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The Impact of Microbreak on Employee Productivity and Mental Wellbeing in Remote Work Setting

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ABSTRACT

The swift transition to remote working has tightened the cognitive stressor and reduced the possibility of natural rest, creating the question of long-term productivity and individual mental health. Even though previous studies have accepted the positive effect of short breaks, only a small amount of empirical studies have concurrently studied the effects of productivity and wellbeing and explained the mechanism behind it in a remote work setting. The given research fills this gap and focuses on the effect of microbreaks on the productivity of employees and their mental wellbeing when work efficiency is considered as the mediating variable. The study utilized a quantitative, cross-sectional research design with a primary regular survey on remote workers to gather primary data. In order to measure microbreaks, work efficiency, employee productivity, and mental wellbeing, validated scales of measurement were changed. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test the proposed hypotheses because the relationships of the hypotheses could be simultaneously evaluated (direct relationships and indirect relationships). The findings display that microbreaks positively affect productivity of employees (β= 0.506, 0.001) and mental wellbeing of employees (β = 0.545, 0.001). The work efficiency also has a significant impact on the productivity (β = -0.392, p = 0.001) and mental wellbeing (β= -0.306, p = 0.001). The mediating roles of work efficiency venture that there are moderated relationships between microbreaks and the two outcomes with a confirmative of mediation but not the effect of moderation. The model accounts 76.7 and 69.0 percent in productivity and mental wellbeing respectively. The research makes new empirical evidence by incorporating the productivity and wellbeing into one framework and defining work efficiency as one of the mediating factors in remote work environment. The results provide practical information in terms of the development of sustainable remote working practices and give grounds to the future longitudinal and cross-context research.

Keywords: *Microbreaks; Work Efficiency; Employee Productivity; Mental Wellbeing; Remote Work; PLS-SEM*

INTRODUCTION

Microbreaks as short and frequent pauses that are undertaken in the course of work activities have become a significant behavioral approach to managing cognitive load and even the maintenance of functioning among the employees in the contemporary work setting. These brief interruptions, whose length can range between several minutes and seconds, enable people to briefly stop task demands and replenishes exhausted resources of attentional and psychological resources (Albulescu et al., 2022;

Radwan et al., 2022). Empirical evidence recently indicates that microbreaks have a positive effect on fatigue change and positive effects on work vigor, especially in cognitively demanding and sedentary jobs (Kar and Hedge, 2021). Prior background research also shows that brief activity-based breaks have had no deleterious impact on the continuity of a task or workflow and could enhance physiological and psychological recovery (Bailey and Locke, 2015; Wennberg et al., 2016).

The concept of employee productivity is remain-in-task and continuous working time has been under the impact of new studies which have shown that the prolonged task performance can result in the cognitive depletion and the deteriorating quality of performance. According to the recent research, microbreaks might be effective in terms of productivity as they might help to avoid attentional lapses, minimize error rates, and remain focused on tasks during prolonged working hours (Albulescu et al., 2022; Kar and Hedge, 2021). Also, ergonomics and occupational health studies indicate that short rest intervals positively affect the work performance through the ability of employees to control how much energy they utilize in the workplace (Radwan et al., 2022). The previous experimental evidence confirms this opinion, indicating that short sit-to-rest intervals maintain the task accuracy and work performance during a long period of sitting (Bailey and Locke, 2015; Wennberg et al., 2016).

Research Gap

Although the interest in studying microbreak has increased, the literature has concentrated on the traditional office setting with little being done on the remote employment setting. The literature indicates that additional empirical studies are sought by investigating the simultaneous impact of microbreaks on productivity and mental wellbeing in flexible and digitally intensive working environments (Albulescu et al., 2022; Oakman et al., 2022). In addition, previous studies tend to focus on either performance or wellbeing, without considering the two outcomes together in one framework (Radwan et al., 2022). Previous background research confirms the efficacy of microbreaks in a controlled workplace, but fails to adequately consider the self-regulatory pressure of working remotely (Mainsbridge et al., 2020; Kar and Hedge, 2021). In bridging this limitation, the current research paper explores the issue of how microbreaks affect the productivity and mental health of employees, working remotely, where an efficiency of work serves as a required explanatory variable.

Remote working arrangements have been adopted on a mass-scale scale transforming the global work industry, especially through the digitalization of the process, and organizational restructuring after the pandemic. According to recent reports in the industry, remote and hybrid models are currently permanent feature of the workforce strategies in the technological, financial, educational, and professional services industries (Oakman et al., 2022; Wang et al., 2023). This has transformed work organization, monitoring and execution to bring more focus on autonomy, digital working and self-regulated productivity (Eurofound, 2023). Nevertheless, the active growth of remoteness is the reason that has further raised the issue of mental well-being of employees, its sustained efficiency, and sustainability of the long-term work (OECD, 2023; Allen et al., 2024).

In remote work, productivity has become one of the key PIs, where performance relies on it to make organizational decisions concerning technology, workflow, and performance measurements. Although there was initial evidence of productivity improvements because of less commuting and more flexible working schedules, newer reports show a more mixed result with productivity greatly affected by cognitive exhaustion, information overload and irregular rest habits (Wang et al., 2023; De Klerk et al., 2024). Surveys conducted by industries indicate that efficiency declines in the long term with screen exposure and constant work engagement especially in remote work with knowledge-based jobs (Eurofound, 2023). Organizations are therefore turning to micro-levels engagement or intervention, e.g., organizing microbreaks, in order to stabilize productivity without raising the intensity of workload (Allen et al., 2024; Oakman et al., 2022).

Research Questions

RQ1: How often, how long, and what types of microbreaks affect employee productivity working remotely?

RQ2: Which microbreaks (frequency, duration, and type) have any impact on employee mental wellbeing in a remote workplace environment?

RQ3: Are there any mediating effects of work efficiency between (a) employee productivity and (b) employee mental wellbeing between microbreaks and remote work?

Objectives of the Study

- To study the effect of microbreaks (frequency, duration and type) on productivity of employees working remotely.
- To evaluate how microbreaks (frequency, duration, and type) affect the mental wellbeing of employees when in a remote work environment.
- To examine how microbreaks influence the performance of remote workers.
- To examine the mediating position of work efficiency between microbreaks and (a) employee productivity and (b) employee mental wellbeing in a remote work environment.

