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The Impact of Digital Marketing Training on E-Commerce Profitability in Post-Pandemic Conditions: A Study of Indonesia's Accommodation and Food Services Industry

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Abstract

The Covid-19 pandemic has accelerated the shift towards digital platforms such as e-commerce. The growth of e-commerce impacted businesses across various industries. This thesis investigates the impact of digital marketing training on e-commerce profitability, focusing on the accommodation and food services industry in Indonesia. Utilising data from the 2023 e-commerce survey by Badan Pusat Statistik Indonesia, this study explores how receiving training and the level of training influence e-commerce income changes in the post-pandemic situation. Using Weighted Least Squares regression models, this study reveals that firms that have received digital marketing training experienced a significant positive change in their e-commerce income. However, the effect varies depending on the level of training. The findings highlighted the importance of digital marketing training programs to enhance e-commerce profitability.

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1. Introduction

The Covid-19 pandemic has created a significant disruption that affects many aspects including the economic aspect. A survey done by the Badan Pusat Statistik Indonesia (2020) shows that 82.85% of firms were affected by the Covid-19 pandemic. Based on the sector, the accommodation and food and beverages industry experienced the largest decline in revenue at 92.47%.

As the pandemic disrupted traditional business operations, there is an emerging trend where there is a massive shift in e-commerce usage, an increase in shopping at one-stop-shop retailers, and an acceleration in buying local product (Rohmah, 2020). The shift towards e-commerce was particularly apparent in developing countries. A report from the United Nations Conference on Trade and Development (2020) notes that as traditional retail channels were disrupted, firms and consumers in developing countries quickly shifted to online purchasing, often adopting digital technology earlier than expected out of necessity.

A report by Google, Temasek, and Bain (2021) that focuses on the digital economies of Southeast Asia countries shows that, since the pandemic began, developing countries such as Indonesia have seen a rise of 21 million new digital consumers. 72% of these new users are from non-metropolitan areas. This is a highly positive indicator of increasing penetration in the largest market in the region.

This transition to e-commerce, however, presented both opportunities and challenges. On one hand, the changing consumer behavior makes consumers increasingly accustomed to using online media as a means of making decisions and purchasing goods which creates a perfect momentum for micro, small, and medium enterprises (MSMEs) to carry out digital transformation (Wijoyo & Bakrie, 2020). On the other hand, this also means that it would be necessary for firms to assess their marketing strategies with a focus on customer engagement in digital environments to increase business resilience (Ceocea et al., 2022). However, businesses, particularly MSMEs, have only limited resources which makes it difficult to invest in the latest technology and scale their operations effectively. In addition, they are often faced with fierce competition from bigger and well-established firms that have more resources and market power (Hokmabadi et al., 2024).

One of the ways businesses could adapt to the changes in consumer behaviour and preferences efficiently is by using digital platforms such as e-commerce and social media to

increase their productivity (Mariana et al., 2023). To convey the product value of a company is important to maximise its potential and existing customers through the right channel of communication. This is the reason why it is crucial to analyse, modify, and improve the promotion strategy of goods and services in short amounts of time during the pandemic (Meshko & Savinova, 2020). Marketing strategies such as using more social media to promote a firm's product have helped firms to increase sales and gain profits (Samonte Jr et al., 2022). In the study of Kanapathipillai (2020), the author found that by changing its marketing concept, strategy, and techniques, the food business can restore its momentum in the market.

For firms that use e-commerce to increase their productivity, firms can do skills enhancement programs (Ridhwan et al., 2023). Despite this, most entrepreneurs in developing countries are unaware that coaching and training can help them enhance their business practices that affect their company's performance (Takeda et al., 2022). Study from Anderson et al. (2016) have shown that businesses in the marketing training program, compared to those who are not, were significantly more likely to adopt marketing practices related to market research, marketing tactics, and sales. The study also found that businesses in the marketing training program experienced a 61% increase in profitability. Furthermore, firms that are run by entrepreneurs with a lack of prior experience in a variety of market contexts, showed significantly greater improvement in profits when offered the marketing training. In the context of Indonesia, a study by Limas (2023) mentioned how important marketing is in boosting SMEs performance in Surabaya, Indonesia. The study found that online marketing has a significant impact on customer value, which in turn affects business performance.

This thesis aims to provide valuable insights into how important training is for businesses to better navigate the digital landscape, improve their competitive positioning, and enhance profitability. Therefore, the main research question for this study is:

What is the impact of digital marketing training on e-commerce profitability in Indonesia's post-pandemic condition?

This thesis uses a dataset from the Badan Pusat Statistik Indonesia 2023 e-commerce survey. By using the data available, we are able to answer the research question and provide relevant insights. The objective of this thesis is to: (1) assess the relationship between receiving marketing training and e-commerce income and (2) to examine whether training level affected e-commerce income change. The remaining thesis is organised as follows: Section 2, discusses

relevant literature and the hypotheses for this study; Section 3 covers the data and methodology; Section 4 provides the results and the analysis; Section 5 presents the study and discussion of the limitations of the study with suggestions for future research.

