INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 15, Issue 01, (2025) E-ISSN: 2222-6990

Conceptual Framework Development of Employee Productivity among the Employees in Electrical and Electronic Manufacturing Industry

Abdul Mutalib Aziz, Zahir Osman
Open University Malaysia (OUM)

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v15-i1/23479 DOI:10.6007/IJARBSS/v15-i1/23479

Published Date: 04 January 2025

Abstract
This research proposal addresses employee productivity in Malaysia's electrical and electronic (E&E) industry, a key sector that contributes to the nation's economic growth. The study aims to identify and analyse factors influencing productivity from individual and organisational perspectives. Using a quantitative approach, it will examine determinants such as work environment, stress, and training through surveys of employees at all levels. Statistical analysis will explore how these factors impact productivity, focusing on employee engagement as a potential mediator. The findings will offer industry practitioners, policymakers, and academics insights and guiding strategies to enhance workforce productivity and sustainability in the E&E sector.
Keywords: Employee Productivity, Malaysian E&E Industry, Work Environment, Work Stress, Training and Development

Introduction

Low worker or staff productivity is the primary cause of delivery delays in the electrical and electronic (E&E) industrial sectors. This article focuses on worker output and efficiency in the E&E manufacturing sector because it is a labour-intensive industrial sector. It addresses the meanings of the work environment, stress at work, training and development, its viewpoints, and the variables affecting employee productivity through employee engagement as a mediating element. This thesis aims to investigate the factors influencing worker productivity in the E&E manufacturing sector. This review's primary importance lies in pinpointing the critical factors affecting workers' productivity in a manufacturing setting, focusing on the E&E sector. The primary focus of the study is on E&E manufacturing firms with plants situated in Malaysia's Peninsula.

The manufacturing sector is significantly impacted by employee productivity and increased profitability, which results from highly engaged workers who are more attentive, productive, and aware of their surroundings. Research has shown notable correlations between employee productivity and the working environment, work stress, training, and development

in the Malaysian E&E manufacturing sector (Elnaga & Imran, 2013). Improving labour productivity is essential to raising the E&E manufacturing sector's overall performance. In the manufacturing sector, worker productivity and work effectiveness are also influenced by employee engagement (Boadu, Dwomo-Fokuo, Boakye, J. K., & Kwaning, 2014).

Companies in the sector are encouraged to boost production capacity by manufacturing development. As a result, as the industrial sector grows, employees are expected to work more. Excessive work hours can lead to exhaustion, anxiety, and other health issues. Nonetheless, stress at work is a widespread issue that practically all businesses deal with, frequently lowering worker productivity (Elnaga & Imran, 2013).

A toxic work environment fosters negative workplace habits, including bullying, harassment, and job overload. As a result, employees may experience stress, burnout, dissatisfaction, or discomfort. Moreover, personality conflicts hinder employees' ability to stay engaged and productive, regardless of whether they are confrontational or passive/aggressive. This will impact employee productivity. Prompt response is essential since abusive work situations create serious business problems (Boadu, Dwomo-Fokuo, Boakye, J. K., & Kwaning, 2014).

Training and development are essential to increase staff productivity and meet corporate objectives. Because of this, whether or not the training is practical, an organisation must keep an eye on it and respond accordingly. Training and development, which primarily target the profit-driven private sector, are the most significant human resources practices, according to Boadu, Dwomo-Fokuo, Boakye, J. K., & Kwaning (2014). Their goal is to improve employee performance. Additionally, the business can decide what training its staff members require to enhance performance, inspire, and provide them with a sense of fulfilment upon learning new skills or knowledge, particularly regarding their line of work. Elnaga and Imran (2013) assert that employees will be happier with their jobs if they receive more advanced training, boosting the company's profitability and worker productivity.

The Peninsular Malaysian Electric and Electronics (E&E) manufacturing industry will be the focus of this study, which will investigate some factors that determine employee productivity. As well as the mediating effects of commitment on the relationships between work environment and employee productivity, work stress and employee productivity, and training and development programmes on employee productivity, this study investigates the factors that determine employee productivity, including the determinants of work environment, changes in training and development programmes, and changes in work stress. The study starts with this chapter, which includes the history of the study, a statement of the problem, research questions, research objectives, the significance of the investigation, a definition of key terminology, the arrangement of the dissertation, and a conclusion for the chapter. In this investigation, the Albert Bandura, William Khan and Elton Mayo Theories will serve as the foundational theories that will be utilised to assist in evaluating and gaining a deeper comprehension of the numerous factors that influence employee productivity.

