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Analysis of Factors Affecting the Income of Culinary MSMEs in Medan Marelan District

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Abstract

This study aims to analyze the influence of capital, labor, and technology on the income of culinary MSMEs in Medan Marelan District. The study involved 50 culinary MSME actors selected from a population of 857 businesses. The sample size was considered adequate for Partial Least Squares Structural Equation Modeling (PLS-SEM), as this method is suitable for exploratory studies with relatively small samples and complex relationships among variables. This research employed both primary and secondary data. Primary data were collected through questionnaires distributed to MSME actors, while secondary data were obtained from the Central Statistics Agency (BPS) and the Office of Cooperatives and MSMEs. Data analysis was conducted using SmartPLS 4 to examine the direct effects of capital, labor, and technology on MSME income. The findings reveal that all three variables have a positive and significant effect on income. Capital demonstrates the strongest contribution, indicating that business expansion and operational continuity among culinary MSMEs are highly dependent on financial capacity. Labor significantly supports productivity and service quality, while technology contributes to income improvement through operational efficiency and broader market reach. Simultaneously, the three variables significantly explain variations in MSME income. These findings highlight the importance of strengthening financial access, improving workforce quality, and encouraging technology adoption to support the sustainable development and competitiveness of culinary MSMEs.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in supporting economic growth, employment creation, and local economic resilience in developing countries, including Indonesia (Sarfiah et al., 2019). MSMEs have become an important pillar of the Indonesian economy due to their contribution to income generation and their ability to absorb labor across various sectors. MSMEs also contribute significantly to maintaining economic stability, particularly during periods of economic uncertainty. In the context of increasing market competition and economic transformation, MSMEs are required to improve productivity, strengthen business capacity, and adapt to technological developments in order to maintain competitiveness and business sustainability (Wibawa et al., 2021; Rapi et al., 2022).

Medan City is one of the major urban economic centers in North Sumatra with a rapidly growing MSME sector, particularly in culinary businesses. The increasing number of culinary MSMEs has intensified business competition and created challenges related to income sustainability, market competitiveness, and business adaptation in local markets. The city of Medan is divided into 21 sub-districts and 151 sub-districts with an area of 265.00 km². Based on BPS data in 2022, Medan Marelan District occupies the second position with the largest population with 190,940 people in 2022. The majority of residents in this sub-district work as entrepreneurs, especially MSME actors, which is one of the main characteristics of this area.

Based on data from the Ministry of Home Affairs of Medan City, the total types of jobs in Medan Marelan District show that the entrepreneurial sector occupies the most dominant position with a total of 46,366 people, followed by other workers as many as 42,541 people, students and students 35,139 people, and the rest are spread across various professions such as state civil servants, teaching staff, farmers, fishermen, and health workers. This condition is in line with data from the Ministry of Investment which records that as many as 48,737 MSME actors in North Sumatra have Business Identification Numbers (NIB) as of 2022, placing this province as the highest ranked on the island of Sumatra (Rahmadani, 2022). This achievement is supported by a collaboration program between the Ministry of Investment and the One-Stop Investment and Integrated Services Office (DPMPTSP).

MSMEs in Medan City are evenly distributed throughout all sub-districts. Based on data from the Medan City Cooperatives and MSMEs Office in 2021, the most dominant types of businesses include large and retail trade, culinary, automotive, fashion, as well as agriculture, forestry, and fisheries. Data from the Medan City Cooperatives and MSMEs Office show that Medan Marelan District has a relatively high concentration of culinary MSMEs compared to other business sectors. Culinary businesses dominate MSME activities in the district, indicating the importance of this sector in supporting local economic activities. More data is shown in Table 1

Table 1. Distribution of MSMEs in Medan Marelan District in 2021

Types of MSMEs	Six Hundred Land	Rengas Island	Sand Swamp	Deli Harbor	Plunge	Total
Culinary	198	235	228	22	174	857

Types of MSMEs	Six Hundred Land	Rengas Island	Sand Swamp	Deli Harbor	Plunge	Total
Forestry, Forestry, Forestry	11	13	13	16	20	72
Fashiom	18	1	1	3	25	72
Large and Retail Trading	225	76	76	17	190	761
Automotive	13	-	-	-	5	26

Source: Processed Primary Data

The high number of MSMEs, especially in the culinary sector, automatically causes fierce competition between business actors. This phenomenon has a direct impact on the fluctuations in the income of MSME actors. Revenues have become highly dynamic and difficult to predict, depending on the intensity of competition, consumer preferences, and local economic conditions.

The rapid growth of culinary MSMEs in Medan Marelan District creates both economic opportunities and competitive pressures among business actors. Increasing competition has caused income instability, particularly among small-scale businesses with limited access to capital, low labor productivity, and inadequate technological capability. These conditions indicate that MSME income is influenced not only by traditional production factors but also by the ability of businesses to adapt to changing market conditions and technological developments.

