Digital strategy for improving resilience of micro, small, and medium enterprises

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A B S T R A C T

The COVID-19 pandemic impacted several small and medium-sized enterprises (SMEs) in Indonesia. The viability of some SMEs' business operations was disturbed, especially those who create non-essential goods like carving. The sales have decreased by up to sixty per cent, causing reduced levels of income and the termination of numerous workers. SMEs in Indonesia are highly considered because businesses are one of the country's most significant economic contributors. This research proposes a strategy for SMEs to improve the resilience of business operations of the SMEs. The K-means method was used to investigate three groups of SMEs: micro, small, and medium. Changes in the SME class before and after the pandemic are investigated through changes in the values of the variables in the SME profile. Then the SWOT method is used to identify internal and external factors with the highest weight, which can be used as a basis for developing strategies to increase the resilience of SMEs. Furthermore, the TOPSIS method determines the best plan for dealing with the new digital era. The result shows that the W-T strategy to utilize social media can be prioritized based on the criteria that significantly impact SMEs' product sales and business resilience.

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1. INTRODUCTION

Indonesia's industrial and technology sectors are expanding quickly in this age of globalization. The situation caused industrial enterprises to operate swiftly and effectively to be competitive. Hence, industrial businesses must move quickly and efficiently to deal with market competition. [1]–[4]. The pandemic impacted several small and medium-sized enterprises (SMEs) in Indonesia, including delays in product shipments, decreased levels of product purchases, and the termination of numerous workers [5]. Hence, Indonesian SMEs must adjust to these circumstances. [2], [3], [6]–[10].

SMEs are highly considered in Indonesia because businesses are one of the country's biggest economic contributors [11]. SMEs are one of Indonesia's business sectors where society can obtain jobs. Throughout the Indonesian archipelago, SMEs are built by entrepreneurs and consist of different kinds of fields, such as craft, which produces woven, batik, stone carving, or other products. The roles of SMEs in the economic development of the country are obvious. Several people work as employees and business owners to make ends meet. The thickness of Indonesian customs is rich in the works or crafts the people produce, such

as carvings and batik. Each region has different characteristics of the arts that have been made.

The outbreak of COVID-19 has affected many countries, including Indonesia. This pandemic impacts all sectors, including SMEs, which have suffered many losses due to declining sales. With the onset of the Pandemic, SMEs are not ready to deal with this unexpected condition. This research proposes a strategy for SMEs to improve the resilience of business operations of the SMEs. During the past few years, the literature studying how SMEs in Indonesia survive from the impact of the COVID-19 pandemic. Some previous researches had used several methods. K-means Clustering Analysis was used to quantify how the pandemic could generate different levels of impact on 16 indicators based on four clusters: resilient cluster, low vulnerability cluster, moderate vulnerability cluster, and high vulnerability cluster [12]. Then, another research used a qualitative SWOT analysis method to investigate the best strategy for SMEs to revive after the pandemic. The result indicates that E-commerce is an effective tool for SMEs that could be used to survive during the pandemic [13].

An integrated method was used in this research to develop a strategy for SMEs to survive after the pandemic. The clustering method was used to investigate the performance of the SMEs based on the classification of SME criteria, including the number of assets, the number of employees, the amount of sales, the profit, the age of the workforce, and the length of time the company which has been established. Some of these criteria are referring to the SME Law Number 20 of 2008. The analyses have been conducted during and after the pandemic to find the changes in each SME. For example, the results of an SME clustering before the pandemic were in the medium category. However, after the pandemic, the results of the SME clustering were down into the small category. The change was because there was a decrease in the number of assets, workers, and sales results. The clustering results were expected to be used as a reference in identifying the main causes of the decline in the SME class so that SME owners and the government could develop plans and implement strategies to increase the SME class. Then the SWOT method was used to help SMEs experiencing a downgrade class by identifying strategies to be more resilient according to SWOT analysis result.

The findings could serve as the foundation for recommending a development strategy for SMEs within the context of the new digital technology era to sustain the industries.

2. RESEARCH METHODS

The objects of this research were the SMEs focusing on the business in carving in Sumenep, Madura. The research variables were SMEs' profiles, as shown in Table 1. Table 2 and Table 3 present the variables for the external and internal factors in determining the strategies to cope with the conditions due to the COVID-19 pandemic. Table 2 demonstrates the external factors obtained from literature sources to identify how important these factors are to the SMEs in Sumenep, which include opportunities and threats. Meanwhile, Table 3 demonstrates the internal factors influencing SMEs, which cover strengths and weaknesses.