Research Objectives

This study explores the relationships between work environment, work stress, training and development, and their impact on employee engagement and productivity among electrical and electronic manufacturing employees in Peninsular Malaysia. Specifically, it seeks to

determine whether these factors positively and significantly influence employee engagement and productivity. Additionally, the study examines the role of employee engagement as a potential mediator in the relationship between these determinants and employee productivity. By analysing these connections, the research provides valuable insights into improving employee engagement and productivity within the Malaysian E&E industry.

Literature Review

Since Malaysia's emergence as an E&E manufacturing hub in 1972, productive and efficient employees have been essential for sustaining industry growth. Employee productivity drives profitability, cost savings, and competitive advantage (Baily, Farrell, Greenberg, Henrich, Jinjo, Jolles, & Remes, 2005; Hill, 2014). Although employee productivity has been widely studied, limited research focuses specifically on Malaysia's E&E sector. Addressing challenges such as the COVID-19 pandemic and rapid technological changes, this review discusses the need for managers to adapt by prioritising human resources, a crucial factor in organisational success (Vatankhah Javid & Raoofi, 2017; Ahmadi, Helms & Ross., 2000). Given the importance of employee engagement for productivity and retention (Markos & Sridevi, 2010), the review explores how engagement mediates the relationship between productivity and its fundamental determinants. Employee involvement increases motivation and output, while disengaged employees often underperform (Richman, 2006; Fleming & Asplund, 2007). Training and development programs strategically boost job satisfaction and performance (Golden & Ford, 2008), an approach particularly relevant in Peninsular Malaysia's competitive E&E landscape.

This study examines how work environment, training, and stress impact employee engagement and productivity. High-stress conditions can lead to mental health issues, while poor management and excessive workloads exacerbate workplace stress. By examining these relationships, the study aims to provide insights that could help E&E firms strengthen employee engagement and productivity. According to a Singh (2020) study, workers are seen as an essential asset to the business, and it might be challenging to keep hold of those who give their best work. Most businesses strive for improved employee performance to achieve staff productivity. However, in the third quarter of 2022, Malaysia's labour productivity increased by 10.15% yearly, compared to a growth rate of 5.52% in the preceding quarter. Then, in June of 2021, the numbers reached an all-time high of 13.40%, while in June of 2020, they reached a record low of -16.01%. It can be seen that there have been abrupt changes in Malaysia's labour productivity as a whole. This would affect employee productivity within the E&E industry as well.

Albert Bandura's social learning theory (training and development), William Khan's theory (employee engagement), and Elton Mayo's theory (employee productivity, work environment, and work stress) are the three main underlying theories that are used in this study. His approach introduced a social component by contending that observing others might teach people new skills and behaviours. This kind of learning, observational learning, can explain a broad range of behaviours, including ones frequently unaccounted for by other learning theories.

Albert Bandura's Social Learning Theory

Albert Bandura's social learning theory (1977) suggests that people learn primarily through observation and imitation rather than solely through direct experiences. He argued that learning can occur simply by observing others' behaviours and guiding future actions (Bandura, 1977). In the workplace, this approach can foster productive behaviours as employees model the positive behaviours they observe. However, Bandura emphasised that social learning requires attention, recall, replication, and motivation (Bandura, 1977). This theory incorporates cognitive and environmental factors, moving beyond behavioural theories that rely on conditioning and cognitive theories that focus solely on psychological processes.

Bandura (1972) identified four essential processes in observational learning: *attention*, *retention*, *motor reproduction*, and *motivation*. Attention involves focusing on and mentally visualising a model's actions; if observers find the behaviour significant, they are more likely to imitate it. *Retention* means that observers must organise and store behaviours in memory for later reproduction, which is essential for behaviours observed over time. *Motor reproduction* refers to the physical ability to perform an observed behaviour and the limitations that may prevent specific actions. Finally, *motivation* impacts whether the observer is willing to replicate the behaviour based on perceived outcomes (Bandura, 1972).

The theory highlights that imitation is most likely to occur if the observed behaviour is rewarded, while behaviours associated with punishment are often avoided (Bandura, 1977). This social element in learning suggests that exposure to role models can foster skill acquisition and positive behaviours even without direct reinforcement, making it valuable for training and development. Additionally, Bandura identified motivational factors such as the drive for achievement and personal growth as intrinsic motivators in the workplace. He noted that job satisfaction, relationships, training, and company policies contribute to productivity and satisfaction, reinforcing that individual and organisational influences shape learning environments.