Previous studies have examined several determinants of MSME income, including capital, labor, business experience, and working hours. However, many studies tend to analyze these variables separately and focus primarily on traditional economic factors. Recent discussions in MSME literature emphasize that technological capability and digital adaptation are increasingly important in improving business performance, operational efficiency, and market access, especially in highly competitive culinary sectors. Nevertheless, empirical studies integrating capital, labor, and technology simultaneously in explaining culinary MSME income within local competitive markets remain limited, particularly in Medan Marelan District.

This study aims to analyze various factors that affect the income level of Micro, Small, and Medium Enterprises (MSMEs) in the culinary sector in Medan Marelan District. Therefore, this study aims to analyze the effect of capital, labor, and technology on the income of culinary MSMEs in Medan Marelan District using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. This study contributes to the MSME literature by integrating traditional production factors with technological capability in explaining MSME income within a competitive local culinary market. In addition, the findings are expected to provide practical implications for policymakers and MSME actors in strengthening financial access, workforce quality, and technological adaptation to improve business sustainability and competitiveness.

Micro, Small, and Medium Enterprises (MSMEs) have a very important role in the national economy. MSMEs contribute significantly to economic growth, employment creation, and income distribution within society (Hasanah et al., 2020). According to Law No. 20 of 2008 concerning MSMEs, these businesses are classified into three categories, namely micro enterprises, small enterprises, and medium enterprises, each of which has its own criteria based on the amount of net worth and annual sales results. The development of MSMEs in Indonesia is expected to strengthen sustainable economic development and expand economic participation among various levels of society (Wilantara & Indrawan, 2016).

Nancy (2014) explained that MSMEs are generally characterized by independent business management, limited capital ownership, the utilization of local labor, and relatively simple technology in operational activities. These characteristics indicate that MSME performance is strongly influenced by the managerial capability and resource availability of business owners. Despite their important economic role, MSMEs also face various operational and managerial challenges. According to Sincere (2009), MSMEs tend to have relatively high adaptability and flexibility in responding to changing economic conditions.

However, MSMEs frequently encounter several limitations that affect business sustainability and competitiveness. Common challenges faced by MSMEs include limited access to capital, weak managerial capability, low labor productivity, marketing constraints, and limited technological adaptation in business operations. These limitations reduce the ability of MSMEs to improve productivity and maintain competitiveness in increasingly dynamic markets.

Pramiyanti (2008) classified MSME problems into financial and non-financial aspects. Financial problems are primarily related to limited capital access, whereas non-financial problems involve managerial capability, labor quality, product innovation, and business adaptation. This indicates that MSME sustainability is influenced not only by financial resources but also by the ability to manage labor productivity and adapt to technological and market changes. Therefore, strengthening capital capacity, improving labor productivity, and enhancing technological capability are important factors in supporting the competitiveness and income sustainability of MSMEs.

Income is an important indicator in economic activities because it reflects the ability of individuals or business actors to generate economic returns from productive activities. According to Sukirno (2016), income is everything received, usually in the form of money, from the results of an effort. Income may also be interpreted as economic returns obtained from the utilization of production factors such as labor, capital, and other productive resources within a certain period.

Suparmoko Irawan., (2002) explained that income is the result obtained from business activities that generate economic benefits or profits. Boediono (2016) also stated that income is generated through the contribution of production factors used in economic activities. Therefore, income reflects the productivity and economic performance of business activities. Rahardja & Manurung (2004) defined income as the total economic receipts obtained within a certain period, either in monetary or non-monetary forms.

Moreover Swastha & Irawan (2008) explained that business income is influenced by several internal and external factors related to operational and market conditions. Market conditions and consumer preferences may influence sales performance and business revenue. Capital also plays an important role because adequate financial resources enable businesses to increase production capacity and operational activities, which may contribute to higher income. In addition, organizational capability and business management influence operational efficiency and income generation. Marketing activities, including promotion and product presentation, may also affect consumer interest and sales performance. These factors ultimately influence business sustainability and the ability of MSMEs to generate stable income.

Capital is one of the most important factors in determining business sustainability and operational continuity. In economic activities, capital refers not only to financial resources but also to production assets used to support business operations. Mankiw (2019) explained that capital is an accumulation of goods produced in the past and utilized to produce goods and services in the present, including machinery, equipment, buildings, transportation, and raw materials. This indicates that capital plays a strategic role in increasing production capacity and supporting business productivity.

Capital may also be interpreted as resources owned independently or obtained from external parties that are used to generate economic returns. Astawinetu & Handini (2020) emphasized that capital is essential for maintaining business continuity and achieving profit-oriented activities. Similarly, Nurlaila (2017) stated that business success is closely related to the availability of adequate capital. Wibawa et al., (2021) further explained that insufficient capital may limit business actors in fulfilling operational needs such as raw materials, labor costs, transportation, and production equipment. In the context of culinary MSMEs, limited capital often constrains production scale, product development, and business expansion, thereby affecting the ability of MSMEs to compete in increasingly competitive markets.

