UNIVERSITI TEKNOLOGI MARA

THE RELATIONSHIP BETWEEN TECHNOSTRESS CREATORS AND WORK-LIFE BALANCE AMONG EMPLOYEES OF LOCAL COMMERCIAL BANK IN KLANG VALLEY: THE MEDIATING ROLE OF PSYCHOLOGICAL HEALTH

MOHAMMAD AMIR SHAH BIN MOHAMMAD SAIM

PhD

August 2026

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MOHAMMAD AMIR SHAH BIN MOHAMMAD SAIM

Thesis submitted in fulfillment of the
requirements for the degree of
Doctor of Philosophy
(Business Management)

Faculty of Business and Management

August 2026

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 12th November 2025 to conduct the final examination of Mohammad Amir Shah bin Mohammad Saim on his Doctor of Philosophy thesis entitled "The Relationship Between Technostress Creators and Work-life Balance Among Employees of Local Commercial Bank in Klang Valley: The Mediating Role of Psychological Health" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

Halimahton Borhan, PhD
Associate Professor
Faculty of Business and Management
Universiti Teknologi MARA
(Chairman)

Norashikin Hussein, PhD
Associate Professor
Faculty of Business and Management
Universiti Teknologi MARA
(Internal Examiner)

Siti Aisyah Panatik, PhD
Professor
Faculty of Sciences and Humanities
University Teknologi Malaysia
(External Examiner)

PROFESSOR DR HJH ZURAEDA BINTI IBRAHIM
Dean
Institute of Postgraduate Studies
Universiti Teknologi MARA
Date: 27 August 2026

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Name of Student	:	Mohammad Amir Shah bin Mohammad Saim
Student ID. No.	:	2019479435
Programme	:	Doctor of Philosophy (Business Management) – BA950
Faculty	:	Business and Management
Thesis Title	:	The Relationship Between Technostress Creators and Work-life Balance Among Employees of Local Commercial Bank in Klang Valley: The Mediating Role of Psychological Health
Signature of Student	:	
Date	:	August 2026

ABSTRACT

The rapid digitalization of the banking sector has intensified employee exposure to technology, creating a pressing need to understand its profound impact on workforce well-being. This study examines the relationship between technostress creators and work-life balance among executive-level employees at local commercial banks in the Klang Valley, Malaysia, and evaluates the mediating role of psychological health. Despite growing concerns, a critical knowledge gap exists regarding how an integrated theoretical framework that synthesizes Work-Family Border, Job Demands-Resources, Conservation of Resources, and Transaction theories explains the psychological mechanisms by which specific technostress creators disrupt work-life balance in the Malaysian commercial banking sector. To address this gap, sixteen hypotheses were tested using quantitative data collected via an online questionnaire distributed to bank executives. A final sample of 402 valid responses was analyzed. Analysis was conducted utilizing IBM SPSS (v.25) and Partial Least Squares Structural Equation Modelling (PLS-SEM) to assess measurement and structural models. Of the sixteen hypotheses, fourteen were supported, confirming that psychological health acts as a significant mediator across technostress creators. However, the direct effect of techno-overload on work-life balance and techno-uncertainty on psychological health were unsupported. This unexpected finding strongly suggests that high digital workloads and systemic technological shifts have become heavily normalized within contemporary banking culture. These findings extend technostress literature into the Southeast Asian banking environment and offer actionable insights for human resource policies, providing a strategic foundation for developing targeted digital workload management, strong mental health support systems, and proactive work-life balance interventions.

ACKNOWLEDGEMENT

First and foremost, I thank Allah SWT for bestowing me the strength, patience and perseverance necessary to go on and accomplish this profound yet difficult trip. This PhD journey has been fraught with periods of uncertainty, tiredness, tears of despair when the road seemed unending, and tears of gratitude when light finally broke through the gloom. I am here only because of His unending mercy and guidance, having accomplished what seemed impossible then.

I would like to express my greatest appreciation to my supervisor, Professor Dr. Wan Edura binti Wan Rashid, and my co-supervisors, Associate Professor Dr. Siti Noorsuriani binti Ma'on. I am deeply grateful for your invaluable insights, unwavering encouragement, and faith in my abilities. Your words often encouraged me in my worst moments, and I shall be eternally thankful. I'd also like to thank the respondents who generously offered their time, experiences, and knowledge, frequently going above and beyond to help me in ways I'll never be able to repay. Your willingness to participate in this research was the foundation of its success. I owe everything to my beloved family, including my parents, and siblings, who taught me the values of hard work, perseverance, and their unfailing faith in me.

This thesis represents not only years of research but also numerous sacrifices, sleepless nights, and moments when I felt as though I was pouring my entire soul into these pages. It holds the weight of every difficulty I encountered, every prayer whispered in despair, and every drop of effort I gave when I believed I had nothing left. Tears sully it, yet it brims with hope. This accomplishment is not just mine; this thesis is dedicated to the loving parents of my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both you and for my special and loving person it is yours, for every sacrifice you made, every time you believed in me, and every stride you took beside me. This is for you and the dreams you've instilled in me.

Alhamdulillah.

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LIST OF ABBREVIATIONS

Abbreviations

COR	Conservation of Resources
HBM	Health Belief Model
JR-D	Job Demands-Resources
PLS	Partial Least Squares
SEM	Structural Equation Model
SLR	Systematic Literature Review
SPSS	Statistic Package for The Social Science
TO	Techno-overload
TI	Techno-invasion
TC	Techno-complexity
TIN	Techno-insecurity
TU	Techno-uncertainty
WLB	Work-life Balance
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background of The Study

The rapid advancement of digital technologies has fundamentally reshaped contemporary work practices, particularly through the integration of mobile devices, digital platforms, and real-time communication systems. While technology is often framed as a productivity enhancing enabler (Choi et al., 2011; Sarabani et al., 2020), this perspective tends to understate its paradoxical effects on employees. Increased technological reliance has intensified job demands, accelerated work pace, and dissolved traditional boundaries between work and personal life, thereby creating new forms of strain.

From a theoretical standpoint, this phenomenon can be understood through the dual nature of technological integration, where technology functions as both a resource that enhances efficiency and a demand that increases workload and cognitive strain. However, existing literature has predominantly emphasized the resource-enhancing aspect of technology, while insufficiently examining its demand-inducing consequences, particularly in high-pressure sectors such as banking. This imbalance hinders a comprehensive understanding of how digital transformation impacts employee well-being.

The banking sector, characterized by high-performance expectations, continuous customer interaction, and strict regulatory requirements, presents a critical context in which these dynamics unfold. Prior studies have linked such environments to elevated levels of stress, burnout, and turnover intention (Hauk et al., 2019; Kalandatzis & Hyz, 2021; Khalid et al., 2020). Nevertheless, much of this research remains conceptually broad, often attributing employee strain to macro-level factors

such as economic crises, while overlooking the micro-level mechanisms through which technology-driven demands affect employees' psychological states.

Although technostress has been widely examined, existing empirical evidence remains fragmented across sectors such as education, libraries, and general private organizations (Jena, 2015; Tan, 2019; Kupersmith, 1992). These contexts differ significantly from the banking sector in terms of technological intensity, performance metrics, and service delivery expectations, thereby limiting the generalizability of findings. Moreover, prior research tends to treat technostress, psychological health, and work-life balance as separate constructs, rather than examining their interdependent relationships within a unified framework.

The mediating role of psychological health remains underexplored despite its critical function in translating external stressors into individual outcomes. Technostress is likely to arise when a misfit occurs between technological demands and employees' capabilities, leading to psychological strain that subsequently disrupts work-life balance. However, this mechanism has not been sufficiently tested within empirical studies, especially in sector-specific and culturally embedded contexts.

Within Malaysia, the urgency of this issue is amplified by the rapid digital transformation of the banking sector, which plays a pivotal role in national economic development. Employees are increasingly required to adapt to evolving technologies, maintain constant connectivity, and meet escalating performance expectations (Tan et al., 2025; Kitsios et al., 2021). Despite these challenges, empirical research focusing on technostress within Malaysia's banking sector remains limited, with a lack of in-depth investigation into how these pressures affect employees' psychological health and work-life balance.

More critically, there is a notable absence of integrative studies that simultaneously examine technostress creators, psychological health as a mediating mechanism, and work-life balance outcomes within local commercial banks, particularly in Klang Valley. This gap not only constrains theoretical development but also limits the formulation of targeted organizational interventions to address technology-induced strain.

Therefore, this study seeks to address these limitations by developing and empirically testing an integrated framework to examine the relationships among technostress creators, psychological health, and work-life balance among employees

in Malaysia's commercial banking sector. By situating the analysis within a specific industrial and countrywide context, and by incorporating a multi-dimensional theoretical approach, this study contributes to both theory and practice by offering a contextually grounded understanding of employee well-being in the era of digital banking.

1.2 Problem Statement

Work-life balance has become a critical global issue as modern employees increasingly struggle to maintain equilibrium between occupational responsibilities and personal life. A healthy balance between career demands and personal time is widely recognised as a key determinant of employee well-being. However, the rapid increase of work demands driven by digital technologies has significantly disrupted the balance between work and life. Recent evidence indicates that excessive working hours and technology-mediated job demands are strongly associated with increased stress, declining mental health, and reduced well-being (Dee et al., 2020; Blanco-Donoso et al., 2023). This concern is further reinforced by global labour trends, where approximately 10% of employees work 50 hours or more per week, reflecting a persistent culture of overwork across economies, alongside increasing digital connectivity that extends work beyond traditional hours (Organisation for Economic Co-operation and Development, 2020; International Labour Organization, 2022; Eurofound, 2023).

Amplifying this borderless overwork, worldwide organisations are increasingly pressured to maintain operational efficiency, rapid responsiveness, and continuous service delivery through digital technologies. Although technological advancement enhances productivity and organisational competitiveness, it simultaneously increases employee exposure to techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. The growing reliance on digital systems has led to the emergence of technostress, characterised by constant connectivity, information overload, continuous technological adaptation, and increasing dependency in daily work operations. Employees are often expected to remain digitally connected beyond formal working hours, respond immediately to work-related communications, and continuously adapt to evolving technological systems. Consequently, work demands increasingly extend into employees' personal

lives, reducing opportunities for psychological recovery. Prolonged exposure to these technology-driven demands leads to anxiety, fatigue, emotional exhaustion, and reduced psychological well-being, contributing to burnout as a severe occupational phenomenon resulting from chronic workplace stress (World Health Organization, 2022; World Health Organization & International Labour Organization, 2021; Kivimaki et al., 2015; Ahmad & Mahajan, 2026; Gaudioso et al., 2021).

This technological pressure is most significantly felt in the commercial banking sector. The adoption of digital banking platforms, automation systems, artificial intelligence-driven operations, cybersecurity compliance mechanisms, and real-time service delivery has significantly increased job complexity and workload. Employees are now required to manage continuous digital connectivity, frequent system updates, multiple digital platforms, and high customer expectations simultaneously (Bank Negara Malaysia, 2023; Kitsios et al., 2021). Financial institutions continue to strengthen digital transformation initiatives and operational resilience to remain competitive within an increasingly technology-driven financial environment. While these developments improve organisational efficiency, they simultaneously intensify employees' need for continuous technological adaptation. Preliminary evidence reveals that banking employees frequently remain accessible beyond formal working hours to respond to emails, system alerts, operational issues, and customer requests under tight deadlines, resulting in extended working hours, emotional strain, mental fatigue, and heightened vulnerability to psychological distress (Molino et al., 2022; Califf et al., 2023).

Reflects the overall weakness of this industry on a national scale, the severity of this issue is becoming increasingly evident in Malaysia, particularly within urban and service-intensive industries. Kuala Lumpur and the Klang Valley have been ranked among the poorest cities globally for work-life balance, where employees frequently experience long working hours, work intensification, and rising psychological strain (Hariati Hazizan & Dina Murad, 2020; Dorai et al., 2026). Recent reports from the Department of Statistics Malaysia (DOSM, 2023) further indicate that Malaysian employees continue to experience extended working hours and increasing job demands, especially in service-oriented sectors. Generally, Malaysia is facing a quiet workforce crisis, evidenced by the Malaysian Well-being Index 2024's decline and a staggering surge in employee burnout escalating from 58% in 2022 to 67% in

2024 due to poor work-life balance. Within the financial sector, this crisis is acutely intensified by Bank Negara Malaysia's 2024 mandates for aggressive AI and digital transformation. While these advancements optimize institutional efficiency, they paradoxically trap employees in a relentless, 24/7 "always-on" work culture. Prolonged exposure to these conditions contributes to increasing levels of stress, burnout, emotional exhaustion, increased turnover intentions, declining job satisfaction, and difficulties in maintaining a sustainable workforce within the nation's banking industry.

Despite these growing regional and professional challenges, critical gaps still exist in the literature. A turning point between 2024 and 2026 has exposed a widening chasm between the rapid speed of digital banking and human psychological strength. The core problem is that technological invasion has outpaced empirical research: digital banking demands are systematically eroding employees' psychological health, yet research examining the relationship between technostress and work-life balance remains limited, particularly within the Malaysian banking sector. Most existing studies focus on non-banking industries or Western contexts, which may not adequately reflect Malaysia's highly regulated, service-intensive, and digitally driven banking environment (Tarafdar et al., 2019; Ramadevi & Nagimi, 2014). Furthermore, limited attention has been given to the role of psychological health as a mediating mechanism, despite its critical function in translating external stressors into individual outcomes (Shah et al., 2024; Bakker & Demerouti, 2017). Existing studies tend to examine technostress and work-life balance separately, leaving the mediating role of psychological health under explored as an explanatory mechanism within the sector-specific and culturally embedded banking context.

To achieve this objective, this study develops and empirically tests an integrated framework designed to investigate the direct and indirect relationships between technostress creators, psychological health, and work-life balance among employees in Malaysia's commercial banking sector. By focus the investigation on commercial banks within the Klang Valley, this study captures critical, context specific insights from a highly regulated and technologically intensive work environment. Utilizing a multi-dimensional theoretical approach, this study expands existing knowledge by clarifying how contemporary digital stressors translate into psychological outcomes and balance disruptions. Finally, these findings deliver

immediate practical value for financial institutions by guiding the development of strategic mental health interventions, sustainable human resource management policies, and healthy digital work practices tailored to the demands of the digital banking era.

1.3 Research Gaps

Despite the growing global and local evidence highlighting the negative implications of technology-driven work demands on employee well-being, four critical gaps remain in the literature:

First, the empirical representation of the commercial banking sector remains severely limited, creating a distinct disconnect between observed workplace challenges and evidence-based organizational models. While existing technostress research has largely concentrated on non-banking sectors such as education, libraries, and general corporate environments, it fails to account for the uniquely intense operational ecosystem of contemporary banking. This sector operates under four specific compounding conditions: intense customer-facing digital obligations, strict requirements for real-time transaction accuracy, rigid regulatory compliance, and a total operational dependence on uninterrupted technology. Because previous studies lack comprehensive empirical models that link workplace outcomes directly to technostress within a single analytical framework, the current literature fails to capture how these severe, high-stakes banking conditions collectively accelerate employee burnout and work-life imbalance.

Second, current research within the Malaysian context tends to adopt broad, cross-sectoral perspectives that fail to capture the industry-specific realities of digital banking transformation. As local financial institutions rapidly transition toward advanced digital platforms and fintech-driven ecosystems, employees face continuous system updates, real-time performance monitoring, and mandatory constant connectivity. However, these localized, industry-specific operational pressures remain heavily underexplored in empirical studies, resulting in a critical lack of locally grounded evidence that reflects the modern digital banking landscape in Malaysia.

Third, prior literature frequently examines technostress and work-life balance as isolated constructs, leaving the underlying explanatory mechanism underexplored.

There is a distinct lack of integrative research explaining why and how technological demands actively translate into balance disruptions. Psychological health specifically rather than broad organizational attitudes like job satisfaction or employee engagement serves as the primary internal translation mechanism because it captures the direct cognitive and emotional erosion caused by chronic stressors (Kristensen et al., 2005). Grounded in the conceptual lens of resource depletion, technology functions as an aggressive demand that drains an individual's psychological reserves; without adequate recovery, this severe internal strain directly impairs an employee's capacity to maintain equilibrium between professional duties and personal life.

Fourth, Current research is mostly based on Western organizations, which fails to consider how Malaysian culture shapes the workplace. The reliance on Western frameworks overlooks how a collectivist and high-power-distance environment shapes employee stress responses through three specific cultural mechanisms: the structural tendency toward internalizing stress to maintain group harmony, hierarchical discouragement that prevents open communication regarding workload struggles, and high-power distance amplifying the perceived personal and professional costs of failing to remain constantly available. The absence of context-specific studies addressing these cultural dynamics severely limits the applicability and generalizability of international findings to Malaysia’s corporate environment.

To address these distinct empirical and conceptual omissions, the specific focus and direction of this investigation are explicitly detailed in Section 1.4 (Research Objectives).

1.4 Research Objectives

The main purpose of the current study is to investigate the relationship between technostress creators and the balance of life and work among local commercial banks of workers in the Klang Valley, with psychological health as a mediator. To provide a comprehensive and structured overview of the study's framework, the research objectives are categorized into specific clusters based on the relationships between the main variables. When all these relationships are expanded, it results in a total of sixteen specific objectives. This allows the study to provide a more

detailed and accurate analysis. Specifically, several combined research objectives have been developed, as detailed below:

a) RO1-RO5: To examine the relationship between technostress Creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance.
b) RO6-RO10: To examine the relationship between technostress Creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and psychological health.
c) RO11: To examine the relationship between psychological health and work-life balance.
d) RO12-RO16: To examine the mediating effect of psychological health on the relationship between technostress creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance.

Based on research objective above, the direct baseline relationship testing the impact of the five individual technostress creators on work-life balance yields the first five hypotheses (Hypotheses 1 to 5). Second, evaluating relationship how these same five distinct technostress creators with the mediator, psychological health, generates another five hypotheses (Hypotheses 6 to 10). Third, testing the direct pathways from the single mediating variable of psychological health to the dependent outcome of work-life balance establishes one hypothesis (Hypothesis 11). Finally, examining the indirect pathways where psychological health serves as a mediator between each of the five technostress creators and work-life balance produces the remaining five hypotheses (Hypotheses 12 to 16).

1.5 Research Questions

In alignment with the research objectives, the specific research questions of this study are categorized into distinct clusters based on the structural paths of the conceptual framework. Accordingly, the following combined research questions have been formulated:

i) RQ1-RQ5: what is the relationship between technostress Creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance?

ii) RQ6-RQ10: what is the relationship between technostress Creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and psychological health?

iii) RQ11: what is the relationship between psychological health and work-life balance?

iv) RQ12-RQ16: does psychological health mediate between technostress Creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance?

1.6 Significance of The Study

This study demonstrated the critical relationships between technostress creators, psychological health, and work-life balance within the highly digitalized banking environment. By investigating these dynamics, the study provided dual-fold contributions that are both theoretically significant to academic literature and practically actionable for the banking industry.

1.6.1 Practical Significance

For practical significance, particularly within the Malaysian commercial banking sector, the findings of this study offered crucial insights to enhance operational efficiency, employee well-being, and overall organizational performance.

- Digital Workload Management and Policy Formulation: By revealing that psychological health fully mediates the relationship between technostress creators and work-life balance, this study provided a actual empirical basis for human resource (HR) departments to design targeted interventions. Specifically, the unexpected finding that techno-overload did not directly impact work-life balance highlighted a critical culture of normalization of high digital workloads among banking executives. This insight warned management that while employees may seem to tolerate heavy digital demands, their psychological health is quietly being depleted. Consequently, this study

assisted HR policymakers in recognizing the urgent need to establish "Right to Disconnect" policies and digital boundaries.

- Proactive Well-being Interventions: The study provided actionable guidance for bank managements to move beyond generic wellness programs. It demonstrated that mitigating specific technostress creators, such as techno-invasion and techno-uncertainty, is essential to protecting employees' psychological health. Organizations can utilize these findings to develop structured workload management strategies, digital stress-reduction initiatives, and increase mental health support systems, thereby reducing turnover intentions and fostering a healthier, more productive workforce.

1.6.2 Prospective of Theoretical

Theoretically, this study advanced the existing literature by addressing the fragmented nature of technostress and well-being research through an integrated theoretical framework:-

- Integration of Multi-Disciplinary Theories: Rather than relying on a single theoretical lens, this research successfully synthesized Work-Family Border Theory, Job Demands-Resources (JD-R) Theory, Conservation of Resources (COR) Theory, and the Transaction Theory of Technostress. By integrating these theories, the study established a more comprehensive conceptual model that explains not just if technostress affects work-life balance, but how and why through the cognitive and psychological pathways of the employee.
- Elucidating the Explanatory Mechanisms: Guided by the Transaction Theory of Technostress and COR Theory, this study empirically demonstrated how constant digital demands act as draining job demands that deplete valuable cognitive and emotional resources. It clearly illustrated that when these resources are threatened or exhausted, an individual’s psychological health deteriorates, which impairs their ability to direct the shifting borders between work and personal domains (consistent with Work-Family Border Theory).

16.3 Policy Significance

From a policy standpoint this research offers crucial empirical evidence to support the development of national labour and institutional frameworks in the era of digital banking. The findings serve as a direct response to modern regulatory mandates such as aggressive digital and artificial intelligence transformation objectives by highlighting the human costs associated with a 24/7 "always-on" corporate culture. By providing locally grounded data from the commercial banking sector in the Klang Valley, this study gives regulatory bodies, including Bank Negara Malaysia and the Department of Statistics Malaysia, a clear reference point to evaluate current workplace well-being indices. Thus, these insights can guide the formulation of balanced guidelines that mandate institutional operational resilience while simultaneously regulating technological invasion to protect worker welfare on a national scale.

1.7 Scope of Study

As Malaysia was plagued by a quiet workforce crisis characterized by escalating employee burnout and deteriorating work-life balance due to rapid digital transformation, this study aimed to examine the detrimental effects of technostress creators within the high-pressure financial sector. Despite the psychological strain happening nationwide, commercial banks in Malaysia continued to aggressively accelerate digital banking and AI mandates, trapping employees in a relentless "always-on" work culture. Thus, the present study aimed to examine how contemporary technostress creators influenced employees' work-life balance to inform targeted organizational interventions and promote healthy digital work practices among Malaysian bankers. Banking stakeholders, particularly human resource strategists and policymakers, could use the research findings as an input to foster sustainable workforce management.

First, the relationship among the five dimensions of technostress creators, namely techno-overload, techno-invasion, techno-complexity, techno-insecurity, and

techno-uncertainty, was studied in relation to employees' work-life balance. To bridge the literature gap and explain the underlying mechanism, psychological health was added as a mediating variable to investigate how these external technological demands were internalized and translated into individual well-being outcomes.

The scope of this study was restricted to local commercial banking institutions to ensure structural and cultural homogeneity, thereby eliminating external confounding variables arising from disparate global operating frameworks. Respondents for data collection consisted of active employees working in any of the eight (8) locally incorporated commercial banks who were stationed within the Klang Valley, as this urban financial centre exhibited the poorest indices for work-life balance. Online questionnaires were distributed to the target respondents via digital channels due to post-pandemic institutional security restrictions. Following strict data screening and the removal of one extreme outlier, the final data from 402 valid respondents were analysed through SmartPLS software for Partial Least Squares Structural Equation Modelling (PLS-SEM) alongside IBM SPSS version 25 to verify the hypotheses.

1.8 Definition of Key Terms

Below are some of the definitions used for this research:

Table 1.1
Definitions of key terms

Banking sector	The banking sector is an important institution in the national financial system, serving as the primary mobilizer of funds and the main source of financing for economic activities, investment, and national economic development (World Bank, 2024)
Work-life balance (WLB)	Work-Life Balance refers to the individual achievement of an acceptable equilibrium between the competing domains of professional work and personal life (Clark, 2000). Achieving this balance is generally recognized as essential for maintaining overall psychological well-being. Operationally, a successful balance between work and family responsibilities is indicated by high self-esteem, satisfaction, and a pervasive feeling of harmony across life roles.

Technostress creators	Technostress, as any adverse effects caused either directly or indirectly by technology on attitudes, thoughts, behaviors, or body physiology (La Torre et al., 2019)
Techno-Overload (TO)	Techno-overload refers to the condition in which the use of information systems forces professionals to work more and work faster, systematically increasing the volume and pace of occupational tasks (Tarafdar et al., 2011).
Techno-Invasion (TI)	Techno-invasion refers to the condition in which professionals can potentially be reached anywhere and anytime, creating a persistent pressure to remain continuously connected beyond formal working hours (Tarafdar et al., 2011).
Techno-Complexity (TC)	Techno-complexity refers to the condition in which the intricate nature of information systems forces professionals to spend excessive time and effort learning and understanding how to use new applications (Tarafdar et al., 2011).
Techno-Insecurity (TIN)	Techno-insecurity refers to the condition in which users feel threatened about losing their jobs to individuals who possess a better understanding or superior mastery of new information systems (Tarafdar et al., 2011).
Techno-Uncertainty (TU)	Techno-uncertainty refers to the condition in which continuous changes and frequent upgrades to information systems prevent professionals from developing a stable, long-term base of experience with a specific application (Tarafdar et al., 2011).
Psychological Health (H)	Psychological Health refers to a state of mental well-being that enables individuals to cope with life stresses, realize their abilities, and work productively (World Health Organization, 2022). Operationally, in alignment with Kristensen et al. (2005), this construct is evaluated through behavioural and symptomatic indicators of cognitive fatigue, emotional exhaustion, and tension. By tracking these dimensions, the study captures the internal strain experienced by bank employees when their psychological reserves are eroded by technostress creators

1.9 Organization of The Remaining Chapters

This proposed study is organized into five distinct chapters. Chapter One introduces the foundational framework by outlining the background of the study, the statement of the problem, the specific research objectives and questions, the practical and theoretical significance of the research, and the operational definitions of key terms.

Chapter Two reviews the extensive literature regarding technostress, work-life balance, and psychological health, incorporating a previously published systematic literature review that conceptualizes the relationship between these constructs based on prior empirical works. This chapter also establishes psychological health as the critical mediating mechanism and evaluates the four underpinning theoretical lenses that guide the study, namely Work-Family Border Theory, the Transaction Theory of Technostress, Job Demands-Resources (JD-R) Theory, and Conservation of Resources (COR) Theory.

Expanding into the empirical execution, Chapter Three describes the detailed methodology utilized in this research, which includes the research design, target population, sampling technique, sample size determination, unit of analysis, data collection procedures, and instrument development, alongside the data analysis approach leveraging IBM SPSS version 25 and Partial Least Squares Structural Equation Modelling (PLS-SEM).

Following this, Chapter Four reports the comprehensive data analysis and preliminary findings, presenting the respondent response rates and the statistical interpretations necessary to address all formulated research questions.

Finally, Chapter Five discusses the empirical results by contextualizing the relationships between technostress creators, psychological health, and work-life balance among employees of local commercial banks in the Klang Valley, before concluding with the practical and theoretical implications, limitations, and strategic recommendations for future research.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In addition to using literature review to analyze the research conducted, in this chapter the researcher also used systematic literature review (SLR) and bibliometric analysis (Vosviewer) to find the trend of the variables and relationship items between the variables. The primary benefit of the SLR is that it provides a broad overview of a field of study, identifies gaps in the literature, and uses its results to persuade the intended audience (Marzi et al., 2025). Study in SLR used Meta-Analyses (PRISMA) to ensure transparency in the selection and evaluation of studies. The selected databases for conducting the SLR are ProQuest, Web of Science, Emerald Insight, and UiTM Library. For bibliometric analysis, SCOPUS and Web of Science were used. Bibliometrics is a method broadly applied to draw a big picture in the literature review. Who (Authors), What (Keywords), Where (Location), When (Year of Publication), and With Whom (Professional Network) are the first questions that need to be answered (Jing et al., 2024). To see the relationship between the important elements of research topics (authors, keywords, location, year of publication, and other professional networks) that support the analysis, bibliometrics can be incorporated into the SLR process (Jing et al., 2024).

The variables involved in this study are discussed in this chapter of literature review. It is presented into several sections, mainly with the first section which is Systematic literature review (SLR) is 2.2. Then, bibliometric analysis Vosviewer 2.3; Next, the researcher presented the dependent variable of this research (work-life balance) which is discussed in Section 2.4 and the independent variable of this research (technostress creators) is discussed in Section 2.5. Next, the relationship between technostress creators and work-life balance is discussed in Section 2.6.

Next, the current literature review on psychological health is discussed in Section 2.7. Technostress creators and psychological health variables in this study are discussed in Section 2.8. Next, psychological health towards work-life balance is discussed in Section 2.9. Psychological health as a mediator variable is discussed in

Section 2.10 Followed by Section 2.11, the researcher highlights the underpinning theories in this study. Four theories are discussed respectively in Section 2.12 (Work-family border theory), Section 2.13 (Transaction theory of technostress creators), Section 2.14 (Health believe model), Section 2.15 (Job Demand Resources JR-D Model), and Section 2.16 (The conservation of resource COR theory).

The penultimate section in this Chapter Two illustrates the proposed conceptual framework of this study in Section 2.17. The researcher highlights the development of hypotheses in this study in the last section 2.18.

2.2 Systematic Literature Review (SLR) Between Technostress and Work-Life Balance

To establish a highly reliable and clear foundation for this relationship, this section presents a systematic literature review (SLR) that connects established procedural frameworks with targeted academic evidence. First, the SLR protocol which follows the strict guidelines of (Paul & Barari, 2022; Paul & Criado, 2020) and (Liberati et al., 2009; Parola et al., 2024) for visual PRISMA flow chart shown in Figures 1 and 2 maps out how 1,300 initial records were screened down to 31 directly relevant quantitative studies. This review process builds upon the published work of Saim et al. (2021) in the Romanian Journal of Information Technology and Automatic Control, giving the study a verified academic baseline. However, while the SLR is excellent for showing these search metrics, database numbers, and broad industrial trends, a deeper narrative analysis is needed to address the presentation issues in past summaries. Therefore, this section refines the review findings to eliminate repetitive arguments and clearly highlight the missing links in current literature, such as the over-reliance on direct-effect models. By combining the rigorous structure of the SLR with a focused narrative synthesis, this section explains the exact theoretical gaps, proving why it is essential to study psychological health as a mediator between technostress and work-life balance for commercial bank employees in the Klang Valley.

The search strategy targeted empirical studies published between 2000 and 2018 across major electronic databases, including ProQuest, Web of Science, Emerald Insight, and the UiTM Library. Using Boolean operators, the search combined specific

keywords such as "technostress creators" AND "work-life balance." To ensure high data quality, the inclusion criteria were strictly restricted to English-language, quantitative studies focusing specifically on working populations. Through this systematic screening process, the initial pool of 1,300 documents was filtered down to 120 eligible papers resulting in final studies that directly addressed the link between technology-driven stress and work-life conflict.

The findings from these 120 studies indicate that research on this topic spans multiple industries, including banking, information technology, manufacturing, and library services. However, a major limitation in the existing literature is that most studies focus heavily on job satisfaction, organizational commitment, and employee performance, rather than evaluating work-life balance as a primary focus. This trend proves that work-life balance is frequently treated as a secondary or indirect variable, leaving a gap in our understanding of how digital tools directly disrupt personal life boundaries.

Furthermore, the review highlights a clear methodological imbalance in past research. Approximately 95% of the reviewed studies rely entirely on quantitative survey designs, with very few utilizing qualitative or mixed-method approaches. While these survey designs are useful for identifying general patterns, this heavy reliance on quantitative metrics limits our ability to capture the complex, everyday psychological strain experienced by employees as they try to manage constant technological demands.

In terms of specific factors, the literature consistently identifies work overload, ICT complexity, constant connectivity, role ambiguity, and poor organizational support as the primary technostress creators. These factors are heavily linked to negative workplace outcomes such as severe stress, burnout, job dissatisfaction, and work-family conflict. However, existing research largely examines these variables in isolation, and they are rarely brought together into a single, unified framework that explains the complete process of employee strain.

Consequently, this study directly addresses these identified theoretical, methodological, and contextual gaps. By shifting away from isolated, direct-effect models, this research explicitly positions psychological health as a critical mediating variable between technostress creators and work-life balance. Testing this integrated framework among local commercial bank employees in the Klang Valley provides a

more complete, context-specific understanding of how modern professionals survive in highly digitalized work environments.

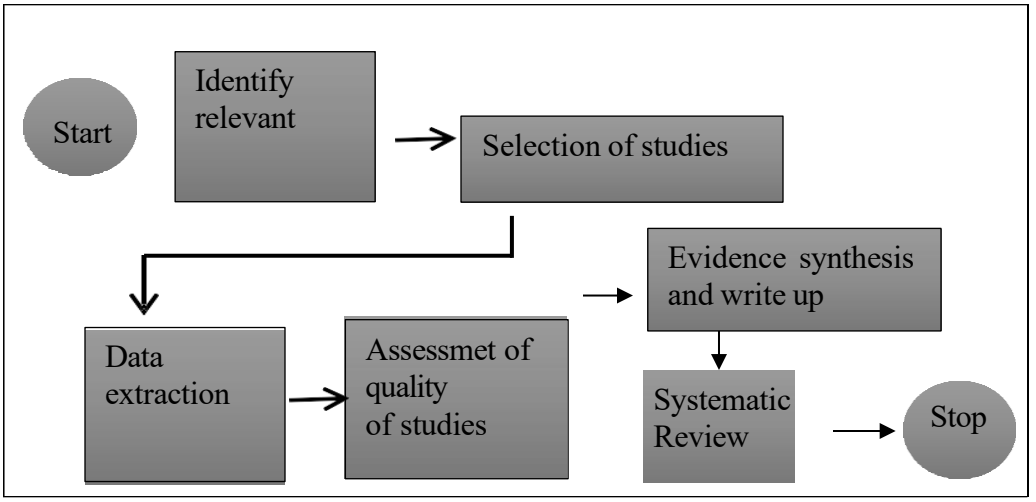

Figure 2.1: Stages in a Systematic Review Process

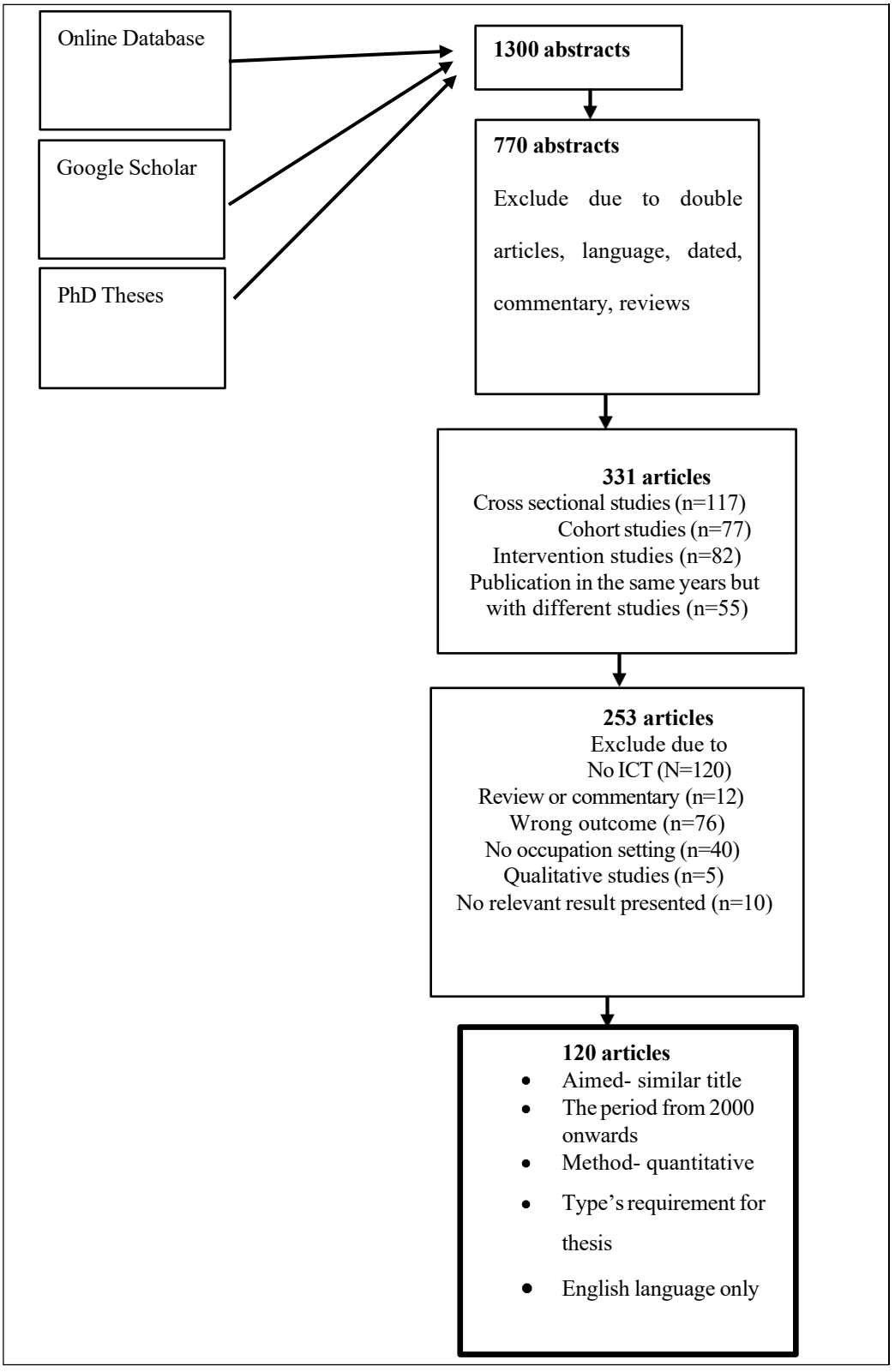

Figure 2.2: PRISMA collection method flow

In conclusion, this systematic literature review (SLR) is incorporated into the study for several vital reasons regarding research quality and objectivity. Unlike traditional literature reviews that can be subjective or biased in selecting articles, this SLR provides a transparent, structured, and replicable method to map out the exact state of current research. By using the rigorous PRISMA framework, this approach systematically filters a large pool of 1,300 documents down to the 120 most relevant studies, ensuring that the theoretical gaps identified, such as the over-reliance on direct-effect models, are based on verifiable empirical evidence rather than assumptions. Furthermore, the exceptional quality and academic validity of this specific SLR process are strongly proven by its prior publication in a peer-reviewed journal (Saim et al., 2021). Last but not least, utilizing this SLR serves as a high-quality diagnostic tool that scientifically justifies the necessity of this study, proving exactly where past literature has fallen short and explaining why it is critical to investigate psychological health as a mediator within the Klang Valley banking sector**.**

2.3 Bibliometric Analysis (Vosviewer)

The study of bibliometrics uses a quantitative method to examine scientific publications and research endeavours. This approach gathers information from publications, including citations, articles, and scientific journals, and then examines the information to identify pertinent trends (Ragadhita & Nandiyanto, 2024; Buele & Guerra, 2021). Furthermore, the performance of researchers, institutions, or nations in a certain scientific topic can be compared using bibliometric data. This data can help funding organizations and researchers better to allocate resources, identify possible partners, and comprehend the dynamics of research across disciplines. In Vosviewer technique, this method finds information on publication articles by journal name, author, country of origin, type and content. The majority of academic disciplines view "articles" published in respectable journals as more significant than conference papers, reviews, or book chapters because journal articles are usually subjected to a more stringent peer review process, are more widely accessible, and are more likely to be cited by other researchers, all of which greatly enhance the researcher's academic reputation (Mahajan et al., 2024).

Arici et al. (2019), cited articles that include scientific information, sophisticated techniques (document co-citation analysis, co-occurrence, co-authorship, bibliography) and citation. Besides, general descriptive statistics like publishing journals, publication year, and main author classification are included (Wu & Wu, 2017). For an effective literature review, bibliography construction with trustworthy results render for iterative sequence of appropriate keywords, literature search, and analysis (Fahimnia et al., 2015). Adoption of search terms, preliminary screening of search results, and refinement of search results are covered in the next section.

High-quality journals are those that have the Clarivate Analytics Journal Citation Reports (JCR) impact factor (Meier, 2011). Hence, the study tried to restrict to top-tier publication as they may assist in understanding the theoretical perspective regarding the evolution of research domain. Additionally, books and conference proceedings were excluded in favour of only articles published in thoroughly peer-reviewed, high-quality academic journals to ensure the inclusion of top-tier publications (Liu et al., 2015). In contrast to Elsevier's Scopus, WoS has had extensive coverage since 1990. Although there are many journals in Scopus, only recent works have an influence (Aghaei Chadegani et al., 2013).

This study used the Vosviewer as an application or bibliometric method for the variable technostress and work-life balance. In addition, this method is also used for the relationship between technostress and work-life balance, but for psychological health as a mediator, there are no documents found in Scopus or WOS. Nowadays, the document variable psychological health as mediator is not much studied by researchers. In December 2024, the researcher retrieved from this bibliometrics to find new information or techniques for this study. To begin with, the researcher studied using Vosviewer or bibliometrics techniques for each variable first. First, technostress variable; second, the work-life balance variable; third, psychological health variable and finally, the relationship between the variables.

2.4 Work-Life Balance

To present a complete and clear understanding of the variable, this section bridges a wide-angle bibliometric summary using Vosviewer with a classic narrative literature review on work-life balance. First, the Vosviewer mapping (detailed in

Appendices G, H, I, and J) outlines the global evolution of the literature, which reached an all-time high of 124 papers in 2024. This visual tool highlights the major thematic groups in the field, showing how the research focus moved from basic job requirements toward modern agile working conditions. Even so, while Vosviewer is excellent for clustering large datasets, a standard literature review is required to explain the actual personal and operational boundaries of employees. Therefore, this section connects these visual trends with a deep analysis of past studies, looking closely at how individuals protect their personal lives today. Bringing together the data-driven insights from Vosviewer and the conceptual depth of the literature review clearly highlights the current research gaps, proving why it is vital to examine work-life balance among commercial bank employees in the Klang Valley.

