SENTIMENT ANALYSIS OF MANAGERIAL EFFECTIVENESS OF MSMEs (EMPIRICAL STUDY OF MSMEs IN CISAAT DISTRICT, SUKABUMI REGENCY)

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Abstract

This study aims to analyze the managerial effectiveness of Micro, Small, and Medium Enterprises (MSMEs) through a data mining-based sentiment analysis approach using Orange Data Mining software. This approach is used to examine the perceptions, experiences, and opinions of MSME actors regarding the implementation of managerial functions, which include strategic planning, organizing resources, directing and motivating, controlling and evaluating, and adapting to change. Research data was obtained through in-depth interviews with MSME actors, which were then processed using text mining techniques. The analysis process was carried out in several stages, namely text preprocessing, sentiment analysis using the VADER method, theme mapping with topic modeling based on the Latent Dirichlet Allocation (LDA) algorithm, and data visualization through word clouds, heat maps, and bar plots. The results show that the majority of respondents expressed positive sentiments towards the direction dimension, which reflects the ability of MSME managers to motivate team members. However, negative sentiments were also found regarding the control and adaptation dimensions to change, indicating a lack of consistency in evaluating and responding to market dynamics. This study confirms that the managerial effectiveness of MSMEs is not only determined by technical skills, but also by emotional intelligence, adaptive abilities, and leadership qualities in managing resources efficiently.

Keywords: managerial effectiveness, SMEs, sentiment analysis, data mining, Orange Data Mining, topic modeling

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are an economic sector that plays a strategic role in strengthening the national economic structure. Data from the Ministry of Cooperatives and SMEs (Kemenkopukm, 2024) shows that MSMEs contribute more than 60% to Indonesia's Gross Domestic Product (GDP) and absorb approximately 97% of the national workforce. However, this significant contribution has not been matched by optimal managerial effectiveness. Many MSMEs still face obstacles in strategic planning, resource organization, employee motivation, and business performance control and evaluation. Managerial effectiveness is a crucial element in determining the success of MSMEs, as it reflects the manager's ability to manage the business efficiently, adaptively, and results-oriented (Rahmani et al., 2025). Effective managers are able to anticipate market changes, allocate resources appropriately, and motivate teams to achieve organizational goals. However, in today's digital era, the challenges faced by MSMEs are increasingly complex. They must adapt to changes in technology, consumer behavior, and new competitive patterns that demand data-driven decision-making and accurate information. Most previous research on MSME managerial effectiveness still uses conventional approaches such as surveys or direct interviews. While useful, these approaches are often subjective, limited by the number of respondents, and do not fully reflect broader public perceptions. To address these limitations, sentiment analysis approaches have begun to be used in modern management research to assess managers' perceptions and opinions regarding organizational or individual performance.

Sentiment analysis is a Natural Language Processing (NLP)-based method that can extract and classify opinions from digital text into positive, negative, or neutral sentiments. In the context of MSMEs, this method can be used to understand how customers, employees, or local communities assess a business's managerial effectiveness. The Orange Data Mining application is highly relevant because it provides an interactive visual interface and supports machine learning algorithms for comprehensive text classification and sentiment pattern visualization. Cisaat District in Sukabumi Regency is one of the areas with a high concentration of MSMEs, particularly in the culinary, crafts, and local fashion sectors. Despite significant growth, various reports indicate that most businesses still face managerial challenges such as weak planning, team coordination, and limited digital innovation. Therefore, it is important to explore managers' perceptions of the managerial effectiveness of MSMEs in Cisaat District, Sukabumi Regency, through an objective, data-driven approach. The results of this study are expected to contribute empirically to the development of data technology-based MSME management literature, as well as become a reference for business actors and local governments in formulating strategies to increase managerial effectiveness that are more adaptive, innovative, and sustainable.

Based on the background of the problem, the formulation of the research problem is as follows:

1. What are the results of the public sentiment analysis regarding the managerial effectiveness of MSME actors in Cisaat District, Sukabumi Regency?
2. What topics or keywords are most frequently discussed in public opinion regarding the managerial effectiveness of MSMEs in Cisaat District, Sukabumi Regency?

LITERATURE REVIEW

This study focuses on the managerial effectiveness of MSMEs and the use of sentiment analysis technology to evaluate managerial performance perceptions. This study provides a conceptual foundation that strengthens the research direction, making it relevant to developments in data technology, institutional evaluation needs, and the MSME context in the Sukabumi region. In general, managerial effectiveness describes a manager's ability to achieve organizational goals through efficient and adaptive planning, organizing, directing, and controlling processes in response to change. In the context of MSMEs, this effectiveness is reflected in the ability of business actors to manage limited resources to achieve productivity and business sustainability.

