# THE IMPACT OF CAPITAL, LABOR, EDUCATION, AND E-COMMERCE ON THE INCOME OF CULINARY MSME's

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## Abstract

*This study investigates the effects of capital, labor, education, and e-commerce on the income of micro, small, and medium-sized enterprises (MSMEs) in the culinary sector of Semarang City, Indonesia. Utilizing a quantitative approach, primary data were gathered through surveys of culinary MSME owners using structured questionnaires. Multiple linear regression analysis was employed to examine the individual and joint influence of the selected variables on income. The findings reveal that capital, labor, education, and e-commerce each have a significant and positive effect on MSME income. Collectively, these variables account for 71.3% of the variation in income, highlighting their critical role in enhancing business performance. The study underscores the importance of optimizing internal business factors to boost productivity, competitiveness, and earnings within the culinary MSME sector.*

***Keywords:** MSME income, capital, labor, education, e-commerce, culinary business.*

## 1. INTRODUCTION

Economic growth and development in many countries, especially developing nations, cannot be separated from the role of Micro, Small, and Medium Enterprises (MSMEs), which function as the primary engines of growth. MSMEs are considered the backbone of inclusive economic systems and play a vital role in poverty alleviation, employment generation, and regional economic equity (Gherghina, 2019). According to Rosenfeld (2002), national development is largely driven by the advancement of the small business sector.

MSMEs significantly contribute to regional GDP, generate employment, and expand new markets, while playing a critical role in local economic empowerment (Karsinah & Yozi, 2020). In the Indonesian context, MSMEs are key instruments for narrowing income inequality and fostering equitable development. However, the sustainability of MSMEs requires appropriate strategies to ensure income enhancement and poverty reduction (Hasan & Muhammad, 2023).

Income, defined as the amount of money received through business activities, is a vital indicator of the financial performance of both large and small businesses (Husaini, 2017). Based on data from the BPS Kota Semarang (2024), the average income in the micro and small industrial (IMK) sector fluctuated from 2020 to 2022, showing vulnerability to economic uncertainty. While worker compensation consistently increased, expenses rose even when income declined, pressing profit margins and highlighting the need for better internal factor management.

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Semarang City, the capital of Central Java Province, has witnessed a steady increase in MSMEs across various sectors. The culinary sector has emerged as the most dominant sector, with its share growing annually (Dinas Koperasi dan Usaha Mikro Kota Semarang, 2024). Despite this growth, a significant proportion (75.88%) of micro and small businesses in Semarang reported operational difficulties by the end of 2022, especially related to marketing (61.36%) and capital (55.39%) (BPS Kota Semarang, 2024).

These challenges reflect the broader problems faced by MSMEs, including limited market access, low managerial skills, financial pressure, and lack of technological adoption (Suci, 2017; Emmanuel, 2020). Hannun et al. (2023) confirm that Semarang's culinary MSMEs also struggle with weak capital management and insufficient managerial capabilities, hindering business growth.

Capital is the first and most crucial internal factor in the development of MSME. Romer (1990) states that capital is a key factor that influences productivity and investment. It forms the basis of business operations and must be efficiently managed to avoid bankruptcy risk (Habriyanto, 2021). Survey data show that 85% of MSMEs in Semarang rely solely on personal capital (Dinas Koperasi dan Usaha Mikro Kota Semarang, 2024).

Labor is the second determinant of income. An increase in product demand leads to higher production needs and greater labor absorption, subsequently boosting income (Sumarsono in Rizani, 2021). As of May 2024, 30,170 MSMEs in Semarang had absorbed 12,323 workers, an indicator of their role in local employment, although labor absorption still lags behind MSME growth (Dinas Koperasi dan Usaha Mikro Kota Semarang, 2024).

The third factor is education. A higher education level equips entrepreneurs with better knowledge and decision-making skills in marketing, finance, and operations (Miranti, 2016; Notoatmodjo, 2009). Well-educated business owners can efficiently use resources, minimize costs, and increase productivity, ultimately raising MSME income (Aprila, 2023).