From a financial perspective, capital management is closely related to decisions regarding funding sources and business financing structures. J. Fred Weston (1992) stated that the proportion between debt and owned capital reflects the company's capital structure and influences financial risk as well as business sustainability. In practice, capital can generally be classified into internal capital and external capital. Internal capital originates from personal savings, retained earnings, or business assets owned by entrepreneurs, while external capital is obtained from loans, investors, cooperatives, or other financial institutions. The availability of external financing is particularly important for MSMEs that experience limitations in internal funding during business development stages.

According to Sukirno Sadono (2016), capital may also be categorized into fixed capital and working capital. Fixed capital refers to production assets that are used repeatedly in the production process, such as buildings, machinery, and equipment, whereas working capital is used for short-term operational activities and is exhausted within one production cycle. Both forms of capital are important in supporting business continuity because they determine the ability of MSMEs to maintain production stability and respond to market demand effectively.

Furthermore, Putri et al., (2014) identified several indicators of business capital, including capital structure, additional capital utilization, constraints in accessing financing, and business conditions after capital expansion. These indicators reflect the capacity of MSMEs to manage financial resources efficiently and sustain business growth. In highly competitive culinary MSME markets, adequate capital not only supports operational activities but also enables business actors to improve product quality, expand marketing activities, adopt technology, and increase business competitiveness.

Labor is an important production factor that directly influences business productivity and operational performance. In MSME activities, labor is not only responsible for transforming raw materials into products with economic value, but also contributes to service quality, operational efficiency, and consumer satisfaction. Fatin Laili & Hendra Setiawan (2020) explained that higher labor productivity may increase business profits because productive workers are able to improve production outcomes and fulfill market demand more effectively. In culinary MSMEs, labor performance becomes increasingly important because business activities rely heavily on production speed, service quality, and direct interaction with consumers.

In a broader perspective, labor is not limited only to individuals who are actively working. Simanjuntak (1985) defined labor as individuals who are working, seeking employment, or physically capable of participating in productive economic activities. This definition indicates that labor represents human resources that potentially contribute to the production process and business development.

The productivity of labor is influenced by various technical, physical, psychological, and social factors. According to Sinungan (2005), technical and physical factors include education level, expertise, technology utilization, working conditions, and workers' physical and mental capabilities. Meanwhile, psychological and social factors include work attitudes, relationships within the workplace, incentive systems, job specialization, and job satisfaction. These factors collectively determine labor productivity and influence the effectiveness of business operations.

Furthermore, Masyhuri (2007) explained that workforce management should consider labor availability, labor quality, and wage systems. The availability of labor must be adjusted to operational needs, while labor quality, particularly skills and competencies, significantly affects business performance and productivity. Wage systems also influence employee motivation and work performance. In the context of culinary MSMEs, skilled and productive labor enables business actors to improve product quality, maintain service consistency, and increase operational efficiency. Therefore, labor should not only be viewed in terms of quantity but also as a strategic resource that supports business sustainability, competitiveness, and income growth.

Technology refers to the development and application of tools, systems, and knowledge used to facilitate human activities and improve efficiency in various sectors, including business activities (Maryono & Istiana, 2008). Etymologically, the term technology originates from the Greek words *techne*, meaning skills or expertise, and *logos*, meaning systematic knowledge (Rifai, 1989). In the business context, technology is not only limited to physical equipment but also includes methods, information systems, and digital platforms that support production, marketing, communication, and operational management.

Lincoln (2010) explained that technology represents changes in production functions reflected through production techniques and operational systems. The utilization of technology enables businesses to increase effectiveness, efficiency, and productivity in the production process. For MSMEs, particularly in the culinary sector, technology adoption may include the use of production equipment, digital payment systems, social media marketing, online delivery applications, and digital communication platforms. The integration of technology into business activities allows MSMEs to improve service quality, accelerate production processes, expand market reach, and enhance customer satisfaction.

Technological development has continuously transformed economic and business activities from conventional systems into increasingly digitalized systems (Fachrizi et al., 2021). In recent years, digital technology has become an important factor influencing business competitiveness because consumers increasingly rely on online platforms and digital services in purchasing decisions. Consequently, MSMEs that are able to adapt to technological changes tend to have better opportunities to improve operational performance and maintain business sustainability in competitive markets.

In addition, technology adoption contributes not only to operational efficiency but also to innovation capability and market adaptability. Businesses utilizing technology effectively are generally more capable of responding to changes in consumer preferences, improving promotional strategies, and optimizing production management. In culinary MSMEs, technology utilization may strengthen competitiveness through faster services, broader marketing access, and more efficient business operations.