*   Leslie et al. (2002) explain that managerial effectiveness depends not only on technical skills but also on an individual's personality, motivation, and experience in navigating changes in the global business environment. Effective managers are able to adapt, build strong interpersonal relationships, and foster commitment within the work team. This model serves as the theoretical basis for this study because it illustrates that the managerial effectiveness of MSMEs at the local level is also significantly influenced by managerial capabilities relevant to the sentiment analysis findings.
*   Umar (2018) highlighted that the fundamental weaknesses of MSMEs in Indonesia lie in low managerial capacity, weak data-based evaluation systems, and minimal leadership training. They emphasized the importance of managerial development based on measurable indicators to ensure more targeted MSME development strategies. The results of this study reinforce the need for modern data analysis approaches such as sentiment analysis, which assesses performance not only from financial figures but also from stakeholder perceptions of the ability of MSME managers to carry out their functions.
*   Susan (2020) stated that many MSMEs in West Java, Indonesia, face persistent challenges in financial management due to limited managerial and financial knowledge. This lack of capability often results in poor cash flow control, weak accounting practices, and limited access to formal financial institutions. Inadequate financial literacy among MSME owners and managers is a major obstacle to sustainable business growth. Strengthening their financial understanding, particularly in the areas of budgeting, record-keeping, and credit access, can significantly improve managerial effectiveness and company performance.
*   Lindgren et al., (2023) stated that sentiment analysis is an effective method for understanding stakeholder perceptions of an organization or management. By processing opinion texts or interview results, this technique can identify positive, negative, and neutral perceptions on various managerial dimensions. This technique was applied to analyze the results of interviews with MSME managers in Cisaat District regarding their perceptions of MSME managerial effectiveness. The results show a distribution of opinions that describe the level of success of small business management in the region.

- Ahmed et al., (2022) explain that processing text-based data using artificial intelligence algorithms can help organizations understand market perceptions and improve decision-making effectiveness. This technique can be applied to evaluate perceptions of policies or managerial performance based on data.

Previous research has generally used traditional methods such as interviews and observations to assess MSME managerial effectiveness. Few have utilized text mining and sentiment analysis approaches to systematically analyze perceptions of effectiveness. This gap underpins the purpose of this study.

METHOD

This research uses a text mining-based sentiment analysis technique with Orange Data Mining software. This approach was chosen because it combines the power of narrative analysis from interviews with a quantitative, algorithm-based approach capable of classifying opinions.

Text Mining

Text mining is an analytical technique used to extract hidden knowledge from unstructured text-based data, such as interview results, comments, and testimonials. This process allows researchers to discover linguistic patterns that describe attitudes or opinions about a phenomenon (Mooney & Nahm, 2003). Text mining was applied to extract keywords from the interview narratives of MSME managers, resulting in an initial overview of dominant themes related to managerial effectiveness.

Text Preprocessing

*Text preprocessing*This is the initial stage aimed at removing noise and preparing text data for proper processing by the system. The stages involved include tokenization, case folding, stopword removal, and stemming (Feldman & Sanger, 2007). This stage is crucial for ensuring more accurate sentiment analysis results because only meaningful words are retained in the analysis process.

Sentiment Analysis

Sentiment analysis is a computational process for assessing the emotional orientation of a text, whether positive, negative, or neutral. According to Liu (2012), sentiment analysis is used to identify a person's attitudes, evaluations, and opinions toward an entity, organization, or event.

Valence Aware Dictionary and Sentiment Reasoner (VADER)

The VADER method is used as a lexical approach to measure sentiment polarity. VADER classifies words based on their level of positivity or negativity by considering linguistic context such as emotional intensity, capitalization, and punctuation (Hutto & Gilbert, 2014).

Topic Modeling with Latent Dirichlet Allocation (LDA)

*opic modeling*is a method for identifying latent topics in a text collection using a probabilistic algorithm. The Latent Dirichlet Allocation (LDA) technique is used to find sets of words that frequently appear together to form specific topics (Chiny et al., 2021). LDA was used to group interview results into key topics, such as leadership strategies, team motivation, control effectiveness, and adaptation to market changes.