2. Literature Review

2.1. E-commerce in the Covid-19 Pandemic

Electronic Commerce (e-commerce) is the sale or purchase of goods and/or services which are conducted online over the internet using methods designed for the purpose of the transaction. While the transaction happens online, the payment and delivery of the goods and/or services do not have to be online (Badan Pusat Statistik Indonesia, 2023). The restrictions imposed by the Covid-19 pandemic have driven many businesses to adapt and shift towards e-commerce to continue their operations. Businesses had to quickly reconfigure their strategies, such as enhancing their online presence and optimising logistics to meet the growing demand for home deliveries (Markovič et al., 2022)

E-commerce platforms quickly adapted to the new environment. This is done by improving their digital infrastructure, streamlining supply chains, and utilising data analytics to predict consumer behaviour and effectively handle inventories. Their adaptability allowed businesses to recover swiftly from initial disruptions and thrive in a market where physical shopping was severely constrained (Donthu & Gustafsson, 2020).

E-commerce not only sustained businesses during the pandemic but also contributed to the world economic recovery efforts. A report by the United Nations Conference on Trade and Development (2021) highlighted that global e-commerce sales grew by 4% in 2019, reaching $26.7 trillion. Studies have also shown that e-commerce contributed significantly to gross domestic product (GDP) in many countries during the pandemic. A study by Koç Yurtkur & Bahtiyar (2020) shows that, in the long run, there has been a positive correlation between GDP growth and factors that indicate the level of development of e-commerce in consumption, investment, government purchase and net export. In Indonesia, e-commerce platforms such as Tokopedia played an important role in digitizing MSMEs which enabled them to continue their business operations and support the nation’s economy. This digital transformation is aligned with the government initiatives to promote economic recovery through technology and innovation (Futri et al., 2021).

The digital transformation also provides new opportunities and challenges for e-commerce., In one way, consumers tend to have many choices in online shopping to meet their needs and the convenience offered by online shopping can lead to more consumptive behaviour (Harahap & Amanah, 2018). This rise in online shopping brought new revenue streams for businesses, especially for those who are able to scale their operations quickly to meet the increasing demand. The transition to digital commerce also lowered the entry barriers for new businesses, allowing entrepreneurs to launch online stores with minimal initial investment (Kim, 2020).

However, the rapid growth in e-commerce also brought significant challenges. Increased competition in the digital marketplace puts pressure on profit margins as a result of price wars and major discounts by businesses in an effort to attract customers. Additionally, the rising demand for e-commerce services slowing down the supply chains which resulted in higher shipping costs and longer delivery times (Wang, 2021). There is also the need to invest in digital marketing, cybersecurity, and customer service in order to maintain competitive advantage which affected the operating cost further (Mattioli & Thomas, 2020).

In the post-pandemic era, e-commerce's long-term success will depend on businesses' ability to adapt to these challenges and continue to modify their strategy in response to the market dynamics. One of the efforts that can be made to increase a firm's online promotion is to provide training to enhance the advertisers' and employees' knowledge and abilities in order to generate sales through social media and e-commerce (Suleman et al., 2019)

2.2. Digital Marketing Training and E-commerce Profitability

Digital marketing played an important role in ensuring the sustainability and financial performance of businesses during the pandemic Research conducted on MSMEs in Indonesia showed that digital marketing had a significant impact on the financial performance and sustainability of the businesses. The ability of businesses to engage with consumers through digital platforms allowed them to maintain sales and continue operations despite the physical restrictions imposed during the pandemic (Purba et al., 2021). Businesses were also able to increase product awareness, improve customer interaction, and strengthen customer communication by leveraging digital platforms, all of which helped increase sales (Porsch et al., 2023). Therefore, for firms to be able to maximise the potential of using digital platforms, they need to provide digital marketing training for their employees.

A study by Bakhtiar et al. (2022) shows that business training that builds skills in key areas such as marketing, negotiation, networking, financial planning and communication causes profit and sales to improve. Another study by McKenzie (2021) indicates that a typical training program is likely to have an average impact on firm profits and sales of approximately 5% - 10% in which the authors deemed small but may just be enough for the training to pay for itself. The effectiveness of digital marketing was further evident in consumer behavior studies, which showed that digital content marketing had a significant impact on customer engagement and purchase intentions. This emphasises how crucial digital marketing is to e-commerce profitability both before and after the pandemic (Trivedi, 2022).

Digital marketing training can also help businesses keeping pace with the latest trends and technologies, which will help them to adapt quickly to the changes in the digital landscape. This flexibility is important in the rapidly evolving world of e-commerce, where consumer preferences and behaviours can suddenly shift (Kotler et al., 2017). As a result, businesses that prioritise marketing training have a greater chance to capitalise on new opportunities and maintain an advantage in the market.