The fourth factor is technology, particularly e-commerce. In the digital era, e-commerce has become indispensable to MSMEs to remain competitive. It allows broader market access, reduces costs, and facilitates efficient transactions (Diana Santri & Aida, 2023; Firdaus et al., 2022). Despite their high adoption, MSMEs still face challenges such as platform fees that impact pricing and profitability (Nida, 2022).

Grounded in endogenous growth theory and the Cobb-Douglas production function (Sukirno, 2013), this study emphasizes internal factors—capital, labor, education, and technology—as key drivers of MSME income. Prior studies have reported mixed findings (Syamra, 2020; Rofiqi & Susilo, 2023; Sidik & Ilmiah, 2022), indicating a research gap. Therefore, this study aims to analyze the simultaneous impact of capital, labor, education, and e-commerce on the income of culinary MSMEs in Semarang City.

## 2. LITERATURE STUDY

### Cobb-Douglass Production Function

This section explores the theoretical and empirical basis for analyzing the effect of internal business factors—capital, labor, education, and e-commerce—on the income of MSMEs. Drawing from the Cobb-Douglas production function and endogenous growth theory, these variables represent critical inputs that drive productivity and firm growth

(Romer, 1990; Sukirno, 2013). The production function links inputs (capital, labor, education, and technology) to outputs (income). Education is included as a factor that enhances human capital and entrepreneurial decision making (Mankiw, 2015; Lumpkin & Dess, 2006).

Capital is one of the most influential factors determining the productivity and scalability of MSMEs. Sufficient capital enables businesses to expand production, procure better raw materials, and implement effective marketing strategies (Tambunan, 2002). Romer (1990) emphasizes that capital directly boosts productivity through investment. In the context of Semarang's culinary MSMEs, many businesses still face constraints in accessing sufficient capital, which limits their ability to grow. Empirical studies have consistently shown a positive relationship between capital and income. Rofiqi and Susilo (2023) and Syamra (2020) found that increased access to capital enhances production capacity and market outreach. Similar findings by Santri and Aida (2023) and Arniyasa and Karmini (2023) reinforce that capital plays a vital role in expanding operations and increasing the MSME income.

Labor is a proactive production factor that is essential for transforming resources into outputs. The quality and availability of labor greatly influence production efficiency and business outcomes. Sumarsono (in Rizani, 2021) argues that increased product demand leads to higher labor absorption, which in turn raises income. Studies by Syamra (2020), Sidik and Ilmiah (2022), and Fajriansyah (2023) confirm that trained and sufficient labor significantly improves production processes and overall business performance. In the culinary sector, skilled labor enhances product quality and customer service, both of which directly impact income levels.

Education transforms individual behavior and enhances cognitive skills, which are vital for effective business management (Utari & Dewi, 2014). Higher education levels correlate with improved decision making, managerial capabilities, and marketing strategies. This is especially important for entrepreneurs seeking to scale up their MSMEs. Empirical studies by Syamra (2020), Sidik and Ilmiah (2022), and Tiya Ratna and Setiawan (2022) show that higher educational attainment among business owners leads to better operational efficiency and increased income. While the impact may vary by sector, education generally supports strategic planning and innovation.

E-commerce serves as a digital tool that enhances market reach, streamlines transactions, and increases operational efficiency. According to Aprilyan (2022), e-commerce enables broader market positioning and better information flow, contributing to higher revenue potential. While Santri and Aida (2023) found mixed results, other studies by Arniyasa and Karmini (2023) and Mardhatillah (2024) reported significant positive effects of e-commerce adoption on income in the culinary sector. These findings highlight the growing relevance of digital technology to MSME sustainability and profitability.

Based on this literature, the study hypothesizes:

H1: Capital positively and significantly affects MSME income.
H2: Labor positively and significantly affects MSME income.

H3: Education positively and significantly affects MSME income.
H4: E-commerce positively and significantly affects MSME income.

## 3. RESEARCH METHODOLOGY

This study adopted a quantitative descriptive approach using survey data collected from 100 culinary MSME actors in Semarang City. The primary objective is to analyze the effects of internal business factors (capital, labor, education, and e-commerce) on MSME income using multiple linear regression analysis.

**Variables and Operational Definitions**

This research employs two main types of variables: independent variables (capital, labor, education, and e-commerce) and a dependent variable (income). Each variable was operationally defined and measured using a Likert scale (1–5), enabling quantification for statistical analysis.