2.4.1 Bibliometric Analysis for Work-life balance

The bibliometric mapping and visual outputs from Vosviewer (Appendices G, H, I, and J) clarified the structural evolution of the work-life balance literature while exposing several critical theoretical, conceptual, and contextual gaps that required urgent empirical investigation.

In 2024, 124 papers highlighted that managing work-life boundaries transformed from a temporary, crisis-driven necessity into a permanent institutional priority essential for daily workforce sustenance. The compilation process across six-word clusters further conceptualized these dynamics. The heavy concentration on variables like employee retention, job burnout, human resource management, workload, and turnover intention (Clusters 1 & 3) reflected the harsh operational realities of modern work environments. Concurrently, the prominence of remote working, flexible working, gender equality, and working conditions (Clusters 2 & 5) highlighted the strategic shift toward agile operating models. Finally, the emergence of micro-stressors such as childcare, work intensification, and stress (Clusters 4 & 6) proved that structural organizational demands directly spilled over into personal and parental domains. Integrating these visual bibliometric trends with deeper literature revealed four supporting research gaps.

Work-life balance had been widely studied, most traditional research primarily examined conventional stressors such as absolute workload, organizational support,

and general job satisfaction, while severely neglecting contemporary, technology-driven stressors like technostress (Pothuganti, 2024). This created a distinct theoretical gap in integrating technostress directly within established work-life balance frameworks. As established in the preceding section, the literature frequently focused on direct outcomes rather than explaining the underlying psychological mechanisms, leaving an incomplete, fragmented understanding of exactly how technostress structurally disrupted and influenced an employee's work-life balance (Ragu-Nathan et al., 2008; La Torre et al., 2019; Wang & Yao, 2025).

Next, the existing body of work-life balance literature in relation to technological strain remained highly concentrated within developed economies, while empirical evidence originating from developing countries like Malaysia remained relatively limited (Kumar, 2024; Nazri et al., 2024). In high-pressure service industries such as banking, technological innovations drastically optimized operational efficiency and corporate service delivery; however, they simultaneously increased employees' vulnerability to continuous digital demands, system complexity, and heightened performance pressures (Gomber et al., 2018; Lee & Shin, 2018). As a direct result, banking employees increasingly experienced severe strain, systematically compromising their ability to maintain a healthy work-life balance (Tarafdar et al., 2019; Alkhayyal & Bajaba, 2024).

Besides, this lack of integration was visibly validated by the Vosviewer density mapping (Appendix I). While foundational concepts like COVID-19 and general job satisfaction resided within highly saturated, bright yellow zones, the darker, low-density peripheral zones pinpointed under-explored areas. Specifically, the direct structural intrusion of technology-driven demands into personal life and parental configurations remained poorly understood, verifying a distinct void in empirical literature regarding how modern professionals protected their personal lives from intensive digital spillovers.

Finally, in Appendix J the overlay visualization mapping proved that the evolution of the field rapidly changed. While early research boundaries (Adisa et al., 2023) were preoccupied with rigid, traditional system management, much of the recent literature remained heavily shaped by temporary, pandemic-related remote working conditions. Insufficient scholarly attention was directed toward the current post-pandemic hybrid work environment, where continuous digital engagement transitioned into a

permanent, institutionalized feature of professional life (Salzmann-Erikson et al., 2024).

In summary, this bibliometric synthesis highlighted a vital paradigm shift. Work-life balance research migrated away from standard structural labor policies toward a dynamic focus on psychological resilience and digital-era boundary negotiation, proving that maximizing technological infrastructure must be balanced.

2.4.2 Overview of Work-life balance

Work-life balance has been conceptualized in the literature from multiple but partially overlapping perspectives. Early definitions emphasize work-life balance as the alignment between work and non-work roles guided by individual values and priorities (Greenhaus et al., 2003; Greenhaus et al., 2012; Haar, 2013; Capitano & Greenhaus, 2018). More recent scholarship extends this conceptualization by framing work-life balance as a subjective perception of compatibility between work and life domains in relation to personal goals and well-being outcomes (Gragnano et al., 2020). This evolution reflects a theoretical shift from time-based segmentation toward psychological and perceptual balance. However, recent evidence suggests that despite this conceptual advancement, work-life balance remains inconsistently operationalized across studies, limiting comparability and theoretical accumulation (Charalampous et al., 2023; Cazan et al., 2024).

In the literature, work-life balance is variably conceptualized as the absence of work-family conflict (Clark, 2000; Arham et al., 2019), a multidimensional life satisfaction construct (Bird, 2006; Veenhoven, 2009), or an outcome of flexible work arrangements (Gajendran & Harrison, 2007; Tan, 2019). This inconsistency creates conceptual fragmentation, where work-life balance is simultaneously treated as both a process and an outcome. Empirical evidence further shows mixed findings regarding flexible work practices: while remote and hybrid work arrangements may enhance autonomy and flexibility, they may also intensify boundary blurring and role interference, particularly in high ICT dependent environments (Charalampous et al., 2023; Derks et al., 2014). Recent post-pandemic studies similarly highlight that digital work intensification does not automatically improve work-life balance but may

instead exacerbate strain depending on organizational expectations and employee control (Cazan et al., 2024).

This contradiction becomes more pronounced when examining the role of technology. Communication technologies are widely reported to improve connectivity, efficiency, and perceived family accessibility, thereby supporting work-life integration (Abeynaike, 2012; Fujimoto et al., 2016; Wahla & Awan, 2014). However, recent empirical findings indicate that constant connectivity and after-hours digital engagement may significantly increase psychological strain and reduce recovery time and pose a serious risk of undermining work-life balance (Stephen et al., 2024; Wang et al., 2023). This duality confirms that technology effects are not inherently positive or negative, but are contingent upon usage intensity, organizational culture, and individual coping capacity.

Within this context, technostress has been increasingly recognized as a critical explanatory construct. Technostress creators refer to stressors arising from the excessive and continuous use of ICTs, including techno-overload, techno-invasion, and techno-complexity (Raisiene & Jonusauskas, 2013). However, recent literature shows that technostress research remains fragmented, with limited differentiation among its dimensions and insufficient integration into broader theoretical models (La Torre et al., 2020; Zhang, 2023). While technostress is consistently associated with negative outcomes such as burnout, reduced productivity, and work-family conflict, recent studies emphasize that its effects are highly context-dependent, particularly in digitally intensive work environments such as banking and remote service sectors (Bakker & Demerouti, 2023; Marsh et al., 2024).

However, the relationship between technostress and work-life balance is not consistently linear. While several studies confirm that technostress negatively affects work-life balance through increased work-family conflict and emotional exhaustion (Derks et al., 2014; Harris, 2014; Wang et al., 2023), other evidence suggests that ICT usage may enhance coordination, autonomy, and efficiency under certain organizational conditions, thereby improving perceived balance (Fujimoto et al., 2016; Charalampous et al., 2023). Over the years, progress in information correspondence technologies made it possible to collect, store, or transmit information that can help employees to perform their tasks beyond regular working hours, thus positively affecting the organizations' performance. Technostress creators is a problem arising

from daily and excessive use of technology, which harms the employees' health, work efficiency, and life quality (Raisiene & Jonusauskas, 2013). This inconsistency highlights a critical theoretical gap: the absence of a mediating psychological mechanism that explains how technostress translates into different work-life balance outcomes.

On the whole, three key limitations emerge from the literature. First, conceptual ambiguity persists in the definition and measurement of work-life balance, despite increasing recognition of its multidimensional nature (Gragnano et al., 2020; Cazan et al., 2024). Second, technostress research remains fragmented and predominantly descriptive, with limited integration of its sub-dimensions into unified explanatory models (La Torre et al., 2020; Zhang et al., 2023). Third, and most critically, psychological health is consistently underexplored as a mediating mechanism, despite strong theoretical justification from recent studies showing its central role in linking digital stressors to employee well-being and work outcomes (Stephen et al., 2024; Kumar, 2024).

2.5 Technostress Creators

To build a strong foundation for this study, this section combines two approaches: a macro-level bibliometric analysis using Vosviewer and a traditional literature review. First, the Vosviewer analysis (shown in Appendices C, D, E, and F) maps out the general trend of technostress research globally and locally. It shows how the field grew from only 11 articles in 2015 to a peak of 113 publications in 2024, highlighting Malaysia's strong position in this research area. However, while Vosviewer is useful for visualizing these numbers and trends, it cannot explain underlying theories and concepts. Therefore, this section connects those visual trends with a detailed literature review. By looking closely at foundational theories, especially the early work of Tarafdar et al. (2022), this review explores the specific parts of technostress creators, such as techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. By combining the data from Vosviewer with the in-depth information from the literature review, this paragraph sets up the framework to highlight the critical gaps in current research. This highlight

the urgency of studying how technostress creators affect the psychological health and work-life balance of commercial bank employees in the Klang Valley.

2.5.1 Bibliometric Analysis for Technostress Creators

The bibliometric mapping and visual outputs from Vosviewer (Appendices C, D, E, and F) clarified the structural evolution of the technostress literature while exposing several critical theoretical, contextual, and situational gaps that justified the need for this empirical investigation.

The chronological publication path, which increased from 11 articles in 2015 to a peak of 113 publications in 2024, proved that technology-induced stress transitioned into a developed, stable, and permanent field of study essential for navigating the global digital transformation era. Supported globally by high-tech economies like the United States and China, and locally by Malaysia's prominent footprint (ranking 7th with 42 articles), this body of knowledge carried high academic validity. Most of the research was peer-reviewed and published across leading behavioral and psychological journals, such as Computers in Human Behavior. Furthermore, the foundational work of pioneer scholars, led by Tarafdar et al. (2022), continued to serve as the dominant theoretical baseline for modern studies in managing workforce stressors. Critically, integrating these visual bibliometric trends with a deeper literature review revealed four fundamental research gaps that underpinned the urgency of this study.

Firstly, although the bibliometric analysis highlighted a growing body of research on technostress, prior studies extensively examined the direct effects of technostress on organizational outcomes such as job burnout, job performance, and general well-being, while paying limited attention to understanding the underlying mechanisms through which these effects occurred (Ayyagari et al., 2011; Tarafdar et al., 2019). Psychological health was too frequently treated merely as an ultimate outcome rather than an active mediating factor. This omission left a severe theoretical gap in explaining the psychological processes that linked technostress creators to employees' work-life balance (Ragu-Nathan et al., 2008; La Torre et al., 2019; Wang & Yao, 2025). Furthermore, while work-life balance appeared frequently across the

co-word clusters (Clusters 2 & 3), it was rarely integrated within a comprehensive framework that simultaneously included specific technostress dimensions and psychological mediators (Pothuganti, 2024).

Secondly, remaining studies were heavily concentrated in Western and developed contexts, leaving fewer empirical investigations conducted in developing countries such as Malaysia (Tarafdar et al., 2022). More seriously, there was a distinct lack of context-specific research focusing on high-pressure, technology-intensive service domains like the banking industry, where digital transformation was exceptionally aggressive (Daud, 2025). Within the Klang Valley, acting as a major economic and financial hub, employees in local commercial banks became particularly in danger to these stressors due to accelerated digitalization and a heavy reliance on financial technologies.

Thirdly, the urgency of this study was further amplified by the ongoing industrial transformation driven by the Fourth Industrial Revolution (IR4.0), which emphasized the integration of advanced digital technologies like artificial intelligence (AI), big data analytics, and automation into organizational processes (Schwab, 2017; Sima et al., 2020). In the banking sector, the emergence of financial technology (fintech) innovations significantly reshaped traditional service delivery, operational efficiency, and customer engagement (Lee & Shin, 2018; Gomber et al., 2018). While these advancements enhanced corporate productivity, they simultaneously increased job complexity, enforced continuous connectivity, and heightened the pressure to rapidly adapt to evolving technological systems (Ayyagari et al., 2011; Tarafdar et al., 2019). Furthermore, the density visualization (Appendix E) indicated that while traditional systems were well studied, latest AI-driven systems in the workplace were associated with heightened cognitive demands and psychological strain among employees, creating a low-density peripheral gap when technological changes outpaced individual coping capacities (La Torre et al., 2019; Asad et al., 2026).

Lastly, the overlay visualization mapping (Appendix F) proved that while recent literature focused heavily on technostress during the COVID-19 pandemic, particularly in temporary remote work settings, there remained a limited understanding of technostress in the subsequent post-pandemic environment characterized by hybrid work arrangements and sustained digital dependency (Salzmann-Erikson et al., 2024). Employees were no longer adapting temporarily;

instead, they were expected to continuously operate in high-tech environments, shifting technostress from a situational crisis into a persistent, chronic organizational issue.

Therefore, this study was necessary to address these critical gaps by examining the relationship between technostress creators and work-life balance, while incorporating psychological health as a mediating variable among employees of local commercial banks in the Klang Valley.

2.5.2 Overview of Technostress Creators

Technostress creators has been widely conceptualized as a negative psychological and physiological response resulting from individuals' dependence on information and communication technologies (ICTs), manifesting in attitudes, cognition, behaviour, and physical strain (Rosen & Weil, 2002; La Torre et al., 2019). Early conceptualizations of technostress viewed the phenomenon as a modern adaptation disorder arising from individuals' inability to cope effectively with rapidly evolving computer technologies and digital work demands (Rohwer et al., 2022; Pirkkalainen et al., 2019). This foundational view framed technostress as an individual's inability to adjust to technological change, with a focus largely on psychological adjustment.

However, more recent scholarship has shifted conceptualization from an individual deficiency perspective toward a work-design and organizational demand perspective. For instance, Sarabadani et al. (2020), define technostress creators as organizationally induced pressures arising when employees are required to continuously adopt and utilize ICTs to enhance task performance. This shift reflects a theoretical transition from "technology anxiety" to "technology-induced job demand", aligning technostress more closely with workplace stress models such as the Job Demands-Resources (JD-R) framework (Tarafdar et al., 2022; Bakker & Demerouti, 2023). Nevertheless, this conceptual evolution is not fully consistent across the literature, as some studies still treat technostress as a personal inability to use technology effectively (Jena, 2015), while others emphasize structural and organizational drivers of stress (Salo et al., 2018; Stich et al., 2019).

This conceptual inconsistency extends to how technostress outcomes are measured and interpreted. A substantial body of research focuses on its negative

consequences, including reduced job satisfaction, performance decline, lower productivity, and weakened organizational commitment (Jena, 2015; Sarabadani et al., 2020; Wang et al., 2023). However, these studies often treat technostress as a direct antecedent of outcomes without distinguishing between different dimensions of technostress creators. In contrast, Salo et al. (2018) and Stich et al. (2019), demonstrate that technostress is not a unidimensional construct but varies depending on technology type (e.g., social media, email, smartphones) and context of use. Recent systematic reviews further confirm that failure to distinguish these dimensions reduces explanatory accuracy in technostress models (La Torre et al., 2020; Pothuganti, 2024). This suggests that findings across studies may not be directly comparable due to differences in operationalization.

Furthermore, empirical evidence on technostress remains contextually fragmented. While early studies treated technostress as a general workplace phenomenon, more recent research highlights its intensified effects in digitally saturated environments where employees are expected to maintain constant connectivity (Hung et al., 2011; Burchell, 2015; Cazan et al., 2024). This boundary less work environment has blurred the distinction between work and non-work life, reinforcing the relevance of technostress in work-life balance discussions. However, despite increasing recognition of its importance, technostress research remains heavily concentrated in IT and general organisational settings, with limited sector-specific investigation in high-pressure service industries such as banking (Choi, 2026).

A key contradiction in the literature lies in the dual effects of technology. On the one hand, ICT usage is associated with improved efficiency, communication, and productivity. On the other hand, excessive connectivity has been linked to emotional exhaustion, cognitive overload, and work intrusion into personal life (Bayer et al., 2015; Derks et al., 2014). This paradox suggests that technology functions as both an enabler and a stressor depending on the intensity of use, organisational expectations, and employee autonomy. Supporting this, Yerkes-Dodson Law indicates that moderate levels of stress may enhance performance, while excessive or insufficient stress leads to performance decline (Le, & Nguyen, 2026; Lauren et al., 2015). However, recent technostress literature still largely assumes linear relationships and has yet to fully integrate curvilinear or threshold-based effects into empirical models (Bakker & Demerouti, 2023).

Another critical limitation concerns how technostress creators are conceptualised. The dominant framework identifies five dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty (Ragu-Nathan et al., 2008; Tarafdar et al., 2022). While this multidimensional model is widely accepted, many empirical studies collapse these dimensions into a single composite construct, thereby limiting the ability to identify which specific stressor exerts the strongest influence on employee outcomes. This oversimplification reduces theoretical precision and weakens the explanatory power of technostress models, particularly when examining indirect effects on psychological health and work-life balance outcomes (La Torre et al., 2020; Pothuganti, 2024).

Overall, three major gaps emerge from the literature. First, there is a persistent conceptual divide between technostress as an individual limitation versus an organisationally induced demand, resulting in inconsistent theoretical grounding. Second, methodological approaches often fail to differentiate between technostress creators, leading to measurement ambiguity across studies. Third, most important, existing research largely neglects psychological health as a mediating mechanism through which technostress influences employee outcomes, despite strong theoretical support from JD-R and Conservation of Resources (COR) theory (Bakker & Demerouti, 2023; Pansini et al., 2023). This is particularly critical in explaining variability in employee responses to digital stressors.

Therefore, there is a clear need to move beyond descriptive associations and develop a more integrated, mechanism based framework that captures both the structural (ICT demands) and psychological (employee coping and health) dimensions of technostress. This is especially relevant in contemporary digitally intensive workplaces such as banking institutions, where employees are exposed to continuous connectivity, performance monitoring, and customer responsiveness demands. Addressing these gaps will allow for a more nuanced and context specific understanding of how technostress creators operate and how technostress also influence work-life balance outcomes through psychological pathways.

2.5.2.1 Techno-Overload

Techno-overload has been widely conceptualised as a technostress creators that compels employees to work faster and handle increased workloads due to intensive use of information and communication technologies (ICTs), particularly in digitalised work environments (Tarafdar et al., 2011). Early conceptualisations positioned techno-overload primarily as a productivity and workload pressure phenomenon, where ICT usage increases job demands beyond employees' cognitive and temporal capacity. However, contemporary literature extends this definition beyond workload acceleration to include cognitive disruption, attentional fragmentation, and information saturation caused by continuous digital communication flows (Fischer et al., 2019; Marsh et al., 2024).

Recent empirical evidence further reinforces that techno-overload is not merely a function of increased task volume but also arises from constant connectivity, excessive messaging, and multi-platform communication systems that create cognitive strain and emotional fatigue (Nel, 2025; ScienceDaily, 2024). This aligns with recent findings that digital workplace environments generate "technology intensity," where employees experience overwhelm due to simultaneous demands from multiple ICT systems (Marsh et al., 2024). However, despite this expansion in conceptual understanding, the literature remains inconsistent in distinguishing whether techno-overload should be interpreted as a workload issue, cognitive overload, or information management failure, indicating a lack of theoretical convergence.

A key contradiction in the literature lies in the dual role of technology as both an enabler and a stressor. While ICTs are designed to enhance efficiency, coordination, and productivity, empirical studies consistently show that they simultaneously increase work pace, extend working hours, and blur work-life boundaries (Tarafdar et al., 2011; Hung et al., 2011; Derks et al., 2014). This contradiction has been described as a "productivity stress conflict," where technological advancement does not necessarily reduce workload but instead redistributes cognitive burden onto employees. Recent studies further confirm that hyperconnectivity creates a persistent sense of obligation to respond immediately, leading to psychological strain and reduced recovery time (Bayer et al., 2015; Marsh et al., 2024).

From a cognitive perspective, techno-overload is strongly grounded in human information processing limitations. Classic cognitive theories argue that individuals have finite attentional and memory capacity (Jones et al., 2004; Kirsh, 2001). However, modern ICT environments continuously exceed these limits by generating simultaneous streams of information across emails, messaging systems, and mobile applications. This has resulted in what recent studies describe as "digital cognitive overload," where employees struggle to filter and prioritise relevant information (Cognitive overload studies, 2023-2024). Despite this, many empirical studies still fail to explicitly integrate cognitive load theory into technostress models, limiting theoretical depth.

Empirical research also highlights that techno-overload is strongly associated with extended working hours, boundaryless work conditions, and work-life conflict. Mobile and digital communication technologies have created an "always-on" work culture where employees are expected to remain responsive beyond official working hours (Jeffrey et al., 2014; Hung et al., 2011). Recent evidence further supports that digital work intensity significantly increases emotional exhaustion and reduces well-being due to continuous interruptions and lack of disengagement from work systems (Marsh et al., 2024). However, most of these studies rely on cross-sectional designs, limiting causal inference and failing to capture long-term psychological adaptation mechanisms.

A major theoretical gap is that techno-overload is frequently treated as a uniform construct rather than a context-dependent phenomenon. Existing literature rarely differentiates how techno-overload varies across industries, job roles, and technological infrastructures. This is particularly important in high-pressure sectors such as banking, where employees simultaneously manage multiple digital banking platforms, customer service systems, and compliance technologies. Despite this complexity, limited empirical studies have focused specifically on banking employees in emerging economies, resulting in a significant contextual research gap.

Another critical limitation is the oversimplification of techno-overload within broader technostress frameworks. Although multidimensional models exist, many studies aggregate techno-overload into a composite technostress score, thereby masking its unique explanatory power. This reduces construct validity and limits understanding of which specific ICT demands most strongly influence employee

psychological outcomes. Furthermore, although JD-R theory suggests that excessive job demands deplete psychological resources, empirical studies rarely test psychological mediators such as stress appraisal, emotional exhaustion, or mental fatigue, resulting in a weak explanation of the mechanism linking techno-overload to work-life balance outcomes.

Overall, three key gaps are evident. First, there is a conceptual inconsistency in defining techno-overload as workload pressure, cognitive overload, or information saturation. Second, methodological limitations persist due to reliance on self-reported, cross-sectional designs and composite measurement approaches. Third, and most pointedly, there is a lack of integration of psychological mechanisms that explain how techno-overload translates into work-life imbalance and employee well-being deterioration.

Therefore, there is a critical need for a more integrated and context-sensitive framework that incorporates both ICT-related job demands and psychological health mechanisms. This is particularly relevant in digitally intensive organisational settings such as commercial banking in Malaysia, where employees are exposed to continuous connectivity, high performance expectations, and customer responsiveness demands. Addressing these gaps will contribute to a more refined understanding of techno-overload as a multidimensional stressor influencing employee psychological health and work-life balance outcomes.

2.5.2.2 Techno-Invasion

Techno-invasion has been consistently identified as one of the most critical dimensions of technostress because it reflects the erosion of boundaries between work and personal life. It describes a condition in which professionals can be reached at anytime and anywhere, and consequently feel compelled to remain continuously connected to work-related technologies such as smartphones, email, and digital communication platforms (Tarafdar et al., 2011; Lei & Ngai, 2014). Ibrahim and Yusoff (2015), further explained that techno-invasion occurs when users perceive that technology has excessively penetrated their personal lives, creating a sense that they are never truly free from work demands. While early studies conceptualised techno-

invasion primarily as constant connectivity, more recent studies extend this view by framing it as a form of psychological boundary violation, in which employees experience reduced autonomy over their personal time, emotional space, and ability to detach psychologically from work (Tarafdar & Davidson, 2018). Recent evidence further supports this argument by showing that digital hyperconnectivity has become a post-pandemic norm, where employees experience techno-strain due to constant availability expectations, making it increasingly difficult to switch off from work and preserve work-life boundaries (Marsh et al., 2024; Bencsik & Juhasz, 2023; Sadaf et al., 2025). This indicates that techno-invasion is not merely about technology usage frequency, but rather about the perceived loss of control over work-life boundaries.

However, the literature presents notable inconsistencies regarding how techno-invasion is measured and interpreted across contexts. For example, Tarafdar et al. (2011), measured techno-invasion through indicators such as after-hours work communication, inability to disconnect during vacations, and constant smartphone monitoring, whereas Hung et al. (2011), emphasised organisational expectations of permanent availability, particularly through mobile communication technologies. In contrast, Kumar et al. (2013), suggested that some employees initially perceive continuous connectivity positively, believing it improves flexibility and time management. This creates a contradiction in the literature: technology connectivity is simultaneously viewed as a productivity enabler and a work-life disruptor. Recent findings by Sadaf et al. (2025), confirmed that techno-invasion has a significant negative relationship with work-life balance and that psychological distress partially mediates this relationship, yet employee resilience can buffer some of these effects. Similarly, Bencsik and Juhasz (2023), found that technostress dimensions significantly reduce employees' work-life balance and organisational satisfaction. This suggests that the consequences of techno-invasion are not universally negative but may depend on contextual variables such as organisational support, resilience, job autonomy, and coping strategies. Despite this, many earlier studies continue to treat techno-invasion as a universally harmful stressor without sufficiently testing these moderating conditions.

This issue is particularly significant in the banking sector, where employees are often expected to maintain rapid responsiveness to clients, managers, and institutional systems beyond formal working hours. Official emails and banking

applications are frequently synchronised with personal smartphones, allowing work responsibilities to penetrate family time, weekends, and public holidays. Such conditions intensify work-family conflict and reduce employees' opportunities for psychological recovery. Recent evidence from banking employees in Tamil Nadu found that technostress significantly affects job satisfaction, employee well-being, and workplace outcomes, confirming that high digital dependency in banking environments creates stronger psychological strain compared to less technology-intensive sectors (Vijayalakshmi & Arulkumar, 2024). Similar findings were reported by Aghaei and Savari (2023), who found that continuous work connectivity in financial service sectors increases emotional exhaustion and weakens boundary control. However, most empirical studies on techno-invasion remain concentrated in Western corporate settings, IT industries, or general service sectors, with limited attention given to banking employees in developing economies such as Malaysia. This creates a contextual gap because banking institutions operate under strict regulatory compliance, performance pressure, and digital surveillance systems, which may intensify techno-invasion differently from other sectors.

Furthermore, prior studies have largely examined techno-invasion as a direct predictor of burnout, job dissatisfaction, and psychological strain, while insufficient attention has been given to its indirect influence through work-life balance mechanisms. This represents a theoretical limitation because employees do not experience stress outcomes in isolation; rather, techno-invasion may first disrupt work-life balance, which subsequently deteriorates psychological well-being, job satisfaction, and organisational commitment. Without examining this mediating process, existing scholarship explains what outcomes occur but not how these outcomes emerge. Fieseler et al. (2014), argued that employees are gradually socialised into accepting constant connectivity as normal, yet the long-term consequences of this normalisation remain underexplored. More recent studies similarly confirm that psychological distress acts as a key mechanism linking techno-invasion and reduced work-life balance, but this pathway remains under-tested in sector-specific settings such as banking (Sadaf et al., 2025; Marsh et al., 2024). Therefore, the absence of sector-specific mediation models limits both theoretical development and practical intervention strategies.

Therefore, the current literature remains fragmented in its conceptualisation, inconsistent in its measurement, and limited in contextual application. There is a clear need for further investigation into how techno-invasion operates within the banking sector, particularly in Malaysian organisations where digital transformation has accelerated rapidly. Understanding whether techno-invasion functions merely as technological pressure or as a deeper organisational mechanism disrupting work-life balance is essential for developing more effective policies on digital boundary management, employee well-being, and sustainable workforce performance. This unresolved gap justifies the present study and highlights the necessity of examining techno-invasion not only as a technological issue, but as a strategic human resource and organisational sustainability concern.

2.5.2.3 Techno-Complexity

Techno-complexity has been widely recognised as one of the most significant dimensions of technostress, particularly in organisations undergoing continuous digital transformation. According to Tarafdar et al. (2011), techno-complexity refers to a situation where employees perceive information systems as difficult to understand and use, requiring substantial time and effort to learn new applications, functions, and technical procedures. This complexity is further intensified by organisational expectations and vendor pressures to continuously adopt updated technologies without adequate preparation or training support. Similarly, Khan et al .(2013), found that employees may require extended periods, sometimes up to a month, to fully understand newly introduced systems, especially when user manuals are inaccessible, overly technical, or poorly designed. Such conditions create frustration, cognitive overload, and psychological strain, indicating that techno-complexity is not merely a technical issue but also a serious psychosocial stressor affecting employee well-being.

Recent literature continues to support this argument. A comprehensive review by Saleem et al. (2024), found that techno-complexity remains one of the most dominant technostress creators because employees are expected to rapidly adapt to increasingly sophisticated digital systems while maintaining high job performance expectations. Similarly, Rademaker et al. (2023), argued that technological complexity becomes more harmful when organisational leadership fails to provide

adequate support, guidance, and digital autonomy, suggesting that techno-complexity should not be treated solely as an individual skill problem but also as a leadership and structural management issue.

However, the conceptualisation of techno-complexity remains inconsistent across studies. Some scholars define it primarily as a personal skill inadequacy problem, where employees feel their technical competencies are insufficient for effective performance (Kumar et al., 2013), while others frame it as an organisational failure caused by poor system design, inadequate training, and constant technological changes (Lei & Ngai, 2014). This contradiction creates theoretical ambiguity regarding whether techno-complexity originates from employees' capability deficits or from organisational technology management failures. Fieseler et al. (2014), for instance, emphasised employees' feelings of being overwhelmed by technological sophistication, whereas Ibrahim and Othman (2014), highlighted employer-imposed expectations that force employees to spend excessive time learning systems beyond formal working hours. These contrasting findings suggest that techno-complexity may operate through both personal and structural mechanisms, yet many empirical studies fail to distinguish these pathways clearly.

In the banking sector, this issue becomes even more critical due to rapid digitalisation and increasing dependence on technology-driven services. Wu et al. (2020), reported that banking employees are required to repeatedly learn and relearn sophisticated banking applications, compliance systems, and digital platforms under strict productivity demands. While such transformation improves operational efficiency, it simultaneously increases employees' cognitive burden and emotional exhaustion. A recent banking study by Yıkılmaz et al. (2024), further confirmed that technostress significantly increases burnout among bank employees, particularly when digital demands are intensified by insufficient coping resources and health-related strain. Similarly, Khalequzzaman et al. (2025), found that digital overload and digital surveillance in the banking sector significantly reduce job performance through technostress, while perceived organisational support serves as an important moderator. These findings indicate that technological sophistication in banking is not only an operational issue but also a serious employee well-being concern.

A major contradiction in the literature lies in whether techno-complexity necessarily produces negative outcomes. Studies such as Maier et al. (2012), conclude

that techno-complexity is predominantly perceived negatively because it reflects employees' inability to cope with increasing technological demands. In contrast, newer studies argue that technological complexity may also create positive outcomes when organisations provide sufficient training, leadership support, and flexibility. For example, Saleem and Malik (2023), found that organisational flexibility can reduce the negative impact of technostress on employees' quality of work life by improving coping capacity. This suggests that the negative consequences of techno-complexity may not be universal but highly dependent on contextual variables such as leadership quality, organisational culture, and digital readiness. Unfortunately, many studies continue to model techno-complexity as a direct predictor of stress without testing these important moderating conditions, leading to oversimplified conclusions.

Another significant research gap concerns the relationship between techno-complexity and work-life balance. Existing studies often assume that employees who successfully master complex technologies are subsequently assigned additional responsibilities, increasing workload and reducing personal time (Kumar et al., 2013). However, direct empirical evidence linking techno-complexity specifically to work-life balance disruption remains limited. Most studies focus on burnout, productivity, or job performance rather than examining how prolonged learning demands, after-hours adaptation, and cognitive spillover affect employees' personal and family domains. Recent evidence by Sadaf et al. (2025), confirms that technostress significantly undermines employees' work-life balance through psychological distress, while employee resilience weakens this negative effect. However, this study focuses mainly on techno-overload and techno-invasion, leaving techno-complexity relatively underexplored despite its strong relevance in highly digitalised service sectors such as banking.

Furthermore, methodological limitations remain substantial. Much of the existing literature relies heavily on cross-sectional surveys and self-reported perceptions, which limit causal interpretation and may inflate negative associations. There is also a strong dominance of studies conducted in Western and highly developed economies, with limited empirical evidence from Southeast Asian contexts where digital readiness, organisational support systems, and cultural expectations regarding after-hours work differ significantly. In Malaysia's banking sector, where digital transformation is accelerating rapidly, employees may experience techno-

complexity differently due to stronger hierarchical management practices and weaker work-life boundary protections. Yet empirical investigation in this context remains insufficient.

Therefore, the real problem is not simply that techno-complexity exists, but that current literature has not adequately explained how and under what conditions techno-complexity disrupts employees' work-life balance. Existing studies remain fragmented in conceptualisation, inconsistent in findings, and limited in contextual application. There is a need for deeper investigation into how techno-complexity functions as both a technological and organisational stressor, particularly in the banking sector, where digital demands are continuously intensifying. Addressing this gap is essential to determine whether digital transformation truly enhances organisational efficiency or whether it silently undermines employee well-being and sustainable work-life balance.

2.5.2.4 Techno-Insecurity

Techno-insecurity has emerged as one of the most critical dimensions of technostress, particularly in organisations experiencing rapid digital transformation, automation, and continuous technological upgrading. According to Tarafdar et al. (2011), techno-insecurity refers to employees' fear of losing their jobs or becoming less valuable in the workplace because others possess superior technological knowledge and digital competencies. This fear becomes stronger when organisations continuously introduce new systems while simultaneously recruiting younger employees who are perceived to be more technologically competent and adaptable. Fieseler et al. (2014), similarly argued that techno-insecurity develops when employees feel threatened by colleagues or new recruits who demonstrate greater familiarity and confidence in using advanced technologies. Such conditions create not only job-related anxiety but also emotional tension, self-doubt, and chronic workplace stress.

Recent studies continue to support this concern. A systematic review by Saleem et al. (2024), found that techno-insecurity remains one of the strongest predictors of employee stress because technological advancement often creates uncertainty regarding future employability and professional relevance. Likewise,

Ragu-Nathan et al. (2023), reported that employees experiencing high techno-insecurity show significantly higher emotional exhaustion, lower organisational commitment, and stronger turnover intention, particularly when organisational support is weak. These findings indicate that techno-insecurity is not merely a perception of replacement but a broader psychological threat to professional identity and career sustainability.

However, the conceptualisation of techno-insecurity remains inconsistent across the literature. Some scholars define it primarily as fear of job replacement caused by automation and technological advancement (Khan et al., 2013; Kumar et al., 2013), while others view it as a broader psychological perception of inadequacy resulting from comparisons with technologically skilled peers (Jena & Mahanti, 2014). This distinction is theoretically important because techno-insecurity may arise even when no actual job replacement exists. Lei and Ngai (2014), argued that employees often experience insecurity because of perceived professional inferiority rather than formal redundancy threats, suggesting that leadership communication and transparency significantly shape insecurity perceptions. Yet many empirical studies fail to distinguish objective job insecurity from perceived techno-insecurity, resulting in conceptual overlap and measurement ambiguity.

In service intensive sectors such as banking, techno-insecurity becomes particularly severe because employees must continuously adapt to automation, artificial intelligence, digital banking systems, and compliance technologies. Ibrahim and Othman (2014), found that techno-insecurity creates workplace stress when employees believe their inability to keep pace with technological demands may result in marginalisation or replacement. This issue is intensified in banking institutions where digital transformation directly changes job structures and reduces dependence on traditional manual processes. Okolo (2018), further argued that rapid technological advancement challenges employees' sense of job security because organisations increasingly prioritise efficiency, speed, and digital capability over workforce stability. Consequently, employees are forced to engage in continuous upskilling not only for career growth but also for basic job survival.

Recent banking studies strengthen this argument. Yıkılmaz et al. (2024), found that technostress significantly increases burnout and health-related strain among banking employees, particularly when employees perceive uncertainty regarding

technological adaptation and performance expectations. Similarly, Khalequzzaman et al. (2025), reported that digital overload and digital surveillance significantly reduce employee performance in banking institutions, while perceived organisational support weakens this negative relationship. These findings suggest that techno-insecurity is not simply caused by technology itself, but by how organisations manage technological change and communicate expectations during transformation processes.

A major contradiction in the literature concerns whether techno-insecurity is always harmful or whether it can also function as a motivational mechanism. Traditional studies such as Tarafdar et al. (2011) and Maier et al. (2012), treat techno-insecurity as a purely negative stressor that increases anxiety and reduces well-being. In contrast, newer studies argue that moderate insecurity may encourage proactive learning, career adaptability, and professional development when employees perceive fair opportunities for growth and strong leadership support. For example, Saleem and Malik (2023), found that organisational flexibility and managerial support can reduce the harmful effects of technostress by improving employees' coping capacity and quality of work life. This contradiction suggests that the negative consequences of techno-insecurity may not be universal but highly dependent on contextual factors such as leadership quality, digital readiness, and organisational culture. Unfortunately, many studies continue to model techno-insecurity as a direct negative predictor without testing these important moderating conditions.

Another significant research gap concerns the relationship between techno-insecurity and work-life balance. Existing studies mainly focus on outcomes such as burnout, turnover intention, job satisfaction, and performance decline, while the spillover effects into employees' personal and family lives remain underexplored. Employees experiencing techno-insecurity often spend additional time outside working hours learning new systems, attending training sessions, or worrying about career survival, which reduces psychological detachment from work and disrupts family responsibilities. However, direct empirical evidence linking techno-insecurity specifically to work-life balance remains limited. Recent evidence by Sadaf et al. (2025), confirms that technostress significantly damages employees' work-life balance through psychological distress, yet the study focuses primarily on techno-overload and techno-invasion, leaving techno-insecurity relatively underexplored despite its strong relevance in highly digitalised sectors such as banking.

Furthermore, methodological limitations remain substantial. Most existing studies rely heavily on cross-sectional surveys and self-reported perceptions, which limit causal interpretation and may overestimate negative relationships. There is also a strong concentration of studies conducted in Western and highly developed economies, with limited evidence from Southeast Asian contexts where organisational hierarchy, digital readiness, and after-hours work expectations differ significantly. In Malaysia's banking sector, employees may experience techno-insecurity differently due to stronger compliance pressures and weaker work-life boundary protections. Yet empirical investigation within this context remains insufficient.

Therefore, the core problem is not simply the existence of techno-insecurity, but the limited understanding of how and under what conditions it affects employees' work-life balance and psychological well-being in highly digitalised work environments. Although techno-insecurity is widely recognised as a key dimension of technostress (Tarafdar et al., 2011), existing literature remains fragmented in conceptualisation, inconsistent in empirical findings, and limited in contextual application, particularly in explaining the mechanisms linking it to employees' personal and family life. Recent studies continue to confirm that techno-insecurity is a significant predictor of psychological strain, job insecurity perception, and emotional exhaustion (Saleem et al., 2024; Ragu-Nathan et al., 2023). However, most research still focuses on general outcomes such as burnout, job satisfaction, and turnover intention, while overlooking how continuous digital transformation, automation, and complex system demands intensify employees' perceived job vulnerability and psychological pressure, especially in banking environments (Yıkılmaz et al., 2024; Khalequzzaman et al., 2025). This issue is further aggravated by insufficient organisational support and unclear work-life boundaries, leading to stress spillover into employees' personal and family domains (Sadaf et al., 2025). In addition, the dominance of cross-sectional designs and Western-based samples limits the generalisability of findings to developing contexts such as Malaysia, where organisational hierarchy, leadership practices, and after-hours work expectations may shape techno-insecurity differently. Therefore, further research is essential to examine techno-insecurity as both a psychological and organisational stressor in relation to work-life balance, to strengthen theoretical understanding and provide practical

insights for managing digital transformation without compromising employee well-being and sustainable work-life integration.

2.5.2.5 Techno-Uncertainty

Techno-uncertainty, as defined by Tarafdar et al. (2011), refers to the continuous and rapid changes in information systems where employees are required to constantly update their knowledge due to frequent technological upgrades in software and hardware. This ongoing evolution renders existing knowledge quickly obsolete, leading to frustration, anxiety, and stress as employees struggle to keep pace with continuous learning demands. Supporting this view, Fieseler et al. (2014), found that employees often resist frequent system updates and experience discomfort when organizational ICT changes disrupt established work routines. Similarly, Jena and Mahanti (2014), described techno-uncertainty as a psychological state of instability where users feel stressed because continuous technological change prevents mastery of systems, a perspective also supported by Lei and Ngai (2014) and Kumar et al. (2013). However, these studies differ in conceptual framing some treat techno-uncertainty as cognitive overload, while others emphasise emotional insecurity indicating a lack of conceptual consistency in the literature.

Recent studies further reinforce this issue in digitalised workplaces. Saleem et al. (2024), highlighted that continuous technological upgrading remains a dominant technostress creators, particularly because employees must repeatedly relearn systems while maintaining productivity. Similarly, Ragu-Nathan et al. (2023), found that frequent technological changes significantly increase employee anxiety and reduce organisational commitment, especially when change management practices are weak. These findings suggest that techno-uncertainty is not only a psychological issue but also a structural organisational challenge linked to how technology is implemented and managed.

Khan et al. (2013), argued that although technology enhances productivity, continuous system upgrades require intensive and repeated learning processes that generate stress. This learning burden is further intensified by insufficient training, limited technical skills, resistance to technology adoption, increased workload from upskilling, job insecurity, and poor organisational support systems. According to

Khan et al. (2013), and later studies (Rademaker et al., 2023) suggest that techno-uncertainty is strongly influenced by organisational readiness and support mechanisms, rather than being purely an individual deficiency. However, much of the literature still frames it as an employee adaptation problem, creating a theoretical imbalance between individual and organisational responsibility.