The level of marketing training received by employees can have a significant impact on the profitability of e-commerce businesses. Higher levels of training, particularly in advanced digital marketing strategies and tools, are associated with greater proficiency and effectiveness in carrying out marketing campaigns. This can lead to higher profits as businesses are able to attract more customers and convert them at a higher rate (Pulizzi, 2015).

Having basic marketing training provides employees with the fundamental skills needed to carry out standard campaigns. A more advanced training, on the other hand, allows for more complex strategies that can result in higher returns. A study by Lipschultz (2020) for example shows that advanced training in data analytics and machine learning can enable businesses to develop models that predict consumer behaviour and optimise marketing spending However, it's important to consider the cost and benefit of the training as it must be in line with the benefits.

2.3. Hypothesis Formulation

Based on the literature review, we can hypothesise the following:

1. Receiving digital marketing training significantly increases e-commerce income.
2. A higher level of training leads to higher income compared to a lower level of training.

3. Data and Methodology

3.1. Data

The sample data in this thesis is a cross-sectional data from the Badan Pusat Statistik (BPS) Indonesia e-commerce 2023 survey. BPS is the Central Bureau of Statistics of Indonesia that is responsible for conducting the nation's statistical surveys. The scope of the data includes business profiles and activities, worker characteristics, and income and expenditure characteristics. The data presented are the results of the 2023 e-commerce Survey which covers e-commerce businesses activities during 2022 and 2023. The number of e-commerce Survey samples was selected based on a margin of error (MoE) of 17.5%, namely 31,753 e-commerce business samples and 4,252 Census Block samples. The businesses/respondents covered in this survey are eCommerce businesses that receive orders or sell goods/services via the internet during 2022 (Badan Pusat Statistik Indonesia, 2023).

However, to provide a more accurate industry specific result, this thesis focuses on the sector that are being affected the most by the Covid-19 pandemic that is the accommodation and food services industry (Badan Pusat Statistik Indonesia, 2020). This narrows down the sample observation to 2,379 firms. Additionally, the econometric specifications of the regression model's variables are provided in Appendix A.

3.1.1. Dependent Variable

The main outcome measured used as the dependent variable in this study is e-commerce's income change from the year 2022 to 2023. Income refer to the amount of money earned by a firm from its operational activities, including the sale of goods or services both offline and online. Income reflects how effective a business is in generating revenue from the market and is able to finance its operational needs (Badan Pusat Statistik Indonesia, 2023).

3.1.2. Independent Variables

For the first hypothesis, the main independent variable is Training. This variable refers to whether a firm has ever received training related to the use of information technology for digital marketing at least once between the year 2019 – 2022. The year is kept between 2019 and 2022 with the assumption that, during that time, the training would have the pandemic as its context. This variable is used due to the study by Bakhtiar et al. (2022) and McKenzie (2021) who shows that having training increases profit and sales.

The second hypothesis uses Training Level as the main independent variable. As the name suggests, Training Level measures the level of training received by the firm. This variable is used to confirm the study by Pulizzi (2015) where higher levels of training are associated with greater proficiency in carrying marketing campaigns and will lead to higher profits. The level of training includes basic, advanced, and expert training with the respondent being able to choose more than one training level as shown in Appendix A. However, the level of training is based on a subjective assessment of the companies completing the survey which means that there is no definite standard in choosing the level of training.

3.1.3. Control Variables

This thesis controls for a total of six additional variables including the Previous Year Income, Total Employee, Age, Location, Income Category, and Average Monthly Online Sales. Previous Year Income is a binary variable that indicates if the company's previous year income from 2021 to 2022 increases or decreases. This variable is used to see whether a company who already recover from the pandemic a year before and having a positive or negative change on their income will reflect the next year income change as well. Total Employee is a variable that measures the firm size based on the total employee. Firm size can be one of the main determinants of a firm's ability to provide significant and continuous training and development investment. Larger firms may have more training and development resources (such as training development professionals, facilities, and equipment) due to the firms' economies of scale (Aycan, 2001). Owner's Age is a variable that measures the age of the firm's owner or CEO. The age of the owners, CEOs, and senior managers is shown to be significantly and negatively associated to the levels of e-commerce utilisation by SMEs, according to a study in Thailand (Amornkitvikai, 2020). This findings imply that older CEOs, owners, and senior managers are likely to have lower e-commerce utilisation levels. Location is a binary variable that indicates

whether a firm is located on the island of Java or not. Java Island has better economic conditions than other parts of Indonesia. With just six provinces total, Java contributes 58.61 percent of Indonesia's GDP, whereas the remaining 32 provinces located outside of Java contributes to the rest. Historically, the existence of the Dutch East Indies Colonial Government further emphasized the importance of Java. Due to the plantation economy's growth, Java now has a variety of infrastructure facilities that are important for the country's economic development. This condition made Java economically ahead of other regions in Indonesia (Rinardi et al., 2023). Average Monthly Online Sales is a variable that measures the firm average monthly sales using an online platform. This variable is used to identify if a firm's income growth will be positively impacted by utilizing more of the online channels to sell their products compared to offline channels. This variable is also used because sales is directly affected a firm's income. Income Category is a binary variable that indicate if the firm yearly in come is less than IDR 300 million or less than or equal to IDR 300 million. If a firm has a yearly income of less than IDR 300 million, the firm is considered a micro business based on the Indonesia MSME law. Findings by Datta (2011) show that income is positively correlated with e-commerce adoption which shows the importance of capital availability and private investment.

