Universitas Ahmad Dahlan

Jurnal Fokus Manajemen Bisnis
Volume 14, Number 2, September 2024, Page 164-176
https://doi.org/10.12928/fokus.v14i2.10479
http://journal2.uad.ac.id/index.php/fokus
P-ISSN: 2088-4079 E-ISSN: 2716-0521

The impact of techno complexity on work performance through emotional exhaustion

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ARTICLE INFORMATION

Article History
Accepted: 07-05-2024
Revision: 20-06-2024
Accepted: 24-06-2024

Keywords
Techno complexity;
Work performance;
Emotional Exhaustion.

ABSTRACT

Technology has become an integral part of work life, providing significant benefits for increasing productivity and competitiveness. However, the use of technology also carries risks, especially in the form of technostress, namely, the stress that arises from using technology. This study aimed to investigate the impact of technological complexity as a technostress trigger on work performance among employees in micro, small, and medium enterprises in Semarang, Indonesia, with emotional exhaustion as a potential mediator. The sample for this study consisted of 315 micro, small, and medium-sized enterprise workers in various sectors. Data were collected through surveys and analyzed using structural equation modeling and partial least squares. The research results show that technological complexity negatively affects emotional exhaustion, but does not significantly affect work performance. By contrast, emotional exhaustion negatively influenced work performance. However, there is insufficient evidence to support the mediation of emotional exhaustion between technological complexity and workplace performance. These findings emphasize the importance of considering additional factors beyond techno complexity in shaping work performance as well as the importance of organizational support in mitigating the negative impact of techno complexity on employee well-being and performance in micro, small, and medium-sized enterprises.

1. Introduction

Micro small and medium-enterprises (MSMEs) significantly influence a country's economy because they significantly contribute to job creation. MSMEs are important in supporting various economic sectors and driving overall financial progress. The number of MSMEs currently reaches 64.2 million and contributes 61.07% or 8.573 trillion rupiah to gross domestic product (GDP). MSMEs also play an essential role in forming GDP, absorbing labor, and expanding employment opportunities. MSMEs also provide a safety net for low-

income individuals to engage in productive economic activities. However, in the current digital era, MSMEs face the challenge of adapting new technologies to remain competitive (Adhiatma et al., 2023). However, behind the benefits obtained from using technology, there are negative impacts. One of the negative impacts of technology use is technostress. A study conducted by Gaudioso et al. (2017) showed that technostress is partly formed through the presence of technology in the workplace and causes workers to feel a technology invasion.

Techno complexity is one of the main factors causing technostress (La Torre et al., 2020). The more complex the technology is, the greater the possibility that users will experience technostress (La Torre et al., 2020). For example, if a technology has many features that are difficult to learn, users may feel frustrated and overwhelmed, which can ultimately lead to technostress. Techno complexity refers to the level of difficulty faced in understanding or using a new technology (Tarafdar et al., 2019). In the context of MSMEs, techno complexity is a critical issue owing to the limited resources and technology knowledge possessed by MSMEs workers.

However, researchers have different views regarding the technostress phenomenon. Some researchers state that technostress has a high relationship between anxiety and performance (Marchiori et al., 2019; Salo et al., 2019; Tarafdar et al., 2019; Ma et al., 2021; Fernández-Fernández et al., 2023). In other words, the higher the technostress, the higher the anxiety and performance. Other researchers assume that technostress does not negatively affect performance and that technology is not a stressor (Di Dalmazi et al., 2022). Therefore, it is essential to explore the factors that create technostress from different perspectives, methodologies, theoretical frameworks, and research contexts, which may contribute to mixed results. In this context, further investigation is warranted to fully understand how technology affects emotional exhaustion and workplace performance.