Figure 1. Conceptual Framework
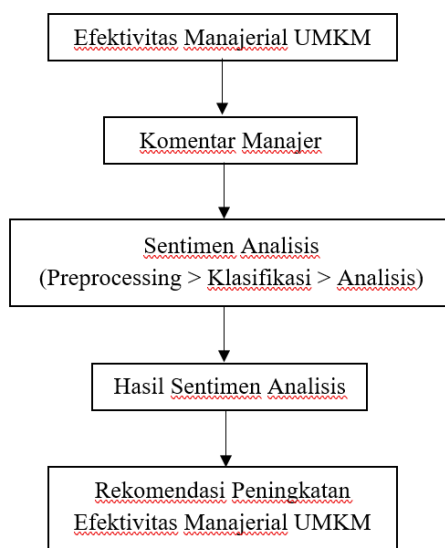
Data Analysis Method Steps

1. Interview
   Data collection was conducted through semi-structured interviews with MSME managers in Cisaat District. The interviews focused on their perceptions of managerial effectiveness, including their abilities in organization, motivation, control, and decision-making.

2. Text Preprocessing in Orange
   Interview data is converted into digital text and then processed using Orange's Text Preprocessing feature. Orange Data Mining is a Python-based, open-source software that provides a visual interface for data exploration, modeling, and visualization. Orange has a Text Mining module that allows users to analyze interview text, perform sentiment analysis, and display the results interactively. Orange enables intuitive analysis without the need for complex programming, making it ideal for use in social research such as this one.

3. Sentiment Analysis
   Through a data mining approach, this method uncovers hidden sentiment patterns, classifies statements into positive, negative, or neutral categories, and interprets behavioral tendencies empirically and data-driven.

RESULTS AND DISCUSSION

Figure 2. Setiment Analysis and Topic Modeling
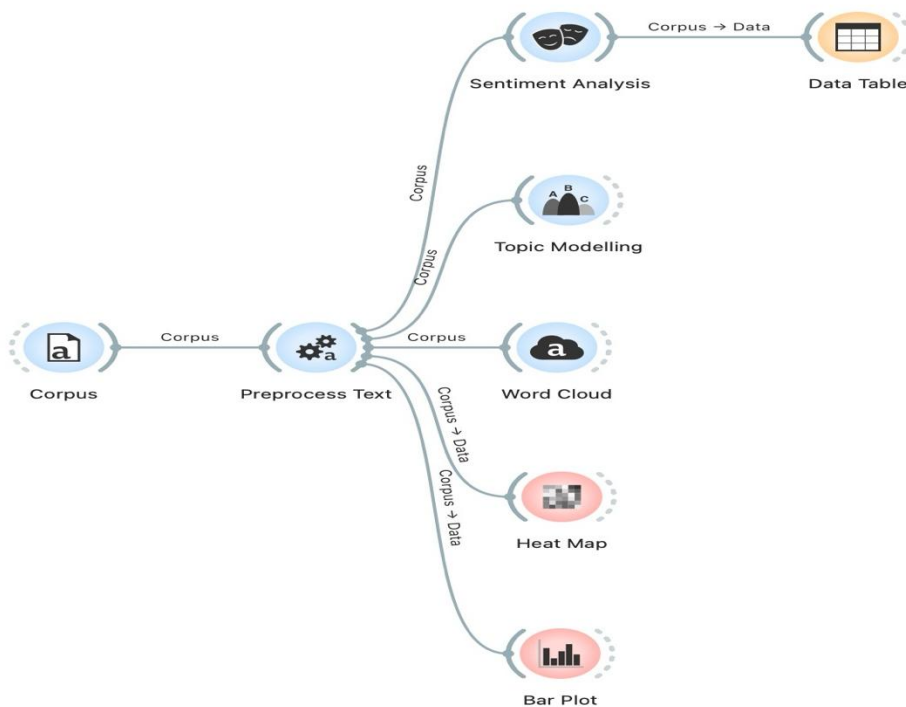
Source: Orange Data Mining Software

Research Scenario

a. *Corpus* (Text Data Source)
   The first stage in this research scenario is to build a corpus, a collection of texts to be analyzed using Orange Data Mining software. Data were obtained from in-depth interviews with MSME managers in Cisaat District, Sukabumi Regency. Interview transcripts were then cleaned of irrelevant elements such as word repetition, fillers, and non-textual symbols. The corpus serves as the primary foundation for the sentiment analysis process. Through the corpus, interview data can be processed into textual analysis material to explore meaning, communication patterns, and managers' perceptions of managerial effectiveness in the MSME sector. The results of this stage allow researchers to understand the dynamics of small business management empirically and data-driven.

b. *Text Preprocessing*

The text preprocessing stage is carried out to ensure that text data is ready for systematic analysis and free from noise. This process includes steps such as:

1. Lowercasing, which is changing all letters to lowercase for uniformity.
2. Stopword removal, which is removing common words that have no analytical value, such as "and," "which," or "for."
3. Tokenization, which is breaking down sentences into word fragments that are easier to analyze.
4. Lemmatization, which is returning each word to its basic form.