Several previous studies have demonstrated the importance of technology and other production factors in influencing MSME income. Squirting (2024) found that capital, labor, and technology positively and significantly affect the income of the bakery industry in Indragiri Hulu Regency. Similarly, Ardodik et al. (2024) reported that capital, labor, business duration, and promotion significantly influence the income of coffee shop MSMEs in Mataram City, although education level was found to be insignificant. Nadia (2021) also showed that capital, working hours, and experience significantly affect the income of street vendors in Banda Aceh. Likewise, Eya Pizar Manita (2021) found that capital, working hours, and business duration significantly influence traders' income in South Aceh, while Ridho Akbar (2022) emphasized that capital, business duration, and time allocation simultaneously affect MSME income in South Singkep. These studies indicate that business performance and income are influenced by both internal production factors and the ability of MSMEs to adapt to changing market and technological conditions.

Several studies have examined the factors that affect the income of micro, small, and medium enterprises (MSMEs). Squirting (2024) that capital, labor and technology have a positive and significant effect on the income of the bakery industry in Indagiri Hulu Regency. Similar things are shown by Ardodik et al., (2024) which states that the variables of capital, labor, length of business and promotion have a positive and significant effect on the income of coffee shop MSMEs in Mataram City, while the education level variable does not have a positive and significant effect on the income of coffee shop MSMEs in Mataram City. Research Nadia (2021) on street vendors in Banda Aceh show that capital, working hours, and experience have a significant effect on income. Next Eya Pizar Manita (2021) found that capital, working hours, and business hours significantly affect the income of market traders in South Aceh. Ridho Akbar (2022) also emphasized that capital, business duration, and time allocation together affect the income of MSMEs in South Singkep. These studies indicate that business performance and income are influenced by both internal production factors and the ability of MSMEs to adapt to changing market and technological conditions.

METHOD

This study employed a quantitative research approach to examine the relationship between capital, labor, technology, and income among culinary MSMEs in Medan Marelan District, Medan City, North Sumatra. A quantitative approach was considered appropriate because the study aimed to analyze the structural relationships among variables and test the proposed hypotheses empirically using statistical procedures. The research was conducted during the even semester of the 2022/2023 academic year.

The population of this study consisted of 857 culinary MSMEs registered at the Cooperatives and MSMEs Office of Medan City in 2021. The sample comprised 50 culinary MSME owners selected using purposive sampling techniques based on several criteria, namely: (1) MSME owners operating in the culinary sector, (2) businesses actively operating for at least one year, and (3) respondents willing to complete the questionnaire completely. The determination of the sample size referred to Roscoe's guideline in Sekaran & Bougie (2013), which suggests that an appropriate sample size in multivariate research ranges from 30 to 500 respondents and should exceed ten times the number of structural indicators or variables analyzed. In addition, the use of Partial Least Squares Structural Equation Modeling (PLS-SEM) was considered suitable because this approach is relatively robust for exploratory and predictive studies involving relatively small sample sizes and non-normal data distributions (Hardani et al., 2023).

The study used primary and secondary data sources. Primary data were collected through structured questionnaires distributed directly to culinary MSME owners. The questionnaire applied a five-point Likert scale ranging from strongly disagree to strongly agree to measure respondents' perceptions regarding the research variables (Sumartini et al., 2020). Secondary data were obtained from related institutions, including the Central Statistics Agency (BPS), the Cooperatives and MSMEs Office, and other supporting literature relevant to the study.

The operationalization of variables was developed based on theoretical and empirical literature. The capital variable was measured through indicators related to capital availability, capital adequacy, access to financing, and the utilization of additional capital in business operations. Labor was measured through indicators related to labor availability, workforce quality, skills, productivity, and operational effectiveness. Technology was measured through the utilization of production equipment, digital technology adoption, marketing technology, and technology use in supporting operational activities. Meanwhile, income was measured through indicators reflecting business revenue, sales improvement, business profitability, and perceived income growth among MSME actors.

Prior to data collection, the questionnaire instrument was reviewed and adjusted to ensure the clarity and relevance of each statement item to the culinary MSME context. To minimize response bias and common method bias, respondents were informed that their responses would remain confidential and

Commented [FSF1]: The manuscript requires substantial revision to improve its conceptual coherence, methodological rigor, and academic contribution. The introduction is excessively descriptive and relies heavily on statistical and demographic information without sufficiently establishing a clear theoretical gap or explaining how the study advances the existing MSME literature. Several sections contain repetitive explanations and weak analytical integration between theory, prior studies, and the research problem. The literature review also lacks critical engagement with recent empirical and theoretical debates on MSME income determinants, particularly regarding the interaction between capital, labor productivity, and technological capability.
In addition, the operational definitions of variables remain underdeveloped, especially concerning how "technology" and "income" are conceptually measured within the culinary MSME context. The study also depends on relatively outdated references, while recent high-impact studies on MSME resilience, digitalization, and informal business competitiveness are largely absent. Methodologically, the justification for using a sample of 50 respondents for PLS-SEM analysis remains weak and requires stronger statistical reasoning. Furthermore, the discussion section appears overly focused on confirming hypotheses rather than critically interpreting the socioeconomic implications of the findings within the competitive structure of culinary MSMEs in Medan Marelan District.

used only for academic purposes. Participation in this study was voluntary, and respondents were allowed to withdraw from the survey process at any stage.