Parisa et al. (2013), further noted that continuous exposure to evolving technologies may lead to feelings of incompetence, ignorance, and anxiety, which in extreme cases can result in psychological distress and health-related issues. They also highlighted behavioural extremes where employees either mistrust technology or over-rely on it. Maier et al. (2012), similarly confirmed that techno-uncertainty generates negative employee perceptions when individuals cannot keep pace with technological change. However, recent evidence suggests that these negative outcomes are not universal. For instance, Saleem and Malik (2023), found that organisational flexibility and support can significantly reduce technostress impacts by enhancing employees' coping ability and resilience. This indicates that techno-uncertainty outcomes are highly context-dependent rather than deterministic.

A key contradiction in the literature lies in whether techno-uncertainty is an unavoidable consequence of technological progress or a manageable organisational phenomenon. While earlier studies (Tarafdar et al., 2011; Maier et al., 2012) treat it as an inherent stressor of digitalisation, more recent research suggests that its impact can be mitigated through effective training, leadership support, and structured change management systems (Rademaker et al., 2023; Saleem et al., 2024). This contradiction highlights a shift in perspective from individual blame to organisational responsibility, although empirical validation of this shift remains limited.

Furthermore, a significant research gap exists in understanding how techno-uncertainty affects broader employee outcomes beyond immediate psychological stress. Most studies focus on anxiety, frustration, and perceived stress, while neglecting long-term consequences such as work-life balance disruption, career sustainability, and employee well-being in highly digitalised environments. Recent technostress research has begun to address related outcomes such as burnout and psychological distress (Yıkılmaz et al., 2024; Sadaf et al., 2025), but techno-uncertainty specifically remains underexplored, particularly in its role in shaping employees' personal life interference and recovery ability.

In addition, existing studies are largely concentrated in Western and developed economies, limiting their applicability to developing contexts such as Malaysia. Organisational culture, hierarchical structures, and after-hours work expectations may intensify techno-uncertainty differently in Southeast Asian banking environments, where continuous digital transformation and regulatory technology adoption are rapidly increasing. However, empirical studies in this context remain scarce, particularly within the banking sector, where continuous system upgrades and digital compliance demands are highly prevalent.

Overall, while the literature agrees that techno-uncertainty is a significant technostress creators, it remains conceptually fragmented, theoretically inconsistent, and empirically underexplored in terms of organisational mechanisms and long-term employee outcomes. Therefore, there is a critical need for integrated research that examines techno-uncertainty as both a psychological and organisational stressor, particularly in relation to employee well-being and work-life balance in digitalised banking environments.

2.6 Technostress Creators and Work-Life Balance

To unpack this relationship using a comprehensive strategy, this section connects a data-driven bibliometric review from Vosviewer with a critical, deep-dive literature analysis. First, the visual networks from Vosviewer (presented in Appendices O, P, Q, and R) map out the academic environment of this specific link, showing a rise to 10 publications in 2023 out of 59 Scopus-indexed documents. This mapping outlines how the two variables interact in the existing literature, highlighting that most past research has treated this relationship as a direct, one-way street. However, while Vosviewer is highly effective for charting these publication networks and data density, it cannot explain the internal friction or the resource erosion that happens within an employee. To look past these surface-level numbers, this section connects the visual patterns with a rigorous review of established stress models, such as the Job Demands-Resources (JD-R) Model and Conservation of Resources (COR) Theory. Combining the quantitative mapping of Vosviewer with the theoretical insights of the literature review clearly exposes the missing links in current frameworks, providing a solid reason why we must investigate this

relationship alongside psychological health as a mediator among commercial bank employees in the Klang Valley.

2.6.1 Bibliometric Analysis for Relationship between Technostress Creators and Work-Life Balance.

A critical synthesis of the bibliometric parameters and visual mappings (Appendices O, P, Q, and R) exposed a domain that was academically contemporary yet theoretically immature and conceptually fragmented. While the chronological publication track monitored up to December 2024 showed an upward trend, climbing from absolute dormancy between 2014 and 2019 to a peak of 10 publications in 2023, this metric should not be misconstrued as conceptual depth. Out of 59 Scopus-indexed documents, a mere 15 studies (2023-2024) survived accurate screening. This scarcity revealed that despite the aggressive digitalization accelerated by the pandemic (Charalampous et al., 2023; Cazan et al., 2024), current scholarship remained highly reactive, functioning as an emergency response to immediate technological shocks rather than constructing proactive, durable frameworks.

This conceptual fragmentation was vividly illustrated by the keyword co-occurrence network (Appendix P), which dispersed 33 threshold keywords across seven loosely connected clusters. The literature thinness became evident when analysing the thematic gaps between these clusters:

First (Saturated Outliers and Empirical Isolation): The density visualization (Appendix Q) indicated that while macro-performance frameworks (Cluster 1: organizational support, work performance) and overt strain outcomes (Cluster 4: burnout, distress) occupied dense, bright yellow regions, they operated in empirical isolation from one another.

Second (The Structural Disconnect): The literature frequently assumed a linear, unmediated pathway between a technological stressor and a lifestyle outcome. By treating technostress merely as a direct antecedent to work-life conflict, existing models ignored the internal cognitive and affective friction that took place within the

employee. This over-reliance on direct-effect paradigms represented a major methodological and theoretical gap (Donthu et al., 2021; Nandiyanto et al., 2024).

Third (Theoretical Under-Development): From a theoretical standpoint, this body of literature suffered from an incomplete execution of established stress models, specifically the Job Mechanics of the Job Demands-Resources (JD-R) Model and the Conservation of Resources (COR) Theory. While technostress creators were easily classified as systemic job demands that aggressively depleted an employee's finite cognitive and emotional resources, the actual process of resource erosion was rarely traced. Within a rigorous JD-R or COR framework, psychological health must function as the primary, critical mediating mechanism the explanatory "black box" that translated severe resource depletion into a fractured work-life balance.

Despite this clear theoretical alignment, contemporary empirical studies consistently treated psychological health as an ultimate endpoint or independent outcome variable rather than an intervening pathway (Cazan et al., 2024; Stephen et al., 2024). This structural omission left a profound void in organizational behaviour literature, heavily skewed toward developed Western economies and leaving emerging digitalized economies like Malaysia heavily under-represented.

So, the present study corrected these theoretical and contextual deficiencies. By shifting the paradigm away from descriptive, direct-effect relationships, this study explicitly integrated technostress creators, psychological health, and work-life balance into a single, coherent causal framework among local commercial bank employees in the Klang Valley to resolve the empirical-contextual disconnect under IR4.0 conditions.

2.6.2 Overview of Relationship between Technostress Creators and Work-Life Balance.

Although employees are generally committed to their organisations and are often willing to invest additional time, effort, and personal resources to improve their work performance (Ungku Norulkamar et al., 2014), excessive work demands remain a significant concern in modern workplaces. In Malaysia, the Employment Act 1955 (Amendment 2022) limits normal working hours to a maximum of 45 hours per week, replacing the previous 48-hour standard effective from January 2023. However, in

practice, many employees continue to work beyond this threshold due to organisational expectations, digital connectivity, and performance pressures, creating a contradiction between legal regulation and actual workplace behaviour (Malaysia Government, 2026). While Mika Kivimaki et al. (2015), found that working 55 hours or more per week increases the risk of stroke by 33% and cardiovascular disease by 13%, more recent evidence by the World Health Organization and International Labour Organization (2021), confirms that long working hours contribute significantly to premature mortality worldwide. Nevertheless, most studies continue to focus primarily on physical health outcomes rather than examining how excessive working hours gradually disrupt employees' work-life balance, emotional well-being, and long-term organisational sustainability. This reveals a critical research gap, particularly in identifying the threshold at which working hours begin to significantly damage work-life balance in knowledge-intensive and technology-driven environments.

Furthermore, communication technology, while designed to improve efficiency and flexibility, has increasingly become a major source of occupational stress. This creates a paradox in which technology functions simultaneously as a productivity enabler and a psychological stressor. Wahla and Awan (2014), suggest that communication technology contributes to workaholic behaviour by blurring boundaries between work and personal life, while, Tarafdar et al. (2011), argue that technostress creators reduce job satisfaction and increase psychological strain. Recent studies also support this argument, showing that digital hyperconnectivity increases emotional exhaustion and reduces recovery opportunities after work (Molino et al., 2020; Keshavarz et al., 2025). However, these studies differ conceptually in how they measure technostress. Some researchers operationalise technostress through emotional outcomes such as anxiety and burnout, while others define it in terms of environmental stressors such as workload, constant connectivity, and technological complexity. This inconsistency weakens theoretical clarity and makes empirical comparison difficult across studies. For example, Tarafdar et al. (2011), focus on technostress creators as organisational conditions, whereas Lei and Ngai (2014), explain technostress through perceived discrepancies in personal capabilities such as skills, time, and energy. Such contradictions indicate that technostress has been treated

both as a structural problem and an individual psychological appraisal, yet limited studies attempt to integrate both perspectives within a single explanatory framework.

In addition, earlier literature frequently links technostress with negative consequences such as burnout, emotional exhaustion, job dissatisfaction, and turnover intention (Tarafdar et al., 2011; Lei & Ngai, 2014; Shinde, 2025). However, many of these studies are cross-sectional and outcome-driven, focusing more on describing consequences rather than explaining the underlying mechanisms through which technostress damages work-life balance. For instance, Reinecke and Oliver (2017), Hall (2017), and Hefner and Vorderer (2017), associate excessive technology use with anxiety, depression, and emotional entrapment, but they do not sufficiently explain whether these effects emerge from workload intensification, social expectations of constant availability, or employees' inability to psychologically detach from work. Similarly, Misra and Stokols (2012), highlight information overload, while Reinecke and oliver (2017), emphasise rapid response expectations and internet multitasking. More recent studies by Montag and Jon D. Elhai (2023), further indicate that constant digital interruptions intensify cognitive fatigue and emotional dysregulation. These studies provide complementary yet fragmented explanations, suggesting a conceptual gap in understanding which specific technology-related demands most strongly predict work-life imbalance.

Recent studies such as Park et al. (2020) and Lutz et al. (2020), further demonstrate that after-hours smartphone use and work pressure are associated with burnout, cognitive exhaustion, poor sleep quality, and reduced well-being. Similar findings were reported by Eurofound (2023), which found that digital work intensification significantly reduces employees' psychological detachment from work and increases work-family conflict across Europe. Nevertheless, these studies are largely conducted in Western contexts and may not fully reflect the realities of Malaysian workplaces, where collectivist work culture, hierarchical management structures, and strong normative expectations of employee commitment may intensify techno-invasion and techno-overload differently. This creates a contextual gap because the influence of technostress creators may vary significantly across cultural and organisational settings. Existing literature remains limited in examining how technostress specifically affects Malaysian employees' work-life balance within the post-digital workplace environment.

Moreover, the technostress creators model introduced by Akhtari et al. (2013), identifies five dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Although widely adopted, many studies treat these dimensions independently rather than examining their combined and interactive effects on work-life balance. For example, techno-overload may coexist with techno-invasion, where employees are not only required to work faster but are also expected to remain constantly accessible beyond formal working hours. Similarly, techno-complexity may intensify techno-insecurity when employees perceive themselves as unable to keep pace with technological changes. Recent evidence from Molino et al. (2020) and Keshavarz et al. (2025), suggests that these dimensions frequently overlap and reinforce one another, yet empirical studies rarely test these interactions simultaneously. The lack of integrated analysis creates a theoretical limitation because employees rarely experience these stressors in isolation. Therefore, understanding how these dimensions collectively influence work-life balance is necessary for developing stronger explanatory models.

In summary, the existing literature confirms that technology-driven work demands negatively influence employee well-being and work-life balance, yet significant conceptual, contextual, and methodological gaps remain. Prior studies are often fragmented, inconsistent in measurement, heavily focused on outcomes rather than mechanisms, and insufficiently contextualised within Malaysian workplaces. Therefore, this study seeks to address these limitations by critically examining how technostress creators influence employees' work-life balance, with particular attention to the multidimensional nature of technostress and its relevance within contemporary organisational settings. This deeper investigation is necessary to move beyond descriptive findings and toward a more strong theoretical explanation of how digital work environments shape employee well-being.

2.6.2.1 The Relationship Between Techno-Overload and Work-life Balance

Techno-overload has been widely recognized as one of the most significant dimensions of technostress that negatively influences employees' work-life balance. It generally refers to situations where technology forces employees to work faster, handle larger volumes of information, and remain continuously available for work-related demands beyond formal working hours (Tarafdar et al., 2011; Molino et al.,

2020; Joy & Kumar, 2025). However, the literature reveals important differences in how techno-overload has been conceptualised and measured. For example, Joy and Kumar (2025), define techno-overload primarily as the extension of working hours caused by unfamiliar digital tasks and continuous adaptation to new technological systems, which reduces employees' quality of life. In contrast, Okebaram and Moses (2013), conceptualise techno-overload as the excessive inflow of work demands through emails, voice messages, and online platforms that forces employees to sacrifice personal and family time. Similarly, Ingusci et al. (2021), describe techno-overload as the urgent pressure to respond immediately to unexpected work demands transmitted through digital communication channels. More recently, Ullah et al. (2025), argue that techno-overload also includes psychological pressure to remain digitally present and constantly responsive, even when employees are physically away from work. These varying definitions suggest that techno-overload is not merely about workload quantity, but also involves psychological urgency, constant accessibility, and perceived loss of personal control. This conceptual inconsistency creates difficulty in comparing findings across studies because researchers may be measuring different aspects of the same construct under one label (Molino et al., 2020; Ullah et al., 2025).

Despite these differences, most studies consistently report a negative relationship between techno-overload and work-life balance. Califf and Brooks (2020), found that employees who frequently engage in work-related technological tasks after working hours experience greater difficulty separating work responsibilities from personal life. Similarly, Chen et al. (2021), reported that after-hours technology use increases work-family conflict because employees continue managing unfinished tasks during personal time. Joy and Kumar (2025), further found that prolonged exposure to digital workload contributes to longer working hours, emotional fatigue, and lower life satisfaction. These findings are supported by Jena and Mahanti (2014), who argued that rapid information flow and continuous digital communication force employees to work faster, leaving less time for recovery and family responsibilities. More recent evidence by Keshavarz et al. (2025), also shows that persistent digital workload significantly increases emotional exhaustion and reduces employees' psychological well-being. The link between techno-overload and work-life balance is therefore well established, as employees experiencing excessive technological

demands often report reduced psychological detachment, emotional exhaustion, poor sleep quality, and weak boundary management between work and non-work domains (Park et al., 2020; Keshavarz et al., 2025; Ullah et al., 2025).

However, some contradictions remain in the literature regarding whether techno-overload is universally harmful. Earlier studies tend to present techno-overload as an entirely negative condition that inevitably reduces work-life balance (Okebaram & Moses, 2013; Raisiene & Jonusauskas, 2013). These studies assume that constant connectivity automatically leads to stress and work-life imbalance. In contrast, more recent studies suggest that the effects of techno-overload may depend on organisational context and employee perception. Molino et al. (2020), argue that employees with higher job autonomy and stronger organisational support may perceive digital connectivity as flexibility rather than intrusion. For some employees, technology can enhance work-life balance by allowing remote work, flexible scheduling, and faster task completion. Similarly, Eurofound (2023), reported that flexible digital work arrangements may improve autonomy when organisational expectations are clearly managed. This contradiction suggests that techno-overload should not be treated as a universally negative predictor, but rather as a condition whose effects vary depending on support systems, organisational culture, management practices, and individual coping capacity. This indicates that the direct relationship between techno-overload and work-life balance may be more complex than earlier literature suggests (Molino et al., 2020; Eurofound, 2023).

Management support and supervisory practices also emerge as important factors influencing how techno-overload affects employees' work-life balance. Christian et al. (2020), argue that managers can reduce job demands by clarifying expectations, managing workloads, and providing emotional support. Similarly, Petry (2018), highlights that leadership styles in digital environments significantly shape employees' responses to technology-related stress. Employees who receive clear communication, workload flexibility, and timely support from supervisors are more likely to manage excessive digital demands effectively and maintain healthier boundaries between work and personal life. He et al. (2021), suggest that supportive supervisors help employees handle excessive workloads, reducing work-family conflict and emotional strain. Chung and Van der Lippe (2020), also found that positive supervisor support improves employees' ability to maintain work-life balance

by enhancing recovery opportunities and reducing psychological pressure. Recent findings by Ullah et al. (2025), further indicate that resilience and supportive workplace environments significantly reduce the negative psychological consequences of techno-overload. These findings suggest that management support may weaken the negative relationship between techno-overload and work-life balance because employees with strong workplace support are better able to manage digital work demands.

Nevertheless, existing studies often examine techno-overload and management support separately rather than testing how supervisory practices directly influence the relationship between techno-overload and work-life balance. Most research focuses on the independent effect of techno-overload on employee well-being or the separate effect of management support on job satisfaction and performance. Limited studies empirically examine whether strong supervisory support can specifically buffer the negative effects of techno-overload on employees' personal lives (Christian et al., 2020; Ullah et al., 2025). This creates an important research gap because workplace support may explain why some employees experience severe work-life imbalance under techno-overload while others remain relatively resilient. Without examining this interaction, the understanding of techno-overload remains incomplete.

Another limitation in the literature is methodological. Many studies rely heavily on cross-sectional self-reported survey data, which limits causal explanation and increases the possibility of common method bias (Molino et al., 2020; Keshavarz et al., 2025). Most studies explain what outcomes occur, such as burnout, stress, and work-life imbalance, but fewer studies explain how these outcomes gradually develop over time. For example, employees may initially perceive after-hours digital communication as manageable, but prolonged exposure may eventually lead to emotional exhaustion and reduced family satisfaction. Without longitudinal evidence, it remains difficult to determine whether techno-overload directly causes poor work-life balance or whether employees with weaker personal boundaries are more vulnerable to techno-overload. This limits the strength of current conclusions and suggests the need for more process based and longitudinal research designs (Park et al., 2020; Ullah et al., 2025).

In addition, most techno-overload studies are conducted in Western or highly digitised organisational settings, where flexible work arrangements and employee

autonomy are relatively common. These conditions may differ significantly from Malaysian workplaces, where collectivist values, hierarchical management structures, and strong expectations of employee commitment may intensify employees' willingness to remain constantly available beyond formal working hours. As a result, employees may experience techno-overload differently compared to Western contexts. Existing literature remains limited in examining how techno-overload influences work-life balance within Malaysian organisations, particularly in relation to workplace support and cultural expectations (Christian et al., 2020; Joy & Kumar, 2025). This contextual gap reduces the generalisability of previous findings and strengthens the need for localised investigation.

Overall, prior studies clearly establish that techno-overload negatively influences employees' work-life balance, while management support and organisational practices may serve as important buffering mechanisms. However, contradictions in conceptual definitions, assumptions of universally negative outcomes, limited moderator analysis, methodological weaknesses, and insufficient Malaysian evidence indicate that the relationship remains underexplored. Therefore, a more critical and integrated investigation is needed to explain not only whether techno-overload affects work-life balance, but also how workplace support shapes this relationship and under what organisational conditions these effects become most significant (Ullah et al., 2025). This provides a strong rationale for examining techno-overload as an independent variable and work-life balance as the dependent variable in the present study.

Hypotheses Development

H1a There is a relationship between techno-overload and work-life balance.

2.6.2.2 The Relationship Between Techno-Invasion and Work-life Balance

Organizations increasingly adopt advanced communication technologies to enhance productivity and operational efficiency; however, this digital transformation has generated unintended consequences for employees' work-life balance. Prior studies indicate that while technology improves coordination and flexibility, it simultaneously intensifies expectations of constant availability, leading to blurred boundaries between work and personal life (Tarafdar et al., 2011; Raisiene &

Jonusauskas, 2013; Wu et al., 2020; Eurofound, 2023). This dual effect reflects a persistent contradiction in the literature, where technology is simultaneously positioned as both an efficiency enabler and a source of work-life imbalance (Molino et al., 2020; Kim, 2021).

However, studies differ in how this phenomenon is conceptualised. Some researchers treat technology as a neutral tool whose effects depend on organisational expectations (Kim, 2021), whereas others argue that digital technologies fundamentally restructure temporal boundaries and reduce employees' ability to psychologically disengage from work (Murray & Rostis, 2007; Abdelrady & Akram, 2022). More recent evidence suggests that digital communication may also enhance flexibility and autonomy under certain organisational conditions, indicating that its impact is not universally negative (Molino et al., 2020; Eurofound, 2023). This inconsistency highlights a conceptual gap in explaining when technology becomes enabling versus intrusive.

A key construct in this literature is techno-invasion, defined as the extent to which technology penetrates employees' personal lives and blurs boundaries between work and non-work domains (Abdelrady & Akram, 2022; Audi & Masri, 2024). Unlike techno-overload, which focuses on workload intensity, techno-invasion is concerned with temporal and psychological intrusion (Wang et al., 2008; Porcari et al., 2023). Employees are often expected to remain accessible beyond working hours, creating a culture of "always-on connectivity" that increases cognitive preoccupation with work even during leisure time (Park & Jex, 2011; Keshavarz et al., 2025).

Empirical studies consistently show that techno-invasion negatively affects work-life balance by increasing work-family conflict and reducing psychological detachment. Park and Jex (2011), found that after-hours connectivity reduces employees' ability to mentally disengage from work, leading to emotional exhaustion. Similarly, Peeters et al. (2013), argue that blurred role boundaries create chronic inter-role conflict and reduce recovery time. Recent studies further confirm that continuous digital interruptions are associated with fatigue, sleep disruption, and reduced life satisfaction (Audi & Masri, 2024; Porcari et al., 2023; Ullah et al., 2025). These findings demonstrate a strong and consistent negative relationship between techno-invasion and work-life balance.

However, the literature also presents contradictions. Earlier studies assumed techno-invasion inevitably leads to negative outcomes (Murray & Rostis, 2007; Park & Jex, 2011), while more recent research suggests that its effects may depend on individual coping strategies and organisational flexibility (Molino et al., 2020; Eurofound, 2023). Employees with higher autonomy or strong boundary management skills may experience reduced negative effects despite high digital connectivity, indicating that techno-invasion is context-dependent rather than universally harmful.

Furthermore, most studies are conducted in Western or highly digitised contexts where flexible work arrangements are common. Less attention has been given to developing countries such as Malaysia, where cultural expectations, hierarchical workplace structures, and strong employee commitment norms may intensify techno-invasion effects (Christian et al., 2020; Joy & Kumar, 2025). This limits the generalisability of findings and suggests that the strength of the relationship may differ across cultural contexts.

Overall, the literature confirms that techno-invasion negatively affects work-life balance by disrupting psychological and temporal boundaries between work and personal life. However, inconsistencies in conceptualisation, contextual differences, and methodological limitations indicate that the phenomenon is not yet fully understood. Therefore, further research is required to clarify how techno-invasion operates under different organisational and cultural conditions and when digital connectivity becomes harmful rather than beneficial.

Hypotheses Development

H1b There is a relationship between techno-invasion and work-life balance.

2.6.2.3 The Relationship Between Techno-Complexity and Work-life Balance

Techno-complexity has been widely identified as a key dimension of technostress that arises when employees perceive digital technologies as difficult to understand, learn, and operate effectively. Prior studies suggest that continuously evolving technological systems increase the time and cognitive effort required for employees to perform their tasks, which consequently reduces time available for personal and family life (Okebaram & Moses, 2013; Lalitha et al., 2013; Raisiene &

Jonusauskas, 2013). This indicates a direct behavioural pathway where learning demands extend working hours and interfere with employees' private life boundaries.

However, the literature presents inconsistencies in conceptualising techno-complexity. Some researchers define it as skill-based difficulty in operating systems (Li & Wang, 2020), while others extend it to include cognitive overload, emotional strain, and decision-making difficulty caused by digital transformation (Shahzad et al., 2021; Nascimento et al., 2024). More recent studies further expand this construct by linking techno-complexity to organisational innovation pressure, where employees are required to continuously upgrade digital competencies to remain competitive (Urukovicova et al., 2023). This variation shows that techno-complexity is not a single-dimensional construct, but rather a multi-layered phenomenon involving technical, cognitive, and organisational demands.

Despite differences in definition, existing studies consistently suggest that techno-complexity reduces employees' work-life balance by increasing time investment in learning and adaptation processes. Employees often need to spend additional hours outside formal working time to understand new systems, which reduces their ability to engage in personal and family activities (Delmo, 2024; Jyoti et al., 2025). Similarly, Tarafdar et al. (2011), argue that intensive technology use drains employees' internal resources, leaving less energy for non-work roles. Recent evidence also shows that prolonged exposure to complex digital systems increases emotional exhaustion, cognitive fatigue, and dissatisfaction with work-life integration (Gao et al., 2025;Nascimento et al., 2024; Renk, 2025).

However, a key contradiction exists in the literature regarding whether techno-complexity is inherently negative. Different studies assume that increased technological complexity automatically leads to reduced work-life balance due to time extension and cognitive overload (Okebaram & Moses, 2013; Coklar & Sahin, 2011). In contrast, more recent research suggests that techno-complexity may also enhance employee satisfaction when accompanied by adequate training and organisational support, as employees may perceive skill development as career growth (Yeniaras & Altinay, 2023). This indicates that techno-complexity does not always produce negative outcomes; instead, its impact depends on whether employees are adequately supported in managing technological transitions (Molino et al., 2020; Eurofound,

2023). This contradiction suggests that previous research may have oversimplified the relationship between techno-complexity and work-life balance.

Another important issue in the literature is the mechanism through which techno-complexity affects work-life balance. While most studies agree that it increases workload and learning demands, fewer studies explain how these demands translate into reduced personal well-being. Some scholars argue that techno-complexity disrupts communication and collaboration due to misunderstandings in using complex systems (Urukovicova et al., 2023), while others highlight its role in increasing job insecurity as employees struggle to keep up with technological change (Li & Wang, 2020). These conditions create psychological pressure, which contributes to stress, reduced job satisfaction, and poor work-life balance (Yeniaras & Altinay, 2023). However, the literature remains fragmented, as these mechanisms are often studied separately rather than as an integrated process.

Furthermore, most existing studies focus on individual-level outcomes (stress, satisfaction, fatigue) rather than examining structural or organisational factors that influence the impact of techno-complexity. For instance, while Raisiene and Jonusauskas (2013), highlight that employees sacrifice personal time to learn new systems, they do not explore how organisational policies (e.g., training, workload distribution) may moderate this effect. Similarly, Ungku et al. (2014), found a relationship between time allocation and work-life balance but did not explicitly examine how digital complexity influences time distribution across work and family domains. This represents a significant theoretical gap in explaining how techno-complexity translates into behavioural and psychological outcomes.

Finally, there is a contextual gap, as most techno-complexity studies are conducted in highly digitalised or Western contexts. In contrast, less is known about developing countries such as Malaysia, where employees may face additional cultural expectations of extended working hours, hierarchical supervision, and high-performance pressure. These contextual factors may intensify the effects of techno-complexity on work-life imbalance (Ramadhani, 2025; Samsudin, & Mahadi, 2024). This suggests that findings from previous studies may not be fully generalisable across different organisational and cultural environments.

In summary, existing literature consistently indicates that techno-complexity contributes to reduced work-life balance by increasing cognitive demands, learning

time, and emotional strain. However, contradictions in conceptualisation, inconsistent findings regarding outcomes, limited explanation of mechanisms, and contextual differences highlight that the relationship is not yet fully understood. Therefore, further research is needed to clarify how techno-complexity influences work-life balance across different organisational settings, particularly in contexts where digital transformation is rapidly increasing.

Hypotheses Development

H1c There is a relationship between techno-complexity and work-life balance.

2.6.2.4 The Relationship Between Techno-Insecurity and Work-life Balance

The rapid digital transformation of the banking sector has intensified organizational dependence on software applications, automation, artificial intelligence, and advanced information systems to improve efficiency, competitiveness, and service delivery. As global corporations increasingly invest in digital technologies, banking institutions are similarly compelled to continuously upgrade their technological infrastructure and introduce new systems to remain competitive (Tarafdar et al., 2019; Molino et al., 2020; Ayyagari et al., 2011). However, while these technological investments improve organizational productivity, they simultaneously create significant challenges for employees, particularly in maintaining work-life balance. Employees are often required to invest substantial time and cognitive effort in learning, adapting to, and continuously updating their technological competencies, which may interfere with personal and family life (Molino et al., 2020; Ragu-Nathan et al., 2021). Maimunah et al. (2012), argued that employees spend considerable additional time learning new systems because failure to adapt may threaten their job position and career progression. This argument remains highly relevant in the banking industry, where technological competence is increasingly associated with employability, performance expectations, and long-term career security (Shen & Kuang, 2022; De Clercq et al., 2024).

Previous studies consistently suggest that banking employees are highly exposed to technostress due to continuous technological changes, yet the specific dimension of techno-insecurity remains conceptually underexplored. While Owusu et

al. (2016), found that banking institutions strongly pressure employees to learn and adapt to new technologies, their study primarily emphasized general technological pressure rather than distinguishing techno-insecurity from other technostress creators such as techno-overload or techno-complexity. This reflects a common limitation in earlier literature where technostress dimensions are often treated collectively, reducing theoretical precision and weakening explanatory power (Tarafdar et al., 2019; La Torre et al., 2019). Similarly, Kumar et al. (2013), linked technological revolutions with occupational stress but did not specifically explain the psychological mechanisms through which techno-insecurity influences work-life balance. This creates a conceptual gap because techno-insecurity involves a unique fear of replacement, technological obsolescence, and job instability that differs significantly from workload-related stressors such as techno-overload.

According to Shen and Kuang (2022), techno-insecurity refers to employees' feelings of dread, anxiety, and vulnerability arising from the fear that new technologies may threaten their job security or reduce their professional relevance. This conceptualization aligns with Tarafdar et al.'s (2007; 2011) technostress framework, where techno-insecurity is positioned as a specific stress creator associated with perceived threats to employment continuity and competence relevance. However, recent studies present contradictory findings regarding its effects. For example, Fernandez-Batanero et al. (2021), emphasized that techno-insecurity significantly reduces employee well-being and work-life balance by increasing stress, emotional exhaustion, and uncertainty. Similarly, Upadhyaya and Vrinda (2021), found that insecurity associated with technological change contributes significantly to psychological strain and work-family conflict. In contrast, Okolo (2018), suggested that techno-insecurity may produce positive outcomes when organizations provide clear communication, employee participation, and structured training during technological change, thereby reducing fear and improving adjustment. This contradiction indicates that techno-insecurity may not operate uniformly across contexts; rather, organizational support may function as an important moderating or boundary condition.

Recent literature further expands the causes of techno-insecurity beyond simple fear of job replacement. Asad et al. (2023), identified automation, technological obsolescence, data privacy concerns, cybersecurity threats, and rapid

innovation cycles as major contributors to techno-insecurity. This broader conceptualization is important because many previous studies narrowly focused only on automation anxiety, overlooking how cybersecurity responsibilities, digital surveillance, and compliance burdens also contribute to employee stress. For instance, the need to constantly protect sensitive customer data and comply with cybersecurity requirements increases psychological strain, particularly in banking environments where data sensitivity is extremely high (Ayyagari et al., 2023). Kurniawaty et al. (2019), found that concerns over privacy violations and data breaches weaken employees' trust in both technology and organizational processes, which subsequently reduces job satisfaction and work-life balance. However, their study was conducted outside the banking context, limiting its contextual generalizability to highly regulated financial institutions such as commercial banks.

Similarly, Yeniaras and Altinegne (2023), argued that employees experiencing technological insecurity often report low job satisfaction, poor work-life balance, and fear of job displacement due to workplace automation. Murray et al. (2022), further noted that the constant pressure to stay updated with rapidly changing technologies creates technical anxiety, emotional exhaustion, and feelings of inadequacy, especially among employees with limited digital readiness. Recent evidence by Spagnoli et al. (2023), also supports the argument that technology-related insecurity significantly predicts burnout and reduced work engagement. It remains unclear whether techno-insecurity directly causes poor work-life balance or whether employees with poor work-life balance are more likely to perceive technological change as threatening.

Furthermore, although De Silva et al. (2024), reported that fear of technological displacement reduces employee motivation and engagement, limited research has examined this relationship specifically among bank employees in developing economies such as Malaysia, where digital transformation is occurring rapidly but organizational readiness may vary substantially. Most prior studies were conducted in Western contexts or general corporate environments, creating a contextual gap regarding whether techno-insecurity operates similarly in Malaysian commercial banks. Since banking employees face unique regulatory pressures, service expectations, cybersecurity responsibilities, and digital compliance demands, findings from other sectors may not be directly transferable (Bank Negara Malaysia, 2023; Ayyagari et al., 2023).

The relationship between techno-insecurity and employees' work-life balance is theoretically strong and consistently supported by contemporary empirical evidence. Employees who perceive technology as a threat to job continuity, professional relevance, and competence sustainability are more likely to devote additional time to learning new systems, experience prolonged psychological strain, and transfer work-related anxiety into their personal and family domains, thereby weakening work-life balance (Shen & Kuang, 2022; Spagnoli et al., 2023; De Clercq et al., 2024). This is consistent with the technostress framework proposed by Tarafdar et al. (2007; 2011), which positions techno-insecurity as a critical stress creator that disrupts employees' psychological well-being and boundary management between work and non-work life. In the banking sector, where continuous digital adaptation is often mandatory, employees may experience stronger perceptions of technological vulnerability due to high performance expectations, cybersecurity responsibilities, and fears of technological displacement (Ayyagari et al., 2023; De Silva et al., 2024).

However, the relationship is not universally negative, as several studies suggest that organizational context significantly shapes how employees interpret technological change. While Fernandez-Batanero et al. (2021), found that techno-insecurity increases stress, emotional exhaustion, and work-family conflict, other scholars argue that organizational support can mitigate these negative outcomes. Wayne and Ramiro (2016), emphasized that involving employees during technology implementation reduces resistance, strengthens trust, and improves adaptation outcomes. Similarly, Molino et al. (2020) and Upadhyaya and Vrinda (2021), highlighted that adequate training, transparent communication, managerial support, and participative decision-making reduce employees' perceptions of insecurity and improve adjustment to digital transformation. This suggests that techno-insecurity may function differently depending on the availability of organizational resources, implying that support mechanisms may buffer its negative influence on work-life balance. Nevertheless, such moderating effects remain insufficiently examined within banking institutions, particularly in developing countries such as Malaysia, where digital transformation is accelerating but organizational readiness may vary considerably.

Based on the critical synthesis of prior studies, the dominant literature strongly supports the argument that techno-insecurity negatively affects employees' work-life

balance. Employees who perceive technological advancement as a threat to job security, career continuity, and professional competence are more likely to experience chronic stress, lower job satisfaction, emotional exhaustion, and difficulty maintaining healthy boundaries between work and personal life (Cappellozza, 2025; Yang et al., 2024). Although some contradictory findings indicate that organizational intervention may reduce these adverse effects, the prevailing evidence confirms that higher levels of techno-insecurity are generally associated with poorer work-life balance outcomes. This relationship is particularly significant in the banking industry, where technological dependence is high and employees are continuously required to adapt to new digital systems under strict performance and compliance demands. Therefore, establishing this relationship is essential not only for theoretical advancement but also for providing practical insights into how organizations can manage technostress and sustain employee well-being in increasingly digital workplaces.

Hypotheses Development

H1d There is a relationship between techno-insecurity and work-life balance.

2.6.2.5 The Relationship Between Techno-Uncertainty and Work-life Balance

The rapid evolution of digital technologies in organizations has intensified the relevance of techno-uncertainty as a major dimension of technostress, particularly in technology-intensive sectors such as banking. Techno-uncertainty refers to the continuous changes, upgrades, and replacements of technological systems that force employees to repeatedly learn new applications, adapt to unfamiliar platforms, and stay up to date with constantly evolving digital processes (Tarafdar et al., 2011; Tarafdar et al., 2019; Pflugner et al., 2021). Raisiene and Jonusauskas (2013), highlighted that the rapid pace of technological development often exceeds employees' capability to adapt effectively, creating feelings of inadequacy, uncertainty, and professional instability. Recent studies further support this argument by showing that rapid digital transformation increases employee anxiety, cognitive overload, and work-family interference, especially when technological change occurs without sufficient preparation or support (Molino et al., 2020; Spagnoli et al., 2023; De Clercq et al., 2024). While technological advancement may initially enhance employees' knowledge, skills, and productivity, the continuous pressure to remain

technologically competent often demands a higher level of commitment, which can negatively affect work-life balance (Pietrafesa et al., 2019; Molino et al., 2020). This suggests that technology functions as both a productivity enabler and a psychological burden, creating a paradox that many earlier studies have insufficiently addressed.

Tarafdar et al. (2011), identified a significant positive relationship between techno-uncertainty and deteriorated work-life balance, arguing that frequent technological changes make employees feel persistently underqualified and psychologically pressured to continuously update their digital competencies. This finding is supported by Pflugner et al. (2021), who found that techno-uncertainty contributes directly to technostress by disrupting employees' routine stability and increasing after-hours work involvement. Similar findings were reported by Upadhyaya and Vrinda (2021), who found that technology-related uncertainty contributes significantly to psychological strain, burnout, and work-family conflict. However, much of the earlier literature treats techno-uncertainty as a general stressor without clearly distinguishing it from related dimensions such as techno-complexity or techno-overload. This conceptual overlap weakens theoretical precision because techno-uncertainty is specifically associated with unpredictability and instability caused by technological change, rather than workload intensity or task complexity alone (La Torre et al., 2019; Tarafdar et al., 2019). Therefore, separating these dimensions is essential to better explain how techno-uncertainty uniquely influences work-life balance.

According to Popovic (2014), the more complicated and frequently changing the technology within an organization becomes, the higher the anticipated level of technostress among employees. Organizations are often compelled to adopt constant technological upgrades to remain competitive, especially in the banking industry, where digital efficiency determines service quality and operational survival. As a result, employees are left with little choice but to continuously absorb and adapt to these changes, often by spending additional working hours learning new systems and applications (Pflugner et al., 2021; De Silva et al., 2024). This reflects a critical issue in techno-uncertainty research: while organizations benefit strategically from innovation, the hidden cost is often transferred to employees in the form of work-life imbalance, fatigue, and emotional exhaustion. Mahmood (2015), similarly argued that techno-uncertainty significantly affects employees' work-life balance because the

repeated need to learn new technological applications reduces personal time and increases psychological strain. Recent evidence by Shen and Kuang (2022), also confirms that constant technological adaptation increases emotional exhaustion and weakens employees' ability to maintain work-life boundaries. However, most of these studies were cross-sectional and descriptive, limiting causal understanding of whether technological change itself causes poor work-life balance or whether already stressed employees perceive change more negatively.

Recent studies also suggest that techno-uncertainty may weaken employee motivation and digital readiness. Kim and Lee (2021), found that frequent technology upgrades can trigger reduced motivation to learn and lower interest in updating technological skills, particularly when employees perceive that new systems are introduced without sufficient training or organizational support. This finding contradicts earlier assumptions that employees naturally embrace technological change for career advancement. Instead, employees may respond with resistance, disengagement, and avoidance behaviour when uncertainty becomes excessive. Spagnoli et al. (2023), similarly found that technology-related uncertainty predicts burnout and reduced work engagement, particularly in environments with weak leadership support. This contradiction highlights an important moderating factor: organizational support. Molino et al. (2020), emphasized that training opportunities, managerial communication, and participative implementation processes can significantly reduce the negative effects of techno-uncertainty. De Clercq et al. (2024), further found that organizational support significantly buffers the impact of technostress on employee well-being. Thus, the relationship between techno-uncertainty and work-life balance may not be universally negative but contingent upon the availability of institutional support mechanisms.

Within the banking context, techno-uncertainty becomes even more significant due to the sector's heavy dependence on real-time digital systems, cybersecurity protocols, and continuous regulatory compliance. Embi (2007), found that rapid technological updates in commercial banks created adverse working patterns among employees, including extended working hours and increased work pressure. Similarly, Owusu et al. (2016), reported that employees frequently spend time after office hours learning new programs, systems, and technologies, often at the expense of personal and family responsibilities. Tarafdar et al. (2011), further argued that banking

operations are highly dependent on continuous computer application upgrades for processing and disseminating large volumes of information, making technology adaptation unavoidable. Recent reports also indicate that digital banking transformation and cybersecurity compliance have intensified employees' cognitive demands and work pressure in financial institutions (Bank Negara Malaysia, 2023; Ayyagari et al., 2023). However, limited research has specifically examined how techno-uncertainty affects employees' work-life balance in Malaysian commercial banks, where digital transformation is accelerating rapidly, but institutional readiness and employee support structures may differ from Western contexts. This contextual gap remains underexplored and limits the generalizability of existing findings.

The relationship between techno-uncertainty and work-life balance is theoretically strong and empirically supported. Employees facing continuous technological changes are more likely to experience uncertainty, emotional exhaustion, reduced recovery time, and blurred boundaries between work and personal life, weakening work-life balance (Pflugner et al., 2021; Molino et al., 2020; Kim & Lee, 2021; Spagnoli et al., 2023). This is consistent with the technostress framework of Tarafdar et al. (2007; 2011), which explains that persistent exposure to technology-related uncertainty disrupts psychological well-being and increases work-family conflict. Although some studies suggest that adequate organizational support can mitigate these negative outcomes, the dominant literature consistently demonstrates that higher levels of techno-uncertainty are associated with poorer work-life balance. In banking institutions, where employees are expected to adapt rapidly to technological innovations while maintaining service quality and compliance standards, the effects of techno-uncertainty may be even stronger.