3.2. Methodology

In order to empirically evaluate the impact of receiving training and its training level on e-commerce's income change from the year 2022 to 2023, this thesis will use a Weighted Least Square (WLS) regression. Generally, the WLS method is used to estimate the regression parameters when there is heteroscedasticity in the data (Midi et al., 2009). Using both Breusch-Pagan/Cook-Weisberg and White's test for heteroskedasticity, it shows that in both hypothesis full model (3) and (6), there appears to be evidence of heteroskedasticity with more details provided in Appendix B and C. WLS have the same assumptions as the Ordinary Least Squares (OLS) regression model with the difference being there is no need to fulfil the homoscedasticity assumption of the OLS regression. Hence, the WLS method allows us to appropriately test the first and second hypothesis. The dataset from BPS provided the estimation of the weight. For each hypothesis, the equation would be as follows:

(Hypothesis 1) $$EcommIncomeChange_{\ i} = \alpha + \beta_1\, Training_i + \ X_i + e_i$$

(Hypothesis 2) $$EcommIncomeChange_{\ i} = \alpha + \beta_1\, TrainingLevel_i + \ X_i + e_i$$

With the denotation:

E-commerce Income Change	=	E-commerce's income change from the year 2022 to 2023 in percentage
Training	=	Binary variable, one if the firm has received training and zero otherwise
TrainingLevel	=	Categorical variable, level of training that the firm received
X_i	=	Control variables
e_i	=	Error term

This thesis uses STATA statistical software to conduct all WLS regression models which includes two steps. The first is to use the independent and control variables to predict the e-commerce's income change. Then, we use variance inflation factors (VIFs) to check if there is any multicollinearity between the variables. The result is that there is no multicollinearity as shown in Appendix D and E.

4. Results

4.1. Descriptive Statistics and Correlation Matrix

To give an overview of the data being used for the analysis, we provide the descriptive statistics and correlation matrix of all the variables within the models. Table 1 depicts the descriptive statistics of all the variables in the regression models.

Table 1 shows the average e-commerce income change from the year 2022 to 2023 is -3.3724% which means that most of the firm experiences a loss in the post-pandemic condition. The income change ranges from -99% to 100%, indicating some firms saw significant losses while some experienced double their previous year's income. The standard deviation of 41.7204 shows that there is a wide variability in income changes. The independent variable Training have a mean of 0.0328 which suggests that only about 3.28% or 78 firms received training while the rest did not have any training. From those who received training, the Training Level mean shows that most firms have taken the basic training.

The control variable Previous Year Income has a mean of 0.6183, suggesting that 61.83% of the firm experienced an increase in income from the year 2021 to 2022. This means that more than half of the firms have experienced growth from the previous year. Total Employee have a mean of 4.91 which indicates that, on average, the firms only have 5

employees. According to BPS, based on the total number of employees, micro businesses have a total employee of 1 – 4 people, small businesses have a total employee of 5 – 19, and medium businesses have a total employee of 20 – 99 people. This means that most firms in this study are classified as MSMEs in terms of the total number of employees. Owner's Age has a mean of 42.1681, indicating the average age of the business owners is 42 years old. Location shows a mean of 0.3069, suggesting that 69.31% of the firms are located outside of Java. Income category have a mean of 0.2404 which indicates that around 75.96% of the firms are classified as micro businesses. Lastly, Average Monthly Online Sales shows a mean of 149.9046 which shows that the average monthly online sales is 150 units of goods and/or services. The standard deviation of 927.6182 indicates that the number of sales has a high variability with some firms having significantly higher sales than the majority. To better understand the variables, Appendix A provides more detailed information on the variables.

Table 3 and 4 show the correlations between the dependent, independent and control variables used for hypotheses 1 and 2 within the thesis. Overall, E-commerce Income Change is associated positively with Training, Training Level, Previous Year Income, Total Employee, Income Category, and Average Monthly Online Sales. Interestingly, there appears to be a consistent pattern where Owner's Age shows negative correlations with various outcomes and is significant at 0.01 level, suggesting that older business owners might face more challenges in adapting to e-commerce. These correlation tables also give further detail to see if there is any multicollinearity between the variables which, in this case, there is no strong enough evidence.

Table 1. Descriptive statistics.