The result of this process is clean, structured text, ready for further analysis such as sentiment analysis or topic modeling. This process ensures the validity and accuracy of the data in the context of empirical research.

c. *Sentiment Analysis*

The sentiment analysis stage is the process of recognizing and categorizing emotional expressions or opinions contained in interview transcripts. Using the Sentiment Analysis widget in Orange Data Mining, the system classifies each text into three main categories: positive, negative, or neutral. Because the interview data is in Indonesian, adaptations were made in the form of manual labeling or the use of Indonesian lexical models to make the classification results more contextual. This analysis helps researchers understand MSME managers' perceptions of dimensions of managerial effectiveness, such as planning, organizing, directing, evaluating, and adapting to change. The results are then displayed visually and numerically, providing a comprehensive picture of emotional patterns, dominant opinions, and the direction of managers' perceptions of their leadership effectiveness.
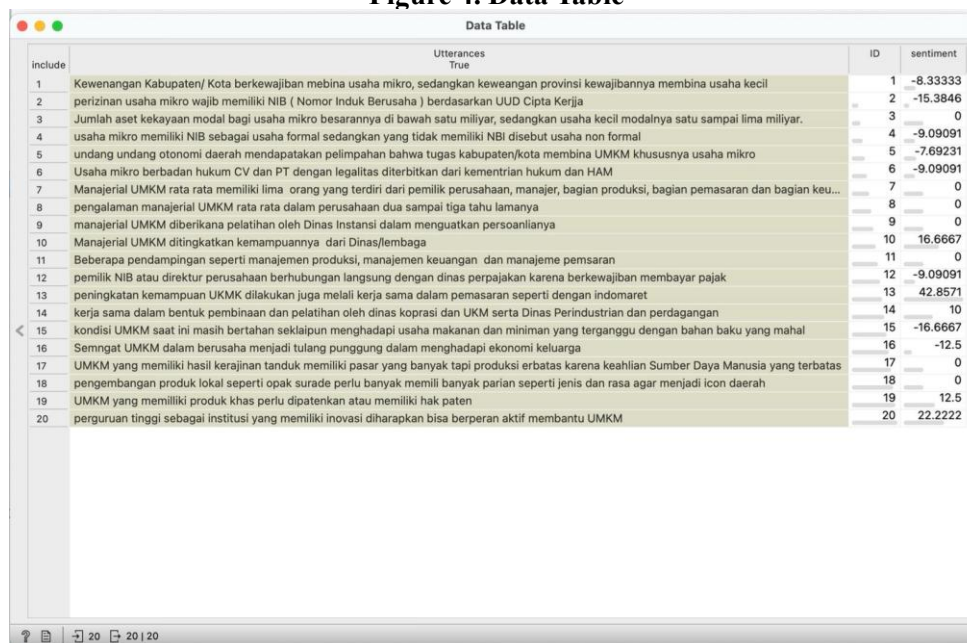
Figure 3. Sentiment Analysis
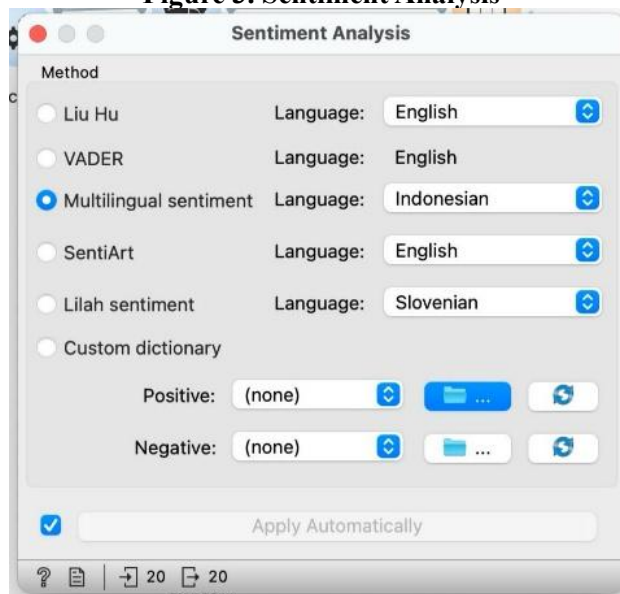
Source: Orange Data Mining Software

d. Data Table

The analysis results are presented in an interactive table using the Data Table widget. This table contains comprehensive information such as the original text, preprocessing results, and sentiment classification. Furthermore, the table displays sentiment scores and the frequency of dominant words, allowing researchers to interpret the data with greater depth. This step provides empirical clarity and helps draw logical conclusions about sentiment patterns that describe managerial effectiveness in the MSME sector.