Based on the critical synthesis of prior studies, techno-uncertainty is not merely a consequence of technological advancement but a significant organizational stressor that shapes employees' psychological well-being and work-life balance. The literature strongly supports the argument that frequent and unpredictable technological changes create sustained stress, reduce personal recovery time, and increase work-family conflict (Shen & Kuang, 2022; De Clercq et al., 2024). Therefore, understanding this relationship is essential for both theoretical development and practical organizational intervention, particularly in technology-intensive sectors such as banking

Hypotheses Development

H1d There is a relationship between techno-uncertainty and work-life balance.

2.7 Psychological Health

To examine this variable from both a wide and narrow perspective, this section pairs a large-scale bibliometric mapping from Vosviewer with a classic narrative literature review. First, the Vosviewer outputs (illustrated in Appendices K, L, M, and N) chart the global trajectory of mental well-being research, highlighting its rapid expansion from 37 papers in 2017 to a peak of 108 publications in 2024. This visual mapping groups past studies into specific clusters, demonstrating how psychological health has evolved from a basic clinical concern into a major workplace priority. However, while Vosviewer successfully groups these large datasets, it cannot capture the deeper psychological processes or explain how internal mental strain operates. To address this limitation, this section connects these visual benchmarks with a focused review of the literature. By evaluating established psychological frameworks, this review examines how mental health acts as a crucial intervening mechanism rather than just an outcome. Merging the data-driven patterns of Vosviewer with the conceptual depth of the literature review makes it easier to pinpoint the exact gaps in current knowledge, explaining why it is necessary to study psychological health as a mediator for commercial bank employees in the Klang Valley.

2.7.1 Bibliometric Analysis for Psychological Health

The bibliometric parameters and visual mappings derived from Vosviewer (Appendices K, L, M, and N) systematically combined the intellectual evolution of the psychological health domain while exposing several critical theoretical, contextual, and temporal gaps that justified the execution of this study.

From 2017 until 2024 the path of literature revealed a exponential expansion, jumping from a minor baseline of 37 papers to a peak of 108 publications. This pattern weaknesses established that empirical concern for mental well-being transitioned from

a localized clinical interest into a global institutional priority, fundamentally positioned as a prerequisite for workplace performance and daily life sustenance. The programmatic co-word matrix further deconstructs this domain into a multi-layered ecosystem through its six visual clusters, which mapped baseline vulnerabilities like anxiety, depression, and financial stress (Clusters 1 & 2), occupational friction like burnout, workload, and technological stress (Clusters 3 & 6), and cognitive-behavioral intervention pathways like mindfulness and counselling (Clusters 4 & 5). More importantly, synthesizing these visual bibliometric patterns with an in-depth literature review exposed four critical research voids.

Evidence on psychological health research revealed a mature but conceptually fragmented field, where most studies focused on descriptive and outcome-based approaches rather than explanatory theoretical development in bibliometric analysis. Psychological health was repeatedly operationalized merely as a dependent variable or ultimate outcome (typically in relation to stress, burnout, depression, and general well-being), without sufficient attention to its function as a vital mechanism within workplace processes. This reflected a fundamental theoretical limitation: existing scholarship explained what outcomes occurred but failed to clarify how and through which internal processes workplace conditions translated into behavioral consequences. Furthermore, despite the visible emergence of occupational stressors across the clusters and integration with emerging digital stressors remained heavily underdeveloped (La Torre et al., 2019; Shin & Shin, 2024; Wang & Yao, 2025).

Next, the bibliometric mapping exposed a severe geographical and contextual bias. The literature was heavily dominated by developed economies such as the United States (369 articles), the United Kingdom (129 articles), and Australia (105 articles), while empirical evidence from developing contexts, particularly Southeast Asia and Malaysia, remained highly limited and under-theorized (Lin & Yu, 2025; Nazri et al., 2024). Even where psychological health was examined in organizational settings, it was largely treated as a generic, flat construct detached from sector-specific realities. This was highly problematic for employees in local commercial banks within the Klang Valley who operated under continuous digital surveillance, rapid system updates, and intense fintech-driven performance pressures, which extant models failed to adequately capture.

Appendices M and N about the density and overlay visualization confirmed that while recent studies acknowledged psychological strain in the context of COVID-19 and hybrid work arrangements (inhabiting highly dense, bright yellow regions), this focus created a narrow, situational temporal framing. This framing overlooked the longer-term implications of sustained digitalization (Banerjee & Gupta, 2024; Salzmann-Erikson et al., 2024). The post-pandemic workplace was no longer characterized by temporary disruption, but by a permanent digital integration driven by IR4.0 and advanced technologies such as AI, fintech systems, and automation (Schwab, 2017; Lee & Shin, 2018). Yet, extant models failed to theorize this structural shift adequately, particularly regarding how continuous technostress exposure chronically affected psychological health and subsequently disrupted work-life balance.

Accordingly, the present study addressed these deficiencies by positioning psychological health as an active mediating mechanism rather than a passive result, challenging existing fragmented models and advancing a more structurally coherent explanation of employee well-being in highly digitalized work environments.

2.7.2 Overview of Psychological Health

The adverse effects of technostress creators on human health can be understood as a progressive continuum, beginning with psychological impairment in the early stage and potentially extending to physiological and behavioural consequences when exposure becomes chronic. Psychological health, as defined by the World Health Organization (WHO, 2005), refers to a state of well-being in which individuals can realize their abilities, cope with normal life stressors, and function productively. In contemporary digital workplaces, this definition increasingly extends to employees' ability to manage technology-related demands, including emotional regulation, cognitive flexibility, and adaptive capacity in the face of continuous digital change (Tarafdar et al., 2019; Molino et al., 2020).

Early technostress literature conceptualized psychological health mainly through cognitive disruption indicators such as reduced attention, decision-making difficulties, and sleep disturbance. Brillhart (2004), identified memory impairment, sleep interruption, and persistent work-related rumination as early signs of technostress exposure. More recent empirical studies reinforce this perspective by

showing that digital overload contributes significantly to anxiety, emotional exhaustion, and reduced cognitive functioning (Shen & Kuang, 2022; Spagnoli et al., 2023). However, a key limitation across these studies is the heavy reliance on self-reported psychological symptoms, with limited integration of physiological or longitudinal health indicators, thereby restricting causal inference.

Psychological distress has consistently been associated with reduced work performance and weakened career sustainability. Zulkefly (2013), identified depression as a key indicator of declining psychological health, while Latiff et al. (2014), classified workplace stressors into social-psychological and work adaptation categories. However, these frameworks largely predate digital transformation and do not explicitly incorporate technology as a structural stressor. This represents a theoretical gap, as modern work environments are increasingly shaped by continuous technological disruption rather than traditional organizational stressors alone.

Recent studies have expanded this understanding by incorporating positive psychology perspectives. Kotera et al. (2020), argued that psychological health is not merely the absence of illness but also the presence of resilience, optimism, and adaptive coping. Similarly, Beattie et al. (2019), emphasized that psychological disorders are closely linked to reduced concentration, poor help-seeking behaviour, and workplace disengagement. However, these studies still largely treat mental health as an individual-level construct, with limited consideration of technological and organizational determinants such as technostress creators.

A growing body of literature highlights a contradiction in organizational responses to mental health. While, Moulton-Perkins et al. (2019), found that individuals experiencing psychological distress often exhibit lower resilience and reduced well-being, Magson et al. (2021), reported that many organizations still fail to provide adequate mental health support systems, particularly in high-pressure sectors such as banking and education. This indicates a systemic gap between awareness and implementation of mental health strategies in workplaces undergoing digital transformation.

Furthermore, Rusmingsih et al. (2021), highlighted a disconnect between mental health knowledge and practical workplace application, suggesting that employees often lack structured guidance in managing psychological strain. However, this argument remains largely conceptual, with limited empirical evaluation of mental

health intervention effectiveness in reducing technostress outcomes. Similarly, Moulton et al. (2019), noted employer reluctance to address mental health issues due to productivity concerns and stigma, although this varies significantly across organizational cultures and national contexts.

From a conceptual standpoint, mental health is increasingly viewed as a multidimensional construct encompassing psychological, physical, and social well-being (Lutwak, 2024; Agnafors et al., 2021). This broader perspective suggests that organizations should not only aim to reduce distress but also actively promote psychological growth. However, most technostress research still adopts a deficit-based approach, focusing on negative outcomes such as anxiety, burnout, and depression rather than positive psychological functioning such as resilience and engagement.

Cross-cultural evidence further indicates that psychological responses to stress are context dependent. Kotera et al. (2020), demonstrated that predictors of psychological health vary across cultural contexts, were job engagement and self-compassion influence mental health differently across populations. This suggests that mental health outcomes related to technostress may not be universal but shaped by cultural and organizational environments. However, most technostress studies remain concentrated in Western contexts, limiting generalizability to developing countries such as Malaysia, where banking employees face unique digital transformation pressures, hierarchical structures, and compliance demands.

Finally, although positive psychology has been widely promoted as a framework for enhancing workplace well-being (Glazzard, 2019; Obeagu & Akinleye, 2024), its integration into technostress research remains limited. There is still a lack of empirical studies linking positive psychological constructs such as psychological capital, resilience, and optimism with technostress creators such as techno-uncertainty and techno-insecurity. This represents a significant theoretical gap in understanding how employees can not only cope with but also thrive in digitally intensive work environments.

2.8 Technostress Creators and Psychological Health

Technostress has been widely recognized as a significant psychological and occupational phenomenon arising from continuous interaction with rapidly evolving digital technologies. According to Tarafdar et al. (2011), the effects of technostress

become particularly evident in modern workplaces where employees are increasingly required to engage with complex and continuously updated technological systems. Recent systematic reviews further confirm that technostress is no longer limited to psychological strain alone but also extends to physiological health outcomes and work-life imbalance, although the conceptual boundaries between these outcomes remain inconsistently defined in the literature (Tarafdar et al., 2019; Kumar et al., 2024).

Early studies, such as Okebaram and Moses (2013), conceptualized technostress as a psychological response manifested through negative self-perception, cognitive strain, and psychosomatic symptoms. However, more recent empirical evidence suggests that these effects are more complex and multidimensional, involving both psychological and physiological pathways, including sleep disruption, fatigue, and stress-related somatic disorders (Galluch et al., 2015; Tams et al., 2014; Spagnoli et al., 2023). This indicates a conceptual shift from purely psychological interpretations toward a biopsychosocial understanding of technostress outcomes. Nevertheless, most studies still rely heavily on self-reported measures, limiting the ability to capture objective physiological consequences.

Oluwagbemi et al. (2011), highlighted that the increasing use of integrated digital systems, databases, and internet technologies in banking environments creates significant workload strain among employees. While this study emphasizes operational stress, it does not differentiate between workload related stress (techno-overload) and uncertainty-based stress (techno-uncertainty), which reduces theoretical precision. Similarly, Salanova et al. (2013), argued that although technology improves efficiency, it simultaneously generates resistance behaviours and psychological strain. However, a contradiction emerges in the literature, as other studies suggest that digital tools may enhance job satisfaction and performance when adequate training and support are provided (Molino et al., 2020; De Clercq et al., 2024). This inconsistency indicates that technostress outcomes are highly contingent on organizational context rather than being universally negative.

The evolution of digital technology has further intensified technostress exposure. Modern technologies such as smartphones, cloud systems, and social media platforms have eliminated traditional boundaries between work and personal life, increasing employees' constant connectivity (Julia & Rothlauf, 2022; Hsiao, 2017).

While this enhances flexibility, it also increases psychological pressure due to expectations of continuous availability. Stana and Nicolajsen (2021), further argue that such boundaryless work environments lead to higher emotional exhaustion and reduced recovery time. However, these studies often assume uniform employee adaptability, neglecting individual differences such as digital literacy, age, and organizational support systems.

A key theoretical gap in the literature concerns the inconsistent operationalization of technostress outcomes. While, Galluch et al. (2015), and Tams et al. (2014), identified physiological symptoms such as headaches, insomnia, and muscle tension, Maier et al. (2015), focused more on psychological outcomes such as anxiety, helplessness, and technophobia. Recent meta-analytical evidence also confirms that technostress significantly predicts burnout, reduced well-being, and impaired cognitive functioning, but the magnitude of these effects varies across contexts and measurement approaches (Spagnoli et al., 2023; Tarafdar et al., 2019). This indicates a lack of standardization in measurement models, which limits comparability across studies.

Furthermore, Camarena and Fusi (2022), define technostress as stress resulting from socio-technical changes; however, this broad definition does not clearly separate different stress mechanisms such as system complexity, technological uncertainty, and connectivity pressure. This conceptual ambiguity remains a major limitation in the field, as most empirical studies still aggregate technostress creators into a single construct, reducing explanatory power (La Torre et al., 2019; Tarafdar et al., 2019).

Recent literature also highlights a critical contradiction regarding employee adaptation. While early studies framed resistance to technology as a lack of competence (Bausch et al., 2024), more recent research suggests that resistance may actually reflect psychological overload and inadequate organizational support rather than individual weakness. This shifts the theoretical interpretation from individual blame to structural and organizational responsibility.

From a health perspective, technostress is now widely recognized as both a psychological and physiological stressor. Srivastava et al. (2015), conceptualize stress as an adaptive response to environmental demands, while recent studies confirm that prolonged exposure to technostress leads to both mental health deterioration and physical symptoms such as fatigue, insomnia, and musculoskeletal pain (Galluch et

al., 2015; Tams et al., 2014; Wang & Yao, 2025). However, most existing studies remain cross-sectional, limiting causal inference and failing to capture long-term physiological effects.

Overall, although there is strong empirical evidence linking technostress to psychological and physiological health outcomes, the literature remains fragmented due to inconsistencies in conceptual definitions, measurement approaches, and contextual applications. Therefore, further research is required to develop an integrated model that clearly distinguishes between technostress creators and their differential impacts on employee health, particularly in high-digital dependency sectors such as banking.

2.8.1 The Relationship Between Techno-Overload and Psychological Health

Long-term interaction with digital technologies has been widely recognised as both an enabler of productivity and a source of psychological strain in contemporary workplaces. While technology facilitates efficiency, automation, and improved communication, it simultaneously increases job demands, time pressure, and emotional exhaustion among employees. Recent studies confirm that digital work intensification contributes to workload escalation, declining health, and increased work-family interference (Wang et al., 2020; Yang et al., 2020; Spagnoli et al., 2023). This dual effect highlights a fundamental contradiction in the literature: technology is designed to reduce work effort, yet in practice it often increases perceived work pressure.

Within the technostress framework, techno-overload is defined as a condition in which technology forces employees to work faster, longer, and beyond their normal capacity (Ragu-Nathan et al., 2008; Tarafdar et al., 2011). Unlike techno-uncertainty or techno-insecurity, techno-overload specifically focuses on quantitative work intensification. However, a key limitation in existing studies is the tendency to treat techno-overload as an isolated construct, despite its strong interdependence with other technostress creators. Recent reviews argue that failing to integrate technostress dimensions leads to fragmented theoretical explanations and weak predictive validity (Tarafdar et al., 2019; La Torre et al., 2019).

Empirical evidence consistently shows that techno-overload is associated with psychological strain and deteriorating health outcomes. Molino et al. (2020), found that excessive technological demands significantly contribute to sleep disturbances, anxiety, and reduced well-being. Similarly, Dragano and Lunau (2020), argue that digitalised work environments increase psychosocial demands such as workload pressure, role conflict, and blurred work-life boundaries, leading to chronic stress responses. However, these studies primarily assume a direct linear relationship between techno-overload and health outcomes, without adequately considering mediating psychological mechanisms such as emotional exhaustion or coping resources.

A critical contradiction exists in the literature regarding the strength and universality of this relationship. Chesley (2014), found a strong direct link between workplace technology use and psychological distress, suggesting a straightforward overload-stress pathway. In contrast, more recent studies indicate that the impact of techno-overload is highly contingent on contextual factors such as digital literacy, job autonomy, and organizational support systems (Molino et al., 2020; De Clercq et al., 2024). This suggests that techno-overload does not uniformly produce negative outcomes, but its effects may vary depending on employees' internal and external resources.

From a theoretical perspective, techno-overload increases cognitive load by requiring employees to process more information in less time, resulting in emotional exhaustion and reduced recovery capacity. Wang et al. (2020) and Yang et al. (2020), further explain that increased technological demands create time pressure and work intensification, which negatively affect employees' psychological well-being. Recent evidence also supports that prolonged exposure to such conditions is linked to depressive symptoms, burnout, and chronic stress (Stich et al., 2019; Spagnoli et al., 2023). However, most of these studies are cross-sectional, limiting causal interpretation and preventing understanding of long-term health deterioration patterns.

Another important gap is the limited integration of physiological health outcomes. While psychological consequences such as anxiety and burnout are well documented, fewer studies examine physical manifestations such as fatigue, insomnia, and musculoskeletal disorders, despite emerging evidence that digital work overload also affects physiological health systems (Dragano & Lunau, 2020; Molino et al.,

2020). This indicates an imbalance in technostress research, where psychological outcomes are overemphasized compared to physical health consequences.

In addition, most techno-overload studies are conducted in Western or general organizational contexts, with limited focus on highly digitalised sectors such as banking. This is a significant gap because banking employees operate in environments characterised by real-time systems, strict compliance requirements, and continuous digital monitoring. Therefore, findings from general workplaces may not fully capture the intensity of techno-overload experienced in banking institutions.

Overall, the literature strongly supports the argument that techno-overload is a significant technostress creators that negatively affects employees' psychological and physiological health. However, inconsistencies in conceptualization, measurement, and contextual application suggest that this relationship is not yet fully understood. Therefore, further research is needed to develop an integrated model that explains not only the direct effects of techno-overload but also the mediating and moderating mechanisms that shape employee health outcomes.

Hypotheses Development

H2a There is a relationship between techno-overload and psychological health.

2.8.2 The Relationship Between Techno-Invasion and Psychological Health

The rapid transformation associated with the "Age of Technology" has fundamentally reshaped modern work environments, intensifying employees' exposure to technostress and continuous connectivity demands. While digital technologies enhance organizational efficiency and communication speed, they simultaneously increase psychological pressure by blurring the boundaries between work and personal life. Recent studies indicate that although some employees adapt effectively to digitalisation, many have trouble coping with constant connectivity demands, resulting in heightened stress, reduced psychological recovery, and impaired well-being (Jinnan et al., 2020; Spagnoli et al., 2023; De Clercq et al., 2024).

A key phenomenon underpinning this issue is techno-invasion, where technology enables work to intrude into employees' private lives through emails, instant messaging, and virtual meetings. Jinnan et al. (2020), argue that employees are increasingly expected to remain accessible beyond working hours, creating a

perception of “always-on” availability. This aligns with boundary theory, which suggests that blurred boundaries between work and non-work domains reduce psychological detachment and recovery time. However, an important contradiction exists in the literature: while some studies suggest that digital connectivity enhances flexibility and work autonomy (Molino et al., 2020), others demonstrate that it increases stress and work-life conflict (Tarafdar et al., 2018; Spagnoli et al., 2023). This indicates that the impact of techno-invasion is not universally negative but depends on contextual and individual factors such as job control and organizational culture.

From a technostress perspective, Tarafdar et al. (2011; 2018), conceptualize techno-invasion as a stress creator that forces employees to extend work activities into non-work time, thereby reducing recovery opportunities. Empirical evidence supports this argument, showing that excessive after-hours connectivity leads to sleep disturbance, fatigue, and psychological strain (Molino et al., 2020; Dragano & Lunau, 2020). However, most studies focus primarily on psychological outcomes, while physiological consequences such as long-term sleep disorders, cardiovascular strain, and chronic fatigue remain underexplored. This represents a significant gap in the literature.

In addition, Alam (2016), found that constant mobile connectivity increases work pressure and reduces employees’ ability to disengage from work-related tasks. Similarly, Tarafdar et al. (2018), reported that continuous technology use outside working hours is associated with deteriorating health conditions, including insomnia, headaches, and emotional exhaustion. Nevertheless, these studies largely adopt cross-sectional designs, limiting causal inference and failing to capture long-term effects of sustained techno-invasion.

A further limitation in existing research is the lack of integration between organizational expectations and employee well-being outcomes. Jinnan et al. (2020), highlight that many organizations implicitly encourage constant availability to meet performance targets, which normalizes after-hours connectivity. However, few studies critically examine how organizational culture, leadership expectations, and digital monitoring systems reinforce techno-invasion behaviours. This reflects a theoretical gap in understanding technology not only as a tool but also as a structural mechanism of control.

Moreover, Simons et al. (2017), emphasize that employee health and resilience are critical determinants of sustainable work performance. However, resilience is rarely integrated into techno-invasion models, despite its potential role in buffering negative outcomes. This suggests that existing frameworks are overly focused on stress outcomes, with limited attention to protective psychological resources.

Recent evidence further supports the negative consequences of techno-invasion on employee well-being. Spagnoli et al. (2023), found that digital intrusion into personal life significantly predicts burnout and reduced recovery capacity. Similarly, De Clercq et al. (2024), highlight that poor boundary management between work and personal life increases emotional exhaustion and psychological strain, particularly in digitally intensive work environments. However, these relationships are still under-researched in developing country contexts, particularly in banking sectors where digital transformation and remote accessibility are rapidly expanding.

In summary, the literature consistently indicates that techno-invasion contributes to blurred work-life boundaries, which in turn negatively affect employees' psychological and physiological health. However, inconsistencies in findings, limited consideration of moderating factors, and insufficient integration of organizational and resilience perspectives suggest that the relationship is not yet fully understood. Therefore, a more comprehensive model is required to explain how techno-invasion translates into health deterioration through work-life boundary disruption mechanisms.

Hypotheses Development

H2b There is a relationship between techno-invasion and psychological health.

2.8.3 The Relationship Between Techno-Complexity and Psychological Health

Changes in individuals' work environments, particularly those driven by technological transformation, have been widely recognised as critical determinants of employee well-being and health outcomes. Contemporary research suggests that employee well-being is shaped not only by organizational policies but also by employees' ability to adapt to continuous technological changes. Although organizations increasingly implement strategies such as job autonomy, participation,

and flexible work design to enhance employee well-being, the effectiveness of these interventions remains inconsistent depending on technological complexity and employees' digital readiness (Ajaz et al., 2020; De Clercq et al., 2024).

From an organizational efficiency perspective, the adoption of new technology-based systems is generally associated with improvements in productivity, communication speed, and operational accuracy. Ma et al. (2021), argue that digital systems enable employees to perform tasks more efficiently and reduce manual workload. However, a critical contradiction emerges in the literature: while technology enhances organizational performance, it simultaneously increases employee cognitive load and learning pressure. This paradox highlights a fundamental tension between organizational efficiency gains and employee well-being losses, which remains insufficiently addressed in prior research.

A key issue arises during system implementation and technological upgrades, where employees are required to rapidly acquire new technical competencies. Hang et al. (2022), found that although technical training improves system usability, employees often experience increased psychological strain due to continuous learning demands and time pressure. This supports the argument that technological advancement is not inherently beneficial, but its impact depends heavily on organizational support systems and employee adaptability.

However, a major limitation in existing literature is the tendency to conceptualize technological change primarily as a performance enhancing mechanism rather than a psychological stressor. This creates a theoretical gap in explaining how repeated exposure to system upgrades generates cumulative strain over time. In contrast, technostress theory suggests that continuous technological change leads to cognitive overload, uncertainty, and emotional exhaustion, which negatively affect employee well-being (Tarafdar et al., 2014; Tarafdar et al., 2019; Molino et al., 2020).

In the banking sector, these challenges are more pronounced due to frequent system upgrades driven by cybersecurity requirements, regulatory compliance, and digital transformation initiatives. Banks operate in highly dynamic technological environments where employees are expected to continuously adapt to new systems. This creates a persistent learning burden, particularly for employees with lower digital literacy. As a result, employees often extend their working hours to cope with system changes, reducing their recovery time and increasing fatigue.

Empirical studies consistently show that prolonged exposure to technological demands negatively affects psychological and physiological health. Tarafdar et al. (2014), found that excessive engagement with new technological systems is associated with sleep disturbances, headaches, and reduced psychological well-being. More recent studies confirm that continuous digital adaptation contributes to emotional exhaustion, cognitive fatigue, burnout, and reduced recovery capacity among employees (Spagnoli et al., 2023; Molino et al., 2020; Wang & Yao, 2025).

Nevertheless, a significant contradiction exists in the literature. While some studies suggest that technology adoption enhances employee empowerment, efficiency, and job control, others demonstrate that it increases stress and health deterioration. This inconsistency indicates that the effects of technological change are not universally positive or negative but are contingent on moderating factors such as training quality, organizational support, leadership style, and digital competence (Ajaz et al., 2020; De Clercq et al., 2024). However, most existing studies do not empirically test these boundary conditions, resulting in incomplete theoretical explanations.

Another key gap is the limited integration between technological competence development and health psychology outcomes. Most studies measure technical competence in terms of system usage efficiency, while psychological outcomes such as stress, sleep quality, and emotional exhaustion are treated separately. This fragmentation limits understanding of how technical learning demands translate into health deterioration mechanisms.

Recent evidence further supports that employee well-being is strongly influenced by the ability to manage technological demands. Employees with lower digital readiness are more likely to experience prolonged working hours, sleep disruption, and psychosomatic symptoms such as fatigue and musculoskeletal pain (Hang et al., 2022; Spagnoli et al., 2023). However, most studies rely on cross-sectional designs, limiting causal inference and failing to capture long-term adaptation processes.

Overall, the literature suggests that technological change in organizations has both enabling and disabling effects on employees. While it enhances efficiency and operational performance, it simultaneously imposes psychological and physiological burdens when employees are required to continuously adapt to evolving systems. Therefore, a more integrated framework is required to explain how technological

change influences employee well-being through cognitive overload, learning demands, and work intensification mechanisms.

Hypotheses Development

H2c There is a relationship between techno-complexity and psychological health.

2.8.4 The Relationship Between Techno-Insecurity and Psychological Health

The rapid and continuous advancement of digital technology has intensified the phenomenon of technostress in contemporary workplaces, particularly in sectors that are highly dependent on information systems such as banking. Technostress is increasingly recognised as a multidimensional construct arising from technology-related demands such as overload, invasion, complexity, insecurity, and uncertainty, all of which contribute to psychological strain and reduced employee well-being (Tarafdar et al., 2011; Tarafdar et al., 2019). Recent evidence further confirms that digital transformation is associated with increased stress, anxiety, and sleep disruption among employees, especially when technological demands extend beyond working hours and into personal life (Spagnoli et al., 2023; Adaptavist, 2025).

Empirical studies further demonstrate that technostress is strongly associated with adverse psychological and physiological outcomes. For example, prolonged exposure to digital work demands has been linked to anxiety, sleep disorders, headaches, and emotional exhaustion (Tarafdar et al., 2018; Maier et al., 2015). A recent meta-level observation by Spagnoli et al. (2023), confirms that technostress significantly predicts burnout and reduced work engagement, particularly when employees lack organizational support. Similarly, De Clercq et al. (2024), found that technostress reduces employee well-being by weakening psychological resilience and increasing emotional strain.

However, a key limitation in existing literature is the inconsistent conceptualisation of technostress outcomes. While some studies treat technostress as purely negative, emerging evidence suggests that its effects may vary depending on contextual and organisational factors. For instance, under strong organisational support, technostress may be perceived as a challenge that enhances performance rather than purely a stressor (Khalequzzaman et al., 2025; Tarafdar et al., 2019). This

creates a contradiction in the literature regarding whether technostress is always detrimental or context dependent.

Another important gap is the measurement and conceptual overlap between technostress dimensions and job insecurity constructs. Studies often fail to clearly distinguish techno-insecurity from general job insecurity, despite techno-insecurity being specifically related to fear of technological replacement and skill obsolescence (Ghislieri et al., 2024). This conceptual ambiguity has led to inconsistent empirical findings, with some studies reporting strong negative effects on well-being, while others find weak or non-significant relationships (Hambantota banking study by Jones, & Hameiri, 2021).

Within the banking sector, technostress is particularly critical due to rapid digitalisation, cybersecurity requirements, and continuous system upgrades. Employees are often required to adapt quickly to new systems while maintaining service efficiency, resulting in extended working hours and increased cognitive load (Embi, 2007; Owusu et al., 2016). Recent studies also highlight that digital transformation in banking significantly increases workload intensity and psychological strain, especially in developing economies where training and technological readiness are still evolving (Bank Negara Malaysia, 2023; Ayyagari et al., 2023).

A growing body of recent evidence also suggests that technostress is no longer limited to work hours but extends into employees' personal lives through mobile technology and remote connectivity. This "always-on" culture has been shown to significantly disrupt sleep quality, increase anxiety, and weaken work-life boundaries (Jinnan et al., 2020; Alam, 2016; Adaptavist, 2025). Consequently, employees experience reduced psychological recovery time, which directly contributes to deteriorating health outcomes and work-life imbalance (Simons et al., 2017).

Despite strong empirical support, a major research gap remains in terms of context-specific evidence in developing countries such as Malaysia, particularly in the banking sector. Most existing studies are conducted in Western or general organisational settings, limiting the generalisability of findings. Furthermore, there is insufficient longitudinal research examining causal pathways between technostress and health outcomes, as most studies rely on cross-sectional designs.

Overall, the literature consistently indicates that technostress is a significant organizational stressor that negatively affects employee psychological health, physical well-being, and work-life balance. However, contradictions in findings and limitations in conceptual clarity suggest that further research is needed to refine theoretical boundaries and examine contextual moderators such as organisational support, digital readiness, and job design.

Hypotheses Development

H2d There is a relationship between techno-insecuirty and psychological health.

2.8.5 The Relationship Between Techno-Uncertainty and Psychological Health

Employees experience technological stress when they are unable to adapt effectively to continuous changes in organizational information systems. In contemporary digital workplaces, especially in banking institutions, technology has evolved from being a supportive tool to a core structural requirement that governs work processes, communication flow, and performance monitoring. While digital systems enhance efficiency and connectivity, they simultaneously create continuous adaptation pressure, requiring employees to constantly update their skills and competencies (Tarafdar et al., 2019; Spagnoli et al., 2023).

In banking environments, frequent system upgrades, cybersecurity updates, and digital transformation initiatives intensify employees' cognitive and emotional demands. These changes often generate a situation where employees must continuously learn new systems under time pressure, creating a form of "permanent learning condition" that may exceed individual coping capacity. Recent studies suggest that such continuous adaptation requirements are strongly associated with psychological strain, reduced recovery time, and increased work-family conflict (De Clercq et al., 2024; Molino et al., 2020).

This phenomenon can be explained through resource depletion mechanisms, where employees continuously invest time, energy, and cognitive effort to cope with technological demands. Over time, this reduces available personal resources, resulting in fatigue, emotional exhaustion, and weakened psychological well-being (Hobfoll et al., 2018; Maier et al., 2015). In contrast to earlier assumptions that digital

transformation enhances employee efficiency, recent evidence highlights its dual effect, where productivity gains are accompanied by increased psychological cost.

Empirical studies consistently demonstrate that continuous technological updates negatively affect employee health outcomes. For example, Abasiama et al. (2021), found that frequent system changes in banking environments contribute to sleep disruption, chronic stress, and physical health complaints. Similarly, Ghislieri et al. (2017), reported that continuous digital demands reduce psychological well-being by increasing workload intensity and reducing recovery opportunities. More recent evidence by Spagnoli et al. (2023), further confirms that technostress significantly predicts burnout, emotional exhaustion, and reduced work engagement, particularly in high-demand digital workplaces.

However, a critical contradiction exists in the literature. While many studies highlight the negative consequences of technological adaptation pressure, other studies suggest that continuous learning opportunities can improve employee competence, employability, and career development (Ma et al., 2021; Molino et al., 2020). This indicates that the impact of technological change is not inherently negative but depends on contextual factors such as organizational support, training quality, and employee digital readiness. Nevertheless, most studies have not empirically tested these moderating mechanisms, resulting in an incomplete understanding of when technostress becomes harmful versus beneficial.

Another important gap is the lack of conceptual clarity between technostress, workload stress, and adaptation stress. Many studies fail to distinguish whether employee strain is caused by increased job demands or specifically by technology-induced change. This conceptual overlap reduces measurement precision and weakens theoretical development in technostress research (Elbir, 2026; Malik, 2025).

In addition, employees in technology-intensive sectors such as banking are often required to attend continuous training sessions and adapt to frequent system upgrades. While intended to improve performance, these requirements often extend working hours and intrude into personal time, leading to blurred work-life boundaries. This “always-learning and always-connected” environment contributes to reduced sleep quality, increased fatigue, and deteriorating physical health (Ghislieri et al., 2017; Jinnan et al., 2020; Adaptavist, 2025).

Recent large-scale industry evidence further supports this trend, showing that digital overload and notification pressure significantly increase anxiety, stress, and intention to leave among employees (Microsoft, 2024). This reinforces the argument that technostress is no longer limited to work tasks but extends into employees' personal lives, intensifying work-life imbalance.

Despite strong empirical evidence, two key research gaps remain. First, most studies are conducted in Western or general organizational contexts, limiting applicability to developing countries such as Malaysia. Second, most research relies on cross-sectional data, making it difficult to establish causal relationships between technology adaptation and health outcomes.

Overall, the literature consistently indicates that continuous technological adaptation increases psychological and physical strain among employees. However, inconsistencies in conceptual definitions, measurement approaches, and contextual application suggest that further research is needed to clarify how technological change translates into employee health outcomes, particularly in banking environments undergoing rapid digital transformation.

Hypotheses Development

H2e There is a relationship between techno-uncertainty and psychological health.

2.9 Psychological Health and Work-life Balance

Psychological health has been widely recognized as a critical factor influencing employees' work-life balance, job satisfaction, and organizational effectiveness. However, the literature reveals substantial variation in how psychological health is conceptualized and measured. Kossek et al. (2020), emphasized that psychologically healthy employees are better able to manage work schedules, maintain role boundaries, and achieve higher job satisfaction. Their argument positions psychological health as an internal resource that strengthens employees' capacity to balance work and personal responsibilities. Similarly, Ficapal-Cusi et al. (2025), argued that work-life balance improves not only job satisfaction and organizational commitment, but also family satisfaction, life satisfaction, and psychological well-being, while reducing stress related outcomes such as emotional

exhaustion, anxiety, and depression. They conceptualized work-life balance through two dimensions: effective engagement in work and non-work roles and minimal inter-role conflict.

Nevertheless, a critical contradiction exists in the literature regarding whether psychological health should be treated as an antecedent or an outcome of work-life balance. Earlier organizational studies generally positioned psychological health because of work-life imbalance, where excessive demands produce stress and emotional exhaustion. In contrast, more recent studies increasingly conceptualize psychological health as a predictor of work-life balance, suggesting that employees with stronger emotional resilience and mental stability are better able to manage competing life roles. For example, recent evidence by Han et al. (2025), found that workplace digitization influences employee well-being through job demands and digital anxiety, demonstrating that psychological health functions as an active mediating mechanism rather than merely a passive outcome. This shift indicates theoretical progression but also reveals inconsistency in model direction across studies.

Furthermore, many studies still operationalize psychological health narrowly as the absence of stress, anxiety, and burnout, while recent research adopts a broader perspective including emotional regulation, resilience, well-being, and cognitive functioning. Gazi et al. (2025), examined psychological health from a clinical mental health perspective, linking poor mental health to insomnia, anxiety, depression, irritability, emotional instability, poor decision-making, and reduced problem-solving capacity. This differs significantly from management studies where psychological health is treated as a workplace resource that enhances performance and commitment. Such conceptual inconsistency weakens construct validity and creates difficulty in comparing findings across sectors. Therefore, future research must clarify whether psychological health should be measured as psychological distress, psychological well-being, or a multidimensional construct integrating both dimensions.

The issue becomes more relevant in technology-intensive sectors such as banking, where employees are exposed to constant digital monitoring, system upgrades, performance pressure, and techno-invasion. These technology-related demands may intensify psychological strain and reduce employees' ability to maintain work-life boundaries. Recent studies found that multitasking and increased job stress

significantly reduce workplace well-being, while job autonomy helps buffer these effects (Wei et al., 2025). Similarly, job stress has been shown to increase psychological withdrawal behaviors and reduce employees' psychological presence at work, further affecting both performance and life satisfaction (Akaighe et al., 2025). Despite this evidence, most prior studies focus on healthcare, education, and IT sectors, with limited empirical investigation in the banking industry, particularly in developing countries such as Malaysia. This represents an important contextual gap because banking employees experience unique techno-stressors that differ from those in other service sectors.

National evidence also reinforces the urgency of examining psychological health in employment settings. The National Health and Morbidity Survey conducted by the Ministry of Health Malaysia (2015), reported that mental health problems were highest among younger adults aged 16-24 years, indicating that younger employees entering the workforce may be more vulnerable to stress and psychological imbalance. The World Health Organization defines mental health as a state in which individuals realize their potential, cope with normal life stress, work productively, and contribute to society. This definition positions psychological health not merely as the absence of illness, but as a productive organizational resource. However, these foundational reports predate the rapid expansion of hybrid work, remote monitoring, and digital fatigue after Covid-19. Therefore, older mental health statistics may underestimate current workplace psychological strain, particularly in highly digitized industries.

Anxiety and insomnia further demonstrate how compromised psychological health directly affects work-life balance. Constant exposure to work demands, especially through after-hours digital connectivity, often creates anticipatory sleep anxiety and chronic insomnia. In banking environments where employees remain accessible beyond formal working hours, sleep disturbance becomes a hidden but serious work-life balance issue. Espie et al. (2019), found that reducing insomnia significantly improves functional health status, emotional well-being, and psychological health. However, most studies treat insomnia as an outcome rather than a mediating mechanism linking workplace stressors to work-life balance. This theoretical gap limits understanding of how psychological strain translates into broader work-life disruption.

Another important gap concerns methodological limitations. Much of the existing literature relies on cross-sectional self-reported data, making causal interpretation difficult. Few studies apply longitudinal or sector-specific designs to examine how psychological health evolves over time under sustained technological pressure. This is particularly problematic in the banking sector, where rapid digital transformation may create cumulative psychological strain rather than short-term stress reactions. Without longitudinal evidence, it remains unclear whether psychological health deterioration causes poor work-life balance or whether poor work-life balance gradually weakens psychological health.

Therefore, although the relationship between psychological health and work-life balance is strongly supported in the literature, several unresolved issues remain inconsistent conceptual definitions, contradictory causal directions, limited banking-sector evidence, insufficient post-pandemic investigation, and weak theoretical explanation of mediating mechanisms such as anxiety and insomnia. These gaps justify the present study in examining psychological health as a significant predictor of work-life balance among banking employees. The link between variables is theoretically strong and empirically supported, providing a clear rationale for hypothesis development.

Hypotheses Development

H3a There is a relationship between psychological health and work-life balance.

2.10 Psychological Health as a Mediator

Psychological health has increasingly been recognized as a significant mediating mechanism explaining how technology-related work demands influence employees' work-life balance (Kossek et al., 2020; Han et al., 2025). However, previous studies differ substantially in how psychological health is conceptualized, measured, and applied. Earlier studies largely focused on sleep quality as a physiological outcome of work intrusion (Adam & Kisler, 2013; Thomee et al., 2011), whereas more recent studies extend the concept to include anxiety, depression, emotional exhaustion, digital anxiety, and cognitive fatigue (Han et al., 2025; Wei et al., 2025). This evolution is important because it shifts psychological health from

being treated merely as a health consequence to functioning as an explanatory mechanism through which technostress affects employees' personal and professional lives (Sirgy & Lee, 2018; Gazi et al., 2025).

Adam and Kisler (2013), found that employees who wake up to answer work-related phone calls, emails, and text messages experience significantly lower sleep quality, which subsequently predicts higher levels of depression and anxiety. Their findings suggest that sleep quality functions as an indirect pathway linking technology intrusion to reduced well-being and poorer work-life balance. This supports mediation because the effect of technology does not occur directly; rather, it operates through psychological strain created by disrupted recovery processes (Espie et al., 2019). Similarly, Thomee et al. (2011), explained that sleep is an essential biological mechanism for mood regulation, and frequent smartphone use increases the risk of stress, sleep disturbances, and depressive symptoms. Their longitudinal evidence strengthens the argument that technology-induced sleep disruption contributes to deteriorating psychological health over time rather than being a temporary condition. Recent support by Cheng et al. (2024), further confirmed that improving insomnia significantly enhances functional health status, emotional well-being, and psychological health.

However, contradictions exist regarding whether sleep quality alone is sufficient to explain the mediation effect or whether broader psychological health dimensions, such as anxiety and depression, provide stronger explanatory power. Fang et al. (2024) and Freeman et al. (2020), strongly supported the relationship between poor sleep quality and depression, suggesting that sleep disturbance is the primary psychological pathway. In contrast, Adam and Kisler (2013), found weaker support for the relationship between sleep quality and anxiety, while stronger evidence was found between sleep quality and stress. More recent studies support this multidimensional view by showing that digital stress may trigger anxiety even without severe sleep disruption, particularly in highly monitored workplaces (Han et al., 2025). This inconsistency indicates that psychological health is multidimensional, and that depression, anxiety, and stress may respond differently to sleep disruption. Therefore, measuring psychological health as a single construct without distinguishing its dimensions may weaken construct validity and theoretical precision (Kossek et al., 2020; Gazi et al., 2025).

Recent literature further strengthens the mediating role of psychological health by introducing digital anxiety as a modern psychological response to workplace technology. Han et al. (2025), found that workplace digitization influences employee well-being through the mediating roles of job demands and digital anxiety, where constant connectivity, system dependency, and digital monitoring increase emotional strain and reduce psychological stability. Their study moves beyond traditional sleep-based explanations by showing that employees experience not only fatigue, but also persistent cognitive pressure associated with digital overload. This finding is highly relevant in the banking sector, where employees face continuous system upgrades, digital monitoring, rapid response expectations, and after-hours connectivity. Similar findings were reported by Tarafdar et al. (2019), who argued that techno-invasion and techno-overload significantly increase employees' psychological strain and weaken personal boundary control.