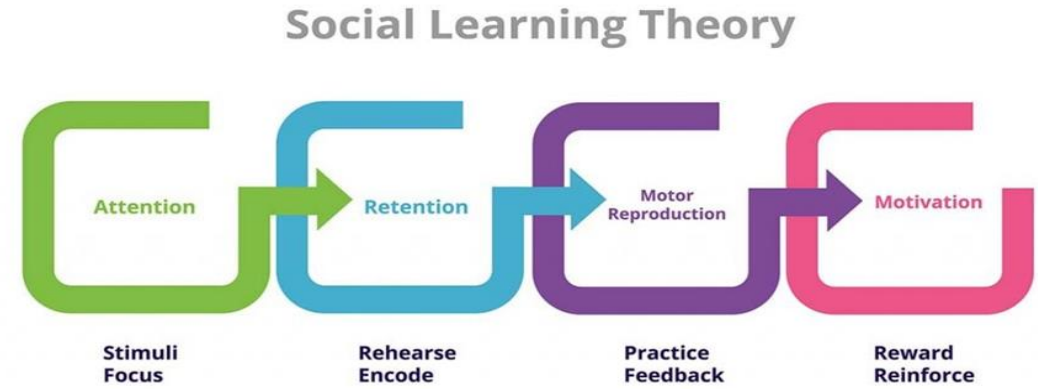

Figure 1: Albert Bandura's Social Learning Theory

Relationship between the theory and training and development: Albert Bandura's concept of self-efficacy—confidence in one's ability to complete tasks—plays a crucial role in learning, as people are more likely to try new things when they believe in their skills. His social learning theory suggests that observing and mimicking others is essential for skill acquisition, a

principle increasingly applied in corporate training today. Companies that offer learning opportunities can attract and retain talent, as workers prioritise growth, with 76% of employees more likely to stay with businesses offering continuous development. This approach also bridges skills gaps by reskilling employees to meet evolving business needs, boosting engagement, adaptability, and innovation.

William Khan's Theory

Kahn's (1990) employee engagement theory emphasises the importance of bringing the "whole person" into the workplace rather than just harnessing specific qualities of a worker. This involves three main elements: meaningfulness, where employees see the value of their work and thus invest more in it; safety, where they feel both physically and psychologically secure; and availability, where they are prepared and capable of performing their roles. Kahn's view suggests that an integrated approach in the workplace leads to greater engagement, with structural changes promoting a more fulfilling work environment where employees contribute at higher standards.

Goal-setting theory, widely applied in various businesses, complements engagement by providing clear, challenging, and well-defined objectives. Practical goals include feedback for improvement, manageable complexity, and commitment that fosters team collaboration. When combined with incentives, goal setting drives consistent, high-quality work by motivating employees with psychological satisfaction and material rewards for achieving their targets. This structure encourages ongoing improvement and supports a culture of continuous high performance.

Relationship between the theory, employee engagement and work environment: William A. Kahn's theory of employee engagement examines three core elements: meaningfulness, safety, and availability, which influence an employee's engagement and well-being. Meaningfulness, or a sense of purpose in work, boosts motivation and commitment, while its absence can lead to burnout. Safety allows employees to express themselves without fearing negative impacts on their status or self-image, fostering risk-taking and initiative. Availability refers to having the physical, emotional, and psychological resources needed to perform well; when support is lacking, employees may feel frustrated and disengaged, making success more challenging.

Theory of Elton Mayo

Elton Mayo's management theories, developed from his Hawthorne experiments, emphasise the importance of social factors like attention, camaraderie, and open communication in motivating employees—over environmental factors or financial incentives (Mayo, 1933). He identified that group dynamics and team cohesion significantly affect productivity. Mayo's matrix explores the impact of group norms and cohesiveness on team effectiveness, with ideal teams displaying high standards and strong cohesion, positively influencing productivity. Conversely, teams with low standards and low cohesion tend to be ineffective, while those with high cohesion but negative norms may harm the workplace (Mayo, 1933).

Mayo's theory underscores business benefits, such as increased reactivity and better employee retention. When employees feel their concerns are heard, management can respond more swiftly to workplace or customer-related issues (Mayo, 1933). Stronger

relationships between managers and employees enhance managerial skills and approachability, positively impacting performance and employee satisfaction. Emotional investment in the company often leads to longer employee tenure, reducing turnover and associated costs (Mayo, 1933). Additionally, Mayo suggested that open communication promotes mental health and reduces burnout by allowing staff to address frustrations, creating a supportive work environment that fosters resilience and morale—especially valuable during challenging periods, such as the COVID-19 pandemic.

Relationship between the theory and employee productivity, work environment and work stress: Elton Mayo's management theory emphasises that social and relational factors are more impactful on employee motivation than financial or environmental incentives, proposing that treating employees as individuals boosts productivity. Known as "Human Relations theories," Mayo's ideas focus on improving job satisfaction, group dynamics, and workplace attitudes through effective communication, recognition, and cooperation. Mayo advocated for managers to address employees' social and personal concerns by fostering open communication, supporting team building, and offering employees a say in working conditions and output standards. This approach remains relevant today, especially in people-centred workplaces like significant tech firms.