Techno complexity can affect work performance through various mechanisms. Emotional exhaustion is an important mechanism. Emotional exhaustion is an emotional health condition resulting from continuous work stress (Chen et al., 2020). When MSMEs workers have difficulty understanding and using new technology, they tend to experience anxiety and emotional exhaustion, which negatively impact their work performance (Nasir et al., 2022). Research conducted by Marchiori et al. (2019), Salo et al. (2019), and Wahl et al. (2024) found that techno complexity can cause emotional exhaustion, thereby reducing worker efficiency and performance. Several studies have demonstrated a relationship between emotional exhaustion and decreased performance (Tarafdar et al., 2019; Chen et al., 2020; Yener et al., 2021). However, the relationship between complexity and performance in MSMEs is yet to be explored. Therefore, emotional exhaustion was tested as a mediator.

The job demand resources theory frames the relationship between variables. According to the job demand resources theory, techno complexity is a job demand that can potentially cause stress and emotional exhaustion in workers (Bakker & Demerouti, 2017). Workers must expend extra cognitive effort and time to adapt to technological development. Prolonged job demand can cause stress in workers who need help with technology development, and they cannot work optimally (Tarafdar et al., 2019). Stress results in increased emotional exhaustion or burnout among workers (Alonso et al., 2020). According to this theory, emotional exhaustion reduces a person's psychological resources. As a result, employee performance decreases, and employees find it difficult to work productively, efficiently, and with quality when using complex technology. Therefore, techno complexity can indirectly influence the decline in worker performance by increasing emotional exhaustion. Emotional exhaustion can mediate the effect of techno complexity on performance by reducing workers' psychological resources.

The focus of this research is on MSMEs located in Semarang, Indonesia. This is due to the following reasons: First, special characteristics. Semarang has different economic and

social characteristics from other cities in Indonesia. This can provide specific insights into how MSMEs function and contribute to a particular local context. Second, there are local policies. To support MSMEs at the local level, the Semarang City government may have policies or programs that differ from those of other city governments. This study investigated the effectiveness of these policies and their impact on MSMEs at the local level. Third, there is data accessibility and availability. Compared with other cities, MSMEs data in Semarang may be more accessible or more complete, which makes it easier for researchers to carry out more in-depth and accurate analyses. Fourth, there is local collaboration and support. Collaborating with related parties, such as local governments, research institutions, or local MSMEs associations in Semarang, can increase the validity and relevance of research and the impact of the results. Fifth, there is a representation of central Indonesia. The city of Semarang is in the Central Indonesian region, which may have different economic and social dynamics from other cities in Indonesia. The research conducted in this study can better represent the conditions of the MSMEs in this region. Sixth, there is geographical representation. Semarang can represent the cities of the central part of Java Island, which is Indonesia's main economic and business center. Choosing Semarang as a research subject for MSMEs can help better understand the role of MSMEs in the local economy, the dynamics of applicable policies, and other elements that influence the growth and progress of MSMEs in the city.

In connection with the purpose of this consideration, the steps taken are as follows. First, the community and testers in this consideration are MSMEs in Semarang with certain classifications, such as utilizing innovation in running their businesses and the number of tests in Semarang. This consideration comprised 315 tests. Currently, information collection strategies are implemented by distributing and surveying respondents. In addition, this study uses a quantitative information investigation strategy using the structural equation modeling partial least squares (SEM-PLS) examination tool. This investigation provides several important commitments as it contributes to including comprehensive information regarding the impact of innovation on the workforce in MSMEs. This investigation contributes to the rules for creating innovation administration programs in MSMEs that consider the effect of innovation on the MSMEs workforce.

2. Literature Review and Hypothesis Development

2.1 Literature Review

2.1.1. Techno Complexity

Techno complexity refers to the difficulty individuals experience in understanding and using a new technology. Techno complexity is often caused by rapid technological developments, software changes, and the need for advanced technical skills (Tarafdar et al., 2019). Techno complexity can hinder employees' adoption of technology because it creates a fear of failure and an inability to master the technology (Marchiori et al., 2019; Pasini et al., 2022). In the context of MSMEs, where resources for technology training are often limited, technical complexity becomes a significant challenge.