The data were collected from the basic information of the SMEs, such as their profile, business operations, and marketing method. Interviews were also conducted to gather information on their performance before and during pandemics. Three types of questionnaires were distributed to the 22 respondents. The first questionnaire, used for clustering, contains questions about the profiles of small enterprises. The questionnaires were created using a Google form to facilitate the process of capturing data containing variables for clustering. The K-means method processed data to obtain SME cluster analysis patterns [14]. The research data were divided into two categories; before and after the COVID-19 Pandemic outbreak. This research used the value of k = 3. Clustering results were validated using the silhouette index (SI) method. The optimal number of clusters is 3 (three); after using 4.5 and 6 groups for the experiment. Fig. 1 shows the results of K=3 cluster validation.
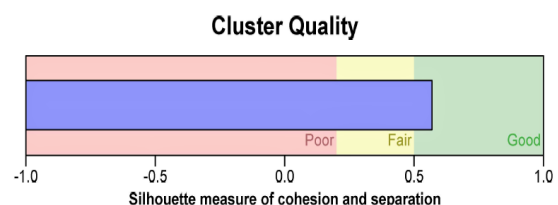

Fig. 1. The result of the validation of the number of clustering

The second questionnaire was developed to design the business strategy, including internal factor evaluation (Table 2) and external factor evaluation (Table 3) and tables for SWOT analysis [15], paired comparison method, and attractive

score. Respondents to the IFE questionnaire were Craft SMEs owners, while respondents to the EFE Questionnaire were experts in Craft SMEs. The third questionnaire was used to rank the digital strategy using the TOPSIS method [16].

Alternative approaches and criteria for selecting strategies were obtained from literature studies [17]–[21] and interviews with experts in the field of SMEs. The TOPSIS weight was determined from interviews with experts and SME owners.

Table 1. Variables for SMEs clustering

Variable	Operational Definition	Sources
The duration of business operations (X1)	The duration of the business's existence, measured from its founding to the present	[22]
The number of staff members (X2)	The number of employees in the small enterprises	[11]
The employees' ages (X3)	The age of employees	[11]
Gross income (X4)	The worth of a company's assets minus its obligations, excluding its land and buildings used for its operations	[23]
Annual sales (X5)	Net annual sales are derived from the sales of goods and business services in one financial year.	[23]
The business's profit (X6)	The financial benefit is realized when the revenue generated from a business activity exceeds the expenses, costs, and taxes involved in sustaining the movement in demand.	[24]–[26]

Table 2. The internal factors evaluation

Code	Strength	Sources
K1	The ability to analyze market conditions and identify business opportunities	[3], [34]
K2	Creative nature and the spirit of never giving up	[35]
K3	Collaboration between members of the small enterprises centers	[29]
K4	Creating new products with old resources	[36]
K5	The capacity to recognize hazards and avoid them	[8]
Weakness		
L1	The low rate of e-commerce technology adoption	[27], [28]
L2	Lost sales	[11]
L3	Distribution issues for both raw materials and final goods	[5]
L4	Low level of education and expertise of workers	[5]
L5	Cash flow problems and a heavy operational cost burden	[5]

Table 3. The external factors evaluation

Code	Opportunities	Source
P1	The e-commerce platform supports online sales and transactions.	[27], [28]
P2	Increased social benefit sentiment by emphasizing local goods purchasing	[27], [29]
P3	The national digital transformation program	[30]
P4	Mentoring for economic rehabilitation and reactivation	[31]
P5	CSR funding for mentoring and training of small enterprises	[32]
Threat		
A1	Declines in macro consumption cause the main impact on small enterprises	[1]
A2	Quarantine activities and large-scale social restrictions limit market opportunity	[1]
A3	Reduced purchases of non-essential goods	[33]
A4	a 2.1% decline in economic growth	[5]
A5	Employee termination	[6]

Table 4 shows the results of SME clustering, which are differentiated based on the amount of sales turnover before the pandemic. Table 5 shows the SME clustering results based on the sales turnover amount after the pandemic. The COVID-19 pandemic caused a sharp drop in sales, leading to a downgrading of the SME class. It can be seen that the pandemic has caused a drastic decrease in the number of sales turnover, which has resulted in SMEs being downgraded from medium to small and micro.