Research Methodology

In general, the goal is to determine the impact that a factor or IV (Work environment, work stress, and Training and Development) has on DV (Employee Productivity) via mediating (Employee Engagement). In order to examine and validate the connection between and among the variables studied in the experiment, the primary purpose of this study is to organise research that will use an experimental design. The experimental design's purpose is to eliminate confusion and lessen the amount of ambiguity that exists. The foundation of a genuine experimental design is the testing of the interactions between and among variables; one variable, known as the independent variable, is controlled to identify its impact on other variables, known as the dependent variables.

This study employs the survey research approach to gather uniform data, which is cost-effective, quick, and allows researchers to control participant responses (Malhotra, 2010). Surveys have long been effective for analysing attitudes, behaviours, and beliefs, and they remain the preferred method for measuring employee productivity (Christensen, Johnson & Turner, 2015; Sauer, Holman, Lazar, Hochheiser & Feng, 2010). Surveys are also highly endorsed in organisational research alongside other methods like quantitative, qualitative, and mixed approaches. This study uses a cross-sectional survey field study, collecting data from the target population in one period. While this approach is limited by one-time data collection, it aligns with the study's timeframe and objectives (Christensen, Johnson & Turner, 2015).

The study's experimental design divides employees into control and experimental groups based on natural variations in their work experiences. The control group includes employees not exposed to specific conditions or determinants (e.g., advanced training or new technology), serving as a baseline for comparison. Experimental groups are exposed to these determinants, such as work-induced stress, skill enhancement through advanced training, or upgraded tools, to assess their impact on productivity. Collecting productivity metrics and

demographic data via survey allows for regression analysis in SmartPLS to identify relationships between determinants and productivity. This design offers valuable insights into productivity factors in Malaysia's electrical and electronic manufacturing industry, potentially informing targeted interventions for improvement.

The next phase in this study's conceptual development involved examining relevant ideas and prior research on employee productivity across various industries to build a research framework and hypotheses. During the research design, key steps included developing research instruments, creating a sampling procedure, and conducting pilot testing. The sampling design determined appropriate methods and sample size, while measurement tools were adapted to fit this study's context. A pilot test validated the research instrument, ensuring alignment with the study's goals. Data were later collected from respondents across Malaysia and analysed using SPSS Version 25, with SmartPLS 3 used for hypothesis testing, followed by a presentation and discussion of the findings.

In research, the population represents all individuals relevant to the study, while the sample is the smaller group from whom data are collected. Since collecting data from the entire population is impractical, a representative sample is chosen to ensure the findings are generalisable. Sampling, therefore, selects a study group that reflects the target population—in this case, employees in the Malaysian E&E manufacturing sector, a population too large to study in full. Larger samples typically enhance representativeness but do not guarantee accuracy (Fowler & Lapp, 2019). Due to the lack of a defined sampling frame for E&E employees, nonprobability sampling—specifically purposive sampling—was used, as recommended by Sekaran and Bougie (2016). This approach was necessary due to the absence of comprehensive data on the E&E workforce. The study targeted approximately 618,000 E&E employees on the Malaysian Peninsula, with the sample size determined based on Krejcie and Morgan's (1970) formula for finite populations. According to Bastos Duquia, González-Chica, Mesa & Bonamigo (2014), selecting appropriate data collection equipment is critical to the research process. Using a quantitative research approach, this study aims to investigate causal relationships between independent and dependent variables (Research Guides, 2021). Quantitative research uses methods similar to natural sciences to gather numerical data and objective facts, employing mathematical and statistical techniques to explore causal links (Ahmad, Wasim, Irfan, Gogoi, Srivastava & Farheen 2019). By focusing on objectivity and systematic data collection, this methodology allows researchers to analyse data effectively and draw inferences from representative samples (Albers, 2017; Queirós, Faria & Almeida, 2017).

Quantitative research can be conducted in several different ways. There are three types of surveys: longitudinal, cross-sectional, and descriptive. Trend surveys, panel surveys, and cohort studies are the three categories of longitudinal surveys. The most popular survey design among educational academics is cross-sectional research. To generalise the findings of this survey study, the researcher selected participants who were representative of the target group for which the study was conducted. An example of a research design known as a cross-sectional study gathers information from many individuals from various backgrounds simultaneously. Cross-sectional research designs are employed for the purpose of conducting population-based surveys as well as establishing the degree to which samples of foreign E&E

production are present. In most cases, it is possible to carry out this kind of research quickly and at a minimal cost.