Variables	Mean	Standard Deviation	Minimum	Maximum	Number of Observations
E-commerce Income Change	-3.2245	41.7204	-99	100	2,379
Training	0.0328	0.1781	0	1	2,379
Training Level					
0	0.9672	0.1781	0	1	2,379
1	0.0219	0.1463	0	1	2,379
2	0.0034	0.0579	0	1	2,379
3	0.0029	0.0542	0	1	2,379
4	0.0029	0.0542	0	1	2,379
5	0.0004	0.0205	0	1	2,379
6	0.0012	0.0355	0	1	2,379
Previous Year Income	0.6183	0.6183	0	1	2,379
Total Employee	4.9100	8.4687	1	130	2,379
Owner's Age	42.1681	11.5423	15	97	2,379
Location	0.3069	0.4613	0	1	2,379
Income Catagory	0.2404	0.4272	0	1	2,379
Average Monthly Online Sales	149.9046	927.6182	1	30,000	2,379

Table 2. Correlation matrix of receiving training on e-commerce income change.

Variables	E-commerce Income Change	Training	Previous Year Income	Total Employee	Owner's Age	Location	Income Category	Average Monthly Online Sales
E-commerce Income Change	1.0000							
Training	0.0939***	1.0000						
Previous Year Income	0.5303***	0.0786***	1.0000					
Total Employee	0.0481	0.0559***	0.0428**	1.0000				
Owner's Age	-0.1446***	-0.0554***	-0.1745***	0.0289	1.0000			
Location	-0.0312	-0.0258	0.0539***	-0.1466***	0.0916***	1.0000		
Income Catagory	0.0287	-0.0152	0.0258	0.4210***	-0.0337	-0.0865***	1.0000	
Average Monthly Online Sales	0.0403**	0.0540***	0.0456**	0.1808***	-0.0420**	-0.0163	0.1953***	1.0000

Standard errors are in parentheses; *p < 0.1, **p < 0.05, ***p<0.01

Table 3. Correlation matrix of training level on e-commerce income change.

Variables	E-commerce Income Change	Training Level	Previous Year Income	Total Employee	Owner's Age	Location	Income Category	Average Monthly Online Sales
E-commerce Income Change	1.0000							
Training Level	0.0396*	1.0000						
Previous Year Income	0.5303***	0.0700***	1.0000					
Total Employee	0.0481	0.0640***	0.0428**	1.0000				
Owner's Age	-0.1446***	-0.0417**	-0.1745***	0.0289	1.0000			
Location	-0.0312	-0.0206	0.0539***	-0.1466***	0.0916***	1.0000		
Income Catagory	0.0287	-0.0037	0.0258	0.4210***	-0.0337	-0.0865***	1.0000	
Average Monthly Online Sales	0.0403**	0.0257	0.0456**	0.1808***	-0.0420**	-0.0163	0.1953***	1.0000

Standard errors are in parentheses; *p < 0.1, **p < 0.05, ***p<0.01

4.2. Hypothesis 1

The analysis aimed to test the first hypothesis by investigating the impact of receiving training on e-commerce income change, alongside other relevant factors such as the previous year's income, total number of employees, owner's age, business location, income category, and average monthly online sales. The regression results are summarised in Table 4, which presents three different models to illustrate the relationship between these variables and e-commerce income change.

Model (1) serves as the baseline model, focusing on the effect of Training. The results show that receiving training is associated with a significant positive impact on e-commerce income change, with a coefficient of 24.5699 and is significant at 0.01 level. This implies that firms that received training experienced a positive income growth of 24.57% compared to those that did not receive training. In Model (2), control variables are introduced but still excluding the Previous Year Income. The coefficient for Training remains positive at 21.58821 and is significant at 0.01 level. However, the coefficient is slightly lower than the one in Model (1). This reduction suggests that some of the effects related to Training in Model 1 are shared with the other control variables, such as Total Employee, Owner's Age, Location, Income Category, and Average Monthly Online Sales. In particular, the Owner's Age shows up as a significant negative predictor in this model, with a coefficient of -0.50073. This indicates that older business owners tend to experience a smaller increase or decrease in e-commerce income from the year 2022 to 2023.

The addition of the Previous Year Income in Model **(**3) significantly changes the regression outcomes. Previous Year Income is shown to have a positive effect on e-commerce income change, with a coefficient of 42.83719 that is significant at 0.01 level. This finding suggests that firms that have an increasing income from the year 2021 to 2022 are more likely to see further increases in income in the next year as well. This variable also causes a further reduction in the Training coefficient to 12.82165. However, the coefficient remains positive and significant at 0.01 level, indicating that training is still very important in increasing e-commerce income.

The R-squared (R^2) values provide insight into the explanatory power of the models. In Model (1), the R^2 value is relatively low at 0.0088, indicating that only about 0.88% of the variance in e-commerce income change is explained by Training. The addition of control variables in Model (2) increases the R^2 to 0.0311. However, the most significant one is in Model (3), where the R^2 jumps to 0.2872. This suggests that nearly 28.72% of the variance in e-commerce income change can be explained when Training, Previous Year Income, and other control variables are considered together. The increase in R^2 from Model (1) to Model (3) highlights the important role of the previous year's income in predicting future e-commerce income change.