- Income (Y): Total earnings from culinary business activities. The indicators include core income, utility of income, operational sufficiency, online sales revenue, and income for expansion.
- Capital (X1): Available funds for business operations. Indicators include initial capital, operational sufficiency, additional capital, the effect of capital on production, and income growth.
- Labor (X2): Number and quality of workers. The indicators include workforce quantity, quality, productivity, training, and income contribution.
- Education (X3): Entrepreneurs' formal education and training. Indicators include business management skills, technology literacy, decision making, and income enhancement.
- E-commerce (X4): Use of digital platforms for marketing and transactions. The indicators include usage, accessibility, market reach, promotion, and revenue impact.

**Population and Sampling**

The population includes all culinary MSMEs in Semarang that use e-commerce, with purposive sampling employed based on the following criteria: being an active culinary MSME, using e-commerce, and operating for over a year. Using Lemeshow's formula with a 10% margin of error and 95% confidence level, the sample size was determined as 100 respondents. A multistage cluster sampling technique was used to divide the MSMEs proportionally across 16 districts in Semarang.

**Data Sources and Data Collection Method**

This study used primary data collected through researcher-administered questionnaires administered to 100 respondents. The questionnaire consists of structured items based on the operational indicators of each variable. The respondents answered directly under the guidance of the researcher.

**Regression Model**

The analysis uses a multiple linear regression model:

$$Y = \alpha + \beta_1 INC_i + \beta_1 CAP_i + \beta_2 LAB_i + \beta_3 EDU_i + \beta_4 ECM_i + \varepsilon$$

Where:

- $INC$: Income
- $CAP$: Capital
- $LAB$: Labor
- $EDU$: Education
- ECM: E-commerce
- $\alpha$: Constant
- $\beta$: Regression coefficients
- $i$: sample
- $\varepsilon$: Error term

**Data Processing Technique**

Several preprocessing steps were applied to ensure the accuracy and reliability of the data. The editing process involved reviewing and correcting inconsistencies and missing responses in the questionnaire data. Coding was then performed by assigning numerical values to the responses for the standardized analysis. The scoring process used a 5-point Likert scale, with responses ranging from 1 (strongly disagree) to 5 (strongly agree), enabling the quantification of subjective measures such as perceptions and attitudes.

Validity and reliability tests were conducted to evaluate the instruments. The Pearson product-moment correlation was used to assess validity, with items considered valid when the r-count exceeded the r-table and the significance was less than 0.05. To ensure reliability, Cronbach's alpha values were calculated with coefficients greater than 0.60 indicated acceptable internal consistency of the instrument.

Classical assumption tests based on–s the Markov conditions were conducted to validate the regression model. Normality was examined using P-P plots and the Kolmogorov-Smirnov test, with data deemed normally distributed if the significance level exceeded 0.05. Multicollinearity was checked using tolerance ($> 0.10$) and Variance Inflation Factor thresholds (VIF $< 10$). Meanwhile, the presence of heteroscedasticity was tested using the Glejser method and scatterplots, and was considered absent when the significance value exceeded 0.05.

Hypothesis testing was performed using both t- and F-tests. The t-test evaluates the individual (partial) effect of each independent variable on income, with significance levels below 0.05, indicating a meaningful impact. The F-test was used to assess the joint influence of all independent variables, and significance values under 0.05 confirmed their collective effect. Furthermore, the coefficient of determination ($R^2$) was used to gauge the explanatory power of the model, with values closer to one representing a stronger ability to account for variations in MSME income.

## 4. RESULT AND DISCUSSION

This study involved 100 respondents who were the owners or managers of culinary MSMEs in Semarang City. The demographic profile of respondents shows that 58% were male and 42% were female, indicating relatively balanced gender participation in the

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culinary sector. In terms of age distribution, the majority of respondents fell within the productive age group of 31–50 years, which reflects an active and experienced group of entrepreneurs. Educational attainment among the respondents was predominantly at the tertiary level, with 43% having a bachelor's degree and 12% holding a diploma, implying a strong foundation for effective business management, innovation, and technological adaptation.