Figure 4. Data Table

include	Utterances True	ID	sentiment
1	Kewenangan Kabupaten/ Kota berkewajiban mebina usaha mikro, sedangkan keweangan provinsi kewajibannya membina usaha kecil	1	-8.33333
2	perizinan usaha mikro wajib memiliki NIB (Nomor Induk Berusaha) berdasarkan UUD Cipta Kerija	2	-15.3846
3	Jumlah aset kekayaan modal bagi usaha mikro besarannya di bawah satu miliyar, sedangkan usaha kecil modalnya satu sampai lima miliyar.	3	0
4	usaha mikro memiliki NIB sebagai usaha formal sedangkan yang tidak memiliki NBI disebut usaha non formal	4	-9.09091
5	undang undang otonomi daerah mendapatakan pelimpahan bahwa tugas kabupaten/kota membina UMKM khususnya usaha mikro	5	-7.69231
6	Usaha mikro berbadan hukum CV dan PT dengan legalitas diterbitkan dari kementrian hukum dan HAM	6	-9.09091
7	Manajerial UMKM rata rata memiliki lima orang yang terdiri dari pemilik perusahaan, manajer, bagian produksi, bagian pemasaran dan bagian keu...	7	0
8	pengalaman manajerial UMKM rata rata dalam perusahaan dua sampai tiga tahu lamanya	8	0
9	manajerial UMKM diberikana pelatihan oleh Dinas Instansi dalam menguatkan persoanlianya	9	0
10	Manajerial UMKM ditingkatkan kemampuannya dari Dinas/lembaga	10	16.6667
11	Beberapa pendampingan seperti manajemen produksi, manajeme keuangan dan manajeme pemsaran	11	0
12	pemilik NIB atau direktur perusahaan berhubungan langsung dengan dinas perpajakan karena berkewajiban membayar pajak	12	-9.09091
13	peningkatan kemampuan UKMM dilakukan juga melali kerja sama dalam pemasaran seperti dengan indomaret	13	42.8571
14	kerja sama dalam bentuk pembinaan dan pelatihan oleh dinas koprasi dan UKM serta Dinas Perindustrian dan perdagangan	14	10
15	kondisi UMKM saat ini masih bertahan seklaipun menghadapi usaha makanan dan miniman yang terganggu dengan bahan baku yang mahal	15	-16.6667
16	Semngat UMKM dalam berusaha menjadi tulang punggung dalam menghadapi ekonomi keluarga	16	-12.5
17	UMKM yang memiliki hasil kerajinan tanduk memiliki pasar yang banyak tapi produksi erbatas karena keahlian Sumber Daya Manusia yang terbatas	17	0
18	pengembangan produk lokal seperti opak surade perlu banyak memili banyak parian seperti jenis dan rasa agar menjadi icon daerah	18	0
19	UMKM yang memilliki produk khas perlu dipatenkan atau memiliki hak paten	19	12.5
20	perguruan tinggi sebagai institusi yang memiliki inovasi diharapkan bisa berperan aktif membantu UMKM	20	22.2222

Source: Orange Data Mining Software

The data table in Figure 4 shows the results of a sentiment analysis of 20 statements from in-depth interviews with MSME managers in Cisaat District, Sukabumi Regency. The analysis was conducted using Orange Data Mining software with the VADER (Valence Aware Dictionary and Sentiment Reasoner) algorithm. Each row in the table depicts a direct quote from the respondent (utterance), a data identity (ID), and a numeric sentiment value indicating the respondent's emotional strength toward the topic discussed. This sentiment analysis categorizes respondents' perceptions into three main categories: positive, negative, and neutral, based on the resulting score range:

1. Positive Sentiment

    Positive sentiment is indicated by a value greater than 0, which represents an optimistic view and support for the managerial effectiveness of MSMEs. Examples are seen in ID 6 (value 16.6667) and ID 20 (value 22.2222), where respondents expressed a positive view of inter-institutional collaboration and the role of universities in strengthening the managerial capacity of MSMEs. This finding illustrates that some respondents consider institutional synergy and improving human resource competency to be important factors in strengthening business management effectiveness.