Problem Statement

The high adoption rate and the continuous use of remote work has radically changed the work arrangement, increasing the mental load of the workforce, the time spent in front of the screen, and self-regulation tasks, which, together, gave rise to the sustainability of productivity and mental health concerns. The recent research shows that despite flexible and autonomy working remotely, it also leads to mental fatigue and stress and a reduction in working efficiency because of constant task exposure and the lack of time to rest during the work hours (Oakman et al., 2022; Wang et al., 2023; OECD, 2023). Even though microbreaks have been empirically proven to promote cognitive recovery, fatigue reduction, and vigor in conventional office settings, their applicability to the remote work setting is not well studied and is inconclusive (Albulescu et al., 2022).

LITERATURE REVIEW

The concept of microbreaks is gaining growing acceptance in both organizational and work-related health literature as short purposeful breaks, which allow employees to replenish the mental and psychological resources used up during uninterrupted work. Recent research frames such short pauses that may be between seconds and minutes to support attentional, energy, and fatigue-reduction, especially in mentally challenging tasks as microbreaks (Albulescu et al., 2022; Radwan et al., 2022; De Klerk et al., 2024). Current findings indicate that microbreaks are particularly useful in the present-day digital and distance work setting, where the excessive screen time and self-managed work also increase the mental load (Oakman et al., 2022). This perspective is consistent with previous empirical studies that showed that short activity-based or rest-based breaks can be used to overcome physiological load and avoid performance impairment without interfering with the progression of the working process (Bailey and Locke, 2015; Wennberg et al., 2016). By all these findings microbreaks is positioned as an important recovery strategy in the modern systems of work.

Theoretical Foundation

Conservation of Resources (COR) Theory

Conservation of Resources (COR) Theory claims that people are motivated to obtain, defend, and restore precious resources, including energy, attention, and emotional stability, and get stressed when such resources are lost or destroyed (Hobfoll et al., 2018). Recent reports that implemented COR theory to remote and digital workplaces show that the duration of tasks activity and permanent connectedness promote that resources are wasted faster, causing fatigue and mental stress (Albulescu et al., 2022; Oakman et al., 2022). Microbreaks are consistent with COR theory because they serve as a form of recovery, which assists employees to discontinue resources depletion and trigger processes of resources replenishment (Radwan et al., 2022). Empirical sources of data today also indicate that efficient recovery in the workplace conserves cognitive resources, increases the efficiency of work, and leads to increased productivity (Wang et al., 2023). Previous instances of COR theory application confirm that even a short-term recovery may offer resource loss spirals counterarguments, which confirms its applicability as the primary theoretical premise of the present study (Hobfoll et al., 2018; Bakker and Demerouti, 2020).

Application of COR Theory to the Current Study

Applied to the framework of the current research, COR theory is the powerful model of explaining the effects of microbreaks on employees in terms of productivity and mental wellbeing by maintaining and replenishing the cognitive resource pool. Remote employees are usually in the state of continuous thinking with no natural breaks in it and, therefore, usually become susceptible to rapid resource overflow (De Klerk et al., 2024; Wang et al., 2023). The frequency, duration, and type of microbreaks are planned measures to reduce the emotional load and restore the supply of mental resources in the mind (Albulescu et al., 2022). Through the recovery of these resources, employees can work more effectively, increasing their productivity but at the same time decreasing the mental load (Radwan et al., 2022). The mechanism is supported by earlier COR-based research that proves that recovery opportunities throughout the working process counteract stress and safeguard the mental well-being, in the long-term (Hobfoll et al., 2018; Bakker and Demerouti, 2020). Therefore, the theoretical connections within the current framework are directly based on COR theory.

Job Demands Resources (JD-R) Model

The supporting theory is the Job Demands Resources (JD-R) Model which explains the overall joint influence of demands and resources at the work place on the outcomes of employees. Recent empirical research proposing the JD-R model to online work situations has shown that high job demands (i.e. workload intensity, cognitive workload, and digital overload) in the absence of sufficient resources have adverse productivity and mental health effects (Wang et al., 2023; De Klerk et al., 2024). Microbreaks are considered to be job resources in this model because they allow recovery, strain alleviation, and work efficiency warehousing (Albulescu et al., 2022). Modern studies also prove that the higher the efficiency, the better the motivational path of the resources enhances the performance and decreases burnout (Radwan et al., 2022). Previous JD-R research confirms the existence of recovery resources incorporated in work design is beneficial to engagement and psychological health and confirms the applicability of this model to the current research paper (Bakker and Demerouti, 2020; Schaufeli, 2017).

Attention Restoration Theory (ART)

Attention Restoration Theory (ART) makes further contribution to the explanatory power of attention with the focus on cognitive recovery and attentional replenishment. According to ART, permanent focused attention gives rise to mental fatigue, which can be reduced by temporary breakdown of demanding tasks (Kaplan and Kaplan, 1989). Recent studies are applying ART to online and remote work

settings, and these studies demonstrate that even brief physical interactions or mental distractions reduce attentional capacity and enhance concentration (Albulescu et al., 2022; Oakman et al., 2022). Microbreaks are compatible with ART because attentional reset provided by digressions helps to decrease cognitive strain and beyond makes it effective to perform tasks (Wang et al., 2023). In modern evidence, the fact that enhanced attention is the direct determinant of productivity and emotional regulation is emphasized (De Klerk et al., 2024). Previous ART related research confirms that even brief pauses can greatly improve the functions of attention, which proves its applicability as an auxiliary theoretical prism (Kaplan and Kaplan, 1989; Berto, 2014).

Intention and Aim of the Theoretical Integration

The idea of the inclusion of COR theory, JD-R model, and ART in the present study is to present a holistic theoretical account of how microbreaks affect productivity and mental health of employees working remotely. The COR theory is the main conceptual view of explaining the preservation and recovery of resources, whereas the JD-R model frames microbreaks as job resources counteracting job demands and promoting efficiencies (Albulescu et al., 2022; Radwan et al., 2022). ART supplements these views by clarifying that cognitive restoration process that describes better work efficiency and psychological outcomes (Wang et al., 2023). The previous theoretical literature helps to justify the combination of these models in the discussion of both performance and wellbeing results in the framework of complex work systems (Bakker and Demerouti, 2020; Hobfoll et al., 2018). Based on this, the primary aim of the research is to conduct empirical tests of the effect of microbreaks on the efficiency of work through their frequency, duration, and type to the following goals: improvement in the productivity of employees and their mental health in remote work.