**Table 1. Business Characteristics of Respondents**

| Indicator | Criteria | Number of Respondents |
|---|---|---|
| **Business Duration (years)** | 1 – 5 | 53% |
| | 6 – 10 | 32% |
| | 11 – 15 | 5% |
| | 16 – 20 | 5% |
| | > 20 | 5% |
| **Type of Business** | Beverages | 8% |
| | Snacks | 9% |
| | Food Stalls | 73% |
| | Café | 3% |
| | Restaurant | 7% |
| **Business Ownership** | Self-Owned | 76% |
| | Family Business | 15% |
| | Partnership with Friends | 9% |
| **Business Income (IDR)** | < 5,000,000 | 9% |
| | 5,000,000 – 10,000,000 | 19% |
| | 10,000,000 – 15,000,000 | 21% |
| | 15,000,000 – 20,000,000 | 23% |
| | 20,000,000 – 25,000,000 | 11% |
| | > 25,000,000 | 6% |
| **Business Capital (IDR)** | < 5,000,000 | 32% |
| | 5,000,000 – 10,000,000 | 40% |
| | 10,000,000 – 15,000,000 | 19% |
| | 15,000,000 – 20,000,000 | 6% |
| | 20,000,000 – 25,000,000 | 3% |
| | > 25,000,000 | 11% |
| **Number of Workers** | 1 – 2 | 6% |
| | 3 – 4 | 32% |
| | 5 – 6 | 40% |
| | 7 – 8 | 19% |
| | 9 – 10 | 6% |

The respondents' business characteristics revealed several insights. Most MSMEs (53%) have been operating for less than five years, suggesting a relatively young and growing sector. The majority (73%) operate as small-scale food stalls or "warung makan," which are simpler in structure and require fewer resources. Ownership is largely individual (76%), although family run businesses and partnerships exist. Monthly income varies, with 23% earning between IDR 15 and 20 million and 21% between IDR 10 and 15 million, indicating a concentration in the medium-income segment. Modal capital also reflects modest beginnings, with the majority (28%) operating with capital between IDR 5 and 10 million, and another 25% with less than IDR 5 million.

In terms of labor force, most MSMEs employ between one and four workers, with 40% employing three to four workers and 32% employing only 1 to 2, reflecting a predominance of small-scale employment structures. This labor distribution aligns with the nature of the business, where resource limitations affect the workforce size. The combination of entrepreneurial drive, moderate education levels, modest startup capital, and limited labor illustrates the resilient and adaptive nature of culinary MSMEs in Semarang City. This characterization provides a crucial context for understanding how internal business factors relate to the income performance in this sector.

**Table 2 Regression Model Result**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | **B** | **Std. Error** | **Beta** | **t** | **Sig.** |
| 1 | C | 0,794 | 1,339 | | 0,593 | 0,555 |
| | X1 | 0,354 | 0,081 | 0,332 | 4,383 | 0,000 |
| | X2 | 0,340 | 0,071 | 0,342 | 4,828 | 0,000 |
| | X3 | 0,138 | 0,062 | 0,152 | 2,2234 | 0,028 |
| | X4 | 0,196 | 0,064 | 0,216 | 3,050 | 0,003 |

This study investigated the influence of capital, labor, education, and e-commerce on the income of culinary MSMEs in Semarang City. A survey method was employed with 100 respondents, all of whom were owners or managers of culinary MSMEs, spread across various districts of Semarang. Most respondents are in their productive age with middle-to higher-education backgrounds and have been operating their businesses for more than five years. These characteristics provide a solid foundation for business development and income generation in China.

The regression analysis revealed that all independent variables—capital, labor, education, and e-commerce—jointly influence MSME income. The adjusted $R^2$ value of 71.3% indicates that these variables explain the majority of the variation in income, whereas the remaining 28.7% is influenced by other factors outside the model. The findings confirm that internal business factors play a critical role in shaping financial performance. The contribution of each variable is elaborated as follows.

Capital was found to have a positive and significant effect on income, with a regression coefficient of 0.354 and t-value of 4.383 ($p < 0.05$). This implies that an increase in capital leads to higher income among culinary MSMEs. Most respondents relied on personal funds rather than external loans, primarily because of concerns about repayment burdens. According to one respondent, managing cash flow independently

without debt allowed for greater flexibility and profit reinvestment. This aligns with the theory of Case and Fair that capital support increases productivity and income.