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4 software. PLS-SEM was selected because it is capable of simultaneously analyzing measurement models and structural models while accommodating relatively small sample sizes and complex variable relationships (Hardani et al., 2023). The analysis consisted of two main stages, namely the evaluation of the measurement model (outer model) and the structural model (inner model).

The outer model evaluation aimed to assess the validity and reliability of the constructs through convergent validity, discriminant validity, and composite reliability testing. Convergent validity was evaluated using loading factor and Average Variance Extracted (AVE) values, where AVE values above 0.50 indicate that the construct adequately explains the variance of its indicators (Ghozali, 2016). Reliability was assessed using composite reliability values to ensure the consistency of the measurement instrument.

Furthermore, the inner model evaluation was conducted to examine the structural relationships among variables. This evaluation included collinearity testing using the Variance Inflation Factor (VIF), coefficient of determination (R-square), and hypothesis testing through path coefficient significance. The structural analysis was intended to determine the extent to which capital, labor, and technology influence the income of culinary MSMEs in Medan Marelan District.

Nevertheless, this study has several limitations. The use of a relatively small sample size and cross-sectional research design may limit the generalizability of the findings and the ability to capture long-term changes in MSME performance. However, the study still provides empirical insights regarding the role of capital, labor, and technology in influencing culinary MSME income within highly competitive local business environments.

RESULTS AND DISCUSSION

Data Description and Respondent Characteristics

The research was conducted on 50 Culinary MSME actors in Medan Marelan District using a questionnaire containing 5 statements for capital variables (X1), 5 labor statements (X2), 6 technology statements (X3), and 2 income statements (Y). The measurement scale used a 5-point Likert scale (1-5), with a sample of 50 respondents.

Table 4. Respondent Distribution

Aspects	Sum	Percentage (%)
Questionnaire distributed	50	100
Questionnaire processed	50	100

Table 5. Likert Scale Instruments

Statement	Weight
Strongly agree	5
Agree	4
Disagree	3
Disagree	2
Strongly Disagree	1

Source: Processed Primary Data

Respondent Characteristics

Table 6. Characteristics of Respondents Based on Gender, Age, and Education

Category	Sum	Percentage (%)
Gender		
Man	15	30
Woman	35	70

Age		
20-30 Years	5	10
31-40 Years	32	64
41-50 Years	13	26
Education		
< High School	12	24
SMA	30	60
S1	8	16

Source: Processed Primary Data

The majority of MSME actors are women (70%) and productive aged between 31-40 years (64%). Most have a high school education (60%), The findings indicate that culinary MSMEs in Medan Marelan District are predominantly managed by women of productive age with secondary educational backgrounds. This condition reflects the important role of household-based entrepreneurship in supporting local economic activities and income generation within the informal MSME sector.

Table 7. Characteristics of Respondents Based on Capital, Labor, Technology, and Income

Category	Sum	Percentage (%)
Business Capital (Rp)		
1.000.000-2.000.000	29	58
2.000.000-5.000.000	5	10
5.000.000-10.000.000	1	2
10.000.000-20.000.000	15	30
Workforce		
1 person	32	64
2 people	3	6
3 people	15	30
Use of Technology		
Not yet	33	66
Already	17	34
Income (Rp)		
500.000-2.500.000	26	52
2.500.000-3.000.000	10	20
3.000.000-5.000.000	5	10
5.000.000-10.000.000	0	0
10.000.000-20.000.000	0	0
20.000.000-30.000.000	9	18

Source: Processed Primary Data

Most MSME actors use low capital (58% below IDR 2 million) and only a few have capital above IDR 10 million (30%). MSMEs are generally still small-scale with a one-person workforce (64%). The use of technology is still low, only 34% have used technology, especially in marketing. The majority of income is still low below IDR 2.5 million (52%), with only a small percentage (18%) earning high income of up to IDR 30 million. Limited capital, labor, and technology factors affect low income.

Description of Respondent Responses

Based on the data that has been collected from the results of the questionnaire, the respondents' responses to each variable are analyzed descriptively. The assessment scale used in this study is the Likert scale with a score range of 1 to 5.