A cross-sectional study collects data from a diverse group at one specific time, analysing it post-collection without altering the variables. This observational design, often used in population surveys, efficiently measures variables within a defined period and with minimal cost. Unlike other studies, cross-sectional research allows data collection only once over days, weeks, or months (Sekaran & Bougie, 2009). It involves representative samples using self-administered survey questionnaires to address research questions (Zikmund, Babin, Carr & Griffin, 2003), and interviews are often the most effective for gathering personal beliefs and attitudes (Kerlinger, Lee & Bhanthumnavin, 2000). This study used Likert scales to quantify various latent constructs, following a common approach in evaluating multiple elements in research (Yin, 1994).

A questionnaire, as defined by Sekaran (2009), is a structured instrument with written questions that respondents answer from a preset range of options. Effective questionnaire design involves clarity and simplicity to ensure respondents understand the questions well (Hennig-Thurau, Gwinner & Gremler, 2002). An optimal response scale is clear, widely understood, easy to interpret, and minimises response bias. Each construct in the questionnaire is operationalised to align with the study's objectives, and the scale selection is guided by the need to measure all hypotheses effectively. The questionnaire's construction follows a three-stage survey development approach by Chen and Paulraj (2004).

In developing the questionnaire, Chen and Paulraj's (2004) method involved adapting and refining metrics from prior studies to fit this study's context. An OUM academic reviewed the questionnaire for clarity and potential ambiguity, then underwent a pilot study with 30 to 40 employees to gather preliminary data and feedback for further refinement (Zikmund, Babin, Carr & Griffin, 2003). The survey uses closed-ended questions on a 5-point Likert scale, a format known to reduce respondent frustration and improve response quality (Babakus & Mangold, 1992; Bouranta, Chitiris & Paravantis, 2009). Section 1 of the questionnaire collects demographic data, while Section 2 focuses on variables like work environment, work stress, training and development, and mediating and dependent variables.

According to Sekaran (2003), validity and reliability are essential tools for assessing the quality of variables measured in research, making careful testing crucial (Mohajan, 2017). In evaluating measurement reliability and validity in PLS models, two primary validity types are convergent and discriminant. Convergent validity indicates indicators reflecting the same construct, measured by Average Variance Extracted (AVE), where an AVE value of 0.5 or higher signifies satisfactory convergence (Fornell & Larcker, 1981; Hair, Ringle & Sarstedt, 2011). Factor loading, a standard method in assessing convergent validity, should ideally exceed 0.7, with standardised loadings signalling convergence and reliability. The reliability and validity of constructs are assessed reflectively, with adjustments made if criteria are not met (Hensler, Ringle & Sinkovics, 2009). The pilot test will confirm reliability and validity through Cronbach's Alpha, a measure of internal consistency commonly used for its reliability (McBurney & White, 2009). Reliability, as defined by Zikmund (2003), includes repeatability and internal consistency, ensuring that measurements are free from random error.

Cronbach's Alpha above 0.7 indicates strong reliability, as Nunnally (1978) suggested, making it a valuable reliability measure.

Evaluating content validity is critical for ensuring an instrument's reliability. As defined by Yaghmaie (2009), content validity measures how accurately an instrument captures the intended construct, which requires careful judgment during the initial stages of development. Face validity serves as a preliminary check, typically carried out by experts, as Sekaran (2003) suggested. Establishing construct validity is essential for confirming an instrument's accuracy in measuring the theoretical construct. Zikmund (2003) notes that construct validity, which verifies alignment with underlying theories, is achieved when there's a consistent correlation pattern with other constructs. This is calculated by summing the squared factor loadings and error variance terms, with a reliability estimate above 0.7 considered reliable (Hair, Ringle & Sarstedt, 2011). Reliability in the 0.6–0.7 range for newer tests can still be acceptable if other validity indices are strong, indicating internal consistency. Researchers use convergent and discriminant validation methods to ensure the accuracy of diverse measurements, confirming that the instrument aligns theoretically and empirically with the intended constructs.

Convergent validity refers to how a newly developed measure correlates with other established measures of similar constructs, indicating that the measure effectively captures the intended theoretical idea (Zikmund, 2003). A strong connection between the new measure and similar assessments confirms its validity. In contrast, discriminant validity is the ability of a measure to show minimal correlation with different constructs, ensuring that it is distinct and unique from others (Zikmund, 2003; Hair, Ringle & Sarstedt, 2011). Discriminant validity can be assessed using confirmatory factor analysis (CFA) and involves comparing average variance extracted (AVE) values; a squared correlation coefficient above 0.85 suggests significant overlap, indicating a lack of discriminant validity, while values below this threshold support the distinctiveness of the constructs being measured.