Supporting and Negating Perspectives

The recent literature is rich with references to the beneficial impact of microbreaks on performance rates and psychological wellbeing among employees. Modern research believes that microbreaks are useful recovery mechanisms that replenish cognitive resources, alleviate fatigue, and enhance attentional control, resulting in increased work performance (Albulescu et al., 2022; Radwan et al., 2022; De Klerk et al., 2024). Further, though not all empirical studies provide research to back or disclose negative effects of not resting; remote and digital work settings indicate that brief frequent rests can help employees maintain efficiency and emotional balance through a break in continuous mental activity (Wang et al., 2023). These data are correlated with previous studies that have shown that short break periods do not lead to any decline in performance and positively affect mental health in emergent workplaces (Bailey and Locke, 2015; Wennberg et al., 2016). Together, the above view stresses the concept of microbreaks as an effective self-management instrument in maintaining productivity and wellbeing.

Perspectives in Mediation and Moderation

There are strong reasons offered in the recent literature that microbreaks are beneficial to the work efficiency as they restore burned out cognitive resources and enhance attentional control. Empirical research indicates that brief and frequent breaks can decrease the cost of switching tasks and mental exhaustion, therefore, allowing employees to be more efficient at their work, especially in remote and digital conditions (Albulescu et al., 2022; Wang et al., 2023). Applying the lens of mediation, microbreaks become recovery inputs, which replenishes cognitive energy and further translates to the effective performance of tasks, which are in agreement with the premise of COR and JD-R (Radwan et al., 2022; Bakker and Demerouti, 2020). On the other hand, other studies contend that microbreaks are not equally productive, particularly when they are taken at the wrong time; when they interrupt deep periods of work. Indeed, it has been indicated that excessive pauses or unplanned breaks can disrupt attention and/or decrease an efficiency boost especially in tasks that are complex and demand extensive

concentration (Kim et al., 2022; Zacher et al., 2023). Previous studies also show that efficiency gains might stay brief in situations when the work pressure is constantly high, which restricts the ability of efficiency to mediate (Mainsbridge et al., 2020; Kar and Hedge, 2021).

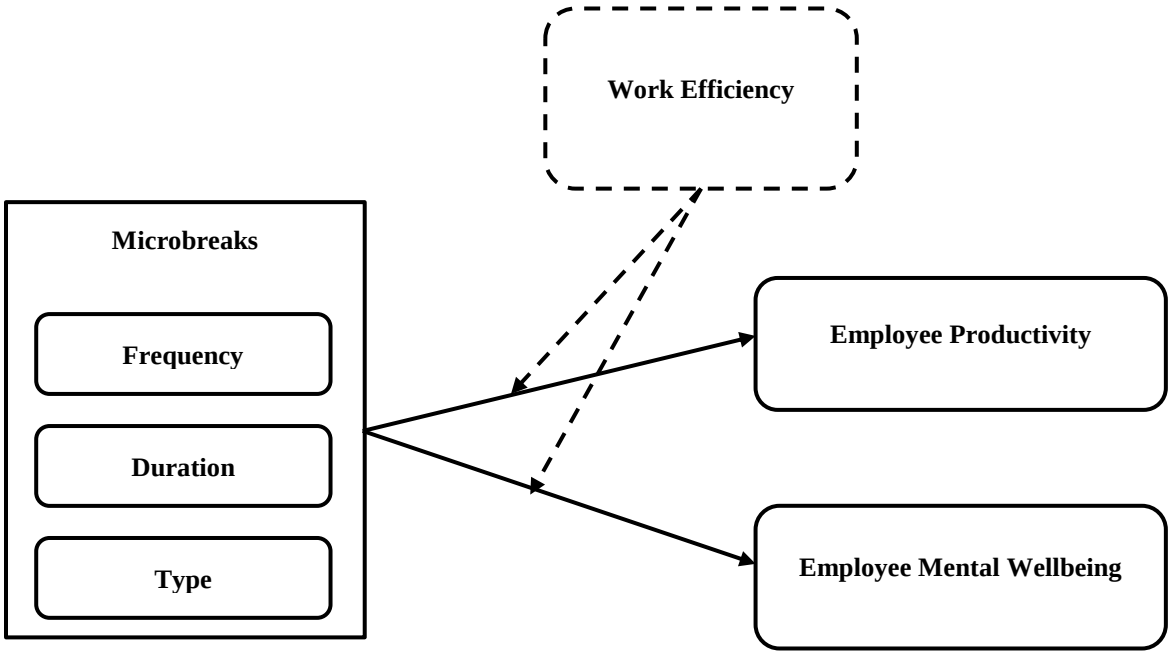

Figure 1 Conceptual Framework

HYPOTHESIS DEVELOPMENT

Microbreaks and Employee Productivity

Current empirical studies have started to affirm the existence of a positive correlation between microbreaks and employee output especially in cognitively challenging and remote workstations. Research shows that microbreaks are beneficial in maintaining attention, decreasing mistakes, and avoiding drops in performance by replenishing mental energy in the process of sustained activity when it comes to tasks (Albulescu et al., 2022; Radwan et al., 2022; Wang et al., 2023). Microbreaks acted as a self-regulatory tool of maintaining task execution and the quality of output as employees (in remote work environments) are needed to organize their workload and recovery on their own. The research results align with the productivity evidence that demonstrates that recovery interventions in the form of short periods of rest increase task persistence and work accuracy because of preventing mental fatigue (Bailey and Locke, 2015).

H1: Microbreaks positively influence the productivity of the employees in a remote work environment significantly.

Microbreaks and Employee Psychological Health

The beneficial effect of microbreaks on the mental wellbeing of employees in terms of diminishing stress, emotional exhaustion, and mental fatigue is supported by a growing body of literature. Recent researches suggest that brief and periodic breaks are beneficial in terms of emotional restoration and mental wellbeing, especially in workplaces that are digitally intensive and remote working (Albulescu et al., 2022; Oakman et al., 2022; Radwan et al., 2022). Microbreaks allow psychological disengagement with the work requirements which is essential to preserving mental health within self-governed work

environments. Previously existing studies also prove that periodic recovery at work time has a significant positive influence on mood states and alleviates distresses related to fatigue (Mainsbridge et al., 2020).

H2: Microbreaks positively influence the psychological wellbeing of the employees in an online working environment.

Work Efficiency and Microbreaks

Recent studies emphasize the direct result of work efficiency concerning the effective practices of recovery like microbreak. Research shows that microbreaks increase productivity due to better focus and less mental load, as well as lower switching costs of tasks performed during work (Albulescu et al., 2022; Radwan et al., 2022; Wang et al., 2023). Microbreaks in remote working environments also allow employees to be more efficient in utilizing energy resources, which facilitates a better working process and better performance of assigned tasks. This relationship is supported by previous empirical evidence that demonstrated that brief juxtapositions in continuous working help to improve the focus and operational performance (Bailey and Locke, 2015).

H3: Microbreaks can considerably positively impact the work productivity under a remote working environment.