Similarly, Wei et al. (2025), found that multitasking negatively affects workplace well-being through the partial mediating role of job stress, with job stress explaining a significant proportion of the relationship. Their study, grounded in Job Demands-Resources (JD-R) Theory and Conservation of Resources (COR) Theory, demonstrates that employees' psychological resources are depleted when excessive task-switching and digital demands create sustained stress (Hobfoll, 1989). This strengthens the argument that psychological health is a significant mediator because workplace demands rarely affect well-being directly; instead, they operate through emotional exhaustion, stress, and reduced psychological resilience (Lesener et al., 2019; Wei et al., 2025).

Hoge et al. (2011), further explained that employees experiencing chronic sleep disorders due to technology interference are highly likely to develop anxiety regarding work performance and future productivity. This performance-related anxiety often extends beyond formal working hours and invades personal life, creating persistent anticipatory stress and emotional exhaustion. Employees become unable to psychologically detach from work, which directly weakens work-life balance (Kossek et al., 2020). This finding strongly aligns with the Conservation of Resources Theory, where depletion of valuable psychological resources such as sleep quality, emotional energy, and mental recovery reduces employees' capacity to manage work and family responsibilities effectively (Hobfoll, 1989).

Despite strong theoretical support, a major gap remains because many previous studies treat psychological health only as a dependent variable rather than empirically testing its mediating role. Most studies examine whether technology increases stress or whether stress reduces work-life balance, but few explicitly test the full mediation pathway of technostress to psychological health and to work-life balance (Han et al., 2025; Wei et al., 2025). This creates a theoretical limitation because the actual mechanism explaining how workplace stressors translate into work-life imbalance remains underdeveloped. Moreover, most existing studies are conducted in Western countries, healthcare sectors, or student populations, with limited empirical evidence from the banking industry, particularly in developing countries such as Malaysia, where techno-invasion and work boundary violations may be more severe (Gazi et al., 2025; Ministry of Health Malaysia, 2015).

Overall, the literature strongly supports psychological health as a mediating variable because technology-related stress rarely influences work-life balance directly; instead, it operates through psychological mechanisms such as sleep disturbance, anxiety, depression, emotional exhaustion, digital anxiety, and cognitive fatigue (Kossek et al., 2020; Han et al., 2025; Wei et al., 2025). Despite strong theoretical support, inconsistencies in conceptualization, limited banking sector evidence, and weak mediation testing remain significant research gaps. Therefore, examining psychological health as a mediator is both theoretically justified and practically necessary for understanding how technostress affects employees' work-life balance in the banking sector.

Hypotheses Development

H4a Psychological health mediate the relationship between techno-overload and work-life balance.

H4b Psychological health mediate the relationship between techno-invasion and work-life balance.

H4c Psychological health mediate the relationship between techno-complexity and work-life balance.

H4d Psychological health mediate the relationship between techno-insecurity and work-life balance.

H4e Psychological health mediate the relationship between techno-uncertainty and work-life balance.

2.11 Underpinning Theory of The Research

The present study is underpinned by an integrated multi-theoretical framework comprising the person-environment (P-E) fit theory, transaction theory of technostress, work-family border theory, health belief model (HBM), job demands-resources (JD-R) model, and conservation of resources (COR) theory, to explain the relationships between technostress creators, psychological health, and work-life balance among banking employees. This integration is necessary because technostress is not a unidimensional phenomenon but a complex interaction between technological demands, individual appraisal processes, and resource dynamics (Tarafdar et al., 2019; Bakker & Demerouti, 2017).

From the P-E fit theory perspective, technostress creators are conceptualised as indicators of misfit between employees and their technological work environment. Ability-Demand (A-D) misfit occurs when employees' skills, time, and cognitive capacity are insufficient to meet ICT-driven demands such as system complexity, multitasking, and constant digital responsiveness (Park, & Cho, 2025; Park et al., 2012). This misfit directly contributes to technostress creators (independent variable) such as techno-overload and techno-complexity, which subsequently generate strain. Similarly, value-supply (V-S) misfit explains how ICT intrusion into personal time violates employees' values such as privacy, autonomy, and family time, thereby directly contributing to work-life imbalance (dependent variable) (Miyuki, 2005; Clark, 2000). Thus, P-E fit theory establishes the origin of technostress at the mismatch level between employees and technology systems.

However, P-E Fit alone does not explain how employees cognitively interpret and respond to such misfit. Therefore, the transaction theory of technostress (Califf et al., 2020) explains technostress creators through the psychological appraisal process. Employees first evaluate whether techno stressors (e.g., overload, invasion, complexity) represent threats or challenges (primary appraisal) and then assess their coping ability (secondary appraisal). When coping resources are perceived as insufficient, psychological strain emerges. In this study, this process directly links technostress creators to psychological health (mediator), as individuals experiencing higher perceived threat and lower coping ability are more likely to develop anxiety,

emotional exhaustion, and stress-related symptoms (Tarafdar et al., 2019; Han et al., 2025).

The job demands-resources (JD-R) Model further strengthens this mechanism by positioning technostress creators as job demands that require sustained cognitive and emotional effort. High workload, constant connectivity, and digital multitasking increase exhaustion when not balanced by adequate job resources such as autonomy, supervisor support, or training (Bakker & Demerouti, 2017). Within this framework, psychological health is conceptualised as an outcome of the job demands strain pathway, meaning that excessive technostress leads to emotional exhaustion and reduced well-being. Empirical evidence confirms that job demands significantly predict strain, while job resources buffer these effects (Wei et al., 2025). Thus, JD-R theory provides structural support for the technostress to psychological health relationship.

Complementing JD-R, the conservation of resources (COR) Theory explains how technostress leads to psychological health deterioration through resource depletion mechanisms. Employees possess limited psychological, emotional, and physical resources, which are consumed when coping with continuous ICT demands (Hobfoll, 1989). Technostress creators such as techno-overload and techno-invasion accelerate resource loss, leading to reduced energy, emotional exhaustion, and sleep disruption. This positions psychological health as a resource depletion outcome, which subsequently affects employees' ability to manage work and family roles. Therefore, COR theory provides a strong justification for psychological health as a mediating variable between technostress and work-life balance (Azpiroz-Dorronsoro et al., 2024; Espie et al., 2019).

The work-family border theory (Clark, 2000), directly explains the dependent variable, work-life balance, by conceptualising employees as "border-crossers" between work and family domains. Technological systems weaken these boundaries by enabling after hours communication, digital monitoring, and work extension into personal time. This boundary blurring leads to time-based and strain-based conflict, particularly when employees cannot psychologically detach from work (Kossek et al., 2020; Sirgy & Lee, 2018). In this study, technostress creators indirectly affect work-life balance through psychological health deterioration, which reduces employees' ability to manage role transitions effectively.

The health belief model (HBM) further explains the behavioural aspect of psychological health as a mediator. Employees' responses to technostress depend on their perceived susceptibility to mental health problems (e.g., anxiety, insomnia, burnout), perceived severity of consequences, and perceived barriers to coping actions (La Torre et al., 2024; Taylor et al., 2025). When employees recognise that technostress negatively affects their mental health, they may attempt to engage in coping behaviours such as boundary setting or digital detachment. However, in high-demand banking environments, perceived barriers such as workload pressure and organizational expectations often outweigh perceived benefits, weakening protective health behaviours. Thus, HBM explains why psychological health deteriorates or is maintained under technostress conditions.

Critically, integrating these theories provides a more comprehensive explanation than any single theory alone. P-E fit explains structural misalignment (source of technostress), transaction theory explains cognitive appraisal (stress perception), JD-R explains job demand structure (strain formation), COR explains resource depletion (psychological health mechanism), HBM explains health-related behavioural responses, and work-family border theory explains work-life boundary disruption (outcome mechanism). Together, they form a coherent explanatory chain: technostress creators to psychological health and to work-life balance.

Despite their explanatory strength, prior studies often apply these theories in isolation, resulting in fragmented understanding of technostress processes. Few studies integrate psychological appraisal, resource depletion, and boundary theory simultaneously, particularly in banking-sector contexts in developing countries (Tarafdar et al., 2019; Waseem & Moazzam, 2025). This study addresses this gap by positioning psychological health as a central mediating mechanism linking technostress creators to work-life balance outcomes, thereby offering a more holistic and theoretically grounded model of employee well-being in digital workplaces.

2.12 Work-Family Border Theory

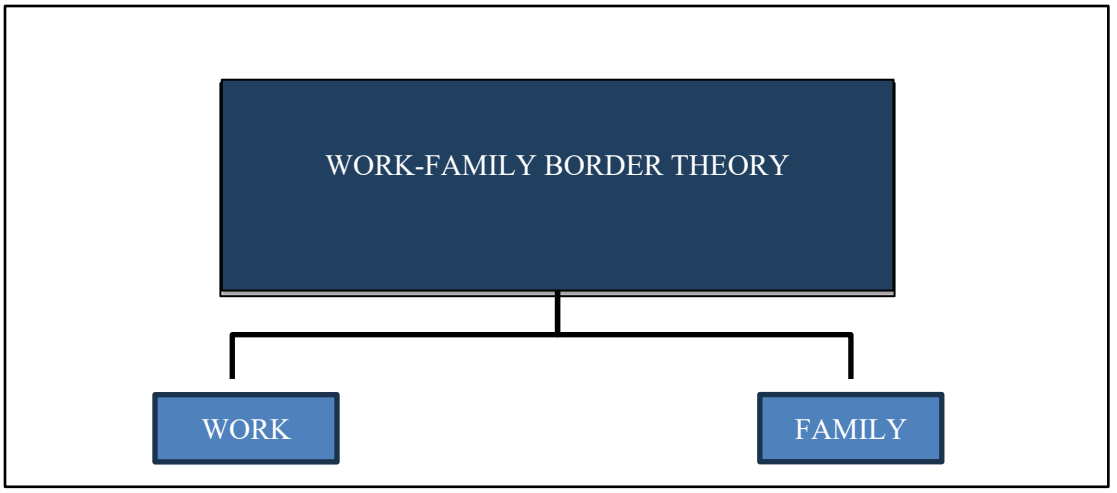

Figure 2.3: Work-family Border Theory (Clark, 2000)

Work-Family Border Theory, introduced by Sue Campbell Clark (2000), explains how individuals manage and negotiate the boundaries between work and family domains to achieve balance. The theory conceptualizes individuals as daily border-crossers who transition between work and family roles, managing physical, temporal, and psychological boundaries. Unlike traditional role conflict theories that view work and family as strictly competing domains, Clark (2000), emphasizes that both domains are interconnected systems that require continuous boundary management. Balance is achieved when individuals can maintain high role functioning and low inter-role conflict, resulting in satisfaction in both domains (Clark, 2000; Greenhaus & Allen, 2011; Sirgy & Lee, 2018)

A key strength of this theory is its classification of work-life balance outcomes into four dimensions: segmentation, integration, enrichment, and role balance quality, which reflect different patterns of boundary management. When boundaries are flexible and permeability is controlled, individuals may experience work-family enrichment, where experiences in one domain enhance functioning in another. However, when boundaries are weak or overly permeable, work-family conflict arises, leading to strain, reduced recovery, and psychological exhaustion (Kossek et al., 2020; Sirgy & Lee, 2018). Therefore, work-life balance is not simply the absence of conflict, but a dynamic equilibrium between role demands and boundary control.

In contemporary organizational contexts, particularly in banking sectors, Work-Family Border Theory has become increasingly relevant due to rapid digital transformation. The widespread use of smartphones, email systems, and mobile banking platforms has significantly increased boundary permeability, allowing work to extend into personal and family life. This phenomenon is commonly referred to as techno-invasion, where employees remain psychologically and behaviourally connected to work outside formal working hours (Tarafdar et al., 2019). Harris (2014), further emphasized that organizational expectations regarding immediate responsiveness through digital devices strongly influence the extent of work-life imbalance. When organizations implicitly expect employees to respond to messages after working hours, boundary segmentation becomes difficult, leading to continuous role interference.

Raisinghani and Goswami (2014), argued that modern employment conditions such as dual-earner families, remote working arrangements, and high-performance expectations make work-family conflict almost unavoidable. Recent studies by Zhang (2023), also highlight that digital work environments increase cognitive overload, further weakening employees' ability to separate work and personal life. This indicates that work-life balance is not solely an individual responsibility but is also shaped by organizational culture, technological systems, and managerial expectations. Therefore, employees' ability to manage boundaries depends heavily on organizational policies regarding after-hours communication, workload distribution, and flexibility arrangements.

From a critical theoretical perspective, work-family border theory provides a more dynamic explanation of work-life balance compared to traditional stress models. While earlier models focus primarily on role conflict as an outcome, Clark's (2000), framework explains the process of boundary negotiation, which better reflects modern digital work environments. However, a limitation in empirical literature is that many studies measure work-life balance as a static construct rather than a continuous process of boundary transition. This creates a gap between theory and measurement, as real-world boundary management is highly dynamic and context dependent (Kossek et al., 2020; Allen et al., 2021).

Recent research further supports the importance of boundary control. Sirgy and Lee (2018), found that work-life balance is strongly associated with both job satisfaction and life satisfaction, suggesting that psychological well-being is a central outcome of effective boundary management. Similarly, Allen et al. (2024), demonstrated that individuals who have higher control over boundary permeability report significantly lower stress levels and better recovery experiences. These findings reinforce Clark's (2000), argument that successful work-life balance depends on the individual's ability to regulate boundary strength and transition between roles effectively.

However, in technology driven environments, boundary control is increasingly undermined. Digital communication tools blur the separation between work and personal life, increasing psychological availability for work even during rest periods. This creates sustained cognitive engagement with work-related tasks, which reduces emotional detachment and increases fatigue. As a result, employees have trouble disengaging from work roles, leading to long-term psychological strain and reduced family satisfaction (Tarafdar et al., 2019; Harris, 2014).

In conclusion, work-family border theory provides a strong conceptual foundation for understanding work-life balance in the context of modern digital workplaces. It explains how employees continuously negotiate boundaries between work and family domains, and how imbalance occurs when these boundaries become permeable or poorly managed. In this study, the theory is particularly relevant because technostress creators such as techno-invasion and techno-overload disrupt boundary stability, leading to psychological strain and reduced work-life balance. Therefore, this theory strongly supports the conceptual framework of the study, where psychological health is expected to play a mediating role between technostress and work-life balance.

2.13 Transaction Theory of Technostress

Recent technostress studies have predominantly been grounded in the Transaction Theory of Stress, originally developed by Richard Lazarus and Susan Folkman (1984), and later extended to organizational contexts by Holroyd and Lazarus (1982). This theory has been widely adopted in technostress research because it conceptualizes stress as a dynamic cognitive appraisal process rather than a direct

reaction to environmental demands, emphasizing the interaction between individuals and their environment (Fuglseth & Sorebo, 2014; Ayyagari et al., 2011; Tarafdar et al., 2019). From this perspective, stress occurs when individuals perceive that the demands of technology exceed their coping resources, particularly in highly digitalized work environments where systems are continuously evolving and increasing task complexity.

A central assumption of the theory is that stress is not caused by technology itself but is constructed through individual cognitive appraisal processes. Lazarus (1999), identifies three key appraisal dimensions: harm/loss appraisal, which refers to damage already experienced; threat appraisal, which refers to anticipated future harm; and challenge appraisal, which reflects perceived opportunities for growth. In technostress contexts, employees experience strain when technological demands such as system upgrades, constant connectivity, and multitasking are perceived as exceeding their skills, time, or psychological capacity (Ragu-Nathan et al., 2008; Tarafdar et al., 2019). Recent studies further support this view by showing that continuous digital engagement increases psychological overload and reduces recovery time, thereby intensifying stress experiences in modern workplaces (La Torre et al., 2020; Jena, 2023).

The transaction theory of stress is typically operationalized through four key components: stressors, situational factors, strain, and outcomes (Cooper et al., 2001). Stressors refer to environmental demands that have the potential to create psychological strain, and in technostress literature these are commonly conceptualized as techno-overload, techno-complexity, techno-invasion, and techno-uncertainty (Ragu-Nathan et al., 2008; Tarafdar et al., 2019). These stressors are particularly relevant in digital work environments where employees are expected to respond immediately to emails, adapt to frequent system changes, and remain continuously connected, which blurs the boundary between work and personal life (Okolo, 2018; La Torre et al., 2020).

Situational factors refer to organizational conditions that can either reduce or intensify the impact of stressors. These include ICT training, employee involvement in system implementation, and organizational support structures (Elbir , 2026; Park & Cho, 2025). Empirical evidence shows that when employees are adequately trained and involved in technological change processes, perceived control increases, thereby

reducing technostress and improving adaptation to digital systems (Tarafdar et al., 2019; Jena, 2023). This suggests that organizational design plays a crucial moderating role in shaping stress outcomes, rather than stress being solely an individual level phenomenon.

The third component, strain, refers to psychological and behavioural reactions resulting from exposure to technological stressors. In technostress literature, strain is commonly expressed through emotional exhaustion, anxiety, cognitive fatigue, and negative attitudes toward technology use (Salanova et al., 2013). Beaudry and Pinsonneault (2010), further explain that strain also includes technology dissatisfaction, which reflects a perceived loss of control over digital systems and outcomes. In contemporary digital workplaces, this strain is increasingly linked to burnout and reduced psychological well-being due to continuous connectivity and work intensification (Dragano & Lunau, 2020; La Torre et al., 2020).

The final component, outcomes, refers to long-term consequences of strain such as reduced job performance, absenteeism, turnover intention, and decreased productivity (Park & Cho, 2025; Ayyagari et al., 2011). In information systems research, outcomes are also measured through system satisfaction and continued usage intention, which reflect both behavioural and attitudinal responses toward technology adoption (DeLone & McLean, 2003; Tarafdar et al., 2019). These outcomes highlight that employees who perceive technology as supportive are more likely to engage effectively with it, whereas those experiencing high technostress tend to disengage or resist its use.

From a critical perspective, although Transaction Theory provides a strong foundation for understanding technostress, it has been criticised for overemphasizing individual cognitive appraisal while underrepresenting structural and organizational determinants such as workload design, digital governance, and organizational culture (Tarafdar et al., 2019; La Torre et al., 2020). Furthermore, most empirical studies rely on cross-sectional designs, which limits understanding of how stress evolves dynamically over time in response to continuous technological change. This is particularly important in modern digital workplaces such as banking and service industries, where employees face persistent connectivity and rapid system updates, making stress a continuous transactional process rather than a one-time event (Jena, 2023; Dragano & Lunau, 2020).

It demonstrates that stress emerges from the interaction between environmental demands and individual coping resources, in the end leading to psychological strain and behavioural outcomes. In the context of this study, the theory is particularly relevant in explaining how technostress creators influence psychological health, which subsequently affects work-life balance among employees in technology-intensive environments.

2.14 Health Belief Model (HBM)

The health belief model (HBM) was originally developed by Irwin M. Rosenstock and later expanded by Hochbaum et al. 1950s and 1960s as a socio-psychological framework to explain individuals' preventive health behaviours. The model is grounded in Lewin's social psychological theory and is widely recognized as an expectancy value framework, which explains behaviour as a function of perceived outcomes and subjective valuation of those outcomes (Becker et al., 1974; Rosenstock, 1966; Champion & Skinner, 2008). In modern health psychology, the HBM remains one of the most widely applied models for understanding how individuals decide to engage in health-related actions, particularly under conditions of uncertainty and perceived risk (Carpenter, 2010; Jones et al., 2015).

At the core of the HBM are several key constructs: perceived susceptibility (an individual's belief about the likelihood of experiencing a health problem) and perceived severity (beliefs about the seriousness of the consequences). Together, these form the perceived threat, which drives behavioural intention. In workplace health and technostress contexts, these reflect employees' sense of vulnerability to psychological strain and its impact on well-being and performance.

Additionally, the model addresses perceived benefits (effectiveness of a health behaviour) and perceived barriers (cost or difficulty of performing it). In occupational settings, benefits might include improved well-being and reduced stress, while barriers can be time constraints, workload, or limited organizational support. This cost benefit evaluation helps explain engagement in stress-reducing behaviours at work.

Another important construct is cues to action, which refers to internal or external triggers that stimulate health related behaviour. Internal cues may include fatigue, anxiety, or psychological distress, while external cues may involve organizational interventions, health campaigns, or social influence from colleagues

(Maiman & Becker, 1974; Jones et al., 2015). In digital work environments, cues to action may also include exposure to technostress symptoms such as burnout or constant fatigue, which signal the need for behavioural adjustment.

More recent literature has also emphasized the importance of self efficacy, which was later incorporated into the extended HBM to reflect an individual's confidence in performing health related behaviours (Rosenstock et al., 1988; Champion & Skinner, 2008). Self efficiency is particularly important in occupational contexts because employees may only adopt stress management strategies or work-life balance behaviours if they believe they have sufficient control and capability to do so.

From a critical perspective, while the HBM provides a strong framework for explaining individual-level health behaviour decision making, it has been criticized for being overly focused on cognitive perceptions while underestimating social, organizational, and environmental influences (Carpenter, 2010; Jones et al., 2015). In modern workplace contexts, especially in technology-driven environments, employee health behaviours are not only shaped by individual beliefs but also by organizational culture, digital workload demands, and technological infrastructure. Therefore, recent scholars suggest integrating HBM with broader frameworks such as the Job Demands-Resources (JD-R) model and Conservation of Resources (COR) theory to better explain workplace health outcomes (Bakker & Demerouti, 2017; Hobfoll et al., 2018).

In conclusion, the Health Belief Model remains a foundational theory in understanding how individuals perceive health risks and make decisions regarding preventive actions. In the context of this study, HBM is particularly relevant in explaining how employees' perceptions of psychological health risks, benefits of coping behaviours, and barriers to action influence their response to technostress and work-life imbalance.

2.15 Job Demand Resources (JR-D Model)

The Job Demands-Resources (JD-R) model, originally introduced by Demerouti et al. (2001), and extended by Schaufeli and Bakker (2004), continues to serve as a dominant framework for explaining how work characteristics influence employee well-being. More recent advancements have reaffirmed the model's

applicability in contemporary, technology-driven work environments, particularly in understanding the dual role of job demands and job resources in shaping employee outcomes (Bakker & Demerouti, 2017; Lesener et al., 2019; Mazzetti et al., 2023). Unlike traditional stress models, the JD-R framework captures both the health impairment process and the motivational process, making it especially relevant for examining digitally intensive sectors such as banking.

Within this framework, technostress can be conceptualized as a critical job demand. Job demands refer to aspects of work that require sustained physical and psychological effort, leading to potential strain (Demerouti et al., 2001). In the context of digital banking, employees are increasingly required to manage complex systems, respond to real-time customer demands, and remain constantly connected through digital platforms. Recent empirical studies have highlighted that such technology-driven demands significantly contribute to technostress, particularly in high-performance environments (Tarafdar et al., 2019; Molino et al., 2020; Califf et al., 2023).

Consistent with the JD-R model, excessive job demands activate the health impairment process, whereby prolonged exposure to stressors depletes employees' cognitive and emotional resources, resulting in adverse psychological outcomes (Bakker & Demerouti, 2017). Emerging evidence further suggests that technostress is strongly associated with diminished psychological health, including increased levels of anxiety, emotional exhaustion, and mental fatigue, particularly in digitally intensive workplaces (Gaudioso et al., 2021; Shah et al., 2024).

The consequences of technostress extend beyond the workplace and disrupt employees' personal lives. The pervasive use of digital technologies has blurred the boundaries between work and non-work domains, contributing to work-life imbalance. Recent studies indicate that constant connectivity and digital interruptions are key predictors of work-life conflict and reduced overall well-being (Spagnoli et al., 2020; Wang et al., 2021; Ayyagari et al., 2022). In the banking sector, where responsiveness and availability are critical, such boundary blurring is likely to be more pronounced.

At the same time, the JD-R model emphasizes the protective role of job resources, such as supervisory support, autonomy, and opportunities for skill development, which can buffer the negative effects of job demands (Bakker &

Demerouti, 2017). However, recent studies suggest that in highly digitalized environments, the availability of such resources may not always be sufficient to offset the intensity of technological demands, thereby amplifying the negative impact of technostress (Califf et al., 2023; Shah et al., 2024).

Therefore, building on both foundational and recent extensions of the JD-R model, this study conceptualizes technostress creators as job demands that influence employees' psychological health, which subsequently affects their work-life balance. By situating this framework within Malaysia's rapidly evolving banking sector, this study responds to recent scholarly calls for more context-specific and technology-oriented applications of the JD-R model in understanding employee well-being in the digital era.

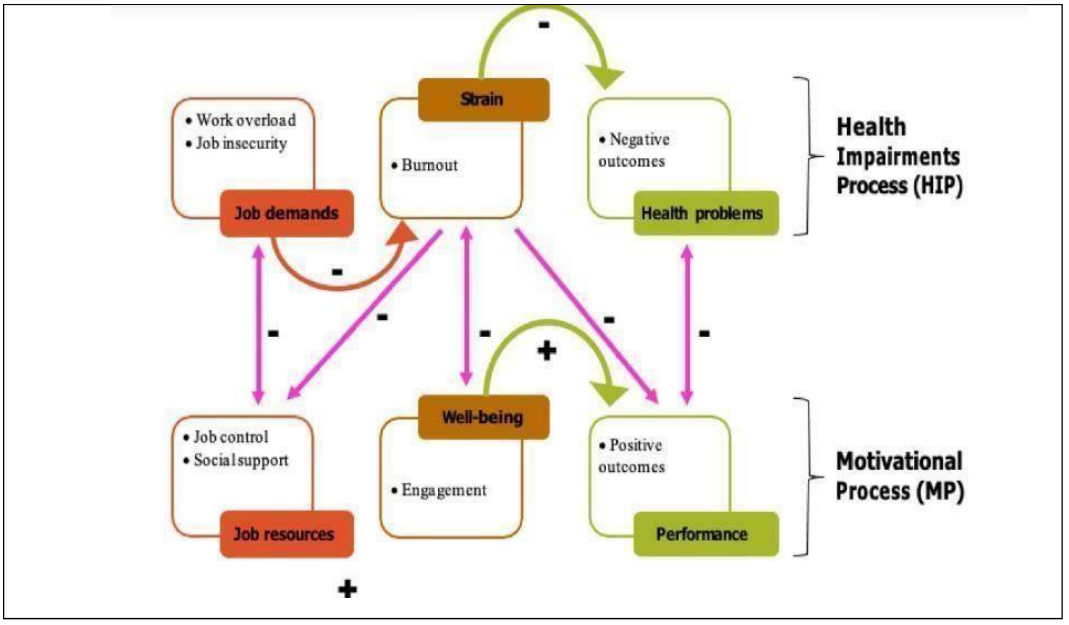

Figure 2.4: Job demand resources (JD-R model) by Schaufeli, & Bakker, (2004) and adapter by Silveri, & Petti, (2026).

2.16 The Conservation of Resource Theory

The Conservation of Resources (COR) Theory, developed by Stevan E. Hobfoll, suggests that individuals are motivated to obtain, retain, and protect valuable resources such as time, energy, emotional stability, and physical health, while stress occurs when these resources are threatened, lost, or insufficiently replenished (Hobfoll et al., 2018). Within occupational psychology, COR theory has been widely applied to

explain how work demands lead to resource depletion and subsequent strain, particularly in high-demand and technology-intensive environments. Recent studies extend this framework by demonstrating that employees who experience excessive job demands such as workaholism, workload pressure, and constant ICT connectivity tend to invest disproportionate cognitive and temporal resources into work, leaving insufficient resources for recovery and personal life activities (Azpiroz-Dorronsoro et al., 2024; Kong et al., 2025).

A central tenet of COR theory is that resource loss is disproportionately more influential than resource gain, meaning that individuals are more sensitive to depletion than to recovery. In the workplace context, this implies that sustained work engagement without adequate recovery leads to a loss spiral, where initial resource depletion reduces coping capacity, further increasing vulnerability to stress (Hobfoll et al., 2018). Workaholism and excessive workload have therefore been identified as significant predictors of resource depletion, as employees continuously allocate emotional and cognitive energy to work tasks at the expense of personal and family-related recovery activities (Siddiqi, 2024; Mehmood et al., 2021).

Recent empirical evidence further supports that sleep functions as a critical restorative resource, essential for cognitive functioning, emotional regulation, and physical health maintenance. When sleep is compromised due to overwork or technological intrusion, employees experience reduced attentional capacity, impaired memory, and weakened self-regulation, which further exacerbates resource loss cycles (Anwar et al., 2024). This reinforces the COR proposition that resource depletion is cumulative and self-reinforcing, particularly in environments characterized by continuous connectivity and blurred work boundaries.

In addition, COR theory provides a strong theoretical basis for understanding the relationship between technostress, work-life imbalance, and psychological strain. The increased use of information and communication technologies (ICTs) has been shown to extend work beyond formal working hours, thereby intruding into personal and family domains (Patanjali & Bhatta, 2022). This intrusion reduces employees' ability to allocate sufficient resources to family responsibilities, leading to increased work-family conflict. Similarly, Palumbo (2020), emphasizes that occupational stress impairs individuals' capacity to effectively manage both work and family roles by depleting emotional and cognitive resources necessary for role transition and recovery.

Furthermore, continuous workplace connectivity enabled by digital technologies has been found to intensify work-family conflict by encouraging after-hours communication, overtime expectations, and constant availability (Sarbu, 2018). This persistent connectivity erodes psychological detachment from work, thereby preventing resource recovery and increasing emotional exhaustion. Recent studies also confirm that technostress-related demands significantly weaken individuals' ability to balance professional and personal responsibilities, further reinforcing the resource loss cycle (Azpiroz-Dorronsoro et al., 2023; Pluut & Wonders, 2022).

From a critical perspective, while COR theory provides a strong explanatory framework for understanding stress as a resource depletion process, it has been criticised for underemphasizing cognitive appraisal mechanisms and individual differences in coping strategies. However, its strength lies in its ability to explain cumulative and cyclical stress effects, particularly in modern digital workplaces where employees face continuous work demands, reduced recovery time, and blurred work-life boundaries. Therefore, COR theory is highly relevant for explaining how technostress and workload demand lead to psychological strain and work-life imbalance in contemporary organizational settings.

In conclusion, COR theory offers a strong foundation for understanding how employees allocate, lose, and attempt to conserve personal resources in response to occupational demands. In the context of this study, it provides a strong theoretical explanation for how technostress creators and work overload deplete psychological and physiological resources, leading to reduced work-life balance and impaired psychological health.

2.17 Conceptual Framework

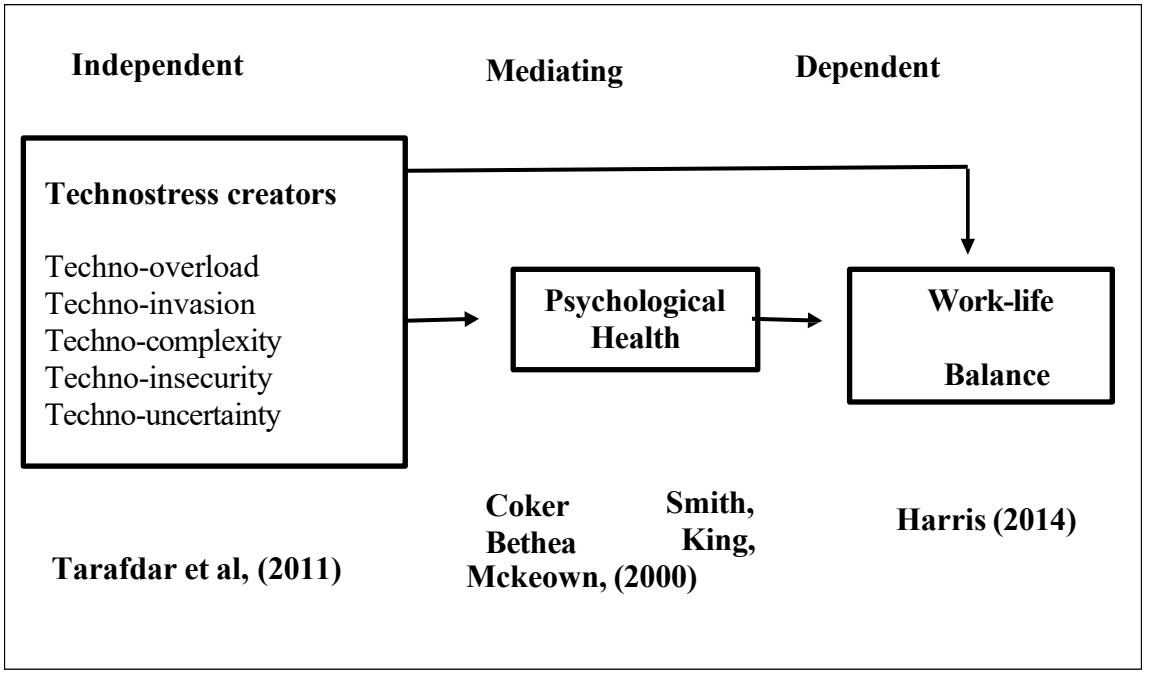

Figure 2.5: Conceptual Framework

From this framework, the independent variable developed by Tarafdar et al. (2011), dependent variable developed by Harris (2014), and mediating variable developed by Coker et al. (2000), are being utilised. Most of the study is more on technostress creators as an independent variable and work-life balance as a dependent variable. However, current existing literature on the relationship between these two variables are still blurry, particularly on the mediating effect of psychological health as a mediator towards work-life balance. Thus, the researcher conducted a preliminary study to explore the effect of psychological health. Psychological health refers to intellectual fitness that is described a state of psychological well-being. This is when the man or woman realizes abilities can address normal stresses of life, emotional and intellectual well-being while using technology. This may have a negative impact on health as psychological health, cognitive signs, and sleep disturbances have changed to mental health measurements (World Health Organization, 2005).

This study used the P-E Fit theory as it one of the most important theories by organizational researchers in stress studies (Chuang et al., 2015; Kaur & Dubey, 2014; Nguyen & Borteyrou, 2016). The need to examine behaviour as a result of the relationship between the individual and the environment has been stressed. To reflect

this perspective, the fit of the person-environment (P-E) was developed. The present study, therefore, uses the P-E Fit theory as the underlying technostress creators theory and work-life balance theory.

The conceptual framework represents the idea proposed by the researcher that will assist the readers to visualize the theorized relationship among the variables. It also helps the researcher to structure and focus on the issues. Hence, the study is able to contribute in the future. Figure 5 above shows the proposed conceptual framework for this research. It is important to develop a framework as a guideline and to better explain the relationship among the independent variable, dependent variable and moderating variable. In this study, the researcher intends to explore the relationship between the technostress creators as an independent variable, work-life balance as a dependent variable and psychological health as a mediator variable.

2.18 Hypotheses Development

A total of 16 hypotheses have been developed for this research as presented below:

H1a	There is a relationship between techno-overload and work-life balance.
H1b	There is a relationship between techno-invasion and work-life balance.
H1c	There is a relationship between techno-complexity and work-life balance.
H1d	There is a relationship between techno-insecurity and work-life balance.
H1e	There is a relationship between techno-uncertainty and work-life balance.
H2a	There is a relationship between techno-overload and psychological health
H2b	There is a relationship between techno-invasion and psychological health
H2c	There is a relationship between techno-complexity and psychological health
H2d	There is a relationship between techno-insecurity and psychological health
H2e	There is a relationship between techno-uncertainty and psychological health
H3a	There is a relationship between psychological health and work-life balance.
H4a	Psychological health mediate the relationship between techno-overload

and work-life balance.

H4b	Psychological health mediate the relationship between techno-invasion and work-life balance.
H4c	Psychological health mediate the relationship between techno-complexity and work-life balance.
H4d	Psychological health mediate the relationship between techno-insecurity and work-life balance.
H4e	Psychological health mediate the relationship between techno-uncertainty and work-life balance.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodologies that have been used in this study. It consists of several elements that explained in further about the methods in the study. The items are research design, population, sampling technique, sample size, unit of analysis, data collection methods, instruments, the validity of instruments, reliability analysis, PLS-SEM and data analysis; using IBM SPSS version 25 and SMARTPLS4.

3.2 Research Paradigms

A research paradigm refers to a set of fundamental beliefs and assumptions that guide how research is designed, conducted, and interpreted within a specific discipline. It represents a worldview that shapes the selection of research methods, theoretical frameworks, and approaches to understanding social phenomena (Kuhn, 1970; Guba & Lincoln, 1994; Neuman, 2011). These paradigms are commonly classified into positivism, interpretivism, and critical theory, each differing in ontological, epistemological, axiological, and methodological assumptions (Creswell & Clark, 2017).

Positivism, which underpins this study, is grounded in the assumption that reality is objective, measurable, and independent of human perception. It emphasises empirical observation, hypothesis testing, and statistical analysis to establish cause-and-effect relationships (Neuman, 2011; Polgar & Thomas, 2005). From a positivist perspective, researchers remain objective and detached from the research process to ensure neutrality and reduce bias (Guba & Lincoln, 1994). This paradigm is widely used in quantitative research where the aim is to test theories and generalise findings through measurable data.

In contrast, interpretivism focuses on subjective meanings and individual experiences, where reality is socially constructed and understood through human interpretation. It commonly uses qualitative approaches such as interviews, ethnography, and case studies to explore phenomena in depth (Creswell, 2009;

Neuman, 2007). Meanwhile, critical theory extends beyond interpretation by examining how power, ideology, and social structures influence human behaviour, often adopting a transformative and emancipatory approach (Guba & Lincoln, 1994; Neuman, 2007).

For this study, the positivist paradigm is most appropriate as it aligns with the research objectives, which aim to examine the relationships between technostress creators, work-life balance, and psychological health among employees in local commercial banks. First, positivism supports the assumption that human behaviour in organizational settings can be observed, measured, and analysed statistically. This is consistent with the study's focus on quantifiable relationships between variables.

Second, the research objectives are clearly defined and structured to test hypotheses derived from established theories. Positivism is suitable for hypothesis-driven research, where existing theories are used to develop testable propositions that are either supported or rejected through empirical data analysis.

Lastly, this study requires objectivity and generalisability. Positivist research ensures that findings are based on observable evidence rather than researcher interpretation, thereby enhancing the reliability and replicability of results. As a result, the positivist paradigm provides a strong foundation for examining the causal relationships proposed in this study.

3.3 Research Design

This research employed a correlational study design, which was conducted with the aim of detecting the extent to which variations in a factor are related (correlated) with one or more other factors based on the correlation coefficient (Sinulingga, 2017). The basis of this study is to determine the relationship between technostress creators and work-life balance among employees of local commercial bank in Klang Valley: the mediating role of psychological health. Therefore, this cross-sectional study tests the outcome and exposures of the study participants at the same time. Once the participants have been selected for the study, the investigator follows the study to assess the exposure and the outcomes (Setia, 2016). This study is designed and guided by the following four main research. When all these relationships are expanded, it results in a total of sixteen specific objectives.

3.4 Population

While Malaysia's banking ecosystem includes 26 commercial banks, this study intentionally focuses only on the eight (8) locally incorporated commercial banks. This decision is important to maintain high internal validity and remove confusing institutional differences. Foreign-owned multinational banks operate under global frameworks, centralized IT systems, and corporate cultures controlled by their overseas parent companies. In contrast, local commercial banks share a highly similar regulatory and cultural environment shaped strictly by Bank Negara Malaysia's (BNM) domestic mandates. Including foreign banks would introduce too many outside variables such as different tech budgets and international HR policies which could hide the actual effects of technostress creators.

Furthermore, current changes in the Malaysian financial sector provide an urgent reason to study these local institutions. Driven by the Fourth Industrial Revolution (IR4.0) and the arrival of new digital banks, these eight local commercial banks are currently locked in an aggressive digital race. To protect their market share, local banks have quickly adopted complex financial technologies (fintech), real-time transaction platforms, and AI-driven tools. This rapid digital transformation forces employees into a high-pressure environment filled with constant system updates and strict digital monitoring.

Additionally, local banking cultures often expect employees to be "always-on" through digital communication, which directly leads to techno-invasion and blurs the line between work and personal life. As a result, employees in local commercial banks are uniquely exposed to severe resource depletion. This makes them the most suitable and context-specific group to examine how technostress creators damage psychological health and disrupt work-life balance. Table 3.1 provides the details of these eight local commercial banks in Malaysia:

Table 3.1
List of Headquarters Eight Local Commercial Bank in Malaysia.

No	Bank	Branch or Address
1	Affin Bank Berhad	17th Floor Mezzanine Affin, 80, Jln Raja Chulan, Kuala Lumpur, 50788, Kuala Lumpur.
2	Alliance Bank Malaysia Berhad	8, Jalan Munshi Abdullah, City Centre, Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.
3	AmBank (M) Berhad	8, Jalan Yap Kwan Seng, Kampung Baru, 50450 Kuala Lumpur, Federal Territory of Kuala Lumpur
4	CIMB Bank Berhad	11, Jln Raja Laut, Kuala Lumpur City Centre, 50350 Kuala Lumpur, Federal Territory of Kuala Lumpur.
5	Hong Leong Bank Berhad (Malaysia) Berhad	Ground Floor (LotG3), Menara Raja Laut No, 288, Jln Raja Laut, 50350, Kuala Lumpur.
6	Malayan Banking (Maybank)	Maybank Tower, 100, Jalan Tun Perak, Bukit Bintang, 50050 Kuala Lumpur, Federal Territory of Kuala Lumpur
7	Public Bank Berhad	Ground Floor, Menara Public Bank, 146, Jalan Ampang, Kampung Baru, 50450 Kuala Lumpur, Wilayah Kuala Lumpur.
8	RHB Bank Berhad	Ground Floor, RHB Centre, 426, Jln,Tun Razak, Kelab Golf di Raja Selangor, 50400, Kuala Lumpur, Wilayah Kuala Lumpur

3.5 Sampling Technique

This study utilized a non-probability sampling technique, specifically convenience sampling, based on both practical and methodological considerations. Probability sampling was not feasible due to the absence of an accessible sampling frame, as employee lists within local commercial banks are highly confidential and restricted. Such constraints are common in organizational research, particularly in the banking sector, where strict data privacy policies limit direct access to formal

employee directories. Therefore, convenience sampling is considered the most appropriate and practical approach as it allows the researcher to reach available and accessible respondents under restricted conditions (Taherdoost, 2016). Additionally, non-probability convenience sampling is widely accepted in business and behavioural studies for examining relationships between variables and testing hypotheses, especially when access to the entire organizational population is limited (Sekaran & Bougie, 2019; Okolo, 2018).