The following are the results of the recapitulation of respondents' responses to each variable:

1. Respondents' Response to Capital (X1)

There are five statements submitted to measure capital variables. The average response of respondents to each statement is presented in the following table:

Table 8. Respondents' Response to Capital

No.	Statement	Average
1	The capital used is its own capital	4.0
2	The business uses small capital without loans so that the income obtained is also not high	3.9
3	Capital increase efforts are often carried out for business	3.9

	development but fail	
4	Difficulties in making capital loans for business development	4.0
5	Capital loans can help business growth	3.5
	Total	3.9

Source: Processed Primary Data

The descriptive findings indicate that most respondents still rely on personal capital and experience difficulties in accessing external financing for business expansion. This condition suggests that limited financial access remains one of the major constraints faced by culinary MSMEs in Medan Marelan District. The inability to obtain additional capital may restrict production capacity, product diversification, and business scalability, which ultimately affects income generation.

2. Respondents' Response to the Workforce (x2)

The labor variable is measured through five statements, with the results of the recapitulation as follows:

Table 9. Respondents' Responses to the Workforce

No.	Statement	Average
1	The amount of labor affects the income earned	4.1
2	Able to employ manpower to help business continuity	4.1
3	Workforce quality is very important in business development but hard to find	4.2
4	It is difficult to find a high-skilled workforce that can affect business development	4.1
5	The wages set have an effect on the interest of prospective workers but it is still difficult to regulate them	3.6
	Total	4.0

Source: Processed Primary Data

The workforce variable shows that respondents perceive labor availability and workforce quality as important factors influencing business continuity and income generation. However, difficulties in obtaining skilled labor indicate that human resource limitations remain a challenge for culinary MSMEs, particularly in maintaining service quality and increasing productivity in a competitive market environment.

3. Respondents' Responses to Technology (X3)

Technology variables are measured using six statements, and the results of the average recapitulation of respondents' responses can be seen in the following table:

Table 10. Respondents' Responses to Technology

No.	Statement	Average
1	The use of technology is very helpful for business development but has not been realized	3.8
2	The use of technology is able to protect consumers without limits but is constrained	4.0
3	The use of technology has not been carried out so that marketing is not yet widespread	3.3
4	Understanding technology is very important in life, one of which is in the business world	4.0
5	Understanding technology has been mastered	3.0
6	There are several obstacles to engaging businesses with	4.0

	technology	
	The use of technology in an effort to increase business turnover	
	Total	3.7

Source: Processed Primary Data

The technology variable demonstrates that respondents recognize the importance of technology adoption in supporting business development and marketing expansion. Nevertheless, the relatively low level of technological implementation indicates the existence of digital capability gaps among MSME actors. Limited technological knowledge and resource constraints may hinder MSMEs from maximizing digital platforms for promotion, operational efficiency, and market expansion.

4. Respondent's Response to Income (Y)

The income variable is measured using two statements with the following results:

Table 11. Respondents' Responses to Income

No.	Statement	Average
1	Family needs are not met properly from the business income obtained	3.7
2	Welfare has not been achieved with the business income obtained	3.8
	Total	3.8

Source: Processed Primary Data

The income variable indicates that several respondents still experience limitations in fulfilling household welfare needs through business income. This finding reflects the unstable and relatively vulnerable financial condition of culinary MSMEs, particularly among small-scale businesses operating with limited capital, labor, and technological support.

Model Evaluation

The model analysis in this study uses the Partial Least Square (PLS) method through SmartPLS 4 software. PLS is used because it is able to handle complex relationships between variables with a relatively small sample size and does not require certain data distribution assumptions.

1. Convergent Validity

Convergent validity is assessed from the value of the loading factor of each indicator. According to Chin (1998), the loading factor value ≥ 0.7 is considered to meet the validity requirements. The results of the outer loading test are shown below:

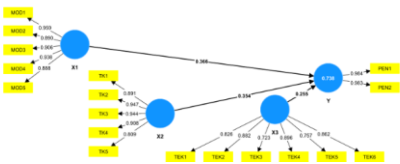

Figure 1. Outer Loading Results

The satisfactory loading factor values indicate that all indicators consistently represent their respective constructs. This suggests that the measurement model has adequate convergent validity and that the indicators are capable of explaining the latent variables used in this study.

Based on the results of the estimated

loading factor in the table, all indicator values are above 0.7, so they meet the convergent validity requirements.

In addition, convergent validity is also seen through the Average Variance Extracted (AVE) value, with the AVE value criterion ≥ 0.6. The results of the AVE test are presented in the following table:

Table 13. Average Variance Extracted (AVE) Value

Variable	AVE
X1	0.840
X2	0.812
X3	0.684
Y	0.966

Source: Processed Primary Data

From the above results, the entire AVE value > 0.6 so it can be concluded that this research instrument has good convergent validity. The AVE results demonstrate that each construct explains more than 50% of the variance of its indicators, indicating that the measurement model possesses adequate explanatory power and construct validity.