2.1.2. Work Performance

Work performance includes individuals' effectiveness, efficiency, and productivity in completing work tasks. Various factors, including technical ability, motivation, and organizational support, influence workplace performance. According to Marchiori et al. (2019), technostress triggered by techno complexity can reduce work performance through increased anxiety and decreased concentration. Ma et al. (2021) also found that employees who experience difficulties using technology tend to show lower performance compared to those who do not experience these difficulties.

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2.1.3. Emotional Exhaustion

Emotional exhaustion is a condition of mental and emotional exhaustion that is caused by continuous work pressure. It is one of the main components of burnout (Macía-Rodríguez et al., 2023). Fernández-Fernández et al. (2023) indicate that techno complexity can contribute to emotional exhaustion because it requires employees to constantly learn and adapt to new technology, which can be an emotional burden. Emotional exhaustion can negatively impact work performance and reduce employee effectiveness and productivity.

2.2. Hypothesis Development

2.2.1. Negative Effect of Techno Complexity on Work Performance

Techno complexity refers to the difficulty and complexity faced by users in understanding and using a technology (Tarafdar et al., 2019). The job demand resources theory states that high job demand can cause exhaustion and reduce work performance if not balanced with adequate resources (Bakker & Demerouti, 2017). In this context, techno complexity results in a high demand for jobs. Technological complexity can hurt the mental exhaustion of MSMEs mainly because of information overload and learning requirements. In the application of technology, business owners and employees must handle a large amount of processing. Learning and mastering this new technology require considerable time and energy, which can result in mental and emotional exhaustion. Techno complexity can cause users to feel overwhelmed by the amount of information that must be processed and various tools that must be learned and integrated. This can reduce the time and energy available to complete primary tasks, thereby reducing the performance effectiveness. Tarafdar et al. (2019) also Ya'acob and Aziz (2021) found that techno complexity can cause confusion and lack of understanding, which hurts work performance. The complexity of information and communication technology reduces employees' work effectiveness and increases the time needed to learn various information and communication technology-related aspects.

H_1: Techno Complexity Has a Negative Effect on Work Performance

2.2.2. Negative Effect of Techno Complexity on Emotional Exhaustion

Techno complexity can function as a high job demand, which increases the pressure and stress for employees (Tarafdar et al., 2019). The job demand resources theory explains that high job demand, such as techno complexity, can cause emotional exhaustion without adequate resources (Bakker & Demerouti, 2017). Technological complexity can hurt the mental exhaustion of MSMEs, mainly because of information overload and learning requirements. In the application of technology, business owners and employees must handle large amounts of processing. A wealth of information and further learning-level requirements. Learning and mastering this new technology requires a lot of time and energy so that it can result in mental and emotional exhaustion. Techno complexity can cause stress and emotional exhaustion because users have to spend extra time and effort learning and understanding new technology (Tarafdar et al., 2015). Salo et al. (2019) also showed that the complexity of information technology causes significant stress and contributes to increased emotional exhaustion. When the MSME workforce has to use and operate complex technology, they may feel overwhelmed, which ultimately increases emotional exhaustion (Ya'acob & Aziz, 2021).

H_2: Techno Complexity Has a Negative Effect on Emotional Exhaustion

2.2.3. Negative Effect of Emotional Exhaustion on Work Performance

Emotional exhaustion is one of the main components of burnout and is defined as emotional and physical exhaustion caused by ongoing work stress (Bianchi et al., 2015). Job demand resources theory states that high job demand can cause emotional exhaustion and reduce work performance (Bakker & Demerouti, 2017). Park and Nam (2020) found that emotional exhaustion has a negative impact on work performance because emotionally exhausted individuals do not have the energy or motivation to perform their tasks well. The emotional exhaustion caused by high job demand, including the use of technology, can reduce performance (Tarafdar et al., 2019). Yener et al. (2021) stated that emotional exhaustion occurs when job demands exceed a person's ability to cope, ultimately reducing work effectiveness. Studies by Pasini et al. (2022) and Fernández-Fernández et al. (2023) indicate that techno complexity can increase emotional exhaustion because employees must continuously adapt to new technology, which can be an emotional burden. Marchiori et al. (2019) also showed that techno complexity contributes to emotional exhaustion by increasing cognitive load and reducing rest time.