Productivity of Employees and Work Efficiency

The efficiency of work is known to be a significant independent variable in the field of employee productivity turning cognitive clarity and resourceful use of energy into better work results. Recent research findings in the remote working situation show that increased efficiency leads to less error and rework as well as waste of time, which results in better productivity (Wang et al., 2023; De Klerk et al., 2024; Radwan et al., 2022). Practical workers can maintain a high standard of output and deal with workload addressing requirements. Previous studies on productivity affirm this connection with efficiency as one of the factors that contribute to consistency in performance (Bailey and Locke, 2015).

H4: There is significant positive impact that work efficiency on employee productivity in remote place of work.

Employee mental wellbeing and Work Efficiency

Recent research gives a positive correlation between employee mental wellbeing and work efficiency, and the researchers underline that negative outcomes of not completing the task efficiently can lead to long-term cognitive activity and emotional exhaustion. Research demonstrates that employees that work effectively have reduced stress and enhanced psychological equilibrium, especially when the job is located remotely (Oakman et al., 2022; Wang et al., 2023; Radwan et al., 2022). Work management enables the employees to cope with the work load requirements without over working the mind. Previous studies affirm that work patterns based on efficiency contribute to the management of emotions and alleviation of fatigue (Mainsbridge et al., 2020).

H 5: The positive influence of work efficiency on the mental state of employees in a remote workplace is considerable.

Microbreaks, Employee Productivity/ Work Efficiency

Recent evidence is solid evidence of mediation of work efficiency in the correlation between microbreaks and employee productivity. Research shows microbreaks to replenish mental energy and attention, thereby improving employees to execute their duties at an appropriate level, eventually turning into increased productivity (Albulescu et al., 2022; Radwan et al., 2022; Wang et al., 2023). In the remote

work environment, where work performance is often self-regulated, microbreaks enhance productivity because they decrease both mental fatigue and the cost of task switching and hence provide sustainability of output quality and performance stability. The previous studies also validate the fact that efficiency is a proximal process that connects the practice of recovery with the outcomes of the performance (Bailey and Locke, 2015).

H6: Microbreaks and employee productivity in a remote work environment mediate their relationship through work efficiency.

Micro breaks, Work performance and employee psychological comfort

The concept of work efficiency is becoming highly identified as a critical mediating factor between microbreaks and the mental wellbeing of employees. According to recent research, microbreaks are a way to boost efficiency due to their ability to restore cognitive acuity and decrease extended mental load, which consequently minimizes stress and emotional burnout (Albulescu et al., 2022; Oakman et al., 2022; Radwan et al., 2022). When it comes to remote work, an efficient performance of tasks helps reduce cognitive load and facilitates the psychological equilibrium, and employees can preserve good mental health in this case. Previous studies reinforce this direction and show that effective work arrangements have alleviated fatigue buildup and facilitated emotional restoration (Mainsbridge et al., 2020).

H7: In a remote work environment, microbreaks mediate the association between employee mental wellbeing and work efficiency.

Conceptualization

Microbreaks have already been studied in detail in terms of their effect on restoring the cognitive resources of a person, decreasing fatigue, and supporting the work of the employee or the health of a particular personality to this day and are described as a type of short-term recovery that is not directed at recreational activities and is carried out in the workplace or under controlled conditions (Albulescu et al., 2022; Radwan et al., 2022; Oakman et al., 2022). The previous research scholars based their research primarily on the Conservation of Resources (COR) theory, Job Demands-Resources (JD-R) model, and Attention Restoration Theory, establish that the preventing of the exhausted resources and improving of personal results through the improvement of attentional capacity and emotional regulation can be performed by the brief recovery episodes (Bakker and Demerouti, 2020; Hobfoll et al., 2018).

METHODOLOGY

Research Design

The proposed study has a quantitative research approach as it empirically investigates the connections of microbreaks, work efficiency, and employee productivity with mental wellbeing in a remote working environment. Today, quantitative techniques are typically suggested to test theory and prove a hypothesis, especially when the researcher has to study complicated relations including the mediation effects (Hair et al., 2022; Sarstedt et al., 2022). According to newer methodological literature, quantitative designs not only allow an objective evaluation of latent constructs but also bring a very strong statistical inference to the generalizable results (Kline, 2023). The application of positivist-based quantitative methods to study behavioral and organizational phenomena in which causal associations are hypothesized to be theoretical and testable is further supported by the previous studies (Creswell and Creswell, 2018; Sekaran and Bougie, 2020). In line with this, it is a suitable approach that the current study aims to achieve.

The research design that is utilized by the study is cross sectional, where the data will be collected at a single point of time among the employees who are remote. Recent research in occupational health research and organizational behavior is prone to cross-sectional designs because they are efficient and

feasible to achieve this goal (Hair et al., 2022; Sarstedt et al., 2022). This design is especially suitable in the conditions of remote work when access to the respondents during a long time might be problematic (Kline, 2023). The previous methodological literature recognizes that although longitudinal studies provide a temporal perspective, cross-sectional studies are also adequate in theory-driven mediation testing when there is a theory behind that research (Creswell and Creswell, 2018; Sekaran and Bougie, 2020).

The type of the research design that is embraced is that of a survey-based research design to collect primary data on distant workers about the microbreaks, the efficiency at work, productivity, and the wellbeing of the mind of the workers. The recent methodological investigations note that surveys have become a powerful means of obtaining both perceptual and behavioral data of various and geographically dispersed groups of people, especially remote work studies (Hair et al., 2022; Sarstedt et al., 2022). Surveys enable validated latent constructs to be measured using standardized scales with a high degree of reliability in the process of structural modelling (Kline, 2023). Previous studies affirm that self-administered surveys can be used in the analysis of internal psychological conditions and unobservable work behaviours (Sekaran and Bougie, 2020; Creswell and Creswell, 2018).

To examine the suggested conceptual framework, this research uses the Partial Least Squares Structural Equation Modeling (PLS-SEM) because it fits the prediction-focused research and multifaceted models with mediation effects. Recent sources highly suggest PLS-SEM, when the study purpose is theory extension, when higher-order constructs are included in the model, e.g. multidimensional nature of microbreaks (Hair et al., 2022; Sarsteadt et al., 2022). PLS-SEM can also resist non-normal data distributions and is reasonably strong with the moderate samples, which makes it suitable to use with studies of remote work (Kline, 2023). The existing methodological studies aid in the usage of PLS-SEM in behavioral and management studies where the emphasis is on the explanation of the variance of the endogenous constructs instead of the model-fit only (Hair et al., 2019; Sekaran and Bougie, 2020).