2. Discriminant Validity

Discriminant validity is tested by looking at the crossloading value. The value of the indicator against its construct must be greater than the correlation value with other constructs. The results of the crossloading test are presented in the following table:

Table 14. Cross Loading Value

	X1	X2	X3	Y
MOD1	0.959	0.653	0.719	0.77
MOD2	0.89	0.657	0.687	0.692
MOD3	0.906	0.608	0.577	0.75
MOD4	0.938	0.63	0.713	0.758
MOD5	0.888	0.561	0.549	0.623
PEN1	0.803	0.74	0.708	0.984
PEN2	0.745	0.739	0.713	0.983
TEK1	0.718	0.653	0.826	0.734
TEK2	0.613	0.492	0.882	0.61
TEK3	0.527	0.35	0.723	0.402
TEK4	0.574	0.452	0.896	0.649
TEK5	0.42	0.411	0.757	0.538
TEK6	0.632	0.479	0.862	0.568
TK1	0.557	0.891	0.455	0.556
TK2	0.704	0.947	0.6	0.748
TK3	0.634	0.944	0.475	0.709
TK4	0.654	0.908	0.487	0.668
TK5	0.494	0.809	0.605	0.678

Source: Processed Primary Data

From the results of the discriminant validity test, all indicators have a loading value for the variable they measure that is higher than the loading value for other variables. Thus, this model is stated to have good discriminant validity.

Summary of Model Evaluation and Hypothesis Test Results

1. Fornell-Larcker Test

The test results showed that the square root value of AVE for each construct was greater than the correlation value between constructs, so that discriminant validity was declared qualified.

2. Reliability Test

Based on the Composite Reliability value which is all above 0.70 (Capital: 0.963, Labor: 0.956, Technology: 0.928, Income: 0.983), then all constructs are declared reliable. High composite reliability values indicate strong internal consistency among indicators within each construct. Therefore, the measurement instrument is considered reliable for explaining the relationships between capital, labor, technology, and MSME income.

3. Test Inner Model

a. Collinearity (VIF): All VIF values < 10, meaning that there is no multicollinearity problem.

b. Coefficient of Determination (R^2): The R^2 value is 0.738, which means that the Capital, Labor, and Technology variables are able to explain 73.8% of the variation in Culinary MSME Income in Medan Marelan District, included in the strong model category.

4. Hypothesis Test (Path Coefficient and Simultaneous)

Table 15. Hypothesis Test

Hypothesis	Result	Information
H1: Capital → Income	T = 2.155, p = 0.031	Accepted
H2: Labor → Income	T = 2.371, p = 0.018	Accepted
H3: Technology → Revenue	T = 2.336, p = 0.020	Accepted

Source: Processed Primary Data

All hypotheses proposed in this study were accepted. The structural model results indicate that capital, labor, and technology each have a positive and significant effect on the income of culinary MSMEs in Medan Marelan District. The significance of the path coefficients confirms that improvements in financial capacity, workforce quality, and technology utilization contribute to higher business income among MSME actors.

Discussion

The Influence of Capital on the Income of Culinary MSMEs in Medan Marelan District

The test results showed that Capital had a positive and significant effect on the income of Culinary MSMEs in Medan Marelan District, so the hypothesis was accepted. These findings are in line with Squirting (2024) and Ardodik et al., (2024). This means that the increase in capital encourages an increase in income. Data from 50 respondents showed that the majority used their own capital due to limited access to loans due to collateral requirements. Large capital allows for increased productivity and trade variation, which ultimately increases profits and business revenue. Thus, capital is the main driving factor in business activities.

The findings reflect the strong dependence of culinary MSMEs on internal financing sources, particularly personal savings. Limited access to formal financial institutions remains a major structural issue among small business actors due to collateral requirements, administrative complexity, and limited financial literacy. As a result, many MSMEs experience difficulties in expanding production capacity and maintaining business sustainability in highly competitive culinary markets.

From the perspective of resource-based theory, capital represents an important strategic resource that determines the operational capability and competitiveness of MSMEs. Businesses with greater financial resources tend to have more opportunities to improve product quality, expand marketing activities, and adopt supporting technologies, which ultimately contribute to increased income.

The Influence of Labor on the Income of Culinary MSMEs in Medan Marelan District

The second hypothesis test proves that Labor has a positive and significant effect on the income of Culinary MSMEs in Medan Marelan District. These results are in line with Squirting (2024) and Ardodik et al., (2024). Increasing the number and quality of the workforce will increase business income. From the data of 50 respondents, the number of workers is still limited, even though every additional workforce has the opportunity to increase output and income, especially if it is supported by good quality.

The positive influence of labor on MSME income indicates that human resources remain a central factor in small-scale business productivity. In culinary businesses, labor contributes not only to production activities but also to customer service quality, operational efficiency, and business continuity. However, the findings also reveal that many MSME actors still face difficulties in obtaining skilled workers.