To ensure the sample remained relevant to the research objectives, this study applied a specific purposive inclusion filter within the convenience sampling framework, targeting only banking professionals holding positions at the executive level and above. This specific population segment was selected because prior literature suggests that individuals in executive, managerial, and professional roles experience distinct job demands, higher reliance on digital communication tools, and greater exposure to technostress creators compared to non-executive or support staff.

Based on the Z-score formula for large or unknown populations, the target sample size for this study was determined to be 384 respondents. Krejcie & Morgan (1970) supported this baseline, noting that the maximum sample size requirement for large populations typically levels off at 384 respondents, a standard also aligned with general quantitative guidelines by Sekaran and Bougie (2019). Data collection was executed by distributing questionnaires to accessible banking employees who strictly met the predefined inclusion criteria of being at an executive grade or higher. The convenience sampling process continued dynamically until the targeted number above of 384 responses was achieved.

Convenience sampling is particularly suitable for this study for several reasons. First, the complete absence of a sampling frame renders probability sampling highly impractical. Second, incorporating a precise inclusion filter (executive level and above) ensures that the collected data strictly represents the segment of the workforce most impacted by technostress (Sedgwick, 2012). This technique strongly supports quantitative hypothesis testing, in which the primary objective is to examine the structural relationships between variables rather than to achieve purely statistical generalization. According by Morse and Niehaus (2009) argued, the core function of a sampling method is to enhance both validity and research efficiency. By ensuring that the convenience sampling process is structurally consistent with the specific target

population and research objectives, this method successfully minimizes sampling errors and establishes reliable relationships among the hypothesized variables.

3.6 Sample Size

The sample size is a subgroup of the whole population. After identifying the population, the next phase is determining the sample size. A specific sampling technique is also selected. In determining the sample size, there are a few factors that should be taken into consideration. Besides considering the time and cost constraints, the sample size must be precise and confident (Sekaran & Bougie, 2013). In this research, Z-score be used to determine the sample size that be needed in this study. According to Smith (2013), it is common for the population to be unknown. Thus, to determine the sample size, researchers use the Z-score, standard deviation, and margin of error to calculate it. Based on Roscoe (1975), Z-score formula, the sample size for the present study be calculated as below:

Necessary Sample Size = $(\text{Z-score})^2$ *StdDev*(1-StdDev) / $(\text{margin of error})^2$. Assuming the confidence level of the present study at 95%, five standard deviations, and a margin of error (confidence interval) of +/- 5%. If the confidence level is 95%, therefore the Z-score = 1.96.

$$\mathbf{((1.96)^2 \times .5(5) / (.05)^2}$$

$$\mathbf{(3.8416 \times .25) / .0025}$$

$$\mathbf{.9604 / .0025}$$

$$\mathbf{384.16}$$

384 respondents are needed

Apart from using Roscoe's (1975) formula to determine the sample size, the number of sample sizes that be used to achieve the purpose of this study is using Z-score. To ensure the sample size is statistically adequate for quantitative hypothesis testing, this study refers to the landmark criterion established by Krejcie and Morgan (1970). According to their standardized sample size determination, as the target population becomes infinitely large or unknown, the required sample size plateaus at a maximum number of 384 respondents. This calculation is derived using a Chi-square value of 3.841 (reflecting a 95% confidence level), a 5% margin of error, and a highly

conservative population proportion of 0.50 to maximize variance. So, targeting a minimum of 384 respondents satisfies the empirical requirements for structural relationship testing while optimizing research efficiency in a non-probability sampling design. The sample size is measured to 50/50 fragment on the proportion of the population Roscoe's (1975), rules of thumb determined that sample size should be larger than 50 and less than 500 to be appropriate for most research because larger sample size can generate more accurate data (Malhotra et al., 2006).

3.7 Unit of Analysis

The unit of analysis is the major subject to be analyzed in the study. It can be individuals, groups or organizations (Sekaran & Bougie, 2011). Thus, the unit of analysis of this study is individual which consisted of the employees of a local commercial bank. The data be collected from the executive level of each individual employee at headquarters of eight local commercial bank at Klang Valley.

Executives are chosen as a respondent because they are responsible to report top management. They are concerned with the organization and direction or function of management. Interpreting the programs and policies communicated by the top level management, organizing and handling their department or organization as per the main plan, planning the departmental operations, guiding direct and motivating their workers to attain the objective, and managing the activities of the bank competently and effectively. In modern commercial banks, efficient management is vital in an organization. Executive or middle management plays an essential role in achieving its development objectives. The changes in the banking environment, there has been a change in the banking management and change in the economic, technological, and social development which also reflects (Sehic & Krslak, 2017).

3.8 Research Process

The research process reflects the framework of entire business research concerning the study (Sreejesh et al., 2014). The cycle begins with selecting the topic until reporting the data (Neuman, 2014). In this study, the sevens steps of Neuman, (2014), research process recommended for quantitative studies, be followed. The five steps involved in this study are explained in Table 3.2.

Table 3.2
Research Process

Research Process	Activity in this study
Step 1: Selecting the research topic	Generating a broad idea from the personal interest area: development of the study related to work-life balance, the issue of the study by work-life balance.
Step 2: Focusing on research questions	Defining work-life balance, theoretical approach to work-life balance, previous studies on the relationship between technostress creators and work-life balance. Supporting evidence on strategic direction and set the development of research questions, gaps of the study, and theoretical framework.
Step 3: Design of the study	Selecting the design and type of the study samples, individual unit of analysis' questionnaire design and the item used for the survey instrument; and sampling techniques, quantitative study, self-administered survey, unit of analysis, and preliminary work, the purposive sampling technique is employed to recruit respondents and survey questionnaire be distributed.
Step 4: Data collection .	The development of survey instruments and the validity process, academicians, and employee practitioner's identification of the variables, items, and statements used, and modification be made for improvement
Step 5: Data analysis	Data analysis involves Structural equation modelling (SEM) with measurement and structural model assessment, and Smart-PLS to assess these measurement and structural models.

3.9 Data Collection Procedure

In this study, the data was collected through questionnaires. The actual questionnaire distributed personally to the respondent with an attached cover letter on each set of questionnaires to explain the purpose of the study. Data collected by using the online survey as this method is convenient to most people nowadays, although it helps obtain a fast response. Based on the biggest issues from previous situation Covid-19 in Malaysia, online surveys are suitable for this study for distributing the questionnaires to protect both research and respondent. Interestingly, an online survey has become a trend nowadays because it is easily accessible via mobile phone or

laptop or personal computer. Why data collection distributed through online method because following a significant event that occurred globally on that time, including in Malaysia which is Covid-19. Outsiders are not permitted to enter the banking organization at any time until now. Consequently, online distribution is used for this study.

Furthermore, an online survey is considered appropriate, particularly when sensitive questions are involved (Freudenberg et al., 2014). Although the maximum required sample size for this study was 384 respondents, the researchers distributed 403 questionnaires, which is more questionnaires to account for potential nonresponse and unusable data, a common practice in survey-based research. The questionnaires were administered via a Google Forms link shared with employees from eight local commercial banks in the Klang Valley, and the survey was designed to take less than 10 minutes to complete. Data were subsequently analysed using IBM SPSS version 25 and SmartPLS for Partial Least Squares Structural Equation Modelling (PLS-SEM).

A total of 403 responses were initially collected. After screening the data, one extreme outlier was identified and removed, resulting in a final valid sample size of 402 participants for the analysis.

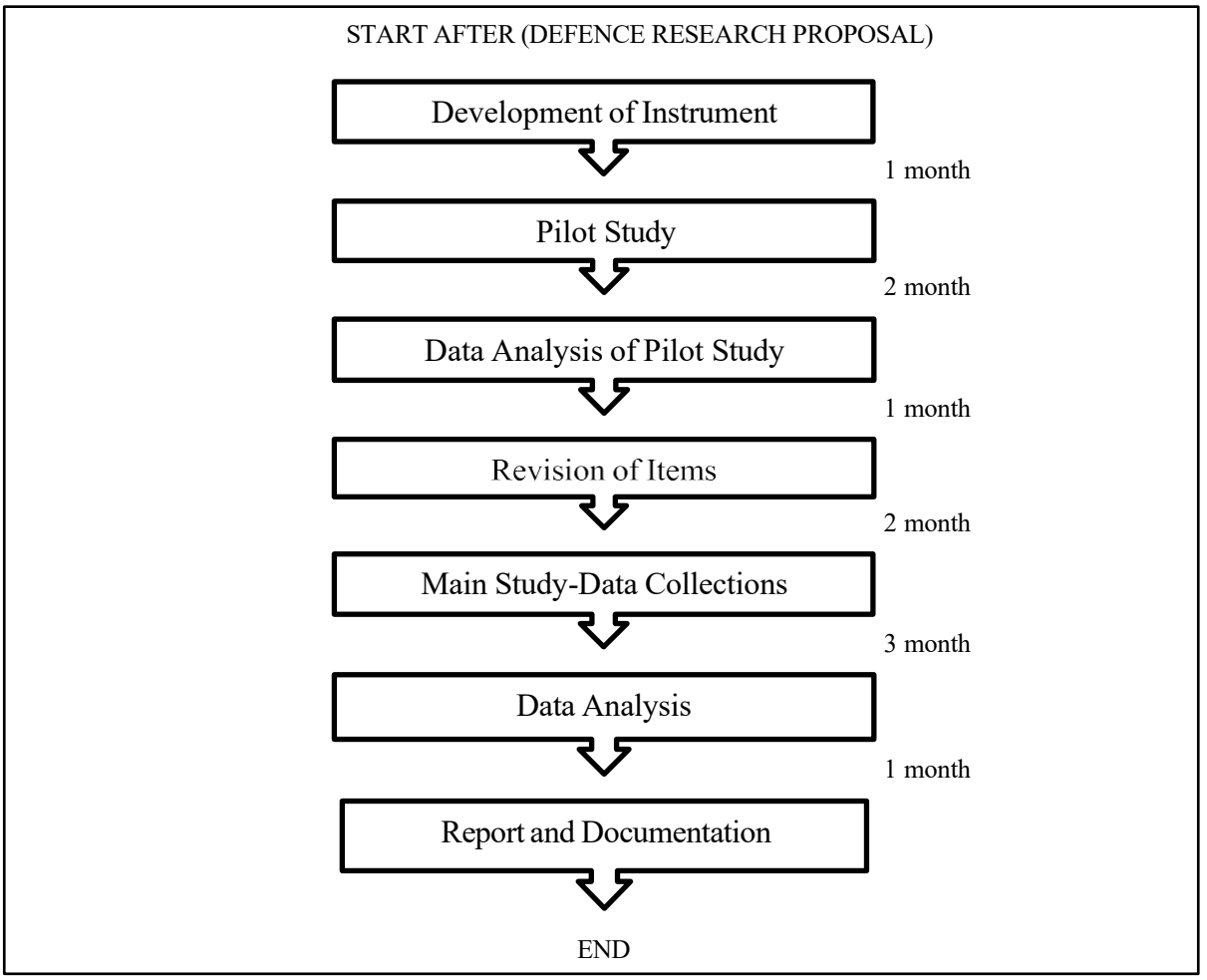

Figure 3.1: Data Collection Procedures

3.10 Research Instrument and Questionnaire Design

To ensure the research instrument fits the study's context, the questionnaire was fully prepared in two language versions: English and Malay. The translation from English to Malay was completed by an expert from the Academy of Language Studies, Universiti Teknologi MARA (UiTM). The questionnaire is divided into a cover letter and four distinct sections (Sections A to D), using a mix of measurement scales optimized for Partial Least Squares Structural Equation Modelling (PLS-SEM).

3.10.1 Section A: Demographic Profile

The first part of the instrument is Section A, which measures the demographic profile of the respondents using a total of six questions. This section utilizes categorical and nominal scales to gather essential background data. It was developed by the researcher based on the specific context of the Malaysian banking sector. The inclusion of this section is highly justified as it is necessary to capture critical control variables and descriptive profiles of the commercial bank employees, such as age, gender, and years of service, which help isolate the true effects of the main constructs.

3.10.2 Section B: Technostress Creators

Section B measures the construct of technology-induced job stressors, widely known as technostress creators, using a total of 23 questions. These items are divided into five distinct sub-dimensions, namely techno-overload with five items, techno-invasion with four items, techno-complexity with five items, techno-insecurity with five items, and techno-uncertainty with four items. The items in this section are adapted from the foundational study by Tarafdar et al. (2011). Responses are measured based on a 7-point Likert scale, which ranges from 1 (Strongly Disagree) to 7 (Strongly Agree). This instrument is selected because it remains the global gold standard for capturing how information technology explicitly induces workplace stress, allowing this study to pinpoint exactly which technological factors cause the most friction for bank employees. Furthermore, the 7-point Likert scale format is heavily justified in behavioral research because it maximizes response variance, minimizes response bias, and increases statistical power during data analysis (Eustler & Lang, 2015; Allen & Seman, 2007).

3.10.3 Section C: Work-life Balance

Section C evaluates work-life balance, focusing specifically on the employee's ability to manage and balance professional duties and personal life boundaries. This section consists of 14 questions adapted from Harris (2014). Similar to the previous

section, the responses are measured using a 7-point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). This specific scale is chosen because it is uniquely designed to capture modern boundary management, making it highly sensitive to the structural disruptions caused by digital communication outside official working hours. Furthermore, employing the same 7-point Likert scale as Section B is strongly justified because it ensures internal consistency across the questionnaire, enhances measurement sensitivity, and provides the continuous behavioral responses needed for strong PLS-SEM structural analysis.

3.10.4 Section D: Psychological Health

The final measurement part is Section D, which measures the psychological health construct, focusing on the mental well-being and psychological strain of the bank employees. This section comprises 11 questions adopted from Kristensen et al. (2005). Unlike the previous sections, Section D retains its original non-continuous scale formats, which include binary options and ordinal categorical scales such as specific time intervals. This instrument is selected due to its exceptional clinical and occupational validation worldwide. Retaining the original binary and ordinal scales rather than altering them to a Likert scale is a critical decision to preserve the instrument's proven psychometric properties and ensure its content validity remains untainted. Modifying established medical or psychological tools can weaken indicator reliability and produce misleading results (Hair et al., 2021; Sarstedt et al., 2022). By selecting these highly validated, complementary instruments, this study ensures that the entire questionnaire provides a stable, error-free measurement model that aligns perfectly with the high demands of PLS-SEM analysis.

3.10.5 Methodological Soundness of Mixed-Scale Measurement in PLS-SEM.

The use of different measurement scales across sections (7-point Likert scales for Sections B and C versus binary/ordinal scales for Section D) does not cause any methodological limitations. From a PLS-SEM perspective, using mixed scale formats across constructs is fully acceptable and valid because the variance-based algorithm

relies on standardized indicator loadings and latent variable scores rather than raw data values (Hair et al., 2022; Ringle et al., 2023).

During model estimation, the PLS-SEM algorithm automatically standardizes continuous data to have a mean of 0 and a variance of 1, eliminating any systematic bias caused by different scale lengths. For the non-continuous data in Section D, data specification methods such as dummy coding for binary items and numeric ranking for ordinal categories are applied prior to estimation. PLS-SEM is good enough to handle these mixed-scale reflective measurement models, allowing for accurate hypothesis testing without requiring manual data transformations.

To ensure the absolute reliability and validity of these constructs, all items were treated reflectively and evaluated using indicator loadings, Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), the Fornell-Larcker criterion, and the Heterotrait-Monotrait (HTMT) ratio. Additionally, a pilot study was conducted to ensure the clarity and reliability of all translation and questionnaire items before full data collection.

3.10.6 Ethical Considerations and Data Protection

Ethical approval for this study was formally obtained from the Universiti Teknologi MARA (UiTM) Research Ethics Committee (REC). All research steps were strictly followed by the REC guidelines. Every questionnaire set included a cover letter explaining the purpose of the study, alongside the researcher's contact information for reference.

Before participating, respondents were given a clear explanation of the study and were required to complete an informed consent form, confirming that their participation was completely voluntary. Participants were explicitly informed of their right to withdraw from the study at any time without facing any penalties. To protect the respondents, strict anonymity and confidentiality were maintained, and no personally identifiable details were collected. All collected data was used strictly for academic purposes, stored securely, and remained accessible only to the primary researcher in line with data protection principles.

Table 3.3
Instruments of questionnaire

Sections	Informations
Section A (6 questions as a total item)	**Demographic Profile** A1: Gender A2: Age A3: Race A4: Marital Status A5: Education Level A6: Number of the year working in the current organization
Section B (23 questions as a total item)	**Technostress creators** B1: Techno-overload B2: Techno-invasion B3: Techno-complexity B4: Techno-Insecurity B5: Techno-Uncertainty
Section C (14 questions as a total item)	**Work-life Balance**
Section D (11 questions as a total item)	**Psychological Health**

3.11 Validity of Instrument

The element of validity also refers to the effects of the test, not to the test itself. There are some styles of validity which are content, criterion and construct. The researcher is conduct content validity in this research. The content validity suggests the volume to which a test represents the universe of objects, and it is particularly while comparing the usefulness of success tests. The validity of questionnaire be tested for a content validity by two persons who check for an errors and mistakes. The validity of the instruments be proving by one of the academician at UiTM by Assoc. Prof. Dr. Shereen Noranee and the person from industry field by Mr. Syukur Bin Kamaruddin as senior executive of RHB bank berhad. This ensure that the questionnaire is relevant to the respondents before the researcher distributes it. Validity is important because it can help all the data collected by the researcher are valuable and can be trust (Burn & Bush, 2006).

3.12 Reliability of Instrument

In order to ensure the reliability of the instrument, a pilot study was conducted on applying the relationship between technostress creators and work-life balance

among employees of local commercial bank in Klang Valley: the mediating role of psychological health. The pilot test be conducted before the researcher proceeds with the actual study (Salkind, 2014). Moreover, the pilot test with a small scale methodological test intended to ensure the proposed methods and procedures work in practice before being applied in a large and expensive investigation. It was also agreed by Bowermen et al. (2005), pilot test gives the researcher an opportunity to make amendments before involving in a large study which needs large investment. Thus, the pilot test was conducted to verify the reliability of the research measures, which are all based on well-established instruments. The results of reliability tested through a Cronbach's alphas testing. In addition, to make sure the instrument reliable the results of the pilot study showed high clarity when the Cronbach's was all above 0.60. Sekaran, (2011), suggested that if alpha is greater than 0.60 showed that the researcher instrument was reliable for this study. Based on the previous study, the internal reliability of the items that were verified by computing Cronbach's alpha (Nunnally, 1978). Nunnally (1978), suggested that a minimum alpha of 0.60 was sufficed from the early stages of research.

Hence, this pilot study be conducted by giving a set of questionnaires to the persons that are related to the population, which are working at the local commercial bank in Klang Valley. Besides that, a series of questions were asked to the respondents in order to ensure the clarity of the contents and instructions. Thus, in order to analyse the reliability of each dimension used in this research, the researcher used PLS-SEM (smart partial least squares structural) and SPSS IBM Statistic Version 25 for data preparation for pilot test and be used for actual study.

3.13 Data Analysis

3.13.1 Ibm Statistical Package for Social Science (SPSS)

All participants' responses were coded first by assigning a number before being entered into the IBM Statistical Package for Social Science (SPSS) version 25 system as raw data. First, SPSS is used to check for outliers and normality during data preparation. Next, descriptive analysis used to analyze the demographic information, including age, gender, marital status, educational background, and length of services.

Descriptive analysis were described through mean, standard deviation, missing value, the minimum and maximum values of each indicator. Next, the internal consistency reliability of reliability analysis used to test the consistency and stability of the study's measures (Bougie & Sekaran, 2010). Hair et al. (2011), stated that a Cronbach's alpha value greater than 0.70 is considered high reliability. However, Nunally (1978), argued that a Cronbach's alpha value of more than 0.50 is accepted. Thus, the recommendation of Nunally (1978), used in this study.

3.13.2 Partial Least Squares Sem (PLS-SEM)

PLS-SEM was originally developed by an econometrician and statistician, Herman Ole Andreas Wold, in 1960s (Hair et al., 2016; Mateos-Aparicio, 2011). PLS-SEM is conducted using the latest updated statistics software named SmartPLS 3. PLS-SEM which consists of two-stages of a process to analyze data: (1) the assessment of the measurement model and (2) the assessment of the structural model (Garson, 2016; Hair et al., 2011). The assessment of the measurement model is accomplished in the first stage (Garson, 2016; Hair et al., 2011). The measurement model describes the relationship between the indicators and their corresponding constructs or latent variables to indicate the right indicators to measure the right constructs (Hair et al., 2016). The measurement model is also known as the outer 121 models (Hair et al., 2016). Meanwhile, the structural model is assessed in the second stage (Garson, 2016; Hair et al., 2011). The structural model represents the relationship between latent variables to test the significance of the research hypotheses (Hair et al., 2016). The structural model is also known as the inner models (Hair et al., 2016).

3.13.2.1Consideration In Choosing Partial Least Square Structural Equation Model (Pls-Sem) As A Statistical Method

Structural Equation Model (SEM) is a statistical analysis technique used to analyze the cause effect of the structural relationship between variables (Hair et al.,

2017; Kunimoto & Saga, 2014). SEM involves multivariate data analysis that examines multiple variables in direct or indirect relationships (Hair et al., 2016). SEM is useful to evaluate research hypotheses and answer research questions on structural linkages among variables (Hair et al., 2016). Additionally, SEM is 120 employed to evaluate the measurement of each latent variable (Hair et al., 2014). SEM consists of two main approaches, which are covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM) (Hair et al., 2016). CB-SEM aims to confirm or reject theories by indicating how well the proposed theoretical model can estimate a covariance matrix for the sample data (Hair et al., 2014; Hair et al., 2016). On the other hand, PLS-SEM aims to develop theories that are valuable for exploratory research by maximizing the explained variances of dependent variables in the proposed theoretical model (Hair et al., 2014; Hair et al., 2016). However, based on the rules of thumb, PLS-SEM is considered most appropriate as a statistical method in this study due to the following reasons. First, PLS-SEM is prediction oriented, which is used to predict the relationship between variables and focus on maximizing the explained variances of the endogenous latent variable (Hair et al., 2016). Thus, the PLS-SEM approach is well-matched to the objective of this study to predict the factors related to well-being. Secondly, the selection of PLS-SEM is because it works efficiently with a small sample size (Hair et al., 2016). However, using the larger sample size can increase precision (Hair et al., 2016). Third, PLS-SEM is a nonparametric method that is practically used to analyze data with non-normality distribution (Hair et al., 2016) that typically occur in social science research (Hair et al., 2014; Hair et al., 2016). Fourth, PLS-SEM can handle the complex structural model, which consists of many latent variables and indicators (Hair et al., 2014; Hair et al., 2016).

3.13.2.2 Reflective and Formative Constructs

The latent variable in SEM can be modeled onto two types of measurement models namely reflective and formative measurements (Garson, 2016; Hair et al., 2011; Hair et al., 2016). Reflective measurement models are pointing the directional arrows from construct to the assigned indicators called outer loadings (Garson, 2016; Hair et al., 2016). Reflective construct indicates the assumption that the individual

items are interchangeable in which any single indicator can be removed without changing the construct's meaning (Garson, 2016; Hair et al., 2016). The uses of reliability and validity in reflective constructs are important to ensure the measures are reliable and valid (Hair et al., 2011; Hair et al., 2016). Thus, the indicators should be highly correlated with a particular construct (Hair et al., 2016). In contrast, formative measurement models are pointing the directional arrows from the indicators to the assigned construct which is called the outer weights (Garson, 2016; Hair et al., 2016). Formative construct indicates the assumption that the individual items are not interchangeable in which omitting an indicator may change the construct's meaning (Garson, 2016; Hair et al., 2016). Thus, the indicators do not necessarily need to be correlated (Hair et al., 2016). PLS-SEM has the ability to handle both reflective and formative measurements in the path model (Garson, 2016; Hair et al., 2016). Figure 7 shows the diagram of reflective and formative constructs. However, based on the literature reviews (Bowling et al., 2017; Emerson et al., 2017; Razak et al., 2017), all latent variables of this study are modeled as reflective constructs. The indicators are to be reflective as it fulfils the criteria in the construct in which any single indicator can be removed without changing the construct's meaning and highly correlated with a particular construct (Garson, 2016; Hair et al., 2016).

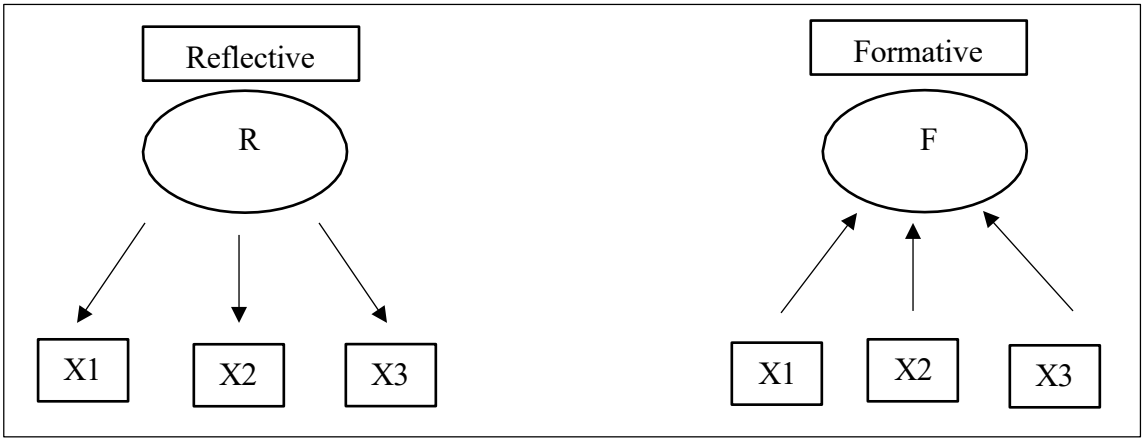

Figure 3.2: Diagram of Reflective and Formative Constructs Source: Adopted from Chang et al. (2016)

3.13.2.3Assessment of Measurement Model Using Partial Least Squares (Pls-Sem)

The measurement model is used to test the reliability and validity of the model (Hair et al., 2016; Hult et al., 2017). The measurement model is also typically known as the outer model (Hair et al., 2016). The assessment of the measurement model can be evaluated by testing its indicator reliability, construct reliability, convergent validity, and discriminant validity (Garson, 2016; Hair et al., 2014; Hair et al., 2016).

3.13.3 Indicator Reliability

Indicator reliability is used to assess the size of outer loading on all items in the model (Hair et al., 2016). According to Hair et al. (2016), a common rule of thumb for indicator reliability is that the outer loading must be greater than 0.70 with the significance of at least at the 0.05 level. A score for the outer loading between 0.40 and 0.70 should be considered to be deleted which depends on the result of Average Variance Extracted (AVE) (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). The indicator performs deletion only when the deletion leads to an increase in the AVE which is above the threshold value (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). On the other hand, the indicator be retained only when the deletion leads to a decrease in the AVE, which is below the threshold value (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). However, the outer loading below 0.40 should be eliminated from the construct (Hair et al., 2011; Hair et al., 2016).

3.13.4 Internal Consistency Reliability

Internal consistency reliability is used to determine how well the items are being measured (Hair et al., 2016). The measurement of internal consistency reliability is typically evaluated using Cronbach's alpha, which assumes that all indicators have the same outer loadings (Hair et al., 2016). Cronbach's alpha provides estimates of reliability based on the inter-correlations of indicators in the construct

(Hair et al., 2016). Moreover, Cronbach's alpha is sensitive to the number of items in the scale which tends to underestimate the internal consistency reliability (Hair et al., 2016; Pallant, 2016). A Cronbach's alpha value greater than 0.70 is considered high reliability (Hair et al., 2011; Pallant, 2016). However, the use of composite reliability is technically preferable within PLS-SEM due to the limitations of Cronbach's alpha (Hair et al., 2016). Composite reliability takes into account that each indicator has different outer loadings (Hair et al., 2016). According to Hair et al. (2016), internal consistency reliability is considered acceptable for exploratory research when the composite reliability values between 0.60 and 0.70. Meanwhile, the values between 0.7 and 0.9 are considered satisfactory for more advanced stages of research (Hair et al., 2016). On the other hand, the values greater than 0.90 is considered not desirable or invalid measure due to the indicators measuring the same phenomenon (Hair et al., 2016).

3.13.5 Discriminant Validity

Discriminant validity is used to assess the extent to which a construct is distinct from other constructs to ensure the items are measured in the right construct (Hair et al., 2014; Hair et al., 2016). Traditionally, there are two approaches to assess discriminant validity within PLS-SEM: cross-loadings and Fornell-Larcker criterion (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). According to Chin (1998), cross-loading is obtained by examining the correlations between each construct component score with all of the other items. The item's loadings on its assigned construct should be greater than any loadings on all the other constructs (Chin, 1998; Hair et al., 2016). Meanwhile, the Fornell-Larcker criterion is obtained by comparing the correlations between the square root of the AVE values with the latent variable (Hair et al., 2016). Thus, the square root of AVE values of each construct should be higher than the highest correlation of construct with any other constructs (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). The summary of reliability and validity guidelines to assess the measurement model are listed in Table 3.4.

Table 3.4
Summary of Guidelines in Assessing the Measurement Model

	Reliability and Validity Type	Criterion	Guidelines
1	Indicator reliability	Indicator loadings	≥ 0.70 with significant at least at the 0.05 Outer loading between 0.40 and 0.70 should be considered for deletion which depends on AVE more than 0.5 ≤ 0.40 should be eliminated from the construct
2	Internal consistency	Composite reliability	0.60 - 0.70 (acceptable for exploratory research) 0.70 - 0.90 (acceptable for advanced stages of research) > 0.90 (not desirable or invalid)
3	Convergent validity Average	Variance Extracted	≥ 0.50
4	Discriminant validity	Cross-loadings	Each item loadings on its assigned construct greater than any of its loadings on all other 125 constructs
		Fornell-Larcker criterion	Square root of AVE values of each construct should be higher than the highest correlation of construct with any other constructs

Source: Hair et al. (2016)

3.13.6 Assessment of Structural Model Using Partial Least Squares (Pls- Sem)

The structural model represents the constructs used to evaluate the relationship between constructs in the model (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016). The structural model is used to evaluate the constructs' hypothesized relationships (Hair et al., 2016). The structural model or typically known as the inner model (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016) is examined after analyzing the measurement model successfully (Hair et al., 2011). The structural model assessment can be evaluated using the significance test of path coefficients and coefficient of determination (R2 values) within PLS-SEM (Garson, 2016; Hair et al., 2011; Hair et al., 2016).

3.13.7 Significance Test of Path Coefficients

Path coefficients represent the strength of hypothesized relationships among latent variables in the model (Hair et al., 2014; Hair et al., 2016). The standardized values of path coefficients range are between -1 to +1 (Hair et al., 2014; Hair et al., 2016). The path coefficient values closer to +1 indicates a strong positive relationship (Hair et al., 2014; Hair et al., 2016). In contrast, the path coefficient values closer to -1 reflects a strong negative relationship (Hair et al., 2014; Hair et al., 2016). Meanwhile, the path coefficient values closer to 0 indicate a weak relationship (Hair et al., 2016). The test of significance is needed to interpret the relationship among all the latent variables in the model, which depends on its standard error obtained from bootstrapping (Garson, 2016; Hair et al., 2014; Hair et al., 2016). Thus, the path coefficients values should be more than 0.10 as a positive and strong relationship or less than 0.10 as a positive and weak relationship with a significant level should less than 0.05 (Hair et al., 2016).

3.13.8 Coefficient of Determination (R2 Value)

The coefficient of determination (R2 value) represents the variance of endogenous (dependent) latent variables that are explained by all of the exogenous (independent) latent variables linked to it (Hair et al., 2011; Hair et al., 2016). The R2 value is computed as the squared correlation between the actual and predicted values of endogenous (dependent) latent variables to indicate the model's predictive power (Hair et al., 2016). The R2 values range from 0 to 1, with 1 representing the highest level or complete predictive accuracy (Hair et al., 2014; Hair et al., 2016). According to Chin (1998), R2 values for endogenous latent variables around 0.67, 0.33 and 0.19 are considered substantial, moderate, and weak.

Table 3.5
Summarizes The Guidelines to Assess The Structural Model.

	Criterion	Guidelines
1	Significance test of path coefficient	Must be above 0.10 and at significance level that is less than 0.05.
2	Coefficient of determination (R2 value)	0.67 - Substantial 0.33 - Moderate 0.19 - Weak

Source: Hair et al. (2016)

3.14 Justification of Data Analysis Techniques

This study employs IBM Statistical Package for Social Science (SPSS) version 25 and Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS for data analysis. The integration of these two statistical tools is appropriate as they serve complementary analytical functions in quantitative research, where SPSS is primarily used for preliminary data preparation, and PLS-SEM is used for hypothesis testing and model evaluation. Recent empirical studies also confirm the common combined use of SPSS and SmartPLS in behavioural and organizational research for strong data analysis procedures (Hair et al., 2022; Kassab et al., 2023).

SPSS is used in the initial stage of analysis for data screening, coding, and descriptive statistical analysis. After data collection, all responses are entered into SPSS to ensure proper data organisation, cleaning, and preparation for further analysis. This includes missing value analysis, detection of outliers, and assessment of data normality. SPSS is also widely used to generate descriptive statistics such as frequency distribution, mean, standard deviation, minimum, and maximum values, which are essential for describing respondents' demographic profiles. In addition, SPSS is used to assess the internal consistency reliability of constructs using Cronbach's Alpha. A Cronbach's Alpha value above 0.70 indicates good reliability, while values above 0.50 are acceptable in exploratory studies (Hair et al., 2019; Nunnally, 1978). Recent methodological literature continues to support Cronbach's Alpha and Composite Reliability as standard reliability indicators in behavioural research (Hair et al., 2022).

PLS-SEM is employed in this study to examine the relationships between technostress creators, work-life balance, and psychological health, as well as to test the mediating effect of psychological health. PLS-SEM is a variance-based structural equation modelling technique that is widely adopted in social science and management research due to its predictive capability and flexibility (Hair et al., 2017; Hair et al., 2021). Recent studies continue to confirm that PLS-SEM is highly suitable for complex models involving multiple constructs, mediation effects, and prediction-oriented research objectives (Hair et al., 2022; Hair et al., 2023).

PLS-SEM is preferred over Covariance-Based SEM (CB-SEM) for several methodological reasons. First, PLS-SEM is more appropriate for prediction-oriented research, particularly when the aim is to explain and predict variance in endogenous constructs rather than confirm an established theoretical model (Hair et al., 2017; Hair et al., 2021). Second, it is suitable for complex models involving multiple constructs and mediating relationships, as is the case in this study. Third, PLS-SEM is non-normal data distribution and is appropriate for small to moderate sample sizes, which are common in organizational survey research. Fourth, it maximises the explained variance (R^2) of dependent variables, which aligns with the objective of this study to assess the predictive impact of technostress creators on work-life balance and psychological health outcomes (Hair et al., 2022; Sarstedt et al., 2023).

The use of both SPSS and PLS-SEM is methodologically justified as each serves a distinct purpose within the analytical process. SPSS is utilised for data preparation, descriptive analysis, and reliability testing, while PLS-SEM is used for measurement model evaluation and structural model assessment. This sequential approach ensures data accuracy before hypothesis testing and enhances the overall rigor, reliability, and validity of the study findings.

3.15 Data Analysis Approach

The data analysis depends on the type of questions, the number of variables, and the scale of measurement (Zikmund, 1994). It is associated with the type of statistical methods observed by the study. Data obtained in this study analyze using the Statistical Package in Social Science Software (IBM SPSS) version 25 and Smart PLS-SEM (smart partial least squares structural equation modeling). In this statistic researcher conduct PLS-SEM first. During conducted PLS-SEM research use SPSS to get data that PLS-SEM cannot ge it. Researcher use data from SPSS to be included in PLS-SEM. These statistics be used to study the demographic profile to run descriptive statistics and overall data for the study. The plans for data analysis for this research are based on the data analysis presented in Table 3.6 below:-

Table 3.6

Data analysis

Research Objective	Concept / Construct	Research Question	Statistical Analysis
RO1-RO5: To examine the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance.	Relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and Work-life	**RQ1-RQ5:** What is the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance?	-Cronbach's Alpha, -Composite Reliability -Convergent Validity: Factor Loadings and Average Variance Extracted (AVE) - Fornell &

			Larker Criterion, Cross Loadings, Heterotrait-Monotrait Ratio of Correlations (HTMT). -Structural Model Analysis Using PLS-SEM
RO6-RO10: To examine the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and psychological health.	Relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and Psychological	**RQ6-RQ10:** What is the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and psychological health?	-Cronbach's Alpha, -Composite Reliability -Convergent Validity: Factor Loadings and Average Variance Extracted (AVE) - Fornell & Larker Criterion, Cross Loadings, Heterotrait-Monotrait Ratio of Correlations (HTMT). -Structural Model Analysis Using PLS-SEM
RO11: To examine the relationship between psychological health and work-life balance.	Relationship: Psychological health and Work-life balance	**RQ11:** What is the relationship between psychological health towards work-life balance?	-Cronbach's Alpha, -Composite Reliability -Convergent Validity: Factor Loadings and Average Variance Extracted (AVE) - Fornell & Larker Criterion,

			Cross Loadings, Heterotrait-Monotrait Ratio of Correlations (HTMT). -Structural Model Analysis Using PLS-SEM
RO12-RO16: To identify the mediating effect of psychological health on the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance	Psychological health mediates the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance.	**RQ12-RQ16:** Does psychological health mediate the relationship between (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) and work-life balance?	-Cronbach's Alpha, -Composite Reliability -Convergent Validity: Factor Loadings and Average Variance Extracted (AVE) - Fornell & Larker Criterion, Cross Loadings, Heterotrait-Monotrait Ratio of Correlations (HTMT). - VAF (Variance Accounted For) -Structural Model Analysis Using PLS-SEM

IBM Statistical Package for Social Science (IBM SPSS) version 25 and Partial Least Square Structural Equation Model (PLS-SEM) were used to facilitate data entry and execute data analysis, respectively, in this study. SPSS conducted to facilitate data entry, analyze demographic information, descriptive analysis, and ensure the reliabilities of each variable of this study. Meanwhile, PLS-SEM is used to indicate the relationship among the constructs.

Wold (2006), listed few reasons using PLS-SEM, and amongst them are broad scope and flexibility of theory and practice and more comfortable to test new latent variables in an inner model relation or the omission of elements. Also, PLS-SEM analyses the prediction based model, complex model (numerous constructs or indicators), and massive data (Rigdon, 2013). Hair et al. (2014), revealed that the advantages of using PLS-SEM included: a) non-normal data, b) small sample sizes, and c) formative measured construct. Hair et al. (2012), reported frequently studies of using PLS-SEM for non-normal data (22 studies, 68.8%), small sample size (17 studies, 53.1%), formative measures (10 studies, 31.3%) and prediction study (10 studies, 31.3%). According to Bacon, (1999); Hwang et al. (2010) and Wong (2013), PLS-SEM can be employed when samples are small, an application has limited theory, utmost predictive accuracy is available, and accurate model specification is definite.

CHAPTER 4
FINDINGS OF STUDY

4.1 Introduction

This chapter describes the data was analysed based on the response rate from the respondents. This study has five independent variables, one dependent variable and one mediation variable. The independent variable of this study consists of techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty. The work-life balance as a dependent variable. Psychological health as a mediator variable. This section provides a statistical assessment of the studies. The section starts with data preparations, creating structure, data cleaning, and data screening, before the PLS-SEM assessment is performed. This chapter provides the interpretation of the data that are relevant to answer all the research questions. Furthermore, in this chapter, the researcher presents a descriptive analysis of each variable in this study and the chapter also explains the basic descriptive statistics of the profile findings. In addition, the researcher also discusses on measurement model for determining items reliable and validity in section 4.6, and the results of the structural model assessment evaluation in section 4.8. An assessment of the mediation connection between the factors is also performed in section 4.9. The section ends with a chapter summary.

4.2 Data Preparation

Preparing the information is the first stage in data analysis before evaluating the research model. Data preparation involves editing, coding, and data entry to ensure the precision and adequacy of the data (Fadele & Rocha, 2025). Response rate for data.

4.2.1 Creating Structure

At the end of data collection, a total of 403 responses were received. All responses were meet the study criteria. This study utilized a manual paper based data collection technique. Therefore, the first stage after information gathering is to create the data structure. The process begins by indicating the name of the variables involved. This research includes a mixture of close ended questions and open-ended questions. The close ended questions comprise of twenty three items for the independent variables (IV), eleven items for mediating variables, fourteen items for dependent variables (DV), and six items for demographic questions. The next step is the coding process, where categories are assigned with numbers or symbols to facilitate the measurement of items into a certain number of groups or categories (Fadele, & Rocha, 2025; Hair et al., 2017). For this study, for all independent variables and dependent variables, the responses are pre-coded as 1-7, with 1 indicates strongly disagree and 7 indicates strongly agree. For the mediating variable have by three different code, one question code excellent and poor, two question code 2 days and 3 months and above ago, and others questions code yes and no. Later, all responses were post coded, where certain numbers are assigned to categories of responses (Hair et al., 2017).