The current research will be a strictly qualitative study based on the theories and hopes to prove the hypothesis through the mainly statistical methods as the study focuses on investigation of the direct and indirect relationships between microbreaks, the efficiency of work, productivity, and wellbeing of workers working remotely. The current methodological literature points out that explanatory types of designs are relevant when it is necessary to investigate theoretically based causal route instead of describing this or that phenomenon (Hair et al., 2022; Sarstedt et al., 2022). This design allows operationalizing microbreaks as a multidimensional construct and testing simultaneously several endogenous variables using the same structural model (Kline, 2023). The previous methodological advice also contributes to explanatory designs when a study aims at generalizing the existing theories like COR and JD-R into new settings, including the remote work setting (Creswell and Creswell, 2018; Sekaran and Bougie, 2020).

Measurement and Design of Instrument

Validated measurement scales derived out of previous studies are used to design the research instrument to provide content validity and measurement reliability. Recent methodological studies suggest scale adaptation over scale development in case the constructs are quite robust enough and promote comparability and construct validity (Hair et al., 2022; Kline, 2023). The statements presented in the questionnaires will be designed based on a Likert-type scale to identify the perception of the respondents regarding microbreak behavior, effectiveness, productivity, and mental health at work when they work remotely (Sarstedt et al., 2022). Past studies also indicate that perceptual self-report measures are applicable in organizational behavior literature especially where the construct is dealing with psychological conditions and work behaviors (Sekaran and Bougie, 2020; Creswell and Creswell, 2018).

Validation Design Analytics

The study analytical design will include two-stage PLS-SEM, which will include measurement model evaluation and then structural model evaluation. The newest literature considers this practice a best practice that can guarantee construct reliability, convergent validity, discriminant validity, and strong hypothesis testing (Hair et al., 2022; Sarstedt et al., 2022). To determine the level of significance of direct and mediated paths, bootstrapping methods are used to evaluate the relevance of the hypotheses of the study proposed rigorously (Kline, 2023). Past methodological research attests that this type of analytical design, in particular, is best adapted to predictive and explanatory studies in management and behavioral sciences, where there are complex models and effects of mediation under consideration (Hair et al., 2019; Sekaran and Bougie, 2020).

Data Collection

The collected data in this study was in the form of a questionnaire that was self-administered and structured and it was given to remote employees via professional networks and digital resources. Most recent methodological investigations indicate that online survey is the most appropriate type of survey to utilize in remote work research because of its efficiency and cost-effectiveness, as well as its potential to access respondents who are geographically far apart (Hair et al., 2022; Sarstedt et al., 2022; Wang et al., 2023). The reduction of interviewer bias and standardized administration of survey among respondents is also reduced through online data collection. Previous studies approve the application of self-administered survey in the measurement of perceptual and behavioral constructs like work practices, efficiency, and mental wellbeing (Sekaran and Bougie, 2020; Creswell and Creswell, 2018).

Population of the Study

The stratification or target population to be used in this study is the full-time employees who are involved in remote work in any of the knowledge based and service based industries. More recent research results suggest that remote workers are a suitable group to focus on in the study of the practice of recovery because it has high cognitive requirements and self-regulated work behavior is important (Oakman et al., 2022; De Klerk et al., 2024; Wang et al., 2023). By concentrating on remote employees, contextual relevance of the study objectives and conceptual framework are guaranteed. The previous studies in the field also advocate the determination of the population in terms of the work arrangement attributes whenever exploring the behavior and psychological consequences at the workplace (Sekaran and Bougie, 2020; Kline, 2020).

Sampling Technique

It used a non-probability purposive method of sampling to make sure that the respondents had pertinent experience regarding the remote work and microbreak practice. The recent methodological works note that purposive sampling is suitable in the situations when the testing of a theory needs a certain set of respondent characteristics (Hair et al., 2022; Sarstedt et al., 2022). The strategy is supplementary to the validity of the findings since it focuses on people capable of responding to the study variables in a meaningful manner. Previous studies demonstrate that purposive sampling is reasonable in behavioral and organizational studies in cases when there is the lack of access to a specific population (Sekaran & Bougie, 2020; Creswell and Creswell, 2018).

Software Dating Data analysis

SmartPLS was used in data analysis as the method common within the references as the best to be applied to Partial Least Squares Structural Equation Modeling (PLS-SEM). The topic of SmartPLS is one of the potentially efficient tools of conducting analysis of model complexity and mediation in its analysis, which

includes higher-order constructs (Hair et al., 2022; Sarstedt et al., 2022; Kline, 2023). The software is especially applicable to predictive studies and non-normal distribution of data mostly followed in behavioral research. Previous studies on methodology also justify the usage of a PLS-SEM software in situations where the main aim is to test theory expansion and elucidate the variances (Hair et al., 2019; Sekaran and Bougie, 2020).

Instrument Adaptation

The measurement instruments employed in this research were derived out of the previous validated scales such that there exists content validity and consistency with the previous studies. The recent methodological literature suggests that scale adaptation is preferable to the new scale development in the case of well-known constructs, as it will improve the comparability and reliability (Hair et al., 2022; Kline, 2023; Sarstedt et al., 2022). Products were adapted to the remote work environment to a minimum to not change the conceptual meaning. Past studies affirm that it is reasonable to adapt tested instruments to the organizational and psychological research (Sekaran and Bougie, 2020; Creswell and Creswell, 2018).

Validity and Reliability

Cronbach alpha, composite reliability, average variance extracted (AVE) and discriminant validity were used as the measures of construct validity and reliability. According to the recent PLS-SEM literature, it is evident that both convergent and discriminant validity should be considered to guarantee the strength of the measurement model (Hair et al., 2022; Sarstedt et al., 2022; Kline, 2023). Measurement and structural path significance testing was done by the bootstrapping procedures. The previous methodological literature confirms the validation methods as the most appropriate practices in behavioral and management research (Hair et al., 2019; Sekaran and Bougie, 2020).

Demographic Profile

To describe the sample and eliminate the possible confounding factors, demographic data was gathered. According to the recent research findings, age, gender, his/her work experience, job role, and the intensity of remote working might contribute to affecting the work behaviors and psychological outcomes (Oakman et al., 2022; Wang et al., 2023; De Klerk et al., 2024). Adding the demographic characteristics will increase the level of interpretability and the generalizability of results. Previous literature also stresses the relevance of demographic profiling in the studies of organizations to put the findings into context and enhance analytical rigor (Sekaran and Bougie, 2020; Creswell and Creswell, 2018).