This condition reflects the limited human capital capacity commonly found in informal MSME sectors. The lack of workforce skills may reduce productivity, service consistency, and innovation capability, especially in increasingly competitive culinary markets. Therefore, workforce development through training and skill enhancement programs becomes important to improve MSME competitiveness and income sustainability.

The Influence of Technology on the Income of Culinary MSMEs in Medan Marelan District

The results of the third hypothesis test stated that Technology has a positive and significant effect on the income of Culinary MSMEs in Medan Marelan District. These findings are consistent with Hasanah et al., (2020) and Rapii et al., (2022). The increased use of technology, both in production and marketing such as social media, is able to expand the market, reduce costs, and increase revenue. However, data from 50 respondents shows that there is still a lack of application of technology in business activities.

The findings indicate that technology adoption among culinary MSMEs in Medan Marelan District remains relatively limited despite respondents acknowledging its importance for business development. This condition reflects the existence of a digital capability gap among MSME actors, particularly in the use of digital marketing platforms, online transaction systems, and technology-based business management.

The limited adoption of technology may be influenced by several factors, including low digital literacy, financial constraints, lack of training, and limited understanding of digital business opportunities. Consequently, many MSMEs still rely on conventional marketing methods and local customer networks, reducing their ability to expand market reach and compete with more technologically adaptive businesses.

From the perspective of MSME development theory, technology utilization can improve operational efficiency, reduce transaction costs, expand market access, and strengthen business competitiveness. Therefore, strengthening digital transformation among MSMEs is essential to support sustainable income growth in the culinary sector.

Overall, the findings confirm that capital, labor, and technology are important determinants of culinary MSME income in Medan Marelan District. However, the study also reveals structural limitations faced by MSME actors, including limited access to financing, shortages of skilled labor, and low levels of technology adoption. These challenges indicate that improving MSME income requires not only internal business capability but also external institutional support through financing access, workforce training, and digital empowerment programs.

This study contributes to the MSME development literature by providing empirical evidence from the local culinary sector in Medan Marelan District, particularly regarding the importance of financial resources, human capital, and technology adoption in supporting business sustainability and income generation among small-scale enterprises.

CONCLUSION

This study highlights the importance of capital, labor, and technology in influencing the income of culinary MSMEs in Medan Marelan District. The findings indicate that financial capacity, workforce quality, and technology utilization contribute to business sustainability and income generation among MSME actors. Among these factors, the limited use of technology and restricted access to business capital reflect structural challenges still faced by small-scale culinary enterprises in local economic environments.

The study also demonstrates that MSME income is not determined solely by financial resources, but is closely related to human resource capacity and the ability of business actors to adapt to technological developments. These findings support the view that business competitiveness in the MSME sector depends on the integration of economic resources, labor productivity, and technological capability.

Practically, the results provide empirical insight into the conditions of culinary MSMEs in Medan Marelan District, particularly regarding the challenges of limited capital ownership, workforce constraints, and low technology adoption. The findings may serve as a reference for understanding the operational characteristics and development barriers commonly experienced by small-scale culinary businesses.

Nevertheless, this study has several limitations. The research was conducted using a relatively small sample size and focused only on culinary MSMEs in Medan Marelan District, which may limit the generalizability of the findings to broader MSME contexts. In addition, the cross-sectional design only captures conditions within a specific period and does not fully explain changes in business performance over time. Future studies are therefore encouraged to involve larger samples, broader research areas, and additional variables such as digital literacy, entrepreneurial capability, market competition, and business innovation to obtain more comprehensive findings regarding MSME income determinants.

Commented [FSF2]: The conclusion requires revision to improve analytical precision and alignment with the empirical findings. The section is overly focused on repeating statistical results rather than emphasizing the study's theoretical and practical contributions. Several policy recommendations, particularly regarding government loan support and workforce development, extend beyond the direct scope of the analysis and are insufficiently grounded in the empirical evidence presented. In addition, the conclusion lacks critical reflection on the study's limitations, including the small sample size and restricted geographical scope, which limits the generalizability of the findings to broader MSME contexts.

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Commented [FSF3]: The reference section requires substantial revision to improve consistency, academic credibility, and alignment with international scholarly standards. Several references rely heavily on textbooks, undergraduate theses, local reports, and non-peer-reviewed sources, which weakens the scientific rigor of the manuscript. Citation formatting is inconsistent, with numerous typographical errors, incomplete bibliographic information, and irregular capitalization. In addition, many references are outdated and insufficiently supported by recent international journal articles, particularly from Scopus-indexed or SSCI-indexed sources. The manuscript would benefit from incorporating more contemporary empirical studies and high-impact literature related to MSME performance, digitalization, entrepreneurial capability, and income determinants.