H_3: Emotional Exhaustion Has a Negative Effect on Work Performance

2.2.4. The Mediating Role of Emotional Exhaustion on The Effect of Techno Complexity to Work Performance

The job demand resources theory states that high job demands (such as techno complexity) can cause emotional exhaustion and reduce work performance (Bakker & Demerouti, 2017). In this model, emotional exhaustion acts as a mediator between techno complexity and workplace performance. Technical complexity can cause increased emotional exhaustion, which affects work performance (Salo et al., 2019). Bakker and Demerouti (2017) found that emotional exhaustion refers to feelings of tension and chronic exhaustion caused by burdensome work. When a workforce experiences emotional exhaustion, they may not have the energy or patience to do their jobs effectively, negatively impacting their workplace performance (Yener et al., 2021). Tarafdar et al. (2019) supporting this model by showing that technology stress can trigger emotional exhaustion and negatively impact performance. Fernández-Fernández et al. (2023) found that emotional exhaustion significantly mediated the relationship between technology demands and work performance.

H_4: Emotional Exhaustion Mediates the Effect Techno Complexity on Work Performance

2.3. Research Framework

As demonstrated by the research framework model in Figure 1, this study examined the impact of community engagement as a mediating variable between social media marketing activities and customer loyalty, based on a literature review and research hypothesis.

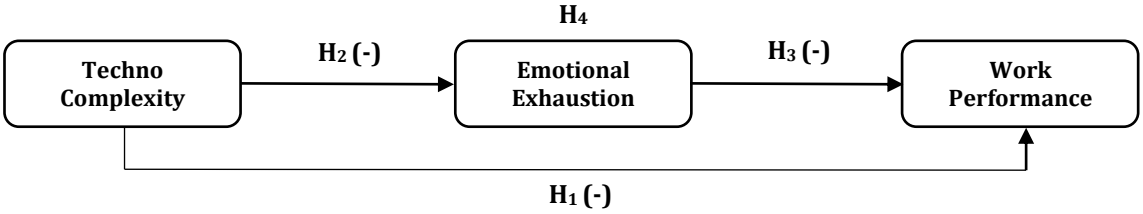

Figure 1. Research Framework

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3. Research Method

3.1. Population and Sampling Method

Semarang, Indonesia has quite a large diversity of MSMEs. This shows the potential for small business development in the creative industry sector (Adhiatma et al., 2023). However, specific data on the number of MSMEs in this sector are currently unavailable. In addition, the rapid growth of technology in the city of Semarang has the potential to increase technostress in the MSMEs workforce. In this context, technical complexity refers to the use and integration of digital technology in MSMEs operations. Several aspects that serve as filters or inclusion criteria for techno complexity need to use various digital platforms, such as social media for marketing, integration with e-commerce platforms, use of software or business applications, and implementation of digital payment solutions. Researchers distributed questionnaires to participants using a non-probabilistic sampling approach, namely purposive sampling, and obtained 315 respondents.

3.2 Data Collection Method

Data were collected using a questionnaire distributed to participants. This questionnaire includes items measuring techno complexity, emotional exhaustion, and work performance, and demographic data, such as business sector, gender, age, education, and tenure. The instruments used were adopted from previous studies and were validated. Techno Complexity (TC) is measured using the scale developed by Marchiori et al. (2019). Emotional Exhaustion (EE) was measured using a scale from Salmela-Aro et al. (2011). Work Performance (WP) was measured using the scale developed by Tarafdar et al. (2010). Before the survey, pilot testing was conducted to perfect the content of the questionnaire, ensuring the quality of the statements and grammatical accuracy. Questionnaires were distributed along with letters requesting participation from the respondents. After one month, 315 survey responses were collected. A number of respondents 315 were considered sufficient to represent the MSMEs population of Semarang.