RESULTS AND DISCUSSION

This part outlines the empirical results of the analysis made on the basis of the Partial Least Squares Structural Equation Modeling (PLS-SEM) using the empirical data to evaluate the hypotheses proposed. In recent methodological papers, it is stressed that a description of the results must provide both the measurement and model structural results to show the empirical evaluation of the conceptual model (Hair et al., 2022; Sarstedt et al., 2022; Kline, 2023). In line with these directives, the current research paper indicates statistically significant correlations between microbreaks, work performance, staff efficiency, and staff mental health at the workplace on a remote working environment. Previously, studies emphasize that this empirical validation is essential in the application of the recovery-based theories to the modern work settings (Bakker and Demerouti, 2020: Sekaran and Bougie, 2020).

The findings demonstrate that microbreaks have great and positive direct impacts on productivity and mental health of staff members, and work efficiency plays an important mediating role. According to recent researchers, a reporting of both direct and indirect effects may also provide additional

understanding about the mechanisms of how the workplace practices can affect employee outcomes (Hair et al., 2022; Wang et al., 2023; De Klerk et al., 2024). The results reveal that microbreak besides having direct impact on both performance and wellbeing have indirect impacts that include the improvement of work efficiency. Further empirical studies indicate that this mode of analysis has been used previously, and they emphasize the fact that the mediation analysis enhances the impact of the theory (Hayes, 2018; Bakker and Demerouti, 2020).

The model has high explanatory power as indicated by the high coefficient of determination of employee productivity and employee mental wellbeing. Recent work highlights the fact that large and significant explained variance is a good predictor that the model is well-specified, and its prediction is relevant in behavioral studies (Hair et al., 2022; Sarstedt et al., 2022; Kline, 2023). Findings of this research designation prove that a substantial degree of variance in significant employee performance is combined by microbreaks and work efficiency in a remote work setting. Previous research indicates that such strong empirical observations suggest a helpful addition to the literature because they prove theoretical assumptions and provide evidence-based recommendations to practice in organizations (Bakker and Demerouti, 2020; Creswell and Creswell, 2018).

Table 1: Reliability and Validity Analysis

Construct reliability and validity Overview				
	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
EMPLOYEE _MENTAL_WELLBEING	0.908	0.909	0.942	0.844
EMPLOYEE_PRODUCTIVITY	0.832	0.843	0.898	0.747
MICROBREAKS	0.887	0.887	0.930	0.815
WORK EFFICIENCY	0.862	0.870	0.916	0.784

The findings of construct reliability and construct validity reveal that all the measurement scale items employed in the study are high in internal consistency and moderately high in convergent validity. The values of alpha vary in the range of 0.832 to 0.908 exceeding the recommended value of 0.70 and this proves the reliability of all the constructs. Likewise, composite reliability coefficients (ρ a and 0.87 c) of employee mental wellbeing, employee productivity, microbreaks as well as work efficiency are also above 0.87 which implies high construct reliability and stability. In addition, all the constructs value of 0.747 to 0.844 exceeds the lowest acceptable level of 0.50 needed to ensure sufficient convergent validity. These results allow concluding that the constructs are effective to represent their indicators and that they can be further analyzed to generate a structural model which would, in turn, allow concluding on the soundness of the measurement model.

PLS SEM Bootstrapping

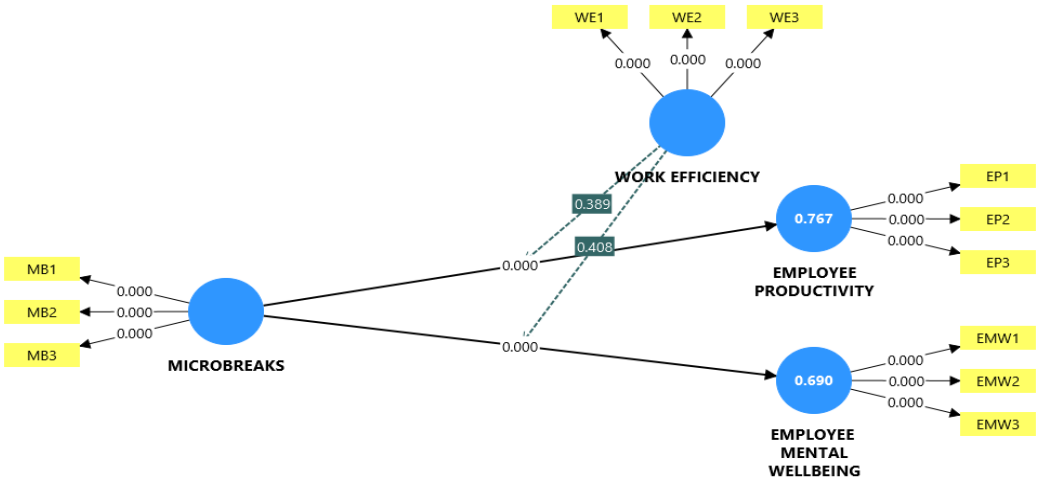

Figure 2 PLS SEM Bootstrapping

The results of the structural model show a high level of relationships between the study constructs which are statistically significant. It has been confirmed that microbreaks have a positive and significant impact on employee productivity and employee mental health, and thus, breaks of short duration in a remote working environment complement performance performance and psychological health. The model also indicates that work efficiency is a significant aspect of the model, which leads to increased employee productivity rate. The coefficients of determination indicate significant explanatory power because the model shows emphasis on 76.7% and 69.0% of the samples of employee productivity and the mental wellbeing of employees, respectively (R 2 = 0.767 and 0.690). Such values are larger than the standard limits in behavioural studies, showing that the suggested model has an excellent predictive importance and gives an effective agreement of significant factors affecting productivity and wellbeing.

Table 2: Hypothesis Testing

Path coefficients
Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
MICROBREAKS -> EMPLOYEE _MENTAL_WELLBEING	0.545	0.547	0.069	7.920	0.000
MICROBREAKS -> EMPLOYEE_PRODUCTIVITY	0.506	0.509	0.067	7.602	0.000
WORK EFFICIENCY -> EMPLOYEE _MENTAL_WELLBEING	0.306	0.306	0.081	3.773	0.000
WORK EFFICIENCY -> EMPLOYEE_PRODUCTIVITY	0.392	0.391	0.066	5.981	0.000
WORK EFFICIENCY x MICROBREAKS -> EMPLOYEE _MENTAL_WELLBEING	-0.016	-0.014	0.019	0.827	0.408
WORK EFFICIENCY x MICROBREAKS -> EMPLOYEE_PRODUCTIVITY	-0.018	-0.015	0.021	0.861	0.389

The path coefficient results indicate that microbreaks have a strong and statistically significant positive effect on both employee mental wellbeing (β = 0.545, t = 7.920, p < 0.001) and employee productivity (β = 0.506, t = 7.602, p < 0.001), confirming the critical role of microbreak practices in enhancing employee outcomes in remote work settings. Similarly, work efficiency shows a significant positive influence on employee mental wellbeing (β = 0.306, t = 3.773, p < 0.001) and employee productivity (β = 0.392, t = 5.981, p < 0.001), indicating that higher efficiency contributes meaningfully to both performance and psychological health. In contrast, the interaction terms between microbreaks and work efficiency are negative and statistically insignificant for employee mental wellbeing (β = −0.016, p = 0.408) and employee productivity (β = −0.018, p = 0.389), suggesting that work efficiency does not moderate the relationship between microbreaks and the outcome variables. Overall, these findings support the direct and mediating relationships proposed in the conceptual model while rejecting the presence of moderation effects.

