghauri, K. Gronhaug, and R. Strange, *Research Methods in Business Studies*, 6th ed. Cambridge: Cambridge University Press, 2020.
38. A. N. Berger and L. J. Mester, "Inside the black box: what explains differences in the efficiencies of financial institutions?," *J. Bank Financ.*, vol. 21, no. 7, pp. 895–947, 1997.
39. D. B. Humphrey and L. B. Pulley, "Banks' responses to deregulation: profits, technology, and efficiency," *J. Money, Credit Bank.*, vol. 29, no. 1, pp. 73–93, 1997.
40. G. E. Battese and T. J. Coelli, "Frontier production functions, technical efficiency and panel data: with application to paddy farmers in India," *J. Product. Anal.*, vol. 3, pp. 153–169, 1992.
41. A. Mongid and M. Muazaroh, "The Efficiency and Inefficiency of The Banking Sectors: Evidence from Selected ASEAN Banking," *J. Ekon. Malaysia*, vol. 51, no. 1, pp. 119–131, 2017.
42. A. Al-Gasaymeh, "Bank efficiency determinant: Evidence from the gulf cooperation council countries," *Res. Int. Bus. Financ.*, vol. 38, pp. 214–223, 2016.
43. V. Le and C. Harvie, "Firm performance in Vietnam: evidence from manufacturing small and medium enterprises," 2010.
44. A. Akhigbe and J. . McNulty, "The profit efficiency of small US commercial banks," *J. Bank. Financ.*, vol. 27, no. 2, pp. 307–325, 2003.
45. R. Alvarez and G. Crespi, "Determinants of Technical Efficiency in Small firms," *Small Bus. Econ.*, vol. 20, no. 3, pp. 233–244, 2003.
46. Y. Amornkitvikai, C. Harvie, and T. Charoenrat, "Estimating a technical inefficiency effects model for Thai manufacturing and exporting enterprises (SMEs): a stochastic frontier (SFA) and data envelopment analysis (DEA) approach," *Proc. Informing Sci. IT Educ. Conf.*, pp. 363–390, 2014.
47. G. Batra and H. Tan, "SME technical efficiency and its correlates: rossnational evidence and policy implications," 2003.
48. T. Beck, A. Demirgüc-Kunt, and R. Levine, "SMEs, Growth and Poverty," 2005.
49. R. Alvarez and R. Robertson, "Exposure to foreign markets and plant-level innovation: evidence from Chile and Mexico," *J. Int. Trade Econ. Dev.*, vol. 13, no. 1, pp. 57–87, 2004.
50. R. M. Salomon and J. . Shaver, "Learning by exporting: new insights from examining firm innovation," *J. Econ. Manag. Strateg.*, vol. 14, no. 2, pp. 431–460, 2005.
51. E. Golovko and G. Valentini, "Exploring the complementarity between innovation and export for SMEs growth," *J. Int. Bus. Stud.*, vol. 42, pp. 362–380, 2011.
52. C. Dahl, "Digital transformation: How technology can improve company oversight and efficiency." https://www.accountingtoday.com/ (accessed Aug. 16, 2021).
53. M. Rachinger, R. Rauter, C. Müller, W. Vorraber, and E. Schirgi, "Digitalization and its influence on business model innovation," *J. Manuf. Technol. Manag.*, vol. 30, no. 8, pp. 1143–1160, 2019.
54. R. Viswanathan and A. Telukdarie, "A systems dynamics approach to SME digitalization," *Procedia Comput. Sci.*, vol. 180, pp. 816–824, 2021.
55. A. M. Andrieș and S. G. Ursu, "Financial crisis and bank efficiency: An empirical study of European banks," *Ekon. Istraživanja J.*, vol. 29, no. 1, pp. 485–497, 2016.
56. S. Bahta and D. Baker, "Determinants of profit efficiency among smallholder beef producers in Botswana," *Int. Food Agribus. Manag. Rev.*, vol. 18, no. 3, pp. 3577–3593, 2015.
57. C. Criscuolo, R. Martin, H. . Overman, and H. . Overman, "The Causal Effects of an Industrial Policy," 2012.