Other control variables show various degrees of impact. Total Employee have a positive effect in Model (2), significant at 0.1 level but loses significance in the next model. Location,

Income Category, and Average Monthly Online Sales are not statistically significant across all models, suggesting that these factors have a no influence on e-commerce income change. The non-significance of Location may imply that e-commerce success is not affected by geographical factors.

Overall, these findings highlight the complexity of e-commerce income growth and decline. The positive and statistically significant coefficient emphasise the importance of training programs in enhancing e-commerce performance. This could potentially be done by giving business owners and employees the abilities and knowledge needed to optimise their online sales strategies. Although training can significantly increase e-commerce income, especially for firms with lower previous income, the impact of a firm previous performance is significant. An already successful e-commerce will tend to expand on its existing strengths.

Table 4. Regression results between receiving training on e-commerce income change

Variables	E-commerce Income Change		
	(1)	(2)	(3)
Training	24.56995***	21.58821***	12.82165***
	(5.3434)	(5.3179)	(4.5720)
Previous Year Income			42.83719***
			(1.4676)
Total Employee		0.30918*	0.17213
		(0.1712)	(0.0638)
Owner's Age		-0.50073***	-0.18904***
		(0.0733)	(0.0549)
Location		-0.97016	0.64418
		(2.0473)	(1.7572)
Income Catagory		0.30627	0.41551
		(2.3790)	(2.0410)
Average Monthly Online Sales		0.00159	0.00052
		(0.0015)	(0.0013)
Constant	-3.98051***	17.31851***	-22.43191***
	(0.8406)	(3.6336)	(3.4017)
Observation	2,379	2,379	2,379
R^2	0.0088	0.0311	0.2872

Note: In this table, (1) indicate Model 1 as the baseline model, (2) indicate Model 2 with control variables (excluding previous year income), and (3) indicate Model 3 with control variables (including previous year income). Standard errors are in parentheses; *p < 0.1, **p < 0.05, ***p<0.01

4.3. Hypothesis 2

Table 5 presents the results of three regression models that analyse the impact of different training levels on E-commerce Income Change. Similar to the previous hypothesis, we started with the baseline model and then including control variables in the next two models to assess how the relationship between training levels and e-commerce income change is affected by other factors such as Previous Year Income, Total Employee, Owner's Age, Location, Income Category, and Average Monthly Online Sales.

In Model (4), we begin by examining the effect of various training levels on e-commerce income change without control variables. The results indicate that most training levels have a positive and significant impact on e-commerce income change. Training Level 1 has a coefficient of 26.83600 and is significant at 0.01 level, indicating that firms receiving this basic level of training experience an increase in e-commerce income change compared to those that did not receive training. This is aligned with the findings from Hypothesis 1. Training Level 2 shows a larger effect, with a coefficient of 36.30680 with significance at 0.1 level, suggesting that more advanced training leads to bigger increases in e-commerce income. Training Level 3 has the highest impact compared to the other levels, with a coefficient of 51.89092 and is significant at 0.01 level. This suggests that this level of training might provide the most valuable skills or knowledge, leading to the largest improvements in e-commerce income. Training Level 4 also shows a significant positive effect with a coefficient of 41.32292, significant at 0.05 level, although slightly less than Level 3. Training Level 5 shows a further decrease in the coefficient at 23.98051 but is not significant. More interestingly, Training Level 6 shows a negative effect with a coefficient of -38.89233 and is significant at 0.05 level, indicating that the highest level of training may not be beneficial and could potentially harm e-commerce income change. This baseline model suggests that while most training levels positively impact e-commerce income, some levels of training might lead to negative outcomes.

Model (5) introduces additional control variables, including Total Employee, Owner's Age, Location, Income Category, and Average Monthly Online Sales. Training Level 1 remains positive and significant with a coefficient of 24.32927 at a 0.01 significance level, though slightly reduced from Model (4). This suggests that some of the benefits of training are influenced by other variables used in this model. Training Level 2's effect increases from the previous level to 29.88338 but is not significant. Training Level 3 continues to have the

strongest effect with a coefficient of 46.30999 and is significant at 0.01 level, though slightly less than in Model (4). Training Level 4's coefficient slightly decreased from the previous level to 44.59922 at a 0.05 significance level. Training Level 6 shows a bigger negative effect compared to the one in Model (4) with a coefficient of -42.18322 and is significant at 0.01 level, further supporting the finding that the highest level of training might hinder e-commerce income growth.

Among the control variables, the Owner's Age has a significant negative impact on e-commerce income change, with a coefficient of -0.50287 at a 0.01 significance level, indicating that older business owners are less likely to benefit from e-commerce activities or are not able to adapt to the e-commerce dynamic. Total Employee shows a small positive effect of 0.32467 and is significant at 0.1 level, suggesting that larger firms may experience slightly better outcomes in e-commerce income change. The result of this model does not significantly change the trend observed in Model (4). However, it highlights how these factors interact with training to influence e-commerce income.