2. Negative Sentiment

    Negative sentiment has a value less than 0, indicating dissatisfaction, obstacles, or challenges faced by MSMEs. Examples are seen in ID 1 (-8.3333), ID 2 (-15.3846), and ID 17 (-16.6667), which express critical views on business legality issues, limited resources, and dependence on unstable local raw materials. This negative sentiment signals weaknesses in strategic planning, operational efficiency, and ineffective public policy support for the MSME sector.

3. Neutral Sentiment

    Neutral sentiment is characterized by a value close to 0, reflecting informative statements that do not exhibit any particular emotional tendencies. Most statements in this category are descriptive, explaining administrative procedures, inter-agency coordination mechanisms, and MSME organizational structures without any evaluative content. This indicates that the majority of MSME managers provided factual and normative responses, underscoring the need for a topic analysis approach to delve deeper into contextual meaning.

The sentiment analysis results show that MSME managers' perceptions of managerial effectiveness are still dominated by neutral and negative sentiments, while positive sentiments emerge in the context of inter-institutional cooperation. This indicates that MSMEs in Cisaat still face obstacles in inter-agency coordination, managerial capacity building, and adaptive operational management to market changes.

e. Topic Modeling
Topic Modeling results using the Latent Dirichlet Allocation (LDA) algorithm in Orange Data Mining software produced ten main topics that reflect strategic issues in the managerial effectiveness of MSMEs in Cisaat District, Sukabumi Regency. Each topic represents the perception patterns and experiences of MSME managers in facing operational, administrative, and institutional challenges.

Figure 5. Topic Modeling
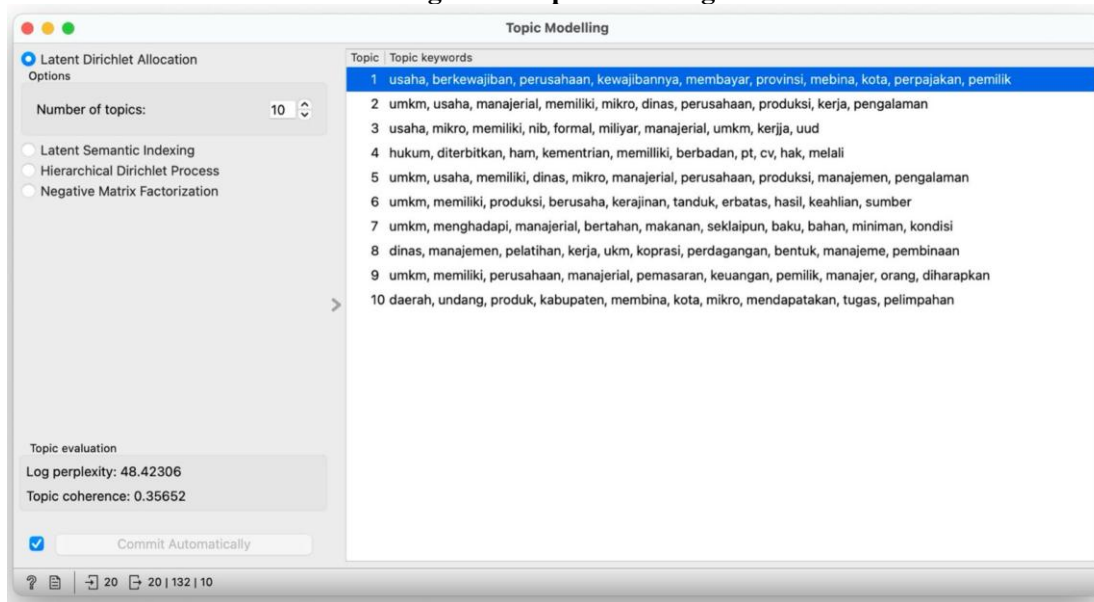
Source: Orange Data Mining Software

The findings in Figure 5 indicate that the dimensions of managerial effectiveness are influenced not only by managers' internal resource management capabilities but also by external support in the form of regulations, local government policies, and institutional development. Some of the most dominant topics include business legality and regulatory compliance (such as licensing and NIB), strengthening managerial and production competencies, and the government's strategic role in providing training and mentoring. Furthermore, issues related to financial management, marketing, and inter-institutional collaboration also emerged as important factors in maintaining MSME competitiveness. These results confirm that MSME managerial effectiveness is multidimensional, influenced by the balance between managerial capabilities, policy support, and adaptation to changes in the business environment.