3.3. Data Analysis Method

A validity test was conducted to ensure that the research instrument could determine what should be measured. Construct validity is assessed by looking at the loading factor value, which must be more than 0.5 (Hair et al., 2014). A reliability test was then conducted to assess the internal consistency of the research instrument. Reliability was assessed using Cronbach's alpha and composite reliability values. The accepted Cronbach's alpha and composite reliability values are more than 0.6 and 0.7 (Hair et al., 2014). Hypothesis testing was also conducted to examine the relationship between the variables in the research model. The provisions in hypothesis testing are accepted if they have a significance value of less than 0.05 (Hair et al., 2014).

4. Result and Discussion

4.1. Validity Test

This path analysis uses a four-path structural model with three structural equations. The first is the effect of techno complexity on work performance. Second, technical complexity affects emotional exhaustion. Third is the effect of emotional exhaustion on work performance. Fourth, emotional exhaustion mediates the effect of techno complexity on work performance. The path analysis form from the results of the analysis using Smart PLS is shown in Figure 2.

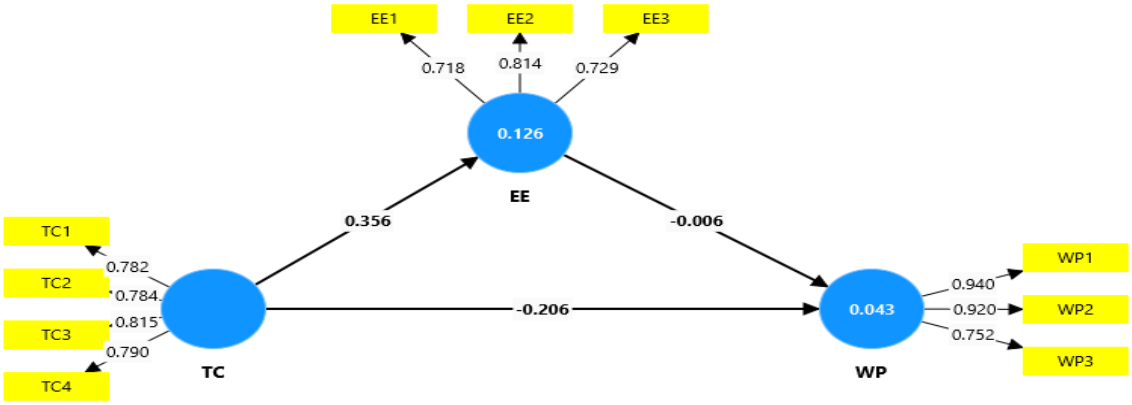

Figure 2. Measurement Model

The findings presented in Table 1 show that the loading factor values of all indicators met the minimum criteria, thus showing sufficient validity. Construct validity is assessed by looking at the loading factor value, which must be more than 0.5 (Hair et al., 2014).

Table 1. Validity Test Result

Indicator	Techno Complexity	Emotional Exhaustion	Work Performance
TC 1	0.782		
TC 2	0.784		
TC 3	0.815		
TC 4	0.790		
EE 1		0.718	
EE 2		0.814	
EE 3		0.729	
WP 1			0.940
WP 2			0.920
WP3			0.752

Source: Primary data processed (2024)

4.2. Reliability Test

The reliability test included the examination of Cronbach's alpha and composite reliability. The accepted Cronbach's alpha and composite reliability values are more than 0.6 and 0.7 (Hair et al., 2014). As shown in Table 2, the results show that both Cronbach's alpha and the composite reliability values of all variables meet the specified threshold.