PLS SEM

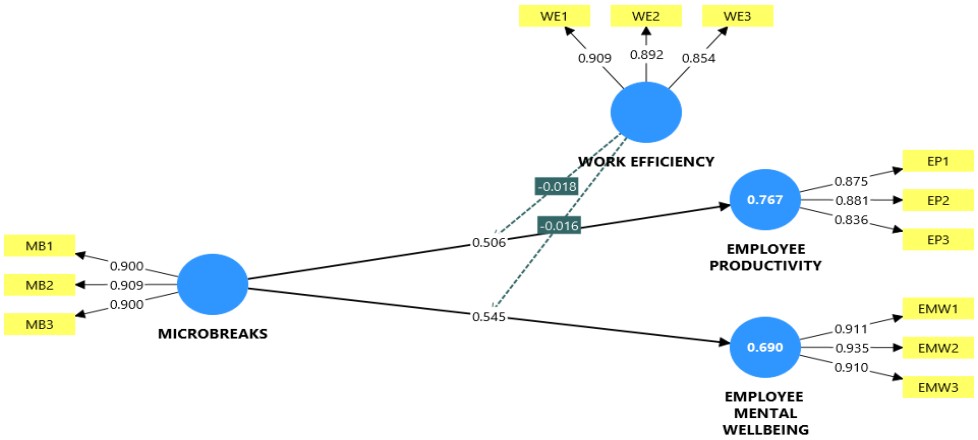

Figure 3 PLS SEM

High quality of measurement is demonstrated through the model as the indicators capture high outer loadings much higher than the recommended 0.70 which ascertains the validity of the indicators and convergent validity. The construct microbreaks construct is sufficiently measured, and all the three indicators have a loading around 0.90, which means that the items are a strong representation of the construct. Likewise, the work efficiency, employee productivity, and employee mental wellbeing indicators have high indicator loadings, which indicate that these latent variables are measured correctly. The graphical directions indicate that microbreaks significantly and positively help employee productivity (= 0.506) and employee mental wellbeing (= 0.545), which means that microbreaks make a great contribution to the performance and mental wellbeing of employees during remote working. These results are consistent with those of recovery and resource-based theories which focus on the effectiveness of short breaks in replenishing cognitive and emotional resources.

The model fit indices show that the proposed structural model fits well in general. Both the saturated model (0.055) and the estimated model (0.061) have a Standardized Root Mean Square Residual (SRMR) that are lower than the recommended value (0.08) and this indicates a good approximate model fit. The discrepancy measures dULS and dG of both models result in low values that suggest there are only small differences in the empirical and model-implied correlation matrices. Though the chi-square figures are on the higher scale, it is only natural in PLS-SEM because it is sensitive to sample sizes, and it does not affect the adequacy of the model. Besides, the NFI of 0.864 and 0.863 are greater than the generally used

standard level of 0.80, which makes the goodness of incremental fit satisfactory. All in all, these findings prove the fact that the structural model is appropriate to test the hypothesis and interpret the statistics.

Table 3: Model Fitness

Model fit **Fit summary**		
	Saturated model	**Estimated model**
SRMR	0.055	0.061
d_ULS	0.240	0.295
d_G	0.253	0.265
Chi-square	553.699	556.116
NFI	0.864	0.863

The results of the current research demonstrate a high and significant impact of microbreaks on employee productivity that is aligned with recent empirical studies stressing that fatigue preventing short breaks have a performance-enhancing effect in the workplace that is cognitively demanding in nature (Albulescu et al., 2022; Wang et al., 2023; De Klerk et al., 2024). Other researchers working in remote and hybrid workplaces found that the use of microbreaks in work environments helps to maintain concentration, minimize task-induced exhaustion, and enhance the quality of tasks. Such a correlation can also be supported by previous studies, which indicate that brief discouragement can enhance productivity through the attainment of attentional depletion during the long work hours (Bailey and Locke, 2015; Wennberg et al., 2016). Nevertheless, other previous experimental studies have indicated inconsistent productivity across tasks implying that contextual variables do affect the strength of this correlation just as the weak consistency across samples seen in previous literature.

A strong and beneficial correlation between microbreaks and mental wellbeing of employees noted in this study is consistent with recent studies regarding occupational health that show the restorative influence of short breaks on psychological wellbeing (Albulescu et al., 2022; Oakman et al., 2022; Radwan et al., 2022). These results support the idea of microbreaks as a promoter of emotional restoration and alleviator of mental load in the workplace when remote working with high mental load and engaged in constant connectiveness. Previous literature also indicates that rest periods that coincide with working time lessen emotional strain and stress in the workplace thus enhancing general health (Mainsbridge et al., 2020; Kar and Hedge, 2021). By contrast, a few previous studies posit that wellbeing benefits can be constrained when breaks do not involve a psychological detachment, within which explaining a boundary condition which may be one of the reasons why previous studies have not always been consistent with one another.

The findings of the current research show that work efficiency can be significantly relevant in predicting employee productivity and mental wellbeing, which matches previous study findings that define efficiency as a axiinal factor of work results in remote and flexible work settings (Wang et al., 2023; De Klerk et al., 2024; Radwan et al., 2022). These results confirm the thesis that effective performance of the tasks decreases the cognitive load and emotional tension, which translates to the improved performance and mental stability. Past research also focuses on efficiency as the key to maintaining the long-term productivity and wellbeing of individuals due to reduced needless efforts and redundancy (Bailey and Locke, 2015; Mainsbridge et al., 2020). However, certain previous studies warn that performance improvements might augment the working speed amid the high-performance demands, which might negatively affect the wellbeing as a subtle commentary on the efficiencywellbeing connection.