b. *Word Cloud*
*Word Cloud*is a visualization used to display the most frequently occurring terms in interviews related to managerial effectiveness among MSMEs. The visualization results show that respondents' discussions focused heavily on aspects of micro-enterprise management, managerial capabilities, and the role of government agencies in supporting capacity building for MSMEs. The presence of the words "service" and "mentoring" indicates that local governments play a significant role in providing training and guidance to MSMEs, while the terms "production," "marketing," and "finance" indicate respondents' focus on internal resource management and strategies for improving business performance. The term "micro" confirms that the context of this study is dominated by small businesses at the local level facing limitations in capital, human resources, and market access.

Figure 6. Word Cloud

Source: Orange Data Mining Software

Figure 6 shows that MSME managerial effectiveness is significantly influenced by managers' adaptive capabilities in managing business processes, government policy support, and the active participation of mentoring institutions. This word cloud helps identify dominant keywords that form the basis for further analysis in topic modeling and sentiment analysis. Thus, this visualization not only displays word frequency but also provides a conceptual understanding of the main focus, strategic issues, and direction of MSME management strengthening in the research area.

c. *Heat Map*

*Heat map*A heat map is a visualization in text analysis that displays the intensity and distribution of sentiment values in each interview excerpt. A heat map is used to show the distribution of sentiment related to MSME managerial effectiveness based on business actors' responses. The colors on the map indicate variations in sentiment values: blue represents negative sentiment (criticism or complaints), yellow represents neutral sentiment (informative statements), and green represents positive sentiment (support or appreciation).

Figure 7. Heat Map
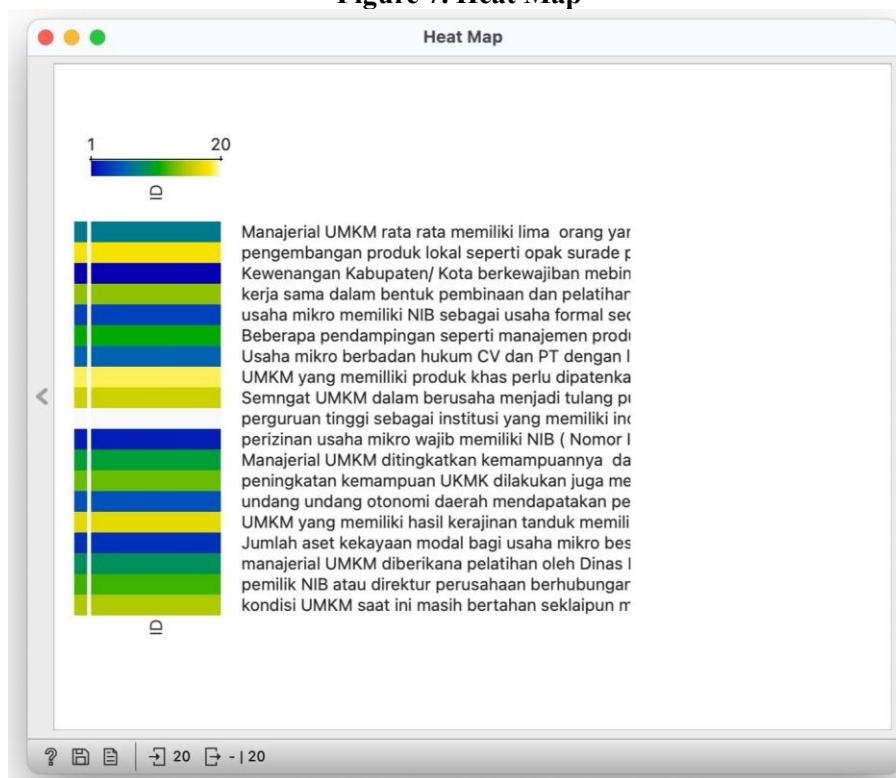
Source: Orange Data Mining Software

Based on the visualization results in Figure 7, the majority of quotes fall within the yellow to green range, indicating that perceptions of MSME management tend to be positive, albeit with some critical remarks. Blue appears in quotes addressing issues such as capital constraints, administrative barriers, and lack of technical training. Meanwhile, green dominates quotes highlighting the enthusiasm of entrepreneurs, support from regional policies, and the role of development institutions and universities in fostering managerial strengthening. The color scheme in the Heat Map demonstrates a balance between challenges and optimism in the field. The effectiveness of MSME management in the regions still depends on the capacity of individual managers, institutional support, and the policy response of local governments.

d. *Bar Plot*

Bar Plot Bar plots are used as data visualization tools to show the distribution and frequency of dominant themes or keywords in text analysis results. Bar plots are created using Orange Data Mining software. Each bar represents a unit of analysis, such as a sentence or main topic, so the taller the bar, the more frequently that topic appears in the data.