Table 4. Clustering of groups before the COVID-19 pandemic outbreak

Cluster	Sales Turnover (Rupiah)
1st cluster (small)	>410M - 2B
2nd cluster (medium)	> 2B
3rd cluster (micro)	Max. 410M

Table 5. Clustering of groups after the COVID-19 pandemic outbreak

Cluster	Sales Turnover (Rupiah)
1st Cluster (micro_2)	>100M – 400M
2nd cluster (small)	> 400M
3rd Cluster (micro_1)	Max. 100M

After identifying the small business clusters, a SWOT analysis was carried out to determine the development strategies for the new normal era. The literature study was conducted to identify the internal and external factors. Then it is used to create IFE and EFE matrices, analyze the internal and external matrices, examine the SWOT matrices, and conduct a quantitative strategic planning matrix (QSPM) analysis [37].

SMEs are among the sectors that COVID-19 has affected the most. Limitations on direct action make it harder for SME management to promote their goods, which reduces their income. Therefore, SME management should sell their products through digital technology [38]. During the Covid-19 outbreak, many SMEs were forced to close their shops and offices due to Indonesia's application of Community Activity Restrictions. Since SME owners cannot sell directly, no customer engagement could decrease their revenue. Digital marketing is essential for SME owners to deal with the current epidemic. Numerous advantages of digital marketing include cost-effectiveness, high trustworthiness, staying one step ahead of the competition, and increased customer contact. The SME might also handle a variety of tasks.

The initial strategy of action is to host a webinar with the potential audiences to attract new clients. Webinars make it easier for enterprises to communicate with huge, dispersed audiences. They can also utilize webinars to look at market trends, inform customers about new products, and act as a platform for sales. The second strategy is to launch blogs or business websites to enhance the value of brands by giving relevant product information. Blogs and websites can also build brands, improve search engine optimization, and increase client confidence. The third digital marketing strategy for SMEs is using marketing email to personally offer products, increase client retention, and raise business recognition. Utilizing social media is one of the most powerful digital marketing strategies for improving customer communication.

3. RESULTS AND DISCUSSION

Table 6 summarizes the clustering from the standardization process referring to the Z-scores. Several variables in all clusters have negative Z-scores, which characterize below-the-average values, in which the businesses can be considered in small-class clusters. Table 7 shows the number of SMEs in each cluster. Nine SMEs are categorized in the first cluster, two in the second cluster, and eleven in the third cluster, where twenty-two SMEs are valid and zero are missing.

Table 6. Result of clustering based on standardization

Z-Score	Cluster		
	1st	2nd	3rd
X1	0,85991	0,29692	-0,75755
X2	-0,04790	2,40423	-0,39794
X3	0,52490	0,94915	-0,60203
X4	-0,01550	2,37102	-0,41841
X5	-0,05202	2,26758	-0,36972
X6	-0,19184	2,60259	-0,31624

Table 7. The results of clustering before the pandemic outbreak

Cluster	The number of clusters' member
1	9.00
2	2.00
3	11.00
Valid	22.00
Missing	0.00

Table 8 demonstrates the average value of each cluster per variable. For example, the average company's duration periods (X1) in the first, second, and third clusters are 39 years, 28 years, and seven years, respectively.

Table 8 The average of three clusters per variable before Covid-19

Variable	Cluster		
	1st	2nd	3rd
The duration of business operations (X1)	39	28	7
The number of staff members (X2)	4	11	3
The employees' ages (X3)	33	37	24
Gross income (X4)	Rp147M	Rp350M	Rp113,6M
Annual sales (X5)	Rp584M	Rp2,1M	Rp376,3M
The business's profit (X6)	Rp30,4M	Rp108M	Rp26,9M

The first cluster contains SMEs with an average duration period longer than the other clusters, an above-average number of employees, age, Gross income, and Annual profit. In other words, this cluster is considered above-average or belongs to a micro-class business. The second cluster includes SMEs with an average company period duration and an enormous number of employees, mostly dominated by the oldest employees, the highest amount of net worth, the highest annual sales, and the highest profit. In summary, this cluster is counted as a middle-class business. The third cluster consists of SMEs with a shorter company period of duration, the smallest number of employees, the youngest age of employees, the least amount of net worth, the minor annual sales, and the smallest profit. In conclusion, this cluster is below average or belongs to a small-class business.

Table 9 illustrates clustering results from the previous standardization process referring to Z-scores. Several variables in all clusters have negative Z-scores. The variables represent below-the-average values, in which the businesses can be considered in small-class groups. The variables identified cause the SMEs drop from the medium to the small and micro classes.

