THE IMPACT OF E-COMMERCE IMPLEMENTATION ON THE PERFORMANCE OF MICRO AND SMALL INDUSTRIES IN INDONESIA

Soeripto Silaban[*], Nunung Kusnadi, and Feryanto

Department of Agribusiness, Faculty of Economics and Management, IPB University, Bogor, West Java, Indonesia

*Correspondence Email: soeriptosilaban@yahoo.com

ABSTRACT

The micro and small industries play an important role in the growth of the national economy, as evidenced by the increasing number of micro and small business units every year and their contribution to the Gross Domestic Product (GDP). However, the COVID-19 pandemic has decreased revenue for micro and small industry players, forcing them to make efficiency measures in their business. To overcome this difficult situation, implementing e-commerce in micro and small industries is considered an important marketing strategy to maintain business continuity. In fact, only a few micro and small business actors apply e-commerce. This study aims to analyze the factors that influence the implementation of e-commerce in micro and small industries, as well as the impact of e-commerce implementation on the performance of micro and small businesses in Indonesia. The data used in this study were secondary data from the 2019 survey of micro and small industries conducted by the Central Statistics Agency (BPS), and the respondents were categorized into two groups: micro and small industries (SMI) that implement e-commerce and those that do not. The data was analyzed using propensity score matching. The study results showed that the implementation of e-commerce has a positive and significant impact on the performance of micro and small industries, namely an increase in employees, revenue, and business profit.

Keywords: *business development, business performance, e-commerce, micro and small industries, propensity score matching*

BACKGROUND

According to APJII (2020), access to social media is the main reason people use the internet, with a percentage of 51.5%, while communicating through messages contributes 32.9%. Businesses can use this to introduce, promote, and market their products through the internet. The BPS e-commerce survey (2020) found that in 2019, businesses in Indonesia used instant messaging and social media as the biggest sales media, with a percentage of 90.56% and 65.14%, especially due to the Covid-19 pandemic. According to the study by Hanifawati and Listyaningrum (2021), during the pandemic, business performance increased due to increased knowledge and skills in production, marketing, asset volume, and sales. The study by Mubarak and Sulistyowati (2020) also shows that internet use in marketing improves business performance through increased business profits, RC ratios, and the number of consumers.

Micro and small industries play a significant role in the growth of the national economy. This can be seen from the increasing number of business units and GDP from micro and small industries

every year (KemenkopUKM, 2021). Although micro and small industries have a significant role in the economy, in the current era of globalization, micro and small business actors must face high business competition and global challenges. To overcome these challenges, micro and small industries must improve product and service innovation, human resources and technology development, as well as expand marketing areas, including through e-commerce (Sedyastuti, 2018). Large companies with significant financial and investment capabilities usually apply e-commerce. However, micro and small business actors face difficulties in implementing e-commerce due to limited capital and human resources, as well as global impacts such as the Covid-19 pandemic. This condition requires business actors to try to maintain their business conditions by taking several efficiency steps (Nilasari, et al., 2022).

The implementation of e-commerce in micro and small businesses is considered an important marketing strategy to ensure business sustainability, especially in difficult times like the present. According to the small and micro industries (SMI) 2019 survey results, there are about 4.38 million micro and small businesses in Indonesia, but only 11.94% use e-commerce as their marketing strategy. Although there are some reasons, such as limited capital, human resources, and the impact of the pandemic, the fear of business failure in online marketing is also one of the factors (BPS, 2019). In line with the study by Nur Fadila, et al. (2014), although many business actors have experienced the benefits of e-commerce, many still do not know whether their e-commerce is successful or even experiencing failure. Previous studies have found that micro and small industries that apply e-commerce have the opportunity to improve their status and business performance even further. By implementing e-commerce, micro, and small businesses can experience an increase in sales, turnover, and business income (Hardilawati, et al., 2019, Jahanshahi, 2012, Almutairi & Altameem, 2016, Hendrawan, et al., 2018, Helmalia & Afrinawati, 2018). Despite the importance of e-commerce for micro and small businesses in Indonesia, there is still a lack of research on the specific impact of e-commerce on the performance and growth of micro and small businesses in Indonesia. Therefore, this paper aims to analyze the impact of e-commerce implementation on the performance of micro and small industries in Indonesia.