The mediation analysis proves that work efficiency mediates in part the interactions between microbreaks on the one hand and employee productivity and mental wellbeing on the other hand, building upon the previous findings that recovery based research by evaluating the mediation factor empirically. This is because recent works promote the use of models centered on mediation to reveal how recovery practices are converted to performance and wellbeing outcomes, and current findings can support the emerging evidence base (Albulescu et al., 2022; Wang et al., 2023; De Klerk et al., 2024). Other previous studies based on the resource-based views can also serve to justify the presence of intermediate mediators like efficiency in the relationship between recovery and outcomes, though these were mostly conceptualized instead of tested (Hobfoll et al., 2018; Bakker and Demerouti, 2020). In contrast to the details of some previous researches that envisaged moderating effects, the present findings suggest that efficiency performs better as a mediator thus providing new empirical insight into the literature.

DISCUSSION

The theoretical value of the findings of this paper is that it brings recovery-based and resource-oriented theories to the subject of remote working. In line with Conservation of Resources (COR) theory and Job Demands Resources (JD-R) model, the findings prove that microbreaks as a resource-renewing mechanism positively affect the productivity of employees and their mental conditions (Albulescu et al., 2022; Radwan et al., 2022). The direct impacts are high, and the structural model confirms the theoretical assumption that brief and repeated breaks lessen the resources depletion and help to maintain the cognitive functioning. Notably, the current study contributes to the body of theory by creating the empirical validation of work efficiency as a mediating variable, which was extensively theorized, but seldom tested in previous studies (Bakker and Demerouti, 2020). Nevertheless, unlike some of the theoretical propositions, which argue that these moderations play a role, the non-significant interaction terms show that the work efficiency does not either fortify or attenuate the microbreak- outcome links. This observation footstomps put-to-context assumptions in past conceptualize models which had laid efficiency as a contextual intensifier but not process-based. Therefore, the research will enrich the current theories by elucidating that efficiency is majorly a transmission channel and not a boundary state in remote working settings (Hobfoll et al., 2018).

Literature-wise, the findings are consistent with the most recent minipauses that provide superior results in relation to productivity and wellbeing reported in digital-heavy work situations (Albulescu et al., 2022; Wang et al., 2023). The explained variance in the productivity and mental health of employees, which the current study reported, is higher than the explanatory variables accessed in a number of previous studies, implying that the combination of work efficiency increases the level of explanatory power (De Klerk et al., 2024). Besides, the partial mediation effects validate previous recommendations that mechanism research is necessary as opposed to use of direct-effect models only (Radwan et al., 2022). The results are, however, also not in agreement with other studies that have observed inconsistent or task-specific effects of microbreaks, especially when the timing or quality of breaks is less than ideal (Kim et al., 2022). Though previous studies have indicated that efficiency may moderate the relationship between recovery and performance, the current study did not provide any statistical data that efficiency could be acting as a moderator, which aligns with recent findings that focus more on structural mediation than conditional effects (Zacher et al., 2023). This study adds some form of clarity to a body of literature that has been shallow and divided by reconciling nature of supporting and negating views regarding workplace recovery practices.

CONCLUSION

This paper finds that microbreaks are essential in increasing productivity of workers and mental health in a working remote environment. The empirical data show that microbreaks influence the outcome variables in a strong and positive direct way, which proves them to be an effective recovery mechanism in

work conditions that require cognition (Albulescu et al., 2022; Radwan et al., 2022; Wang et al., 2023). Moreover, work efficiency became a strong predictor of productivity and mental wellbeing that became important in implementing recovery practices in translating them into actual work outcomes. These results adhere to recovery and resource-based views as they focus on the benefits of brief breaks to keep performance and psychological well-being intact (Bakker and Demerouti, 2020; Mainsbridge et al., 2020).

Theoretically, the research relates to the theories of an extension of the Conservation of Resources (COR) theory and the Job Demands Resources (JD-R) model because it empirically confirms that work efficiency mediates between microbreaks and employee outcomes in the remote work setting (Hobfoll et al., 2018; Bakker and Demerouti, 2020). In contrast to the previous researches, which concentrate basically on direct relations, the current research implies evidence of partial mediation and, thus, can give a more detailed account of how recovery practices affect performance and wellbeing (Albulescu et al., 2022; Wang et al., 2023). Meanwhile, the lack of moderation effects can advance current theoretical presuppositions, which claim that efficiency is a better process-based mechanism than a boundary condition (Zacher et al., 2023).

The results of this research have significant practical implications to an organization that deals with remote work and hybrid work force. The promotion of organised microbreaks can be a rather inexpensive method of promoting productivity and protecting the mental health of employees (Oakman et al., 2022; De Klerk et al., 2024). The intervening variable of work efficiency supports the importance of an organization to shape the working process enabling employees to transform recovery in efficient work performance, but not focusing on work intensity. The absence of moderation effects warns of overperformance pressure, however, and can sabotage the benefits of microbreaks in the event that efficiency demands are too strict (Kim et al., 2022; Mainsbridge et al., 2020).

FUTURE RESEARCH DIRECTIONS

The current research study needs to be augmented by future studies through solutions to methodological constraints of the cross-sectional design study. Although cross-sectional survey is appropriate in testing the theory, it has constraints in understanding the causality; hence, longitudinal survey or experiment might assist in more profound evidence about how the effects of microbreaks would change with time (Hair et al., 2022; Sarstedt et al., 2022). Experience-sampling or journaling might also be able to gain access to real-time recovery processes and decrease typical method bias (Kline, 2023). Moreover, the empirical rigor might be enhanced through the introduction of the objective measures of productivity and the introduction of the self-reported measures that would neutralize the possible perceptual bias (De Klerk et al., 2024). Multi-wave designs are also proposed in earlier literature on methodological literature as better means of validation of mediation mechanisms based on the recovery and resource theories (Creswell and Creswell, 2018).

Theoretically, the future research design must go beyond Conservation of Resources and JD-R frameworks to incorporate the complimental perspective, e.g. self-regulation theory, effort recovery theory, or cognitive load theory, to interpret individual variation in microbreak efficacy (Bakker and Demerouti, 2020; Zacher et al., 2023). The existing evidence suggests that work efficiency is more of a moderator instead of a Si vis pacem fit, yet the prospective studies have the potential to focus on other moderators, including the difficulty of the performed tasks, the quality of breaks, independence, or the level of digital surveillance (Kim et al., 2022). The previous literature underlines that recovery mechanisms are very context-dependent, so more subtle conceptual elaboration is required to include boundary conditions that shape the relation between recovery and outcomes (Hobfoll et al., 2018).

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