Following the improvements to the questionnaire, a pilot test was conducted to refine the instrument based on feedback from a small group of participants to enhance its quality and reliability (Blumberg, Cooper & Schindler, 2014). The pilot study occurred in various electrical and electronic (E&E) manufacturing enterprises across Malaysia, gathering responses from 42 participants. This preliminary investigation confirmed that participants understood the questionnaire and could complete it in approximately 20 minutes (Hair, Money, Samouel & Page, 2007). For the main study, the survey will be distributed to 368 E&E enterprises sourced from the Federation of Malaysian Manufacturers (FMM) directory via email, with a personalised cover letter explaining the study and assuring confidentiality. Data collection is expected to occur over three to four weeks, after which the responses will be analysed for insights.

The analysis of survey data will be conducted using SPSS 25.0 and SmartPLS 3.0 software. Descriptive analysis in SPSS will assess the demographic data collected, while frequency counts will quantify the occurrences of various responses. Frequency counting involves classifying data and tallying the number of items within each category. For structural equation modelling (SEM), SmartPLS will be employed to analyse the relationships between constructs. This software offers a user-friendly interface for evaluating the measurement model, which

examines how indicators relate to their constructs, and the structural model, which focuses on the interrelationships among the constructs.

The study utilises the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach due to its advantages over Covariance-based SEM (CB-SEM). PLS-SEM is suitable for new research phenomena and allows the exploration of complex structural models with multiple constructs. This methodology is also beneficial for hypothesis testing and enhances statistical power. The study incorporates the Albert Bandura's, Elton Mayo's and William Khan's Theories and additional factors to improve theoretical understanding and predictive capability. PLS-SEM has previously been used in studies related to employee productivity, validating its appropriateness for this investigation.

SmartPLS 3.0 will simulate the interactions between variables in the data analysis phase, treating all constructs as reflective. The analysis will follow a two-stage approach: evaluating the measurement model and estimating the structural model. The assessment of the structural model will include checking for collinearity issues among predictor constructs, as high Variance Inflation Factor (VIF) values could indicate potential biases in regression outcomes. Aiming for VIF values below three is crucial to ensure the reliability of the analysis, and complex theoretical models can help mitigate collinearity concerns.

The structural model will be evaluated using a bootstrapping technique, which employs nonparametric resampling to test the significance of relationships in the model. This method involves generating bootstrapped samples to estimate standard errors for hypothesis testing. A significance level of 0.05 will be set, with one thousand subsamples utilised for the analysis. The bootstrapping tool in SmartPLS will calculate t-statistics to assess the strength of the paths, providing insights into the relationships among constructs.

To further evaluate the model, various statistics will be calculated, including the coefficient of determination (R^2), effect size (F^2), and predictive relevance (Q^2). The R^2 value will indicate the model's ability to explain variance in the dependent variable, with values above 0.67 considered strong predictors. The F^2 statistic will assess the impact of predictor constructs on the dependent constructs. Finally, the Q^2 value, derived from a blindfolding technique, will evaluate the model's predictive relevance; a Q^2 value greater than zero will indicate significant predictive capability.

Conceptual Framework

The research study conceptualises work environment, training and development, and work stress as independent variables, with employee engagement as a mediator and employee productivity as the dependent variable. A conceptual framework was developed to integrate these theoretical findings and support the central hypothesis of the thesis. This framework illustrates two types of relationships: the direct effects of the three determinants on employee productivity and their indirect effects through the mediator of employee engagement.