RESEARCH METHODS

This research used secondary data from the 2019 micro and small industries (MSI) survey conducted by the Central Statistics Agency (BPS). A total of 2,935 micro and small-scale food and beverage industries that applied e-commerce and 22,436 those that did not were analyzed Propensity Score Matching (PSM) methods. Propensity Score Matching (PSM) is an estimation technique used to evaluate a program and form a control group matched with the characteristics of the observed participant group. Several stages of the PSM method must be carried out, where the first stage is to divide the research data into treatment and control groups, then estimate the Propensity Score. The estimation model can be used to see the average value of the impact of e-commerce implementation (Feryanto & Rosiana, 2021).

$$\text{ATT} = E\,[Y_i|D_i=1] - E\,[Y_i|D_i=0]$$

The second stage of the Propensity Score Matching (PSM) method is to select a matching algorithm that will compare observations between the treatment and control groups based on their

propensity scores. In this study, the Nearest Neighbor Matching (NNM) method was used, matching participants in the treatment group with the control group with the same propensity score. After that, the third stage is to check the Overlap or Common Support between the two groups. Common support ensures that the matching process between the treatment and control groups can be carried out. The fourth stage is to Assess Matching Quality by checking whether the matching procedure is able to balance the distribution of relevant variables in both groups. However, since not all covariates are conditioned on propensity scores, it is necessary to check whether the distribution of relevant variables in both groups is balanced.

RESULT AND DISCUSSION

The Impact of E-Commerce Implementation on the Performance of Micro and Small-Scale Food and Beverage Industry in Indonesia

The micro and small industry (SMI) plays a significant role in the economic growth of Indonesia. Based on data from KemenkopUKM (2021), there was a 1.94% increase in the number of business units and a 5.21% increase in the Gross Domestic Product (GDP) compared to the previous year. The food and beverage industry is one of the sizable and rapidly growing SMI in Indonesia. The food industry is the largest sector among the 4.38 million micro and small-scale industries in Indonesia, totaling 1.6 million industries. On the other hand, the beverage industry is one of the lowest-ranking sectors, coming in fourth with only 99,000 industries, although it is closely related to the food industry (BPS, 2019). This is evidenced by its substantial market potential due to high population growth and increasing purchasing power of consumers. Furthermore, it is considered a major contributor to the Indonesian economy due to its significant contributions to the GDP and employment (Kemenperin, 2017). Despite the challenges faced by micro and small-scale industries today, e-commerce has become a crucial factor in improving the industry's performance by expanding its market reach and increasing business profits (Hanifawati and Listyaningrum, 2021; Mubarak and Sulistyowati, 2020). In this study, micro and small business owners were divided into two groups: the treatment group, which implemented e-commerce in their business, and the control group, which did not implement e-commerce. The performance indicators used were number of employee, business revenue and business profit. To match the units in both groups, the propensity scores of each unit were estimated using logistic analysis, then matching was performed using the NNM technique. The balance of variables before and after matching can be seen in Figure 1.
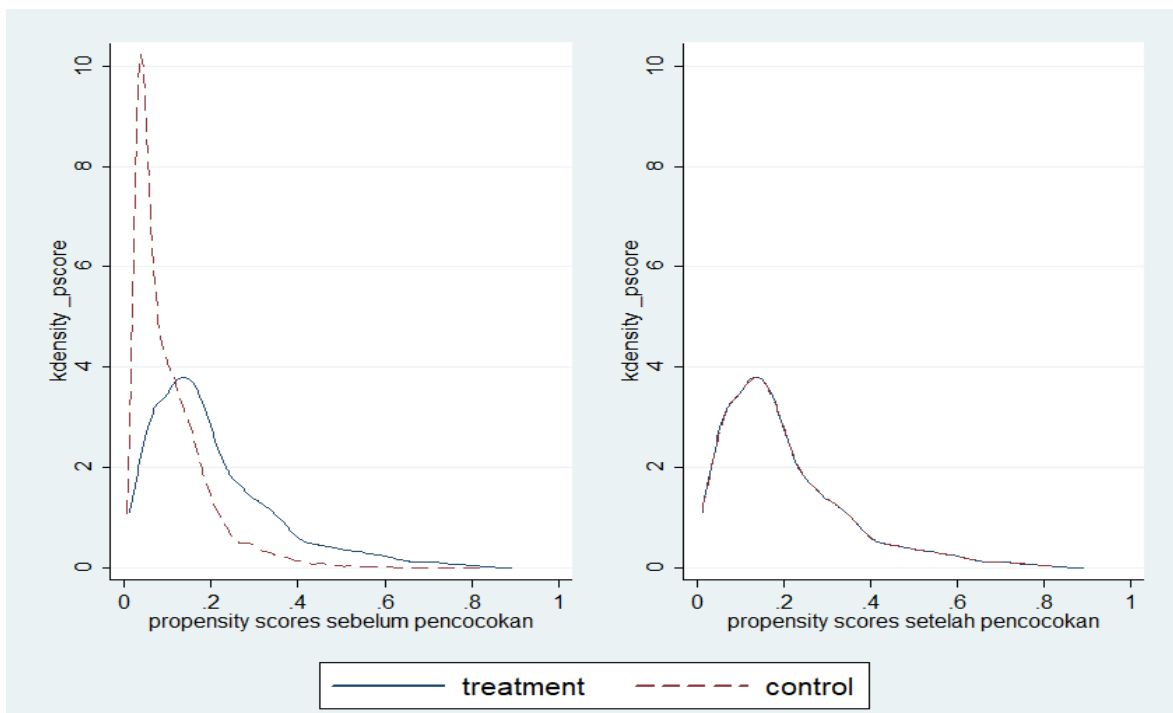
Figure 1. Balance Plot Before and After Matching
Source: Primary Data (2022)