4.2.2 Data Cleaning

As explained in the previous chapter, data cleaning involves the process of checking for straight lining data, missing values, outliers, normality, and common method bias.

4.2.3 Data Screening

4.2.3(a) Blank Responses

The first step in data cleaning is checking for the blank responses among the collected questionnaires, and Microsoft Excel was used to conduct the procedure.

Cases with more than 10% blank responses on the independent variables or any blank response on the dependent variables are deleted from the sample. Using the formula of COUNTBLANK (item1 to item), it is found that there is no blank response in the data, confirming all questions were answered by the respondents.

4.2.3(b) Straight Lining

Straight Lining This study also tests the response pattern to detect if there is a straight lining pattern, which occurs when a participant or respondent provides the same feedback or response for most of the questions (Hair et al., 2017). The straight lining assessment in this study was conducted using Microsoft Excel 2016. Among all 416 tested cases, 13 cases were detected with straight lining, and they were excluded from further analysis, leaving the total of 402 remaining cases to be analysed after one extreme outlier was identified and removed.

4.2.4 Missing Values

The next stage in data cleaning is to identify any missing part of the data set and missing data. According to Hair et al. (2017), missing data occurs when a respondent does not answer one or more questions, either intentionally or unintentionally (Hair et al., 2017). The effect of missing data is that it can diminish the statistical power of a study and may generate biased estimates that result in worthless conclusions (Lavelle et al., 2025). The gravity of missing data hinges on the configuration of missing data, the quantity of missing data, and the reason why it is missing. This study follows a four step process to identify missing data and to apply remedies (Hair et al., 2022).

The steps to follow are as follows:

I. Examine the type of missing data (ignorable or non-ignorable)

In general, there are two types of missing data. The first type is ignorable, whereby the questions can be part of the instrument, but yet it is allowable for the

respondents for not answering the questions. Meanwhile, non-ignorable missing data happens because of several factors such as researcher's procedural factor during the data entry process, or the respondents themselves decline to answer some items in the questionnaire (Hair et al., 2022). For non-ignorable missing data, it is important to identify the extent of missing data to look at the pattern of the missing data before any remedy is applied. In this study, all questions that are related to the structural model are non-ignorable. Therefore, the next step is to measure the extent of missing data.

II. Examine the extent of missing data

The SPSS 25 was employed to test on the degree of missing data. missing data was found on six items from the latent variables (Tin5, W9 and H6). Hair et al. (2016), provides a rule whereby if the number of missing data is less than 5%, it is considered acceptable. Items Tin5 and W9 have at most 2% missing data, which is considered acceptable. The only item with more than 5% missing data is H6, which recorded 5% missing data. According to Chinnaraju (2025), the maximum level of missing data allowed is 10% before it could severely affect the interpretation of the findings. The next step is to identify the randomness of missing data.

III. Examine the randomness of missing data

The next step is to inspect the randomness of missing data. In this case, Little's MCAR test was conducted, and it shows a p-value of 0.049, showing that the difference between the observed missing data pattern in the reduced sample and a random sample is not significant. As a result, any of the remedies for missing data can be employed as the pattern of the missing data shows no sign of probable bias.

IV. Apply the remedies to treat the missing data

There are various techniques used to treat missing data, such as listwise deletion, casewise deletion, mean value replacement, and Expected Maximisation. However, which method is chosen does not matter and may not have a substantial effect on the findings as each method has its own advantageous and disadvantageous (Hair et al., 2020). For this study, Estimation Maximisation (EM) is used to examine and treat the missing values. EM is a method that provides an assumption of

distribution for the partially missing data, and the inferences are based on the likelihood. Several works of literature postulated that in treating missing data, EM is a superior method used compared to other methods such as list-wise deletion and mean substitution (Wang & Song, 2025). In this method, missing values are assigned based on the expectation maximization estimates of the parameter. It has been proven that the EM algorithm is a flexible tool to calculate maximum likelihood estimates in various problems involving missing data or incomplete information (Li, 2025). The analysis shows that the findings are not significant (p-value >0.10), and this is consistent with the assumption that the data is completely missing at random (Ahmed et al., 2025). Therefore, expectation maximization is applicable to address the problem of missing values.

4.2.5 Outlier

Outliers are extreme responses to particular questions or extreme responses to all questions (Hair et al., 2017). Since outliers can adversely affect data's normality and produce distorted results, scrutinizing the outliers is therefore imperative. (Hair et al., 22; Sharifnia et al., 2025). The outliers in this study are detected using multivariate detections on all the independent and dependent variables. The outliers are diagnosed with the Mahalanobis D2 measure, which is a multivariate evaluation of each observation across a set of variables (Hair et al., 2017). Using SPSS version 25, this method measures the distance of each observation in the multidimensional space of all observations. Higher D2 value shows that the data should be removed from the generation distribution of observations. Table 31 indicates that there are 22 cases of outliers in the sample based on Mahalanobis Distance greater than 35. Based on the steam and plots in Appendix S, 1 cases show the characteristics of outliers and therefore, should be removed. A total of 403 cases remains as the 1 outlier are deleted. The next step is to test the assumption of multivariate analysis.

Table 4.1
Multivariate outlier detection

No	Case Number	Mahalanobis (D2)	No	Case Number	Mahalanobis (D2)
1	256	45.887	14	387	45.899
2	266	44.655	15	388	46.330
3	376	35.650	16	389	37.336
4	377	40.832	17	390	69.951
5	378	35.766	18	397	70.211
6	379	66.786	19	398	59.319
7	380	45.777	20	399	77.766
8	381	58.200	21	400	35.550
9	382	46.889	22	401	59.455
10	383	35.486			
11	384	44.589			
12	385	64.952			
13	386	36.300			

4.3 Assumption Testing

The next step after data cleaning is to test for the assumptions underlying the statistical bases for multivariate analysis. There are two reasons that explain the need to conduct testing for the assumptions. Firstly, the complexity of the relationships from a large set of variables may result in potential distortions and bias. Secondly, the complexity of the analysis and results may cover the indicators of assumptions violations, which are evident in simpler univariate analysis (Hair et al., 2017). This study test for few assumptions as discussed in the following section. The testing of assumption includes normality analysis, linearity, normality of the error terms, constant variance- homoscedasticity, auto-correlation and responses bias check.

4.3.1 Normality

The first assumption in multivariate analysis is normality, which is embodied by the normal distribution assumption in each item and all linear combinations of items (Tian et al., 2025). Mardia's multivariate kurtosis is used to check normality of the data. Hair et al. (2017) and Lacobucci et al. (2025), suggested that the multivariate skewness and kurtosis are measured using the software available in statistical analysis website available online. The results can be viewed in the following URL address: https://webpower.psychstat.org/models/kurtosis/results.php?url=ed734a6632b0b4b26a13f5881c2ce6a6.

The results indicate that the data is not normally distributed, as shown by the skewness (β = 20.025, $p < 0.01$) and kurtosis (β = 401.000, $p < 0.01$). All tests produced consistent results showing that the normal distribution assumption of the data is violated and this calls for the use of Smart PLS, which is a non-parametric analysis tool.

4.3.2 Normality of the error terms

The second assumption in multivariate analysis is the normal distribution of the error term, and it can be evaluated using the normal P-P plot. Figure 8, shows that

the point is close to the diagonal line, and thus, the error terms are normally distribute.

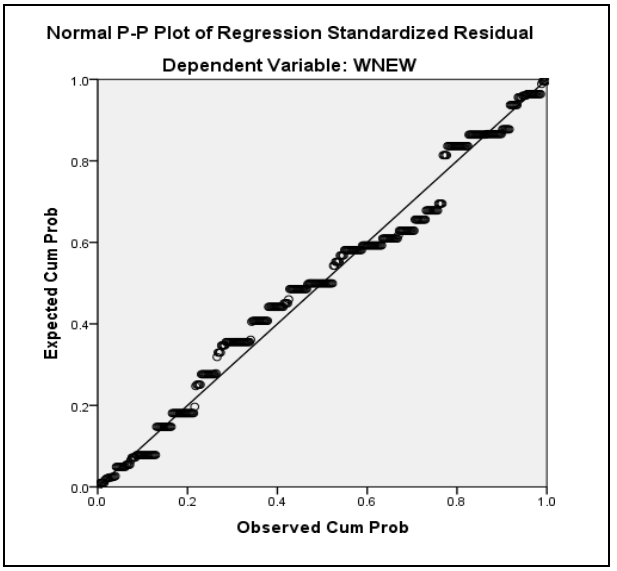

Figure 4.1: Normality of the error term

4.3.3 Linearity

The third assumption of multivariate analysis is the linear relationship between the independent variables and the dependent variable. This is ascertained by examining whether a straight line can be drawn on the scatter plot is generated. As seen in Appendix T, a straight line can be drawn for all variables indicating that the data meets the linearity assumption.

4.3.4 Constant Variance-Homoscedasticity

The fourth assumption is that the variance must be a constant (Homoscedastic) as opposed to not constant (Heteroscedastic). It is done by observing the consistent pattern while plotting the studentized residual (SRESID) against the predicted value of Y (ZPRED).

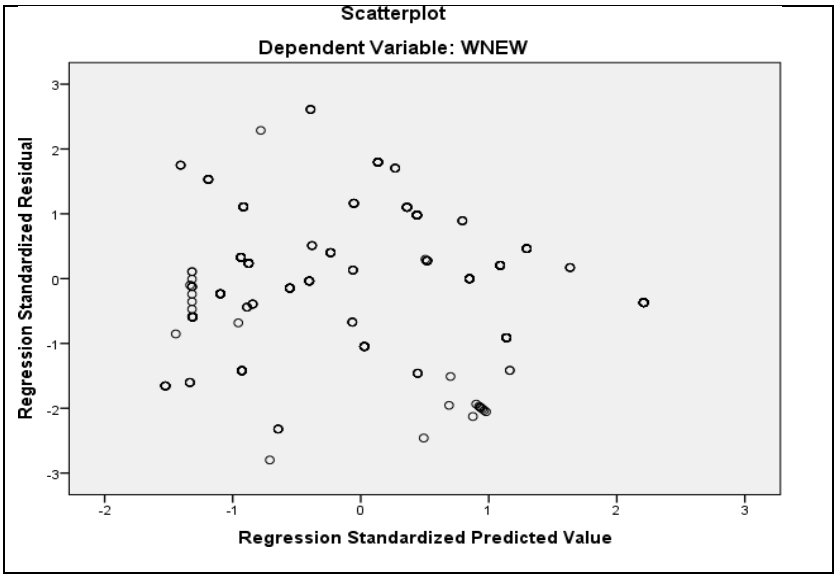

Figure 4.2: Constant Variance-Homoscedasticity

4.3.5 Auto-Correlation

Auto-correlation is a multivariate analysis assumption that the errors should not be auto-correlated. Using the Durbin Watson statistic to diagnose auto-correlation, the cut-off value should be between 1.5 to 2.5. In this study, as enclosed in Appendix U, the Durbin Watson value is 1.639, which is within the allowable range and therefore is the error terms have no problem of auto-correlation.

4.3.6 Response Bias Check

T-tests are conducted to ascertain that responses received are free from bias, or else the conclusion derived from the results of the study could be questionable or invalid. The data was checked for any response-bias between (1) level of department (2) level of promotion (2) data collection method: local commercial bank vs international commercial bank / non-commercial bank. To determine whether it is suitable to pool the sample groups, a T-test on the constructs was conducted to examine if there is any significant difference between the means of the stipulated groups for every variable, by applying a grouping factor. The results, show that the group effect is not significant at the 0.05 level, indicating that these groups have no significant difference in items and constructs. Based on response rate at table 28. In order to expand the response rate and to increase the effectiveness of the survey, the

researcher also decided to use multimode method while conducting the face-to-face survey. Besides collecting the data among the local commercial bank vs international commercial bank/non-commercial bank. To avoid any biases, the t-test is also conducted to examine whether there is any difference between the means of identified groups of respondents on every single variable, using the data collection method as a grouping factor. The results show indicates that the group effect is not significant at the 0.05 level, which indicates that these groups have no significant difference in items and constructs. Therefore, it can be concluded that using different applications or using multiple methods of data collection technique does not discriminate the results, indicating that in general, there is no bias.

Table 4.2
Response rate survey

Variable	N	Valid Percent	N	Missing Percent	N	Total Percent
Technostress	264	65.7%	138	34.3%	403	100%
Work-life balance	221	55%	181	45%	403	100%
Psychological Health	39	98.3%	7	1.7%	403	100%

4.1 Descriptive Analysis

4.1.1 Demographic profile of Respondents

The demographic profile presented in Table 9 provides several important insights that have implications for the interpretation and generalizability of the study findings. The descriptive data reported were based on 402 respondents after one extreme outlier was identified and removed. Respondent who are from employees of local commercial bank in Klang Valley.

Table 4.3
Demographic profile of Respondents (N=402)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	204	50.7
	Female	198	49.3
Age	5 years old and below	72	17.9
	26-35 years old	245	60.9
	36-45 years old	71	17.7
	46-55 years old	14	3.5
Race	Malay	275	68.4
	Chinese	95	23.6
	Indian	32	8.0
	Others	0	0.0
Education Level	STPM	35	8.7
	Diploma	39	9.7
	Bachelor's Degree	316	78.6
	Master's Degree	12	3.0
Marital Status	Married	241	60.0
	Single	160	39.8
	Divorced	1	0.2
Years Working in Current Organization	1 year and below	105	26.1
	2-4 years	138	34.3
	5-7 years	100	24.9
	8-10 years	45	11.2
	11 years and above	14	3.5

Firstly, the gender distribution is relatively balanced, with a slight predominance of male respondents (50.7%) over females (49.3%). This near parity reduces the likelihood of gender bias influencing the overall results and suggests that the findings can reasonably reflect perspectives from both male and female employees within the banking sector.

In terms of age distribution, the sample is heavily concentrated in the 26-35 years age group (60.9%), indicating that the study predominantly captures the perspectives of early to mid-career employees. While this group is typically more technologically adept and adaptable, their dominance in the sample may limit the applicability of the findings to older employees, particularly those aged above 45, who are underrepresented (3.5%). This skewness may influence results related to technostress, as younger employees may perceive and respond to technology differently compared to older cohorts.

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Regarding race, the majority of respondents are Malay (68.4%), followed by Chinese (23.6%) and Indian (8.0%), with no representation from other ethnic groups. While this distribution may reflect the actual workforce composition in the selected banks, it raises questions about the inclusivity and representativeness of minority groups. Cultural differences could potentially influence perceptions of work-life balance and psychological health, and thus, the findings should be interpreted with caution when generalizing across more diverse populations

In terms of educational background, a substantial proportion of respondents hold a bachelor's degree (78.6%), indicating a highly educated sample. This may suggest that respondents possess sufficient cognitive and technical capabilities to engage with digital tools, potentially reducing the perceived complexity of technology. Consequently, the level of technostress reported in this study may differ from populations with lower educational attainment.

Regarding marital status, most respondents are married (60.0%), which may have implications for work-life balance dynamics. Married individuals often face greater family responsibilities, which could intensify the impact of technostress on personal life domains. Therefore, this demographic characteristic may play a moderating role in the relationship between technostress and work-life balance.

Finally, in terms of organizational tenure, most respondents have relatively short to moderate work experience, with the majority falling within the 2-4 years category (34.3%). This suggests that the sample is largely composed of employees who are still adapting to organizational systems and technological environments. Employees with shorter tenure may experience higher levels of uncertainty and stress when dealing with evolving technologies compared to more experienced staff. Conversely, the low representation of long-tenured employees (11 years and above: 3.5%) may limit insights into how prolonged exposure to technology affects stress and coping mechanisms over time.

Overall, while the demographic profile provides a strong basis for analysing the relationships proposed in this study, certain imbalances particularly in age distribution and tenure should be acknowledged as potential limitations. These factors may influence the external validity of the findings and should be carefully considered when generalizing beyond the sampled population.

4.1.2 Study Variable of Descriptive Analysis

Firstly, study variable of descriptive analysis used to analyze the data. According to Salkind (2006), descriptive statistics such as mean, median and standard deviation can be derived from the interval scale of all variables. In addition, in this study, mean, median, standard deviation, kurtosis and skewness have been included in descriptive analysis. Below, shows mean, median, standard deviation and both skewness and kurtosis are within the appropriate range of -3 to +3, (Hair et al.,2017). Among all the constructs, techno-overload recorded the highest mean of 4.128. This is followed by techno-uncertainty (4.091), online review (3.849), techno-insecurity (3.508), and work-life balance (3.423). The lowest mean scores are recorded by techno-invasion and psychological health, with mean values of 2.909 and 2.199, respectively.

Overall, the correlation between construct were in predicted direction and significant a $P<0.01$. The correlations between variables were found to be lower than the result of Cronbach's alpha, indicated evidence of discriminant validity of the measure (Gaski, 1984). In this research, Cronbach's alpha ranged from 0.624 to 0.955, while correlations between variables were generally low to moderate, ranged from 0.00 to 0.955. Below figure 10 are corporate reputation model and PLS-SEM results:

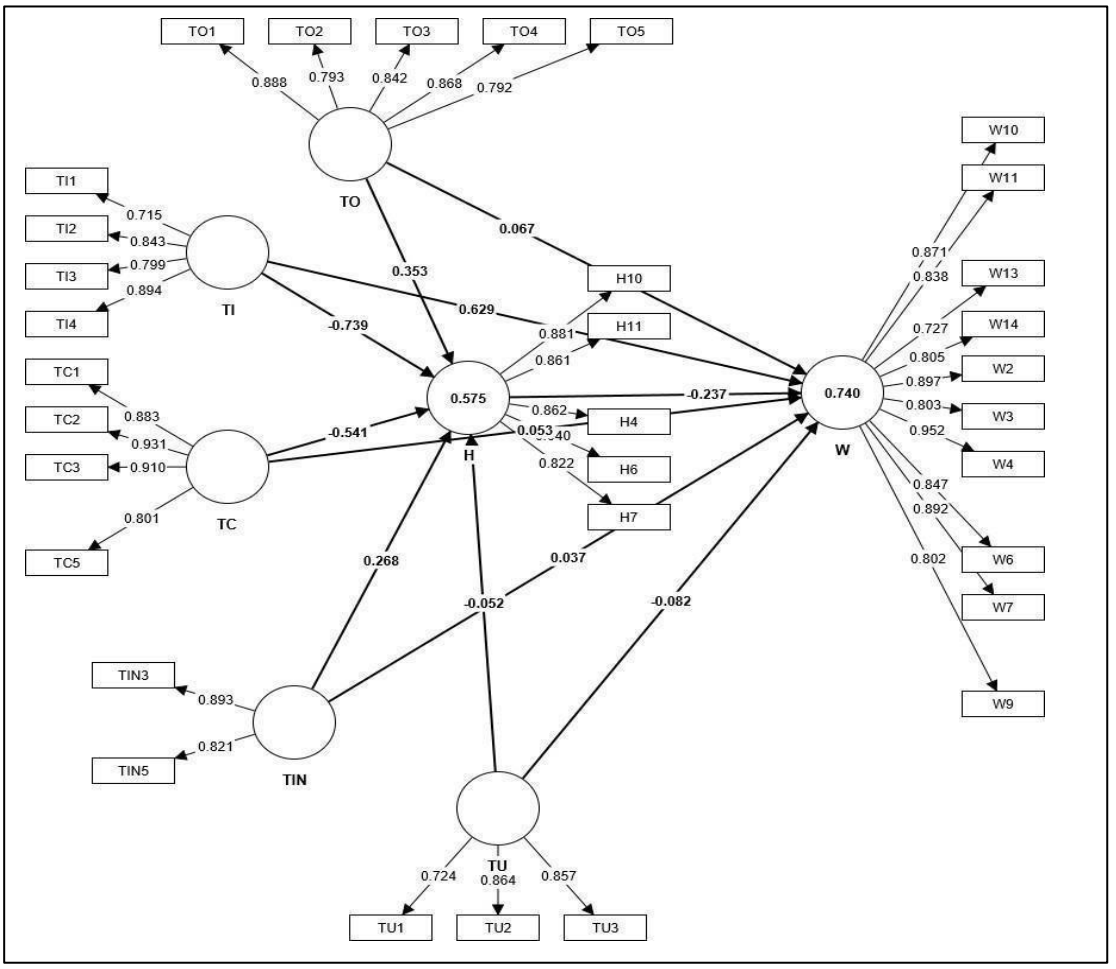

Figure 4.3: Corporate reputation model and PLS-SEM results.

4.2 Item Loading Deleted

To evaluate PLS-SEM results, the confirmatory composite analysis (CCA) sequence that Hair et al. (2020), recommends. In the CCA sequence, one begins by assessing outer item loadings (i.e., measurement model), which indicate the strength of relationships between items and their associated composite factors. Items with factor loadings above 0.70 were retained, after removing the items less than 0.70 one by one, for example, fourteen item in table below which had a loading of below 0.70 which is from the lowest value from 0.201 until 0.498 was deleted. Each time an item was removed, the exploratory factor analysis was run again, the process ended when

the rotated component matrix showed a cleanly distributed pattern. The table 4.4 below shows items loading deleted:-

Table 4.4
Item Loading Deleted

Name	Value outer loading
TC4	0.235
TIN1	0.345
TIN2	0.490
TIN4	0.410
TU5	0.366
H1	0.464
H2	0.442
H3	0.380
H5	0.488
H8	0.201
H9	0.411
W5	0.498
W8	0.477
W12	0.312

Based on the table 4.4 above shows 14 items are deleted and all items loading deleted because outer loading below 0.70. According Hair et al. (2020); Hair et al. (2022) and Hair et al. (2019), one item had an item loading below 0.70, must cut-off or discard for outer loadings because of not valid . All items are deleted not include in the table for analysis because are not valid for analysis.

Table 4.5
Techno-overload

Name	Mean	Median	Std Deviation	kurtosis	Skewness
TO1	4.664	5	1.651	-0.58	-0.459
TO2	3.831	4	1.528	-0.19	0.174
TO3	3.692	4	1.787	-0.845	0.051
TO4	4.530	5	1.952	-1.086	-0.43
TO5	3.736	4	1.842	-1.109	0.075

Based on table 4.5, shows the results for techno-overload items. In this variable, the higher mean is from item TO1 “I am forced by the technologies used in the organization to work much faster” mean=4.664 (SD= 1.651), followed by item TO4 “I am forced to change my work habit to adapt to new technologies” is mean=4.530 (SD= 1.952).

In addition, item TO2 “I am forced by the technologies used in the organization to do more work than I can handle” is mean=3.831 (SD=1.528). Next, mean for item TO3 “I am forced by the technologies used in the organization to work with very tight work schedules” is mean=3.692 (SD=1.787). Meanwhile, the lower mean for this variable is an item TO5 “I have more workload because of the technologies complexity” mean=3.736 (SD=1.842).

Therefore, in this variable, it shows that items TO1 “I am forced by the technologies used in the organization to work much faster” has the highest level of agreement compared to other items in this variable.

Table 4.6.
Techno-invasion

Name	Mean	Median	Std Deviation	kurtosis	Skewness
TI1	3.550	3	1.771	-1.121	0.248
TI2	3.090	2	2.020	-1.45	0.413
TI3	2.595	3	1.404	-0.078	0.703
TI4	2.400	2	1.402	0.656	1.088

Based on table 4.6, shows the results for techno-invasion items. In this variable, the higher mean is from item TI1 “I spend less time with my family due to the technologies used in the organization” mean=3.550 (SD= 1.771), followed by item TI2 “I have to be in touch with my work even during my vacation due to the technologies” is mean=3.090 (SD= 2.020).

Next, item TI3 “I have to sacrifice my vacation and weekend time to keep current on the new technologies used in the organization” is mean=2.595 (SD=1.404). Meanwhile, the lower mean for this variable is an item TI4 “I feel my personal life is being invaded by the technologies used in the organization” mean=2.400 (SD=1.402).

Therefore, in this variable, it shows that items TI1 “I spend less time with my family due to the technologies used in the organization” has the highest level of agreement compared to other items in this variable.

Table 4.7
Techno-complexity

Name	Mean	Median	Std Deviation	kurtosis	Skewness
TC1	3.286	3	1.754	-0.262	0.775
TC2	3.463	3	1.850	-0.861	0.402
TC3	3.194	3	1.628	0.045	0.803
TC5	2.938	3	1.457	1.208	0.825

Based on table 4.7, shows the results for techno-complexity items. In this variable, the higher mean is from item TC2 “I need a longer time to understand and use new technologies in the organization” mean=3.463 (SD= 1.850), followed by item TC1 “I have limited knowledge and skill about the technologies used in the organization to handle my job satisfactorily” is mean=3.286 (SD= 1.754).

Next, mean for item TC3 “I do not find enough time to study and upgrade my technology skills” is mean=3.194 (SD=1.628). Meanwhile, the lower mean for this variable is an item TC5 “I often find it too complex for me to understand and use new technologies” mean=2.938 (SD=1.457).

Therefore, in this variable, it shows that items TC2 “I need a longer time to understand and use new technologies in the organization” has the highest level of agreement compared to other items in this variable

Table 4.8
Techno-insecurity

Name	Mean	Median	Std Deviation	kurtosis	Skewness
TIN3	3.689	3	1.921	-0.975	0.378
TIN5	2.489	2	1.502	0.403	1.051

Based on table 4.8, shows the results for techno-insecurity items. In this variable, the higher mean is from item TIN3 “I am threatened to co-workers with latest technology skills” mean=3.689 (SD= 1.921).

Meanwhile, the lower mean for this variable is an item TIN5 “I feel there is less sharing knowledge among co-workers for fear of being replaced” mean=2.489 (SD=1.502).

Therefore, in this variable, it shows that items TIN3 “I am threatened to co-workers with latest technology skills” has the highest level of agreement compared to other items in this variable.

Table 4.9
Techno-uncertainty

Name	Mean	Median	Std Deviation	kurtosis	Skewness
TU1	3.219	6	1.647	-0.273	-0.823
TU2	3.348	6	2.153	48.902	3.696
TU3	4.980	6	1.682	-0.61	-0.651

Based on table 4.9, shows the results for techno-uncertainty items. In this variable, the higher mean is from item TU3 "There are constant changes in computer hardware in the organization" mean=4.980 (SD= 1.682).

Next, mean for item TU2 "There are constant changes in computer software in the organization" is mean=3.348 (SD=2.153). Meanwhile, the lower mean for this variable is an item TU1 "There are always new developments in the technologies used in the organization" mean=3.219 (SD=1.647).

Therefore, in this variable, it shows that items TU3 "There are constant changes in computer hardware in the organization" has the highest level of agreement compared to other items in this variable.

Table 4.10.
Work-life balance

Name	Mean	Median	Std Deviation	kurtosis	Skewness
W2	3.789	4	1.757	-0.86	-0.12
W3	3.062	3	1.835	-0.828	0.417
W4	3.547	4	1.981	-1.365	-0.046
W6	3.592	3	1.770	-0.883	0.241
W7	3.657	4	1.803	-1.065	-0.09
W9	3.506	4	2.042	-1.251	0.114
W10	3.415	4	1.903	-1.116	0.119
W11	3.408	3	1.646	-1.204	-0.045
W13	3.893	4	1.836	-1.12	-0.135
W14	4.724	5	2.066	-0.939	-0.61

Based on table 4.10, shows the results for work-life balance items. In this variable, the higher mean is from item W14 "I come home from work too tired to do things I would like to do" mean=4.724 (SD= 2.066), followed by item W13 "I make personal sacrifices to get work done" is mean=3.893 (SD= 1.836).

In addition, item W2 "I feel dazed when I try to balance my work and personal life" is mean=3.789 (SD=1.757). Next, mean for item W7 "I have to put aspects of my personal life because of my work" mean=3.657 (SD=1.803). Next, item W6 " I often have to make difficult choices between my work and my personal life''

mean=3.592 (SD= 1.770). Besides, item W4 “I am unable to relax at home because I am preoccupied with work’’ mean=3.547 (SD=1.981). Next, item W9 “ I often neglect my personal life needs because of the demands of my work’’ is mean=3.506 (SD=2.042).

In additional, item W10 “ My personal suffers because of my work’’is mean=3.415 (SD=1.903). Next, item W11 “ I have to miss out on important personal activities due to the amount of time I spend doing work’’ mean=3.408 (SD=1.646). Meanwhile, the lower mean for this variable is an item W3 “I have difficulty scheduling vacation time because of my workload” mean=3.062 (SD=1.835).

Therefore, in this variable, it shows that items W14 “I come home from work too tired to do things I would like to do” has the highest level of agreement compared to other items in this variable.

Table 4.11.
Psychological Health

Name	Mean	Median	Std Deviation	kurtosis	Skewness
H4	2.734	2	0.442	-0.876	-1.062
H6	2.443	1	0.497	-1.956	0.231
H7	2.585	2	0.493	-1.891	-0.345
H10	1.567	2	0.495	-1.936	-0.272
H11	1.662	2	0.473	-1.537	-0.686

Based on table 4.11, shows the results for psychological health items. In this variable, the higher mean is from item H4 “During the past 4 weeks have you had a stomach ache or stomach problems” mean=2.734 (SD= 0.442), followed by item H7 “Problems relaxing, Irritable, Tense, Stressed” is mean=2.585 (SD= 0.493).

In addition, item H6 “Worn out, physically exhausted, emotionally exhausted, tired” is mean=2.443 (SD=0.497). Next, mean for item H11 “Problems concentrating, Difficult thinking clearly, Difficult taking decisions, Difficult remembering” is mean=1.662 (SD=0.473). Meanwhile, the lower mean for this variable is an item H10 “Stomach-ache, Headache, Palpitations, Muscle tension” mean=3.567 (SD=0.495).

Therefore, in this variable, it shows that items H4 “During the past 4 weeks have you had a stomach- ache or stomach problems” has the highest level of agreement compared to other items in this variable.

4.3 The Measurement Model

In this study, to analyses the research model the researcher is using Partial Least Squares (PLS) technique using the Smart PLS 4 software (Ringle, Wende & Becker, 2015). PLS-SEM was used for structural measurement because the goal of this study is to predict key target construct. The objective of PLS-SEM is to maximize the explained variance of the endogenous latent construct (dependent variable) (Hair et al., 2014). This study examined the measurement model (validity and reliability of the measures) and the structural model (testing the hypothesized relationships). In testing the significance of the path coefficients and the loadings, a bootstrapping method (1000 resamples) was used. In addition, in the assessment of reflective measurement model, three main assessment criteria are needed at the outset. These three assessments are the internal consistency reliability, convergent validity and discriminant validity.

4.3.1 Measurement Model - Stage One

Firstly, the internal consistency consists of (α) Cronbach's alpha, composite reliability and dijkstra-henseler's rho). Cronbach's alpha is the most common method used to assess reliability (Hair et al., 2022; Sekaran, 2003). In addition, it has been considered as the first method to access reliability of measurement scale (Dijkstra, & Henseler, 2015; Hair et al., 2017). Cronbach's alpha has a different level of acceptance. Dijkstra, and Henseler, (2015), suggests that alpha should exceed 0.70 to indicate internal consistency. Other than that, Husain et al. (2025), suggest 0.80 is a level of acceptance for internal consistency. Based on Nunnally and Bernstein (1994), level of 0.60 is considered acceptable for internal consistency. Generally, various views on the level of acceptance agreed that an alpha of 0.70 and over is acceptable to indicate internal consistency.

Moreover, composite reliability used to assess internal consistency. The acceptable value for composite reliability (CR) as follows in table 4.12:

Table 4.12
Composite Reliability Internal Consistency Measurement

CR Value	Internal Consistency
CR>0.90	Not desirable
CR>0.7-0.9	Satisfactory
CR>0.6	For exploratory research

In the convergent validity, it consists of factor loadings and average variance extracted (AVE). Outer loadings are to evaluate the extent to what an indicator (Urbach & Ahlemann, 2010). Average variance extracted (AVE) is a grand mean value of the squared loadings of all indicators associated with the construct. Therefore, the acceptable value for indicator reliability is stated in table 4.13.

Table 4.13.
Loading Measurement

Loading Value	Level of Acceptance	Literature Support
Loading values equal or >0.4	Acceptable, if AVE scores >0.5	Hair, Ringle, & Sarstedt, (2011
Loading values equal or >0.5	Acceptable, if AVE scores >0.5	Hairet al., (2011).
Loading values equal or >0.6	Acceptable, if AVE scores >0.6	Hair et al., (2011).
Loading values equal or >0.7	Acceptable, if AVE scores >0.7	Hair et al., (2011).
Loading values equal or >0.708	Indicating a latent variable to explain at least 50 per cent of indicator variance	Hair, Black, Babin and Anderson (2018).

Discriminant Validity consists of Fornell & Larker Criterion, Cross Loadings and Heterotrai -Monotrait Ratio of Correlations (HTMT). Discriminant validity refers to extending the constructs under investigation that are truly distinct from one another. In the cross loading, the loading of each indicator is the highest for their designated constructs. In the Fornell & Larcker's Criterion, the AVE of a latent variable should be higher than the squared correlation between the latent variable and all other variables or the square root of AVE on the diagonal should be higher than the correlation on the off-diagonal.

Next, Heterotrai - Monotrait Ratio of Correlations (HTMT) refers to the ratio of correlations within the constructs to correlations between the constructs. There are three ways to of using HTMT approach to assess discriminant validity is shown in table 4.14:

Table 4.14
HTMT Measurement

HTMT Value	Literature Support
HTMT .85	Kline (2011)
HTMT .90	Gold et al., (2001)
HTMT inference using bootstrapping technique; Does 90% boostrap interval HTMT incluse the value of -1<HTMT<1	Henseler, (2017)

4.3.2 Indicator Loadings

Once the reliability of each internal consistency reliability has been confirmed, the indicator reliability is then measured. As shown in table 4.15, all items have satisfactory indicator reliability (ranging from 0.527 to 0.949) achieving the threshold vale set by Hair et al. (2011), with all AVE scores are higher than 0.50. Therefore, none of the items was dropped. Based on the finding, loading for all items is >0.708 and it is accepted (Hair et al., 2017). However, loading for item H6 (0.642), TC4 (0.527), TIN1 (0.556), and TIN2 (0.620) is <0.70. According to Byrne (2016), loading values equal or >0.50 acceptable, if AVE scores >0.50. Therefore, item H6, TC4, TIN1 and TIN2 is not required to be d eleted because of AVE score >0.5. In conclusion, the analysis of indicator loadings for the measurement model is fully complete. All remaining items are considered reliable and ready for the next structural model testing.

Table 4.15
Indicator Loadings

	Psychological Health	Techno-complexity	Techno-invasion	Techno-insecurity	Techno-overload	Techno-uncertainty	Work-life balance
H10	0.880						
H11	0.859						
H4	0.863						
H6	**0.642**						
H7	0.825						
TC1		0.892					
TC2		0.926					

TC3	0.892				
TC4	**0.527**				
TC5	0.799				
TI1		0.719			
TI2		0.843			
TI3		0.796			
TI4		0.893			
TIN1			**0.556**		
TIN2			**0.620**		
TIN3			0.882		
TIN5			0.740		
TO1				0.885	
TO2				0.799	
TO3				0.847	
TO4				0.867	
TO5				0.784	
TU1					0.788
TU2					0.867
TU3					0.906
W10					0.842
W11					0.831
W13					0.762
W14					0.810
W2					0.914
W3					0.799
W4					0.949
W6					0.845
W7					0.872
W9					0.776

4.3.3 Construct Reliability and Validity

In this study, Cronbach's Alpha was used to measure the internal consistency of the data. It is a measure of scale reliability. A "high" value for alpha does not imply that the measure is unidimensional. In addition, composite reliability (CR) also was used to measure the internal consistency of the data. It is a measure of scale reliability. Other than that, Composite reliability assesses the internal consistency of a measure Fornell and Larcker (1981).

Table 4.16
Cronbach's Alpha Level of Measurement

Cronbach's alpha	Internal consistency
$0.9 \leq \alpha$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Based on the results shown in table 4.17, all the constructs have met the satisfactory level of AVE result of >0.50 (Bagozzi & Yi, 1998; Fornell & Larcker; 1981; Hair et al., 2017). In addition, all the constructs have also met the satisfactory level of CR result of >0.80. In conclusion, all constructs have successfully satisfied the empirical requirements and are accepted. As a result, the measurement model evaluation is fully complete.

Table 4.17
Cronbach's Alpha, Composite Reliability (CR) and Average Variance Extracted AVE Results

Variables	Cronbach's Alpha	rho_A	CR	(AVE)
Techno-overload	0.893	0.897	0.921	0.701
Techno-invasion	0.829	0.837	0.887	0.685
Techno-complexity	0.905	0.921	0.934	0.779
Techno-insecurity	0.646	0.676	0.847	0.736
Techno-uncertainty	0.624	0.631	0.841	0.726
Work-life balance	0.955	0.961	0.961	0.715
Psychological Health	0.888	0.907	0.922	0.747

Other than that, all the constructs have met the good internal consistency value which is $0.8 \leq \alpha < 0.90$. CR values are considered "satisfactory to good" because they are between 0.70 and 0.95 (Sarstedt et al., 2014).

4.4 Discriminant Validity

The discriminant validity assessment has the goal to ensure that a reflective construct has the strongest relationships with its own indicators (in comparison with than any other construct) in the PLS path model (Hair et al., 2017). There are three techniques to assess the discriminant validity which are Fornell-Larcker criterion, cross-loadings, and the Heterotrait-Monotrait Ratio (HTMT) criterion.

4.4.1 Fornell-Larcker Criterion

The Fornell-Larcker criterion was obtained by comparing the correlations between the square root of the AVE values with the latent variable (Hair et al., 2016). The generally accepted threshold is the square root of the AVE value of each construct, and it should be higher than the highest correlation of construct with any other constructs (Hair et al., 2014; Hair et al., 2011; Hair et al., 2016).

Firstly, Fornell-Larcker criterion: the square root of AVE of a construct should be larger than the correlations between the construct and other constructs in the model. Second, cross loading is the loading of each indicator is the highest for their designated construct. Third, HTMT is a new method for assessing discriminant validity in partial least squares structural equation modeling, which is one of the key building blocks of model evaluation. Some authors suggest a threshold of 0.85 (Kline 2011), whereas others propose a value of 0.90 (Teo et al., 2008). Correlations of indicators across constructs measuring different phenomena. Table 4.18 presents the output of the Fornell-Larcker criterion.

Table 4.18
Fornell-Larcker Criterion

No	Variables	1	2	3	4	5	6	7
1	Psychological Health	**0.864**						
2	Techno-complexity	-0.513	**0.883**					
3	Techno-invasion	-0.651	0.398	**0.815**				
4	Techno-insecurity	-0.377	0.469	0.629	**0.858**			
5	Techno-overload	-0.224	0.600	0.442	0.288	**0.837**		
6	Techno-uncertainty	-0.087	0.288	0.284	0.185	0.639	**0.852**	
7	Work-life balance	-0.678	0.465	0.829	0.546	0.401	0.191	**0.845**

Based on table 4.18, indicate that all constructs (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty, work-life balance and psychological health) exhibit sufficient or satisfactory discriminant validity (Fornell & Larcker, 1981) where the square roots of AVE (diagonal) is larger than the correlations (off-diagonal) for all reflective constructs. Thus, the discriminant validity for all seven constructs is fully accepted based on the Fornell-Larcker criterion. Consequently, the assessment of the measurement model is now complete. Table 25 presents the output of cross-loadings between the constructs and indicators.

4.4.2 Cross-Loadings

According to Li and Lay, (2024); Hair, (2014), each indicator loading should be greater than all its cross-loadings. Based on table 4.19, all indicators load high on their own constructs but low on other constructs. Hence, this indicates discriminant validity is achieved as the constructs are distinctly differ. Table 4.19 shown the output of cross-loadings between the measurement items and constructs of this study. The result indicates that all the measurement items (bolded values) loaded highest with their corresponding constructs compared to other constructs. Thus, the output of the cross-loadings confirms that the discriminant validity of the measurement model for this study is satisfied and complete.