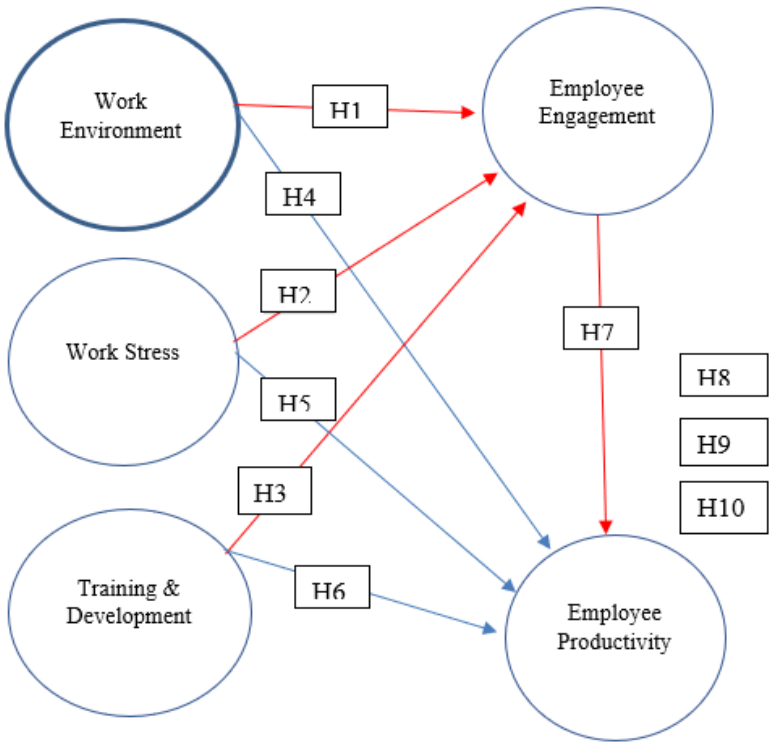

Figure 2: Research Model

Conclusion

This study highlights several key findings regarding the impact of the work environment on employee productivity, particularly in the E&E manufacturing sector. Both physical and non-physical workplace factors were found to significantly influence employees' comfort, motivation, and overall performance. A positive work environment, characterized by supportive coworker relationships and effective management-employee dynamics, was shown to enhance productivity and work quality. Conversely, work stressors such as overload, role ambiguity, and insufficient support emerged as major barriers to productivity. The research also emphasized the importance of training and development programs in helping employees handle non-routine tasks, improving their adaptability and performance. However, the effectiveness of virtual training remains inconclusive, highlighting the need for further investigation. Limitations such as time, financial constraints, and the potential impact of respondent honesty in survey-based research were also acknowledged.Based on these findings, several recommendations are proposed. Organisations should foster a supportive work culture that minimizes stress by providing clear job roles, adequate resources, and effective workload management. Investment in tailored training initiatives, including hybrid models combining virtual and in-person methods, should be prioritized to enhance employee skills and productivity. Additionally, regular assessments should be conducted to identify and mitigate stress-inducing factors in the workplace. Organisations are also encouraged to continuously evaluate the effectiveness of virtual training programs to ensure they align with productivity goals. Future research could explore the longitudinal effects of workplace changes and refine training approaches to address emerging challenges in the manufacturing sector.

This research enhances our understanding of productivity in the electrical and electronic manufacturing sector by examining factors such as organizational culture, leadership styles, employee motivation, and technological advancements. It provides a comprehensive framework that combines both internal and external factors, offering a fresh perspective that fills gaps in previous studies. The findings may challenge or support existing theories, deepening our understanding of the complex dynamics affecting employee productivity. Focusing on Malaysia, a region less studied compared to Western countries, this research provides valuable insights into a key sector driving the nation's economic growth. It uses a mixed-methods approach, ensuring reliable results that are useful for both academics and industry practitioners. The study also offers practical strategies for boosting productivity, such as leadership development, training programs, and technological improvements, providing actionable recommendations for managers and policymakers to strengthen the industry and improve Malaysia's global manufacturing position. Employee productivity and development are enhanced by the theoretical contribution to this study, which motivates workers to take responsibility for their work. These theories can assist managers in determining which organisational components in this E&E manufacturing sector require enhancement. Employees are more likely to work hard to accomplish organisational goals when they are engaged and inspired. Employee trust and optimal performance can be fostered in this E&E production setting by creating a favourable work environment. Employee productivity may suffer in a toxic workplace. The contextual contribution to this study offers information to help better understand how the work environment and stress affect employee productivity and performance. The key to improving performance and establishing a positive work environment is for employees in this E&E manufacturing to have a better awareness of the aspects that affect employee productivity. The ability of employees to contribute to the general well-being of an organisation is referred to as contextual performance, which is a component of employee productivity.

References

Ahmad, S., Wasim, S., Irfan, S., Gogoi, S., Srivastava, A., & Farheen, Z. (2019). Qualitative v/s. quantitative research-A summarized review. Journal of Evidence Based Medicine and Healthcare, 6(43), 2828-2832.

Ahmadi, M., Helms, M. M., & Ross, T. J. (2000). Technological developments: shaping the telecommuting work environment of the future. Facilities.

Albers, M. J. (2017). Quantitative data analysis—In the graduate curriculum. Journal of Technical Writing and Communication, 47(2), 215-233.

Babakus, E., & Mangold, W. G. (1992). Adapting the SERVQUAL scale to hospital services: an empirical investigation. Health services research, 26(6), 767.

Baily, M. N., Farrell, D., Greenberg, E., Henrich, J. D., Jinjo, N., Jolles, M., & Remes, J. (2005). Increasing global competition and labor productivity: Lessons from the US automotive industry. McKensie Global Institute, November 7.

Bastos, J. L., Duquia, R. P., González-Chica, D. A., Mesa, J. M., & Bonamigo, R. R. (2014). Field work I: selecting the instrument for data collection. Anais brasileiros de dermatologia, 89, 918-923.