Figure 1 shows the visualization of propensity score values from 0 to 1 for both groups, the treatment and control groups. On the left graph, there is an overlap between the propensity score plots of the two groups, indicating that the PSM method can be used because there is common support. However, there is a discrepancy between the plots of the two groups, indicating potential bias if performance indicator variables are compared directly without matching. The graph on the right shows both groups after matching, resulting in a more uniform line than the graph on the left. This indicates that the matching process has reduced potential bias. Furthermore, the common support area of covariates after matching was examined and presented in Table 1.

Table 1. Common Support of Covariate After Matching

Treatment	On Support	Off Support	Total
Implement e-commerce	2,935	0	2,935
Not implement e-commerce	22,436	0	22,436
Total covariate	25,371	0	25,371

Source: Primary Data (2022)

In the study, 25,371 samples were used, comprising 2,935 SMI that utilized e-commerce and 22,436 SMI that did not utilize e-commerce. Following the matching procedure, it was observed that all units were within the common support, implying that all treatment units were matched with control units. The study evaluated the performance of micro and small food and beverage industries in Indonesia based on three performance indicators: the number of employees, revenue, and business profits. The impact of implementing e-commerce was assessed using the Average Treatment on Treated (ATT) values for each performance indicator. The outcomes of the analysis regarding the

effect of e-commerce on the performance of micro and small food and beverage industries in Indonesia are presented in Table 2.

Table 2. The Impact of E-Commerce on the Performance of Micro and Small-Scale Food and Beverage Industries in Indonesia.

Variables	Sample	Treated	Controls	Difference	S.E.	T-stat
Number of employees	Unmatched	2.71	2.01	0.70	0.33	21.15***
	ATT	2.71	2.23	0.47	0.66	7.12***
Revenue	Unmatched (Rp Million)	23.45	12.73	10.73	2.05	5.24***
	ATT (Rp Million)	23.45	14.33	9.13	2.63	3.47***
Profit	Unmatched (Rp Million)	6.42	3.54	2.87	0.33	8.63***
	ATT (Rp Million)	6.42	4.51	1.90	0.64	2.99***

Note: * significant at α=10%, |t| ≥ 1.65

** significant at α=5%, |t| ≥ 1.96

*** significant at α=1%, |t| ≥ 2.58

Table 2 shows that three measurements of the effect of e-commerce on the performance of micro and small industries show significant positive results statistically. This is evidenced by the t-statistic values for each variable and the significance level at the real level a=1%. These results are consistent with the study by Kurnyasih & Syahbudi (2022), which showed that e-commerce positively affects business growth.

Number of Employees

The results of this study showed that SMI that applied e-commerce had an average number of employees of 2.71 (2-3 people), while SMI that did not apply e-commerce had an average number of employees of 2.23 (2 people). The number of employees in the e-commerce group increased significantly (T-stat > 2.58) compared to those that do not, with an ATT value difference of 0.47 and a t-statistic value of 7.12. One possible reason is that e-commerce can increase online transactions, thus expanding the market and increasing human resources. This is in line with the study by Lin et al. (2021) which states that e-commerce implementation can increase online transactions and improve human resources, improving the performance of micro and small industries. A company can be successful if its employees and customers are satisfied. By fulfilling customer needs, employee focus on their work is not disturbed, thereby increasing customer satisfaction (Fitriyadi, 2019).