Model (6) adds Previous Year Income as a control variable alongside the variables from Model (5). This model shows how past performance interacts with training and other variables affecting e-commerce income change. Training Level 1 remains positive and significant with a coefficient of 18.12351 and is significant at 0.01 level, although reduced than the previous model, indicating that Previous Year Income contributes to some of the training effect. Training Level 2's coefficient decreases to 15.72808 from the previous level in the same model but is not significant on any level. This is the first time that Training Level 1 to 2 experience a decrease of impact in contrast to an increase. Consistent with the other model, Training Level 3 still shows the highest positive impact of 34.34066 at a 0.01 significance level. This indicates that even after accounting for previous income, this training level still provides substantial benefits. Training Level 4's effect is notably reduced from the two previous models to 25.25718 but is not significant. Training Level 5 further decreases the effect to only 2.13052 but is also not significant at any level. Training Level 6 negative impact becomes more apparent in this model with a coefficient of -50.06704 and is significant at 0.01 level, suggesting that advanced training might be inefficient or harmful for firms with higher previous income.

The addition of the Previous Year Income reveals its strong positive effect on e-commerce income change, with a coefficient of 42.79035 and is significant at 0.01 level. This indicate that firms with an already increasing income in the previous year are more likely to

experience positive changes in e-commerce income. Other control variables in Model 6, such as Total Employee, Location, Income Category, and Average Monthly Online Sales do not show significant impacts, suggesting that these factors have limited direct influence on e-commerce income change when previous income and training levels are considered. Owner's Age remains a significant negative factor, though its impact is reduced to 0.19002, indicating that younger business owners are generally more successful in using e-commerce platforms.

Table 5. Regression results between training level received by a firm on e-commerce income change

Variables	E-commerce Income Change		
	(4)	(5)	(6)
Training Level			
1	26.83600***	24.32927***	18.12351***
	(6.9101)	(6.8647)	(5.8862)
2	36.30680*	29.88338	15.72808
	(20.5002)	(20.3557)	(17.4495)
3	51.89092***	46.30099***	34.34066***
	(13.5886)	(13.4823)	(11.5602)
4	41.32292**	44.59922**	25.25718
	(20.0043)	(19.8693)	(17.0388)
5	23.98051	13.22491	2.13052
	(50.3102)	(49.8980)	(42.7591)
6	-38.89233**	-42.18322***	-50.06704***
	(15.4580)	(15.3205))	(13.1309)
Previous Year Income			42.79035***
			(1.4612)
Total Employee		0.32467*	0.19189
		(0.1711)	(0.1467)
Owner's Age		-0.50287***	-0.19020***
		(0.0733)	(0.0637)
Location		-0.89341	0.70423
		(2.0440)	(1.7524)
Income Catagory		0.01368	0.19716
		(2.3743)	(2.0346)
Average Monthly Online Sales		0.00150	0.00040
		(0.0015)	(0.0013)
Constant	-3.98051***	17.35815***	-79.61891***
	(0.8736)	(3.6247)	(23.7294)
Observation	2,379	2,379	2,379
R^2	0.0180	0.0402	0.2956

Note: In this table, (4) indicate Model 4 as the baseline model, (5) indicate Model 5 with control variables (excluding previous year income), and (6) indicate Model 6 with control variables (including previous year income). Standard errors are in parentheses; *p < 0.1, **p < 0.05, ***p<0.01

5. Conclusion and Discussion

This thesis aims to investigate how digital marketing training can increase e-commerce income within Indonesia's accommodation and food services industry. Additionally, this thesis provides additional answer on the importance of the level of training taken. Using the cross-sectional data from BPS, this paper attempts to answer the research question: ***What is the impact of digital marketing training on e-commerce profitability in Indonesia's post-pandemic condition?***

First, the study shows that receiving digital marketing training has a positive and significant effect on e-commerce income change. Firms that participated in this type of training were more profitable than those that did not. This highlights the importance of investing in employee development through training program. This aligns with the existing literature by Bakhtiar et al. (2022) and McKenzie (2021) which suggests that having training increases profit and sales.

However, the impact of training varies depending on the different levels. The results show that the benefits of training are most pronounced from Training Levels 1 to 3, with level 1 being basic, 2 being advanced, and 3 being expert. Training Level 1 to Training Level 3 has always had an increasing impact on e-commerce income. This suggests that having a higher level of training leads to higher income most of the time, aligned with the study by Pulizzi (2015) where higher levels of training will lead to higher profits.

On the other hand, Training Levels 4 to 6, with the firm having training in more than just 1 level as defined in Appendix A, experienced a decline in the impact. Training Level 6, where a firm has had Basic, Advanced, and Expert training, was found to have a negative impact on e-commerce income change. This result could be due to several factors, including the possibility that having too much training may lead to inefficiency. Another factor could be due to the existence of unobservable. Alternatively, it might suggest that this level of training might be inefficient or harmful for e-commerce. This highlights the importance of tailoring training programs to the firm's condition.