Blumberg, B., Cooper, D., & Schindler, P. (2014). EBOOK: Business research methods. McGraw Hill.

Boadu, F., Dwomo-Fokuo, E., Boakye, J. K., & Kwaning, C. O. (2014). Training and development: A tool for employee performance in the district assemblies in Ghana. International Journal of Education and Research, 2(5), 513-522.

Bouranta, N., Chitiris, L., Paravantis, J. (2009). The relationship between internal and external service quality. Int J Contemp Hospitality Manage. 21(3):275–293.

Chen, I. J., & Paulraj, A. (2004). Towards a theory of supply chain management: the constructs and measurements. Journal of operations management, 22(2), 119-150.

Christensen, L. B., Johnson, R. B., & Turner, L. A. (2015). Research Methods: Design and Analysis (Trns. Ed. Ahmet Aypay).

Elnaga, A., & Imran, A. (2013). The effect of training on employee performance. European journal of Business and Management, 5(4), 137-147.

Fleming, J. H., & Asplund, J. (2007). Human Sigma. New York; Gallup Press.

Fowler, S. B., & Lapp, V. (2019). Sample size in quantitative research: Sample size will affect the significance of your research. American Nurse Today, 14(5), 61-63.

Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology*, 93(6), 1412– 1421. https://doi.org/10.1037/a0012722

Hair, J. F., Money, A. H., Samouel, P., & Page, M. (2007). Research methods for business. Education+ Training, 49(4), 336-337

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet.

Hanaysha, J. (2016). Improving employee productivity through work engagement: Evidence from higher education sector.*Management Science Letters* , 6(1), 61-70.

Hennig-Thurau, T., Gwinner, K. P., & Gremler, D. D. (2002). Understanding Relationship marketing outcomes: An integration of relational benefits and relationship quality. Journal of service research, 4(3), 230-247.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In New challenges to international marketing (Vol. 20, pp. 277-319). Emerald Group Publishing Limited.

Hill, C., Jones, G., & Schilling, M. (2014). Strategic management: theory: an integrated approach. Cengage Learning

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of management journal*, 33(4), 692-724.

Kerlinger, F. N., Lee, H. B., & Bhanthumnavin, D. (2000). Foundations of behavioral research: The most sustainable popular textbook by Kerlinger & Lee (2000). Journal of Social Development, 13, 131-144.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and psychological measurement, 30(3), 607-610.

Malhotra, D. (2010). The desire to win: The effects of competitive arousal on motivation and behavior. Organizational behavior and human decision processes, 111(2), 139-146.

Markos, S., & Sridevi, M. S. (2010). Employee engagement: The key to improving performance. International journal of business and management, 5(12), 89.

Mayo, A. (2000), "The role of employee development in the growth of intellectual capital", Personnel Review, Vol. 29 No. 4, pp. 521-533, doi: 10.1108/00483480010296311.

McLeod, S. (2011). Albert Bandura's social learning theory. Simply Psychology. London.

Mohajan, H. K. (2017). Two criteria for good measurements in research: Validity and reliability. *Annals of Spiru Haret University. Economic Series*, *17*(4), 59-82.

Nunnally, J. C. (1978). An overview of psychological measurement. *Clinical diagnosis of mental disorders: A handbook*, 97-146.

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and quantitative research methods. European journal of education studies.

Sauer, G., Holman, J., Lazar, J., Hochheiser, H., & Feng, J. (2010). Accessible privacy and security: a universally usable human-interaction proof tool. Universal Access in the Information Society, 9, 239-248.

Sekaran, U. (2003) Research Methods for Business: A Skill-Building Approach. 4th Edition, John Wiley & Sons, New York.

Sekaran, U. & Bougie, R. (2009). Research Method for Business, a Skill Building Approach. Wiley, Singapore.

Sekaran, U., & Bougie, R. (2016). Research methods for business: A skill building approach. john wiley & sons.

Singh, J. P., Chand, P. K., Mittal, A., & Aggarwal, A. (2020). High-performance work system and organizational citizenship behaviour at the shop floor. *Benchmarking: An International Journal*, *27*(4), 1369-1398.

Vatankhah, S., Javid, E., & Raoofi, A. (2017). Perceived organizational support as the mediator of the relationships between high-performance work practices and counter-productive work behavior: Evidence from airline industry. Journal of Air Transport Management, 59, 107-115.

Yaghmaie, F. (2009). Content Validity and Its Estimation. Journal of Medical Education, 3, 25-27.

Yin, R. K. (1994), Case Study Research: Design and Methods, 2nd edn, Thousand Oaks: Sage. Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2003). Research methods. Health economics research method, 2.