Business Revenue

Business revenue is calculated as the product of the sales volume and prevailing prices. The estimated effect of e-commerce implementation on the treated group's revenue is indicated by the ATT value of IDR 23.45 million, while the control group has a revenue value of Rp 14.33 million. This difference yields a value of IDR 9.13 million. The research findings indicate that e-commerce implementation has a significant positive impact on business revenue, with a t-statistic value of 3.47, which means it is significant at the real level α=1 percent (T-stat > 2.58). This study supports previous

research findings that e-commerce implementation can increase business revenue (Hendrawan et al., 2018; Helmalia and Afrinawati, 2018). A study conducted by Helmalia and Afrinawati (2018) found that implementing e-commerce can increase sales in micro and small businesses. This means that the use of e-commerce in business can increase the number of products sold. This happens because e-commerce allows business owners to market their products without being limited by geographic regions (Amalina et al., 2022). Several other studies also show similar results, that using e-commerce in micro, small, and medium enterprises can expand markets and increase sales, ultimately increasing business revenue (Farida et al., 2017; Yusgiantoro et al., 2019).

Business Profit

The profit is obtained from the difference between revenue or turnover and the expenses incurred. This study shows that SMI that uses e-commerce has an average profit of Rp 6.42 million, while SMI that does not use e-commerce has an average profit of Rp 4.51 million. The difference between the two groups is Rp 1.90 million. Based on the estimated impact using PSM, the t-statistic value of ATT profit is 2.99, indicating that the implementation of e-commerce has a significant positive impact on business profit at the significant level $\alpha=1$ percent (T-stat > 2.58). This finding is consistent with previous studies that state that e-commerce can increase SMI's profit (Hendrawan et al. 2018; Helmalia and Afrinawati 2018). The implementation of e-commerce can help reduce marketing and promotion costs (Sedighi and Sirang 2018), so that the difference between revenue and costs becomes larger. In addition, the implementation of e-commerce through social media e-commerce can help small businesses reach more customers, showcase their products, and increase sales and profits (Karjo et al., 2022).

CONCLUSION AND SUGGESTION

Based on the previous description, it can be concluded that the implementation of e-commerce has a positive impact on the performance of micro and small industries, especially in terms of the number of employees, business revenue, and business profits. Micro and small industry groups that implement e-commerce tend to have higher average numbers of employees, revenue, and profits than those that do not. Therefore, it is recommended that micro and small industries consider implementing e-commerce in their business to reach a wider consumer market, increase revenue and profits, and ultimately improve their business status.

REFERENCES

Almutairi, J., & Altameem, A. (2016). The impact of electronic commerce on small and medium sized Enterprises in Saudi Arabia. International Journal of Management and Applied Sciences, 2(8), https://doi.org/10.1007/BF02296594

Amalina, N., Kurniawan, R. A., Rizkiawan, I. K., Sari, D. P., & Auliana, N. (2022). Faktor Yang Mempengaruhi Minat Adopsi E-Commerce Dan Pengaruhnya Pada Tingkat Penjualan UMKM di Surakarta. Jurnal Ilmu Manajemen Retail (JIMAT), 3(1), 1–11. https://jurnal.ummi.ac.id/index.php/jimat/article/view/1485

APJII. (2020). Laporan Survei Internet APJII 2019 – 2020. Asosiasi Penyelenggara Jasa Internet Indonesia, 2020, 1–146. https://apjii.or.id/survei

BPS. (2019). Profil Industri Mikro dan Kecil 2019. Bps.Go.Id, 1

BPS. (2020). Statistik E-commerce 2020. Bps.Go.Id, 1

Farida N, Naryoso A, Yuniawan A. (2017). Model of Relationship Marketing and E-Commerce in Improving Marketing Performance of Batik SMEs. JDM. 8(1).doi:10.15294/jdm.v8i1.10408. [diunduh 2023 Mar 13]. Tersedia pada: https://journal.unnes.ac.id/nju/index.php/jdm/article/view/10408

Feryanto, F., & Rosiana, N. (2021). Penggunaan Telepon Seluler Untuk Pemasaran Serta Dampaknya Terhadap Kesejahteraan Petani. Jurnal AGRISEP Kajian Masalah Sosial Ekonomi Pertanian Dan Agribisnis, 20(01), 25–40. https://doi.org/10.31186/agrisep.20.01.25-40

Fitriyadi EP. 2019. Inovasi e-commerce dan starup sebagai tantangan masyarakat industri 4.0. Jurnal Teknologi Informasi ESIT. 14(3): 34-39.