Table 2. Reliability Test Result

Variable	Cronbach's Alpha	Composite Reliability
Techno Complexity	0.804	0.871
Emotional Exhaustion	0.622	0.789
Work Performance	0.848	0.871

Source: Primary data processed (2024)

4.3. Hypothesis Test

Table 3 shows the results of the hypothesis testing. Based on four hypothesis development, three were rejected. The analysis results show that techno complexity does not directly affect the work performance. Emotional exhaustion negatively affects workplace performance. In addition, technical complexity did not directly affect emotional

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exhaustion. Emotional exhaustion did not mediate the effect of techno complexity on work performance.

Table 3. Hypothesis Test Results

Hypothesis	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Value
Techno Complexity → Work Performance	-0.208	-0.215	0.076	0.076	0.939
Emotional Exhaustion → Work Performance	-0.006	-0.004	0.051	7.010	0.000
Techno Complexity → Emotional Exhaustion	0.356	0.364	0.056	3.698	0.000
Techno Complexity → Emotional Exhaustion → Work Performance	-0.208	-0.215	0.076	0.076	0.939

Source: Primary data processed (2024)

4.4. Discussion

4.4.1. The Effect of Techno Complexity on Work Performance

The hypothesis test results showed the effect of techno complexity on workplace performance. This is consistent with the findings of Tarafdar et al. (2020), who concluded that, even though technology is highly complex, its impact on performance is positive if users receive support. According to the job demand resource theory, resources such as coworker support can reduce the negative impact of job demands such as techno complexity (Bakker & Demerouti, 2017). The negative effects of complexity can be minimized if users feel supported when using the technology. Similarly, Ya'acob and Aziz (2021) suggested that management support can reduce the negative effects of techno complexity on employee performance. Therefore, environmental support may moderate the relationship between techno complexity and workplace performance.

4.4.2. The Effect of Emotional Exhaustion on Work Performance

The test results support the hypothesis that emotional exhaustion has a negative impact on work performance. There are several reasons why emotional exhaustion negatively affects the work performance (Hur et al., 2016). First, high pressure was applied. MSMEs often operate in competitive environments with limited resources (De Massis et al., 2018). This condition can cause MSMEs owners and employees to feel high pressure while running, thereby increasing mental exhaustion. Second, multitasking requirements. MSMEs often require the employees to perform different tasks simultaneously or multiple tasks. The pressure to complete many tasks within a limited time can cause stress and mental exhaustion (Parker, 2014). Third, there are risks and threats. MSMEs face higher risks and threats in their operations and business strategies. Uncertainty can cause stress and anxiety, resulting in emotional exhaustion (Torrès et al., 2022). Fourth, human resources were limited. MSMEs often have relatively small teams or only one or two people responsible for various aspects of their business. These restrictions can increase a person's workload and cause them to feel overly responsible, thereby leading to mental exhaustion (Busch et al., 2021). Fifth, there was a lack of social support and research. MSMEs may need more access to resources and social support to help manage stress and emotional exhaustion. This can increase the negative impact on work performance (Caliskan et al., 2014). Sixth, the influence of the social environment. Work culture and the social environment can influence mental

exhaustion (Seidler et al., 2014). For example, pressure from local competition and local market expectations may be additional factors that influence stress levels and emotional exhaustion.

Understanding the impact of mental exhaustion on MSMEs in Semarang will help to identify appropriate management strategies to improve the welfare of employees and business owners, which will ultimately improve MSME performance. This aligns with research Park and Nam (2020), that concludes that emotional exhaustion reduces employee productivity. Kumar and Shazania (2021) found emotional exhaustion to be a predictor of decreased performance. According to conservation of the job demand resources theory, emotional exhaustion can affect performance because it reduces an individual's resources to work optimally (Özgür, 2020).