Figure 8. Bar Plot
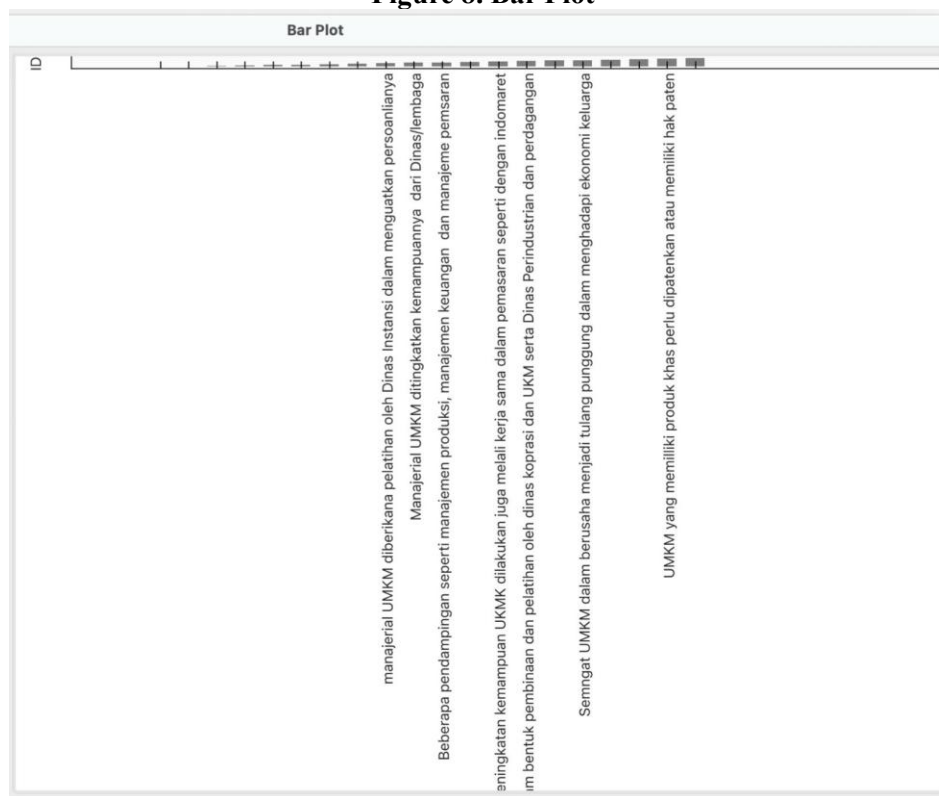
Source: Orange Data Mining Software

*Bar plot*Figure 8 shows that training and mentoring facilitated by government agencies have a dominant influence on strengthening the managerial capacity of MSMEs. The data shows that coaching activities, including personality training, production management, financial management, and marketing strategies, are the most frequently occurring and significant factors in improving managerial effectiveness. Furthermore, collaboration between MSMEs and retail institutions, as well as mentoring in the form of technical training, also help expand market access and strengthen business sustainability. Managerial-based coaching and institutional collaboration are key drivers of strengthening the independence and sustainability of MSMEs at the local level.

CONCLUSION

This study confirms that managerial effectiveness in Micro, Small, and Medium Enterprises (MSMEs) is largely determined by the leader's ability to implement strategic planning, organize resources, provide direction and motivation, and control and adapt to changes in the business environment. The results of data analysis using Orange Data Mining, using sentiment analysis and text mining approaches, successfully revealed patterns of MSME actors' perceptions of the managerial practices implemented. Data visualizations in the form of Word Clouds, Heat Maps, and Bar Plots showed that terms such as training, mentoring, productivity, cooperation, and discipline were dominant themes in respondents' responses. Therefore, efforts to improve managerial effectiveness still depend heavily on strengthening individual capacity and systematic institutional support. Meanwhile, the topic modeling results identified ten key themes that reflect the primary focus of MSMEs, ranging from business planning and task allocation to performance monitoring. Managerial effectiveness is not a random outcome, but rather a systematic process involving continuous learning, adaptive leadership, and the ability to identify strategic opportunities.

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