Hanifawati, T., & Listyaningrum, R. S. (2021). Peningkatan Kinerja UMKM Selama Pandemi Covid-19 melalui Penerapan Inovasi Produk dan Pemasaran Online. Warta LPM, 24(3), 412–426. https://doi.org/10.23917/warta.v24i3.12615

Hardilawati, W. L., Sandri, S. H., & Binangkit, I. D. (2019). The Role of Innovation and E-Commerce in Small Business. December. https://doi.org/10.2991/iccelst-ss-19.2019.18

Helmalia, H., & Afrinawati, A. (2018). Pengaruh E-Commerce Terhadap Peningkatan Pendapatan Usaha Mikro Kecil Dan Menengah Di Kota Padang. Jurnal Ekonomi Dan Bisnis Islam (JEBI), 3(1). https://doi.org/https://doi.org/10.15548/jebi.v3i2.182

Hendrawan, A., Sucahyowati, H., & Cahyandi, K. (2018). E-Commerce in Small and Medium Enterprises (SMEs) in order to Improve Performance. Jurnal Terapan Manajemen Dan Bisnis, 4(2), 208. https://doi.org/10.26737/jtmb.v4i2.1025

Jahanshahi. (2012). Analyzing the effects of electronic commerce on organizational performance: Evidence from small and medium enterprises. African Journal of Business Management, 6(22). https://doi.org/10.5897/ajbm11.1768

Karjo CH, Napitupulu BE, Hermawan F. (2022). Profitability Analysis of Home-scale SMEs Based on. ijiems. 1(1):102.doi:10.52362/ijiems.v1i1.707.

Kemenkopukm. (2021). Perkembangan Data Usaha Mikro , Kecil , Menengah Dan Usaha Besar. Kementrian Koperasi Dan UKM Republik Indonesia, 2000(1), 1. http://www.depkop.go.id/uploads/laporan/1580223129_PERKEMBANGAN DATA USAHA MIKRO, KECIL, MENENGAH (UMKM) DAN USAHA BESAR (UB) TAHUN 2017 - 2018.pdf

Kemenperin. (2017). Industri Makanan dan Minuman Masih Jadi Andalan. https://kemenperin.go.id/artikel/18465/Industri-Makanan-dan-Minuman-Masih-Jadi-Andalan [diakses 06 April 2023]

Kurnyasih, A., & Syahbudi, M. (2022). Pengaruh E-commerce dalam Memajukan Usaha Mikro, Kecil dan Menengah di Kota Binjai Tahun 2022. El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam, 4(2), 291–300. https://doi.org/10.47467/elmal.v4i2.1374

Lin H, Li R, Hou S, Li W. (2021). Influencing factors and empowering mechanism of participation in e-commerce: An empirical analysis on poor households from Inner Mongolia, China. Alexandria Engineering Journal. 60(1):95–105.doi:10.1016/j.aej.2020.06.010.

Mubarak RA, Sulistyowati L. (2020). Manfaat internet marketing dalam meningkatkan pendapatan UMKM puree mangga. Jurnal Ilmiah Mahasiswa. 7(1): 272–287.

Nilasari BM, Beliartati BO, Kristaung R. (2022). Penyuluhan peningkatan motivasi kerja UMKM pada UMKM binaan Yayasan Insan Palma Sejahtera di Palmerah – Jakarta Barat. Jurnal AKAL : Abdimas Dan Kearifan Lokal. 3(2): 110–121. https://doi.org/10.25105/akal.v3i2.12974

Nur Fadila, U., Maria Astuti, H., & Artwodini Muqtadiroh, F. (2014). Analisis faktor kesuksesan e-commerce pada umkm (usaha mikro kecil menengah) di jawa timur. Jurnal Teknik POMITS, 1(1), 1–6.

Sedighi, A., & Sirang, B. (2018). The Effect of E-Commerce on SME Performance. International Journal of Applied Research in Management and Economics, 1(2), 71–81.

Sedyastuti, K. (2018). Analisis Pemberdayaan UMKM Dan Peningkatan Daya Saing Dalam Kancah Pasar Global. INOBIS: Jurnal Inovasi Bisnis Dan Manajemen Indonesia, 2(1), 117–127. https://doi.org/10.31842/jurnal-inobis.v2i1.65

Yusgiantoro, I., Wirdiyanti, R., Soekarno, S., Damayanti, S., & Mambea, I. (2019). The Impact of E-commerce Adoption on MSMEs Performance and Financial Inclusion (FI) in Indonesia. The Financial Services Authority, December, 1–19.