4.4.3. The Effect of Techno Complexity on Emotional Exhaustion

The test results did not support the influence of techno complexity on emotional exhaustion. There are several reasons why the impact of technological complexity on mental exhaustion cannot support MSMEs. First, resources and accessibility are limited. MSMEs may face limited access to technical resources and advanced technology. This reduces their technical complexity and frees them from additional burdens that can lead to emotional exhaustion (Alshaher et al., 2023). Second, there is a small business scale. MSMEs generally have a small business scale compared to large businesses. This scale allows for the use of a more straightforward and less complicated technology that does not significantly impact emotional exhaustion (Riaz & Chaudhry, 2021). Third, we focus on practical work skills. MSMEs focus on applying technology to support essential operational functions rather than handling highly complex technologies. MSME owners and employees may be better at utilizing practical technology relevant to their daily work and are less likely to cause emotional exhaustion (Chang et al., 2014). Fourth, there is flexibility in the application of the technology. MSMEs are often more flexible depending on their needs. They tend to choose technology that can increase efficiency without adding unnecessary tension, so as not to cause significant mental exhaustion. Fifth is the economic and social context. The economic context and unique social environment can influence how MSMEs utilize and respond to technological complexity (Hernita et al., 2021). This condition may limit the level of technological complexity that is relevant or practical for MSMEs so that it does not contribute significantly to emotional exhaustion. Sixth, there is limited support and training. MSMEs may have limited access to support and training to handle complex technologies. These limitations may reduce the impact of technological complexity on emotional exhaustion, because MSMEs are not involved in complex and demanding implementations.

Understanding that MSMEs in Semarang may be fine with technological complexity in terms of mental exhaustion is an essential step in supporting their growth and desires. This can help develop better management approaches. This is not in line with previous research (Chen et al., 2020; Kumar & Shazania, 2021), which shows that techno complexity increases employee stress and emotional exhaustion. According to job demand resources theory, the complexity of technology as a job demand can potentially cause emotional exhaustion if not managed (Tarafdar et al., 2015). High complexity demands excessive cognitive effort from the employees.

4.4.4. The Mediating Effect of Emotional Exhaustion on The Effect of Techno Complexity to Work Performance

The test results did not support the mediation hypothesis of emotional exhaustion. However, based on the job demand resources theory, techno complexity

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can potentially increase emotional exhaustion and affect performance (Tarafdar et al., 2015). Park and Nam (2020) found that the mediation of emotional exhaustion only occurred at moderate and low levels of job demand. Similarly, Chen et al. (2020) found that factors such as management support and stress management skills could eliminate the mediation effect. This finding is consistent with the results of Salo et al. (2019), who stated that, although techno complexity increases emotional exhaustion, its impact on performance can be minimized through self-adaptation skills. Borst (2018) explains that job demands only have an effect through emotional exhaustion in routine work conditions. Jobs using technology are often creative. The mediation hypothesis needs to be entirely supported by the supporting factors and job characteristics. Moderating variables were required to explain this relationship.

5. Conclusion

This study aims to determine how techno complexity influences work performance, with emotional exhaustion as a mediator between employees in MSMEs located in Semarang. The findings revealed that although techno complexity has a significant effect on emotional exhaustion, it does not have a direct impact on work performance. However, emotional exhaustion has a considerable influence on work performance and plays an important role in determining the level of individual performance. However, insufficient evidence supports the role of emotional exhaustion as a mediator between techno complexity and workplace performance. In short, this study provides valuable insights into how techno complexity impacts MSMEs employees' psychological well-being and performance. The generalizability of these findings can be considered by focusing on the representativeness of the sample, the research methodology, and the characteristics of the population studied. Although this study was conducted in Semarang, the results can significantly influence the context of MSMEs employees in other areas with similar characteristics. The practical implications of these findings underscore the need to consider factors beyond techno complexity in affecting performance, and the importance of organizational support in reducing the adverse impact of techno complexity on the mental well-being and performance of MSMEs employees.

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