The significance of capital is further supported by previous research, including Rofiqi and Susilo (2023), Syamra (2020), and Mardhatillah (2024), all of which indicate a positive relationship between capital and income. Access to sufficient capital enables MSMEs to invest in high-quality resources and expand their operations. Therefore, capital remains a fundamental factor for sustaining and scaling culinary MSMEs in Semarang.

Labor also demonstrated a significant positive influence on income, with a regression coefficient of 0.340 and t-value of 4.828 ($p < 0.05$). This indicates that businesses that employ more workers tend to achieve higher revenue. In the culinary sector, labor supports day-to-day operations from food preparation to customer service. Respondents emphasized that adequate and skilled labor improves efficiency and productivity, ultimately enhancing business performance and income.

Supporting studies by Sidik and Ilmiah (2022), Syamra (2020), and others have confirmed that labor contributes to increased output and profitability. For instance, one café owner reported that employing 10 trained staff members helped streamline operations and improve customer satisfaction, especially during peak hours. The ability to divide tasks and maintain service quality plays a vital role in driving customer loyalty and growth in revenue.

Education was also found to have a significant positive effect on income, with a regression coefficient of 0.138 and t-value of 2.234 ($p < 0.05$). Entrepreneurs with higher education levels are better equipped to make strategic decisions, manage finances, and adapt to market trends. Formal education also supports technological adoption and innovation, particularly on marketing and digital platforms. This finding echoes Simanjuntak's assertion that education enhances earnings potential.

Respondents noted that education, when paired with relevant training and experience, contributes to effective business management. A combination of formal education, entrepreneurship workshops, and years of experience provided them with skills to innovate, solve problems, and scale their businesses. Thus, education and continuous learning form a strong foundation for increasing incomes in the culinary MSME sector.

E-commerce also significantly influenced income, with a regression coefficient of 0.196 and t-value of 3.050 ($p < 0.05$). The use of digital platforms such as ShopeeFood, GrabFood, and GoFood has enabled MSMEs to expand their market reach and boost transactions. The respondents reported that e-commerce facilitated order processing, payments, and marketing promotions, contributing to increased sales. While some faced challenges with platform fees, they were offset by pricing strategies and discounts.

This result is consistent with the findings of Arniyasa and Karmini (2023) and Mardhatillah (2024), who highlighted the growing importance of e-commerce in enhancing MSME competitiveness. E-commerce not only lowers operational costs, but also strengthens customer engagement and product visibility. In the digital era, the adoption of online platforms has become necessary for MSMEs to thrive in competitive markets. Hence, leveraging e-commerce is crucial to income growth and long-term sustainability in Semarang's culinary sector.

## 5. CONCLUSION

This study examines the impact of capital, labor, education, and e-commerce on the income of culinary MSMEs in Semarang City. Utilizing multiple linear regressions on survey data from 100 business owners and managers, the findings confirm that all four variables significantly and positively influence income levels. Together, these internal factors explain 71.3% of the variation in income, underscoring their critical roles in driving business performance and financial sustainability.

Capital was the strongest predictor of income, suggesting that access to sufficient funding enables businesses to expand production, invest in quality inputs, and pursue strategic growth. Labor also plays a key role, where the availability of skilled and productive workers directly contributes to operational efficiency and customer satisfaction. While moderately influential, education enhances managerial capabilities and innovation, especially when complemented by training and experience. Finally, e-commerce adoption significantly increases income by expanding market access, streamlining transactions, and reducing promotional costs.

These results have important implications for policymakers, business associations, and financial institutions. Facilitating greater access to capital, improving workforce development programs, promoting entrepreneurial education, and expanding digital literacy initiatives can collectively strengthen the resilience and profitability. Future research could extend this analysis by incorporating external variables, such as competition, consumer trends, or policy support, or by comparing MSME performance across different regions or sectors.

In conclusion, strengthening internal business capacitythrough capital investment, skilled labor, educational advancement, and digital engagementis essential for boosting MSME income and ensuring long-term growth, particularly in the dynamic and competitive culinary industry of urban Indonesia.

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