Table 9. Result of clustering based on standardization

Z-Score	Cluster		
	1st	2nd	3rd
X1	0,58504	0,21413	-0,72142
X2	-0,18571	1,97866	-0,45321
X3	0,36447	1,06847	-0,76113
X4	-0,10714	2,14072	-0,59531
X5	-0,10501	1,81800	-0,48932
X6	-0,00111	1,64306	-0,54645

Table 10 indicates the number of SMEs in each cluster. The first, second, and third clusters have ten, three, and nine SMEs, respectively, with valid data of 22 and missing data of zero.

Table 10. The results of clustering during the pandemic outbreak

Clusters	The number of clusters' member
1	10.00
2	3.00
3	9.00
Valid	22.00
Missing	0.00

Table 11 summarizes the average value of the three clusters per variable. For instance, The duration of business operations (X1) in the first, second, and third clusters are 39 years, 28 years, and seven years, correspondingly. The first cluster covers SMEs with the duration of business operations, the number of staff members equaling that of the second cluster, the average age of employees, the amount of net worth, annual sales, and profit. Thus, this cluster belongs to a micro-class business. The second cluster comprises SMEs with the average duration period, the enormous number of employees, the oldest age, the highest amount of net worth, the highest annual sales, and the highest operating profit. This cluster is, therefore, categorized as a middle-class business. The third cluster includes SMEs with the shortest company duration period, the smallest number of employees, the youngest age, the least amount of net worth, minuscule annual sales, and a minor operating profit. This cluster is below the average or belongs to a small-class business.

Table 12 and Table 13 show the External Factor Evaluation (EFE) and Internal Factor Evaluation (IFE) matrix. The total score of the EFE matrices is 2.81. The most significant threats

are quarantined-off activities, with a score of 0.50, followed by increased social sentiment, with a score of 0.45. Another way to seize the opportunity is to increase the social statements.

The total score of the IFE matrix is 2.79. The focal disadvantage is the most influential lost sales, with a score of 0.53, followed by the factor of creative nature and the spirit of never giving up, with a score of 0.34. The results signify that the weaknesses are more significant than the strengths due to the declining sales of the COVID-19 pandemic, so consumers rarely buy SME products. The Internal-External (IE) matrix can be generated by combining the EFE and IFE matrices that show internal and external business factors. A score of 2.81 in the EFE matrix signifies the average ability to take advantage of opportunities and avoid existing threats. A score of 2.79 in the IFE matrix exemplifies an average ability to utilize strengths to overcome internal weaknesses. The acquisition of EFE and IFE matric scores is found in quadrant V, considered moderate (Fig. 2).

Table 11. The average value of three clusters per variable after the COVID-19 pandemic outbreak

Variable	Cluster		
	1st	2nd	3rd
The duration of business operations (X1)	34	26	8
The number of staff members (X2)	3	9	3
The employees' ages (X3)	32	38	23
Gross income (X4)	IDR135,0M	IDR306,6M	IDR97,8M
Annual sales (X5)	IDR164,4M	IDR520,0M	IDR93,3M
The business's profit (X6)	IDR 14,2M	IDR 30,4M	IDR 8,9M

Table 12. EFE matrix

Code	External Factors	Weight	Rank	Score
P1	The e-commerce platform supports online sales and transactions	0.11	3.00	0.33
P2	increased social benefit sentiment by emphasizing local goods purchasing	0.14	3.33	0.45
P3	The national digital transformation program	0.07	1.67	0.11
P4	Mentoring for economic rehabilitation and reactivation	0.09	2.00	0.18
P5	CSR funding for mentoring and training of small enterprises	0.08	2.00	0.16
A1	Declines in macro consumption cause the main impact on small enterprises	0.08	1.67	0.13
A2	Quarantine activities and large-scale social restrictions limit market opportunity	0.12	4.00	0.50
A3	Declined spending on non-essential products	0.06	1.67	0.10
A4	A decrease in economic growth of 2.1%	0.13	3.67	0.47
A5	Employee termination	0.12	3.00	0.37
Total		1.00		2.81