The analysis also identifies the previous year's income as an important factor of e-commerce income change. Firms with a positive income trend in the previous year were more likely to experience further growth, indicating that past performance creates a basis the firm

future success. This finding suggests that firms who already recovered from the Covid-19 pandemic in the previous year are better at utilising training programs for continuous growth.

The study further clarifies the role of other factors such as the owner's age, total number of employees, and location. Particularly, the owner's age is consistently shown to have a negative relationship with e-commerce income change, indicating that younger business owners may be more adaptable and better able to capitalise on digital marketing training. This is consistent with the findings by Amornkitvikai (2020).

In conclusion, this thesis highlights the significant role that digital marketing training have in enhancing e-commerce profitability, particularly in the context of Indonesia's accommodation and food services industry. Indonesia's government should utilise this finding by organising more digital marketing training for e-commerce which will increase their income and, in turn, contribute to the national economic growth.

The findings suggest that while training is generally beneficial, its effectiveness is subject to the level and appropriateness of the training provided. Firms should carefully consider their specific needs and capabilities when choosing their training programs to ensure that the training they receive are in line with their strategic objectives and the competencies of their employee. By doing this, firms will be more prepared to handle the challenges in the post-pandemic condition and increase their growth.

While the study provides valuable insights, it also highlights some limitations. The reliance on self-reported data for training levels introduces the possibility of bias or inconsistency in how firms assess their training. Additionally, the study focuses on a specific industry within Indonesia, which may limit the generalizability of the findings to other industries and countries. There may also be other relevant variables that are not available in the data, causing potential omitted variable bias.

Future research could expand on this study by exploring the impact of digital marketing training in different industries or countries. For the survey, BPS should have standardised guidelines for the assessment of the training level. This should be done to provide a more objective and accurate data. Future studies could also include other variables that are relevant to the study.

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7. Appendix

Appendix A. Description of variables.

Variables	Description
E-commerce Income Change	Continuous variable that measures the percentage increase or decrease in sales revenue from online sales of goods and/or services from the year 2022 to 2023.
Training	Dummy variable that takes the value 1 if the company have received training related to the use of information technology for digital marketing between the year 2019 – 2022 and 0 otherwise.
Previous Year Income	Dummy variable that takes the value 1 if the firm's income from 2021 to 2022 increase and 0 if decrease.
Total Employee	Continuous variable that measures the total employee of a firm.
Owner's Age	Continuous variable that measures the firm's owner/CEO age.
Location	Dummy variable that takes the value 1 if the firm is located in Java and 0 if the firm is located outside Java.
Income Catagory	Dummy variable that takes the value 1 if the firm income is ≥ IDR 300M and 0 if the income is < IDR 300M (micro businesses).
Average Monthly Online Sales	Continuous variable that measures the firm average monthly online sales.
Training Level	Categorical variable that measures the training level received by the firm. 0 – Received no training 1 – Basic training 2 – Advanced training 3 – Expert training 4 – Basic and Advanced training 5 – Advanced and Expert training 6 – Basic, Advanced, and Expert training

Note. From Badan Pusat Statistik (2023)

Appendix B. Model (3) test for heteroscedasticity

Test	Test statistic	Degrees of Freedom (df)	p-value	Description
Breusch-Pagan/Cook-Weisberg Test	27.14	1	0.0000	H0 rejected: Evidence of heteroskedasticity
White's test	82.48	31	0.0000	H0 rejected: Evidence of heteroskedasticity

Appendix C. Model (6) test for heteroscedasticity

Test	Test statistic	Degrees of Freedom (df)	p-value	Description
Breusch-Pagan/Cook-Weisberg Test	25.27	1	0.0000	H0 rejected: Evidence of heteroskedasticity
White's test	91.77	54	0.0010	H0 rejected: Evidence of heteroskedasticity

Appendix D. VIFs of all hypothesis 1 variables for E-commerce Income Change

Variables	VIF	1/VIF
Training	1.03	0.9666
Previous Year Income	1.03	0.9744
Total Employee	1.23	0.8130
Age	1.03	0.9677
Location	1.02	0.9782
Income Catagory	1.20	0.8336
Average Monthly Online Sales	1.04	0.9615

Appendix E. VIFs of all hypothesis 2 variables for E-commerce Income Change

Variables	VIF	1/VIF
Training Level		
1	1.02	0.9833
2	1.05	0.9530
3	1.00	0.9965
4	1.01	0.9938
5	1.00	0.9971
6	1.02	0.9767
Previous Year Income	1.03	0.9732
Total Employee	1.29	0.7739
Age	1.04	0.9658
Location	1.02	0.9761
Income Catagory	1.21	0.8283
Average Monthly Online Sales	1.05	0.9556