Table 13. IFE Matrix

Code	Internal Factors	Weight	Rank	Score
K1	The ability to analyze market situations and find business opportunities	0.10	3.00	0.31
K2	Creative nature and the spirit of never giving up	0.11	3.00	0.34
K3	Collaboration between members of the SMEs centers	0.09	2.33	0.20
K4	Creating new products with old resources	0.09	2.33	0.21
K5	The capacity to recognize hazards and avoid them	0.09	2.67	0.24
L1	The low rate of e-commerce technology adoption	0.09	2.00	0.17
L2	Lost sales	0.13	4.00	0.53
L3	Distribution issues for both raw materials and final goods	0.09	3.67	0.33
L4	Low level of education and expertise of workers	0.11	3.00	0.33
L5	Cash flow problems and a heavy operational cost burden	0.10	1.33	0.13
Total		1.00		2.79

Table 14. Result of strategy selection for SMEs

Strategy	Cost	Customers connection	Value of brand	Timeline	Team skill	Si+	Si-	Pi	Rank
Weight	**0.4**	**0.15**	**0.19**	**0.17**	**0.09**				
Create Business Website	0.246	0.052	0.127	0.109	0.050	0.222	0.040	0.152	3
Conduct a webinar	0.246	0.052	0.127	0.109	0.067	0.224	0.036	0.139	4
Utilize email marketing	0.197	0.131	0.063	0.072	0.033	0.152	0.117	0.435	2
Social media	0.049	0.104	0.095	0.109	0.033	0.041	0.212	0.838	1
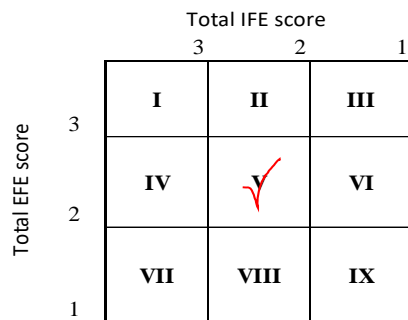
Fig. 2. EFE and IFE matrices for the SMEs in carving arts

SWOT matrix analysis compares opportunities with threats, strengths, and weaknesses to identify the problems encountered by carving businesses in the Sumenep. The S-O strategy aims to build a social sense for buying local products. Utilizing internal strengths, especially unyielding nature and attitude [7], is highly necessary to solve the problems of carving businesses, particularly the artisans, because these traits are indispensable for development strategies. W-O strategy is needed to increase profits by utilizing e-commerce platforms or online sales [27] so consumers can easily obtain information about carving businesses.

In dealing with the S-T strategy, SMEs must be able to analyze the market at a certain time to manage the plans for the sales process, especially in the recent pandemic. W-T strategy is carried out by applying the proper attitude in the new normal to maintain the people's and environment's health [29] and develop consumers' trust because consumers will feel safe buying products from SME enterprises. Another strategy is to manage the quality and time of arrival of raw materials. If the raw material arrives late, it will affect the production process and consumer confidence. Table 14 shows the results of selecting the best digital marketing strategy using the TOPSIS method. The ranking results show that social media is the best strategy for SMEs.

4. CONCLUSION

The SMEs are divided into three clusters, each differentiated according to annual sales. The first cluster belongs to the micro-business group, while the second and third clusters belong to medium and small business groups. The comparative analysis between clustering results before and after the COVID-19 pandemic outbreaks dramatically affects the condition of SMEs carving in Sumenep. Before the outbreak of the COVID-19 pandemic, SMEs earned a high income because of regular customers' monthly purchases. However, after the outbreak, the revenue is dramatically decreasing because customers rarely purchase their products due to the stigma that COVID-19 is dangerous and easily transmitted.

Moreover, there are shifts of SMEs from one cluster to the other one after the pandemic. For example, the average income of the cluster, which was above 2.5 billion rupiahs before the COVID-19 outbreak, decreased after the pandemic, with the highest income of only 420 million rupiahs. The weight calculation in the EFE and IFE matrices has shown that the highest scores are on the threats and weaknesses. Therefore, the W-T strategy can be prioritized since several factors significantly affect product sales. The operational activities in SMEs must be fostered because some SMEs have not practised cash flow accounting. Besides, many SMEs have not taken advantage of e-commerce platforms due to their limited understanding and experience in using the media. Promotion strategies are necessary to increase product sales in the present condition.

This research was carried out in Madura's handcraft SME business sector, so the analysis results and scope are limited. Further research can be carried out on SMEs in other business fields in

a wider area, such as several provinces in Indonesia. Further research can also be conducted by analyzing the capacity and productivity of SMEs in implementing the strategies in the digital era.

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