Table 4.19
Cross-loadings

Hypothesis	PH	TC	TI	TIN	TO	TU	WLB
H10	**0.912**	-0.540	-0.642	-0.300	-0.245	-0.086	-0.669
H11	**0.882**	-0.638	-0.501	-0.362	-0.232	-0.097	-0.577
H4	**0.855**	-0.291	-0.657	-0.335	-0.209	-0.125	-0.577
H7	**0.805**	-0.237	-0.422	-0.313	-0.047	0.035	-0.500
TC1	-0.435	**0.885**	0.324	0.365	0.508	0.304	0.362
TC2	-0.539	**0.930**	0.456	0.449	0.561	0.329	0.473
TC3	-0.454	**0.911**	0.414	0.630	0.494	0.191	0.412
TC5	-0.361	**0.799**	0.168	0.177	0.561	0.179	0.383
TI1	-0.433	0.586	**0.713**	0.546	0.782	0.462	0.683
TI2	-0.545	0.288	**0.842**	0.512	0.293	0.283	0.674
TI3	-0.501	0.023	**0.801**	0.488	0.049	0.001	0.634
TI4	-0.630	0.393	**0.895**	0.509	0.333	0.188	0.713
TIN3	-0.333	0.580	0.518	**0.897**	0.425	0.220	0.543
TIN5	-0.315	0.176	0.572	**0.817**	0.017	0.080	0.375
TO1	-0.182	0.552	0.419	0.333	**0.891**	0.629	0.366
TO2	-0.107	0.468	0.335	0.207	**0.786**	0.390	0.353
TO3	-0.239	0.556	0.358	0.293	**0.836**	0.542	0.292
TO4	-0.147	0.517	0.363	0.286	**0.871**	0.625	0.290
TO5	-0.244	0.424	0.366	0.103	**0.798**	0.488	0.362
TU1	-0.065	0.409	0.197	0.294	0.567	**0.830**	0.153
TU2	-0.056	0.534	0.304	0.187	0.351	**0.870**	0.233
TU3	-0.081	0.103	0.282	0.039	0.525	**0.873**	0.172
W10	-0.563	0.445	0.633	0.510	0.156	0.002	**0.872**
W11	-0.516	0.314	0.627	0.360	0.192	0.046	**0.837**
W13	-0.534	0.313	0.650	0.526	0.423	0.304	**0.725**
W14	-0.519	0.521	0.582	0.324	0.518	0.264	**0.804**
W2	-0.686	0.372	0.837	0.493	0.421	0.242	**0.897**
W3	-0.543	0.288	0.860	0.540	0.338	0.195	**0.803**
W4	-0.670	0.432	0.830	0.568	0.387	0.210	**0.952**
W6	-0.489	0.488	0.606	0.501	0.377	0.155	**0.847**
W7	-0.629	0.428	0.708	0.412	0.284	0.041	**0.893**
W9	-0.532	0.362	0.565	0.318	0.277	0.133	**0.802**

4.4.3 Heterotrait-Monotrait Ratio (HTMT)

Hair et al. (2017), define HTMT as "the ratio of between-trait correlations to within-trait correlation". This study employs two methods to assess discriminant validity. For the first approach, HTMT values greater than 0.90 (Kline, 2011) raise discriminant validity problems. Using the PLS Algorithm, is stated in Table 4.20,

none of the relevant constructs violate HTMT.90, demonstrating construct validity in the measurement model. Furthermore, a bootstrapping test was used to determine whether the HTMT value deviated significantly from 1.00 (Henseler et al., 2015), as recommended by Hair et al. (2019). A value in the confidence interval indicates a lack of discriminant validity (Henseler et al., 2015). None of the upper bound of the 95% confidence interval of HTMT is higher than 0.90 or 0.85.

Table 4.20
Heterotrait-Monotrait Ratio (HTMT) Result

No	Variables	1	2	3	4	5	6	7
1	Psychological Health							
2	Techno-complexity	0.544						
3	Techno-invasion	0.746	0.489					
4	Techno-insecurity	0.502	0.631	0.872				
5	Techno-overload	0.245	0.671	0.533	0.411			
6	Techno-uncertainty	0.134	0.401	0.414	0.313	0.859		
7	Work-life balance	0.724	0.502	0.721	0.672	0.429	0.270	

Based on table 4.20, all the constructs (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty, work-life balance, and psychological health) are below the HTMT.90. and all the constructs indicate as discriminant validity (Gold et al., 2001). Thus, this stage of the assessment is now complete.

4.5 Structural Model

The researcher moved on to the evaluation of structural equation modelling in smart PLS after the measurement model evaluation demonstrated satisfactory quality. The following subsections would provide the guidelines and the outcomes of the structural equation modelling evaluation for this study. Structural model analysis indices via PLS-SEM is shown in Table 4.21.

Table 4.21.
Indices for Structural Model Analysis Using PLS-SEM

Assessment	Name of index	Level of acceptance	Literature support
Lateral Collinearity	Variance Inflator Factor (VIF)	VIF ≤ 3.3	Diamantopoulos &Sigouw (2006)
		VIF ≤5.0	Hair et al., (2017)
Path Coefficient	Path Coefficient	P value < 0.01 T value > 2.58 (two tail) T value > 2.33 (one tail) P value < 0.05 T value > 1.96 (two tail) T value > 1.645 (one tail) P value < 0.10 T value > 1.645 (two tail) T value > 1.28 (one tail)	Hair et al., (2017)
R2	Coefficient of determination	0.26 -Substantial 0.13 - Moderate 0.02 - Weak	Cohen, Manion, & Morrison, (2008)
		0.67 - Substantial 0.33 - Moderate 0.19 - Weak	Chin (1998)
		0.75 - Substantial 0.50 - Moderate 0.25 - Weak	Hair et al. (2017)
F2	Effect size to R2	0.35 - Substantial effect size 0.15 - Moderate effect size 0.02 - Weak effect size	Cohen et al., (2008)
Q2	Stone-Geisser Q2 Predictive relevance	Value larger than 0 indicates that exogenous constructs have predictive relevance for endogenous constructs	Hair et al., (2017) Stone (1974), Geiser (1974)
V2	Effect size to Indirect (Mediation)	0.25 - Large effect size 0.09 - Medium effect size 0.01 - Small effect size 0.0 - None effect size	David A. Kenny (2021)
The Variance Accounted For (VAF)	Type of Mediation	<20% -No Mediation 20-80%-Partial Mediation >80%- Full Mediation	Hair, Hult, Ringle, Sarstedt, (2016)

Source: Ramayah et al. (2018)

4.5.1 Assessment of the Structural Model for Collinearity Statistics

According to Enders (2013), collinearity in statistics is the correlation between predictor variables (or independent variables), such that they express a linear relationship in a regression model. When predictor variables in the same regression model are correlated, they cannot independently predict the value of the dependent variable. In other words, they explain some of the same variances in the dependent variable, which in turn reduces their statistical significance. Based on the recommendation by Hair et al. (2017), all constructs have met the acceptance level of

VIF≤ 5.0 which is from lowest VIF value 1.483 until 3.385. The cut off value for VIF is VIF≤5.0.

Table 4.22
Inner VIF Values

Variables	VIF Values of work-life balance
Techno-uncertainty	1.483
Techno-complexity	3.385
Techno-invasion	1.508
Techno-insecurity	1.811
Techno-overload	2.886
Psychological Health	2.314

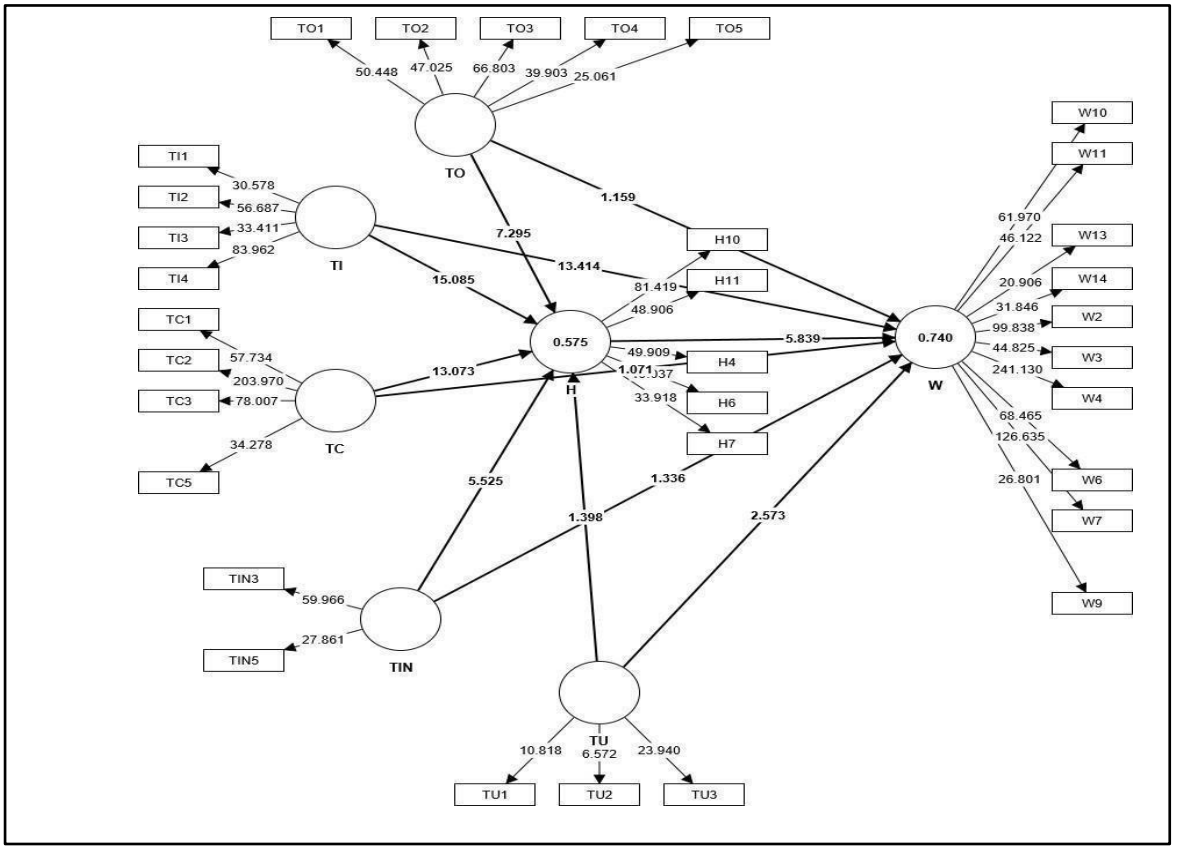

Figure 4.4: Structural Model

To evaluate the hypotheses, the bootstrapping process is used to generate data for each path relationship in the model, as illustrated in Table 4.23. Bootstrapping in PLS is a nonparametric test that uses repeated random sampling with replacement from the original sample to generate a bootstrap sample and achieve standard errors for hypothesis testing (Hair et al., 2011). Chin (2010), proposed performing bootstrapping with 1000 resamples.

For this study, 11 hypotheses are developed for the constructs direct relationship. To test the significance level, t-statistics for all paths are generated using Smart-PLS 5.0 bootstrapping function. The bootstrapping is set to 0.05 significance level, one-tailed test, and 1,000 subsamples. The critical values for a significance level of 1 per cent (α =0.01), 5 per cent (α =0.05 and 10 per cent (α =0. 1) are 2.33, 1.645 and 1.28, respectively for the one-tailed test (Ramayah, Cheah, Chuah, Ting, & Memon, 2018). Based on the findings shown in Table 29, the value of path coefficients has a standardized value approximately between -1 and +1 (values from 0.027 to 0.067). According to Hair et al. (2017), estimated path coefficients close to +1 shows strong positive relationships, and the closer the value to 0 the weaker are the relationships.

Next, for the t-test, relationships are found to have t-value $\geq$ 2.33, for the direct relationship with techno-overload but not significant because p-value more than 0.05, (β=0.058, t-value=1.159, p>0.05, 0.123), thus significant at less than 0.05 level of significance for techno-invasion (β=0.047, t=13.414, p<0.05, 0.000) Next, for the t-test, relationships are found to have t-value $\geq$ 2.33, thus significant at less than 0.05 level of significance for techno-complexity (β=0.049, t=1.071, p<0.05, 0.000). Next, techno-insecurity (β=0.027, t=1.336, p<0.01, 0.000), thus significant at less than 0.05 level of significance for techno-uncertainty (β=0.032, t=2.573, p<0.05, 0.000), and last but not least, for psychological health (β=0.041, t=5.839, p<0.05, 0.000), show that the constructs are positively related to work-life balance.

Next, for the psychological health t-test, relationships are found to have t-value $\geq$ 2.33, for the direct relationship with techno-overload, (β=0.048, t-value=7.295, p<0.05, 0.000), thus significant at less than 0.05 level of significance for techno-invasion (β=0.049, t=15.085, p<0.05, 0.000) Next, for the t-test, relationships are found to have t-value $\geq$ 2.33, thus significant at less than 0.05 level of significance for techno-complexity (β=0.041, t=13.073, p<0.05, 0.000). Next, techno-insecurity

(β=0.048, t=5.525, p<0.05, 0.000), and for techno-uncertainty (β=0.067, t=1.398, p>0.05, 0.081), show that the constructs are positively related to psychological health but not significant because p-value more than 0.05. Summaries of the findings are shown in Table 29.

4.5.2 The coefficient of Determination (R2)

The coefficient of determination, R2 is a measure of the amount of an endogenous construct's variance that is explained by its predictor constructs (Hair et al., 2017). Furthermore, scholars have noted that R2 values of 0.26, 0.13, or 0.02 for endogenous latent variables in the structural model can be classified as substantial, moderate, or weak, respectively (Cohen et al., 2008) (Cheah et al., 2018). In this study, the endogenous variables R2 values 0.575 for psychological health and R2 values 0.740 for work-life balance, respectively. These findings could be explained using the previously mentioned guidelines, the R2 of psychological health, which is 0.575, and the R2 of work-life balance, which is 0.740, are both deemed substantial and higher (shown in figure 11).

4.5.3 Hypothesis Testing

According to Hair et al. (2017), he suggested to looking at the R2 and the corresponding t-value using a bootstrapping procedure. In bootstrapping, subsamples are created with observations randomly drawn (with replacement) from the original set of data. To ensure the stability of the results, the number of subsamples should be large. Hair et al. (2017), also suggested that researchers should also report predictive relevance Q2 and the effect size F2. According to Sullivan and Feinn (2012), a p-value can inform the reader whether an effect exists, the p-value will not reveal the effect size. In this study, as recommended by Hair et al., (2017), the researcher used p-value, p<0.05 and T value >1.645 (one tail). A one-tailed test allows all the alpha to test the statistical significance in the one direction of interest. In addition, one tail is for testing the possibility of the relationship in one direction and completely disregarding the possibility of a relationship in the other direction.

Table 4.23
Path coefficient for direct relationships

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1a	TO -> W	0.058	1.159	0.123	0.012	Not Supported
H1b	TI -> W	0.047	13.414	0.000	0.084	Supported
H1c	TC -> W	0.049	1.071	0.000	0.009	Supported
H1d	TIN -> W	0.027	1.336	0.000	0.004	Supported
H1e	TU -> W	0.032	2.573	0.005	0.012	Supported
H2a	TO -> H	0.048	7.295	0.000	0.034	Supported
H2b	TI -> H	0.049	15.085	0.000	0.115	Supported
H2c	TC -> H	0.041	13.073	0.000	0.068	Supported
H2d	TIN -> H	0.048	5.525	0.000	0.036	Supported
H2e	TU -> H	0.067	1.398	0.081	0.006	Not Supported
H3a	H -> W	0.041	5.839	0.000	0.034	Supported

Note: Bootstrap Samples = 10,000, significance level at 1% (one-tailed test).

As for recommendations by Hair et al., (2017), the researcher has included effect size (F2). Table 30 shows the result of effect size.

4.5.4 Assessment of the Effect Size (F2)

In this stage, the effect sizes (F2) are evaluated. The F2 computes the relative impact of a predictor construct on endogenous constructs. According to Sullivan and Feinn (2012), besides reporting the p-value, both the substantive significance (effect size) and statistical significance (p-value) are crucial to be reported. To measure the effect size, a guideline by Cohen (1988) is followed. Based on Cohen (1988), the values of 0.02, 0.15, and 0.35 represent weak, moderate and substantial effects, respectively. From Table 30, techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty and psychological health has weak effect in producing the F2 for work-life balance. Moreover, the results for techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty also has a weak effect in producing the F2 for psychological health.

Table 4.24
Effect Size Result for direct

Hypothesis	F2 Value	Level of acceptance	Literature support
H1a	0.012	Weak effect size	Cohen (1988)
H1b	0.084	Weak effect size	Cohen (1988)
H1c	0.009	Weak effect size	Cohen (1988)
H1d	0.004	Weak effect size	Cohen (1988)
H1e	0.012	Weak effect size	Cohen (1988)
H2a	0.034	Weak effect size	Cohen (1988)
H2b	0.115	Weak effect size	Cohen (1988)
H2c	0.068	Weak effect size	Cohen (1988)
H2d	0.036	Weak effect size	Cohen (1988)
H2e	0.006	Weak effect size	Cohen (1988)
H3a	0.0034	Weak effect size	Cohen (1988)

In this study, the researcher looks at the R2 and Q2. The coefficient of determination R2= 0.575. According to Cohen (1989), the level of acceptance for R2 is substantial or higher because of R2>0.26. In addition, the systematic pattern of data points elimination and prediction in the blindfolding procedure depends on the omission distance (D). Therefore, in this study, the omission distance is 7. The value for Q2 at table 4.29 it indicates the value is larger than 0 indicates that exogenous constructs have predictive relevance for endogenous constructs.

In order to answer the hypothesis, there is an interpretation for all eleven hypotheses:

H1a There is a relationship between techno-overload and work-life balance.

It was found that there was a positive, and not significant relationship between between techno-overload and work-life balance, (β=0.058, p> 0.05, 0.123). Therefore, the H1a was not supported for this study.

H1b There is a relationship between techno-invasion and work-life balance.

It was found that there was a positive and significant relationship between techno-invasion and work-life balance (β= 0.047, p< 0.05, 0.000). Therefore, the H1b was supported for this study.

H1c There is a relationship between techno-complexity and work-life balance.

It was found that there was a positive relation but significant relationship between techno-complexity and work-life balance (β = 0.049, p< 0.05, 0.000). Therefore, the H1c was supported for this study.

H1d There is a relationship between techno-insecurity and work-life balance.

It was found that there was a positive, and significant relationship between techno-insecurity and work-life balance (β = 0.027, p< 0.05, 0.000). Therefore, the H1d was supported for this study.

H1e There is a relationship between techno-uncertainty and work-life balance.

It was found that there was a positive, and significant relationship between techno-uncertainty and work-life balance (β = 0.032, p< 0.05, 0.000). Therefore, the H1e was supported for this study.

H2a There is a relationship between techno-overload and psychological health.

It was found that there was a positive, and significant relationship between techno-overload and psychological health (β = 0.048, p< 0.05, 0.000). Therefore, the H2a was supported for this study.

H2b There is a relationship between techno-invasion and psychological health.

It was found that there was a positive, and significant relationship between techno-invasion and psychological health (β = 0.049, p< 0.05, 0.000). Therefore, the H2b was supported for this study.

H2c There is a relationship between techno-complexity and psychological health.

It was found that there was a positive, and significant relationship between techno-complexity and psychological health (β = 0.041, p< 0.05, 0.000). Therefore, the H2c was supported for this study.

H2d There is a relationship between techno-insecurity and psychological health.

It was found that there was a positive, and significant relationship between techno-insecurity and psychological health (β = 0.048, p< 0.05, 0.000). Therefore, the H2d was supported for this study.

H2e There is a relationship between techno-uncertainty and psychological health.

It was found that there was a positive, and not significant relationship between techno-uncertainty and psychological health (β = 0.067, p> 0.05, 0.081). Therefore, the H2e was not supported for this study.

H3a There is a relationship between psychological health and work-life balance.

It was found that there was a positive, and significant relationship between psychological health and work-life balance (β = 0.041, p< 0.05, 0.000). Therefore, the H3a was supported for this study.

4.6 Mediation Testing

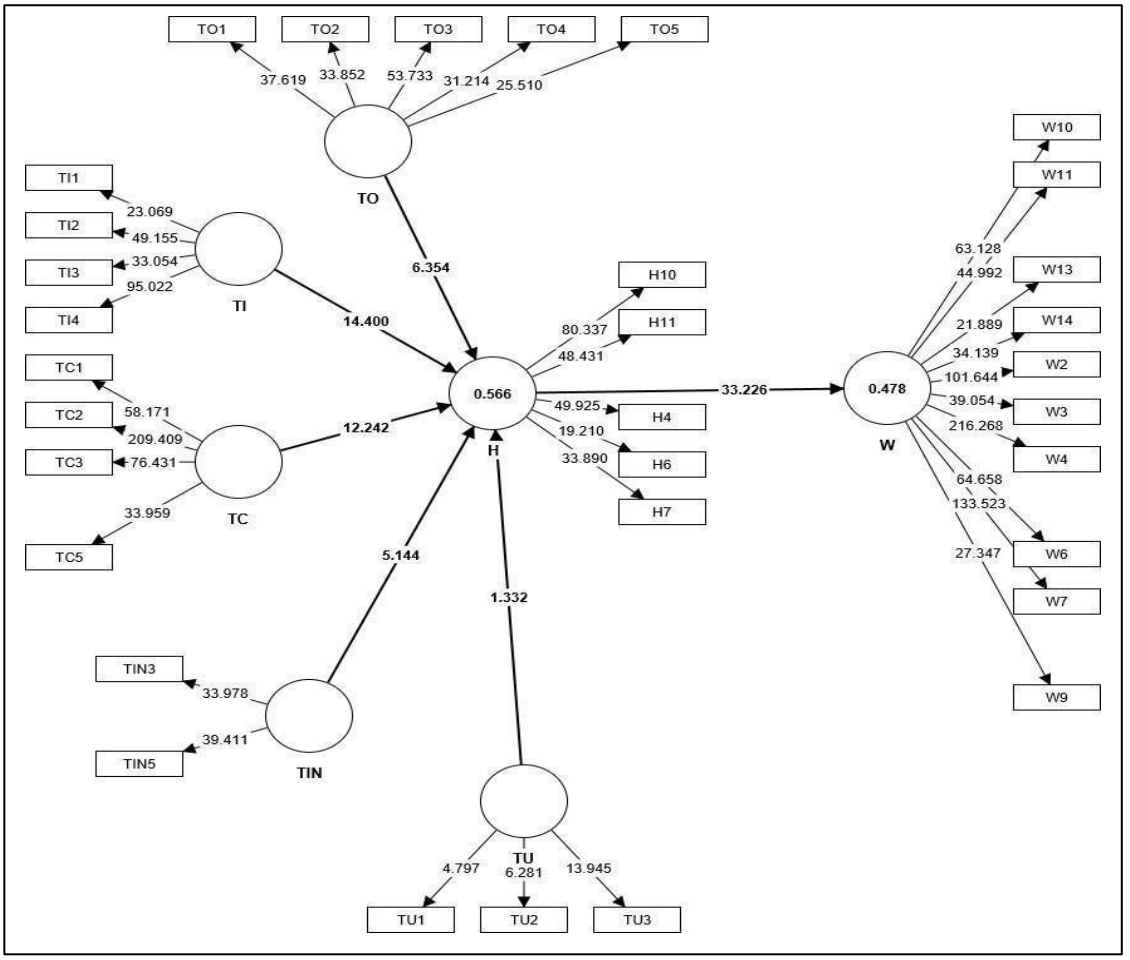

Figure 4.5: Mediation Model

Since current study considered attitude to be a mediator between technostress creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty) and work-life balance, the bootstrapping analysis was used in

Smart-PLS 4.0 to determine the mediation effect of psychological health, as shown in figure 4.5. The mediation findings show that there is a significant positive indirect relationship between psychological health, techno-overload and work-life balance (β= 0.433, t-value= 6.055, p <0.05), as well as a significant positive indirect relationship between psychological health, techno-invasion and work-life balance (β= 0.302, t-value= 14.400, p <0.05), Next, a significant positive indirect relationship between psychological health, techno-complexity and work-life balance (β= 0.399, t-value= 12.242, p <0.05), Besides, a significant positive indirect relationship between psychological health, techno-insecurity and work-life balance (β= 0.255, t-value= 5.144, p <0.05), and last but not least, , a significant positive indirect relationship between psychological health, techno-uncertainty and work-life balance (β= 0.312, t-value= 1.322, p <0.05). Since both the direct and indirect relationships are significant and positive in this study, the mediation effect is present, supporting hypothesis twelve until sixteen (Hair et al., 2017) (Nitzl et al., 2016). Table 4.25 presents the output of the Path coefficient for indirect relationship.

Table 4.25
Path coefficient for indirect relationship without mediation effect.

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	Type of Mediation	Result
H4a	TO -> H -> W	0.433	6.055	0.000	Indirect Effect	Supported
H4b	TI -> H -> W	0.302	14.400	0.000	Indirect Effect	Supported
H4c	TC -> H -> W	0.399	12.242	0.000	Indirect Effect	Supported
H4d	TIN -> H -> W	0.255	5.144	0.000	Indirect Effect	Supported
H4e	TU -> H -> W	0.312	1.322	0.000	Indirect Effect	Supported

Table 4.26
Size Result for Indirect

Hypotheses	V	V2	Level of acceptance	Literature support
H4a	0.433	0.1875	Medium size	David A. Kenny (2021)
H4b	0.302	0.0912	Medium size	David A. Kenny (2021)
H4c	0.399	0.1592	Medium size	David A. Kenny (2021)
H4d	0.255	0.065	Small size	David A. Kenny (2021)
H4e	0.312	0.0973	Medium size	David A. Kenny

To show that the psychological health has a mediation effect in the model, following steps are done. Firstly, the path coefficient of TO -> H -> W. The PLS and Bootstrapping results of it are as shown in Table 31. As shown, there is a significant relation between TO -> H -> W (T Statistic 6.055 > 1.96 and p-value 0.00 < 0.05) with the path coefficient of 0.433. Secondly, the path coefficient of TI -> H -> W. As shown, there is a significant relation between TI -> H -> W (T Statistic 14.400 > 1.96 and p-value 0.00 < 0.05) with the path coefficient of 0.302. Thirdly, the path coefficient of TC -> H -> W. Is stated that, there is a significant relation between TC -> H -> W (T Statistic 12.242 > 1.96 and p-value 0.00 < 0.05) with the path coefficient of 0.399. Next, the path coefficient of TIN -> H -> W. As shown, there is a significant relation between TIN -> H -> W (T Statistic 5.144 > 1.96 and p-value 0.00 < 0.05) with the path coefficient of 0.255. Last but not least, the path coefficient of TU -> H -> W. As shown, there is a significant relation between TU -> H -> W (T Statistic 1.322 < 1.96 and p-value 0.00 < 0.05) with the path coefficient of 0.312. The PLS and Bootstrapping results of it are as shown in Table 31. For indirect analysis, H is included as a mediator for the relation between all variables where the proposed model is shown in Figure 4.5.

To evaluate the mediation effects, the Variance Accounted For (VAF) was computed based on the thresholds suggested by Hair et al. (2016) and Nitzl et al. (2016): full mediation (VAF > 0.80), partial mediation (0.20 ≤ VAF ≤ 0.80), and no mediation (VAF < 0.20). The analysis yielded VAF values of 0.72 (72%) for techno-overload, 0.26 (26%) for techno-invasion, 0.72 (72%) for techno-complexity, and 0.63 (63%) for techno-insecurity. These results indicate that psychological health partially mediates the relationships between these four techno-stressors and work-life balance. Similarly, psychological health exerts a weak partial mediation effect on techno-uncertainty, with a VAF value of 0.26 (26%). Consequently, the indirect links between these technological stressors and work-life balance are significantly influenced by the mediating role of psychological health. Table 4.28 of mediation effect : -

Table 4.27
Original sample for VAF

Direct Relationship	Original Sample
H > W	-0.505
TC > H	-0.26
TC > W	0.05
TI > H	-0.442
TI > W	0.626
TIN > H	-0.127
TIN > W	0.038
TO > H	-0.360
TO > W	0.069
TU > H	0.024
TU > W	0.221

FORMULA: VAF = (P12*P23)/(P12*P23+P13)

1) Independent Variable > 2) Mediation Variable > 3) Dependent Variable.

Table 4.28
VAF (Variance Accounted For)

Construct	**P12 (IV→H)**	**P23 (H→W)**	**P13 (IV→W)**	**Indirect**	**Total**	**VAF**	**Interpretation**
Techno-overload (TO)	-0.360	-0.505	0.069	0.18180	0.25080	0.72 (72%)	Partial mediation
Techno-invasion (TI)	-0.442	-0.505	0.626	0.22321	0.84921	0.26 (26%)	Partial mediation (weak)
Techno-complexity (TC)	-0.260	-0.505	0.050	0.13130	0.18130	0.72 (72%)	Partial mediation (strong)
Techno-insecurity (TIN)	-0.127	-0.505	0.038	0.06419	0.10219	0.63 (63%)	Partial mediation
Techno-uncertainty (TU)	-0.442	-0.505	0.626	0.22321	0.84921	0.26 (26%)	Partial mediation (weak)

The mediation analysis using Variance Accounted For (VAF) reveals that psychological health plays a differential mediating role across the various dimensions of technostress. Following the guidelines proposed by Hair et al. (2022), VAF values between 20% and 80% indicate partial mediation, whereas values outside this range suggest no or non-standard mediation effects. Overall, the findings indicate that

psychological health functions as a context dependent mediator rather than a universal mechanism across all technostress creators.

The results for techno-overload indicate that techno-overload exhibits a strong partial mediation effect (VAF = 72%). This suggests that psychological health significantly transmits the effect of techno-overload on the outcome variable, while the direct effect remains relevant. Employees experiencing excessive workload due to technology are likely to experience psychological strain, which subsequently influences their work outcomes. However, the persistence of a substantial direct effect suggests that techno-overload also exerts an immediate influence independent of psychological health. This finding aligns with recent studies indicating that workload-related technostress has both cognitive and emotional consequences that operate through multiple pathways (Califf et al., 2020; Molino et al., 2023).

Techno-invasion demonstrates a weak partial mediation effect (VAF = 26%), indicating that psychological health plays a limited role in explaining the relationship between techno-invasion and the dependent variable. Instead, the direct effect appears to be the dominant pathway. This suggests that the blurring of boundaries between work and personal life has an immediate impact on employees, which is not fully mediated by psychological health. Recent research supports this finding, highlighting that constant connectivity and after working hours expectations directly disrupt employees' recovery processes and work-life balance (Spagnoli et al., 2023; Wang et al., 2022).

The findings reveal a strong partial mediation effect for techno-complexity (VAF = 72%). This indicates that psychological health plays a substantial role in explaining how technological complexity affects employee outcomes. The cognitive demands associated with complex systems likely increase psychological strain, which in turn influences performance and well-being. However, since the direct effect remains significant, techno-complexity also impacts outcomes independently of psychological health. This is consistent with prior research suggesting that complexity increases cognitive overload, leading to both direct and indirect behavioural consequences (Tarafdar et al., 2019; Califf et al., 2020).

Techno-insecurity also demonstrates a moderate partial mediation effect (VAF = 63%). This suggests that psychological health plays an important mediating role in explaining the relationship between perceived job insecurity due to technology and

employee outcomes. Employees who fear job replacement by advanced technologies may experience psychological distress, which subsequently affects their work behaviour. Nevertheless, the direct effect remains significant, indicating that techno-insecurity also has an independent influence on outcomes. This finding supports recent evidence that perceived technological threat is both psychologically and behaviourally impactful (Brougham & Haar, 2020; Molino et al., 2023).

Techno-uncertainty (TU)

Techno-uncertainty shows a weak partial mediation effect (VAF = 26%), indicating that psychological health plays a minimal role in mediating this relationship. Instead, the direct effect is more influential. This suggests that frequent changes and updates in technology create immediate uncertainty and disruption in employees' work processes, which may not necessarily be fully processed through psychological health mechanisms. This finding is consistent with recent literature suggesting that uncertainty driven stressors often produce immediate behavioural reactions rather than mediated psychological processes (Wang et al., 2022; Tarafdar et al., 2019).

Overall, the findings demonstrate that psychological health functions as a partial and context-dependent mediator across all technostress dimensions, with no evidence of full mediation, indicating that technostress influences employee outcomes through both direct and indirect pathways simultaneously. The strength of mediation varies considerably across constructs, where techno-overload exhibits the strongest partial mediation effect (VAF = 72%), followed by techno-complexity (VAF = 72%) and techno-insecurity (VAF = 63%), which reflect moderate mediation effects. In contrast, techno-invasion (VAF = 26%) and techno-uncertainty (VAF = 26%) demonstrate weak partial mediation, suggesting that the mediating role of psychological health is relatively limited for these dimensions. This variation highlights that technostress is not a homogeneous construct but rather a multidimensional phenomenon characterised by distinct underlying psychological mechanisms. Accordingly, the results reinforce the argument that different technostress creators operate through different cognitive and emotional pathways, thereby supporting a more nuanced and differentiated theoretical understanding of technostress in organizational settings (Tarafdar et al., 2019; Hair et al., 2022; Califf et al., 2020; Brougham & Haar, 2020).

4.7 Hypothesis Interpretation For Indirect Relationship

In order to answer the hypothesis, there is an interpretation for all five hypotheses.

In this study, the researcher looks at the V, V2 and VAF. The coefficient of determination V= 0.433. According to David A. Kenny (2021), the level of acceptance for V2 is medium because of V2>0.09.

H4a Psychological health mediates the relationship between techno-overload and work-life balance.

It was found that there was a positive mediates, significant, and strong partial mediates relationship between between techno-overload and work-life balance, (β=0.433, p=0.000 < 0.05). Therefore, the H4a supported this study.

H4b Psychological health mediates the relationship between techno-invasion and work-life balance.

It was found that there was a positive mediates, significant, and weak partial mediates relationship between between techno-invasion and work-life balance, (β=0.302, p=0.000< 0.05). Therefore, the H4b supported this study.

H4c Psychological health mediates the relationship between techno-complexity and work-life balance.

It was found that there was a positive mediates, significant, and strong partial mediates relationship between between techno-complexity and work-life balance, (β=0.399, p=0.000< 0.05). Therefore, the H4c supported this study.

H4d Psychological health mediates the relationship between techno-insecurity and work-life balance. It was found that there was a positive mediates, significant, and moderate partial mediates relationship between between techno-insecurity and work-life balance, (β=0.255, p=0.000< 0.05). Therefore, the H4d supported this study.

H4e Psychological health mediates the relationship between techno-uncertainty and work-life balance.

It was found that there was a positive mediates, significant, and weak partial mediates relationship between between techno-uncertainty and work-life balance, (β=0.312, p=0.000< 0.05). Therefore, the H4e supported this study.

4.8 Predictive Relevance, Q2

Q2 helps determine the relative construct's predictive relevance in a SEM model (Hair et al., 2017). In this study, the Q2, predictive relevance of the PLS path model was tested using a blindfolding procedure with an omission distance D = 7 (Hair et al., 2017). The guidelines were that if Q2 is greater than zero, the model has predictive relevance; if Q2 is less than zero, the model does not. Table 4.29, shown in the smart PLS results that Q2 of the current study model, which is based on two endogenous constructs named psychological health and work-life balance, is greater than zero, indicating that the current study model has predictive relevance.

Table 4.29
Q2 of endogenous constructs

Endogenous Constructs	Predictive Relevance Q2
Psychological Health	0.563
Work-life balance	0.709

4.9 Chapter Summary

This chapter describes in full all of the analyses that were performed on both the measurement and structural models. First, the structural model shows that the measures are reliable and valid. All of the constructions meet the Cronbach alpha and composite reliability cut-off values of 0.60 to 0.90, and all loadings and AVE values are greater than 0.50. Second, the structural model's validity is assessed using R2 values. According to the findings, two hypotheses are not supported, whereas fourteen are supported. Finally, the structural model shows a moderation relationship. The following chapter discusses the study's findings as well as its overall contribution. The following table 4.30 is a summary of the hypothesis results.

Table 4.30
Summary of the hypothesis result.

Hypothesis Number	Hypothesis	Decision
H1a	There is a relationship between techno-overload and work-life balance	Not Supported
H1b	There is a relationship between techno-invasion and work-life balance	Supported
H1c	There is a relationship between techno-complexity and work-life balance	Supported
H1d	There is a relationship between techno-insecurity and work-life balance	Supported
H1e	There is a relationship between techno-uncertainty and work-life balance	Supported
H2a	There is a relationship between techno-overload and psychological health	Supported
H2b	There is a relationship between techno-invasion and psychological health	Supported
H2c	There is a relationship between techno-complexity and psychological health	Supported
H2d	There is a relationship between techno-insecurity and psychological health	Supported
H2e	There is a relationship between techno-uncertainty and psychological health	Not Supported
H3a	There is a relationship between psychological health	Supported

Hypothesis Number	Hypothesis	Decision
	and work-life balance	
H4a	Psychological health mediate the relationship between techno-overload and work-life balance	Supported
H4b	Psychological health mediate the relationship between techno-invasion and work-life balance	Supported
H4c	Psychological health mediate the relationship between techno-complexity and work-life balance	Supported
H4d	Psychological health mediate the relationship between techno-insecurity and work-life balance	Supported
H4e	Psychological health mediate the relationship between techno-uncertainty and work-life balance	Supported

CHAPTER 5
DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter explains the analysis and presents the empirical results to test the research hypotheses. This chapter consists of six main sections. Following the introduction, the second section presents a recapitulation of the study. The next section provides a discussion of the findings, namely the demographic profile, research objectives, and research questions of the survey. Having presented these, the next section provides the limitations of the study. Suggestions for future research are reported in Section Five. Finally, a short chapter summary concludes this chapter in Section Six.

5.2 Recapitulation of The Study

This study focuses on the relationship between technostress creators and work-life balance among employees of local commercial bank in Klang Valley: the mediating role of psychological health. Technostress creators has positive and negative impacts caused either directly or indirectly by dependency on technology with regard to attitudes, behaviours, or physical body. However, this study has particular interest in great work-life balance which is at its best when an employer can create work timetables with ample integration of leisure activities for the employees, having low impact on health. Based on this concern, this study has drawn upon different theory and one model, including P-E Fit theory, WFB theory, transaction theory, HBM and the conservation of resource theory, to develop research to examine relationships. The results are used to substantiate the research objectives in this research, as summarized:

1. To examine the relationship between technostress creators and work-life balance (techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty).
2. To examine the relationship between technostress creators and psychological health (techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty).
3. To examine the relationship between psychological health and work-life balance
4. To identify the mediating effect on the relationship between technostress creators and work-life balance (techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty).

For the final survey, a preliminary study was undertaken to establish the final data to be utilized in the online survey. The preliminary survey included all bank sectors except local commercial banks in Klang Valley. It was discovered that the preliminary survey respondents provided a good response. Next, for the real survey, researchers wanted to conduct face-to-face surveys. However, due to the Covid-19 pandemic, this study used an internet or online survey to collect data for this study.

In this light, all items in the questionnaire were adapted from reliable and valid measurement instruments based on the current literature. After determining the validity and reliability of the measurement model, the structural model was then evaluated to test the hypotheses relationship, while the findings from the analysis were highlighted in the previous chapter. The next section discusses the study's findings.

5.3 Discussion of Findings

Table 5.1
Hypotheses and Summary of Results for direct relationship between technostress and work-life balance, technostress and psychological health and psychological health and work-life balance.

Hypotheses	Relationship	Result
H1a	TO -> W	Not Supported
H1b	TI -> W	Supported
H1c	TC -> W	Supported
H1d	TIN -> W	Supported
H1e	TU -> W	Supported
H2a	TO -> H	Supported
H2b	TI -> H	Supported
H2c	TC -> H	Supported
H2d	TIN -> H	Supported
H2e	TU -> H	Not Supported
H3a	H -> W	Supported

Table 5.2
Hypotheses and Summary of Results for indirect relationship between technostress and work-life balance

Hypotheses	Relationship	Result
H4a	TO -> H -> W	Supported
H4b	TI -> H -> W	Supported
H4c	TC -> H -> W	Supported
H4d	TIN -> H -> W	Supported
H4e	TU -> H -> W	Supported

Based on Tables 5.1 and 5.2, the findings demonstrate that technostress creators significantly influence employees' work-life balance and psychological health in local commercial banks in the Klang Valley. Out of the sixteen hypotheses developed, fourteen hypotheses were supported, while two hypotheses (H1a and H2e) were found to be positive but not statistically significant. Overall, the findings indicate that technostress remains an important organizational issue in the banking sector, particularly in the context of rapid digitalization, increased technological dependency, and flexible work arrangements (Tarafdar et al., 2019; Han et al., 2025). These findings are consistent with recent studies, which suggest that technological changes in the workplace continue to affect employees' psychological well-being, job

performance, and work-life balance, especially within highly digitalized industries such as banking and finance (Aghaei, & Savari, 2023).

The findings revealed that techno-overload does not significantly influence work-life balance (H1a not supported), although the relationship was found to be positive. A positive but non-significant relationship indicates that an increase in techno-overload is associated with an increase in work-life balance challenges, however, the relationship is not sufficiently strong to produce a statistically significant effect. Employees in the banking sector experience techno-overload through increased workloads, faster work pace, and continuous technological connectivity. Nevertheless, employees may have gradually adapted to these technological demands through better time management skills, flexible working arrangements, digital competency, and effective coping strategies. In modern banking environments, technology may also provide flexibility that enables employees to complete tasks more efficiently and manage work responsibilities within flexible working hours (Geetanjali & Rao, 2020). As a result, although techno-overload creates additional work demands, employees may still be capable of maintaining a balance between work and personal life. This finding aligns with previous studies, which suggest that technology does not always negatively affect work-life balance when employees receive adequate organizational support and possess strong adaptability towards digital work environments (Ragu-Nathan et al., 2008; Molino et al., 2020).

In contrast, techno-invasion (H1b), techno-complexity (H1c), techno-insecurity (H1d), and techno-uncertainty (H1e) were found to have significant positive relationships with work-life balance disruption. These findings indicate that employees experience difficulties maintaining boundaries between work and personal life due to constant connectivity, complex technological systems, fear of job insecurity, and continuous technological changes. Techno-invasion particularly reflects employees' inability to disconnect from work after office hours, resulting in interruptions to personal activities and family responsibilities (Tarafdar et al., 2007). Similarly, techno-complexity requires employees to spend additional time and effort learning new systems and applications, thereby contributing to stress and imbalance between work and personal life (Jena, 2015). Techno-insecurity creates anxiety among employees who fear being replaced by individuals with stronger technological skills, while techno-uncertainty increases pressure due to frequent system upgrades and

continuous technological changes (Tarafdar et al., 2019). These findings support earlier studies, which emphasize that digital transformation and ICT-related stressors significantly undermine employees' work-life balance and increase psychological strain (Califf et al., 2020; Ayyagari et al., 2011).

Furthermore, the results showed that techno-overload (H2a), techno-invasion (H2b), techno-complexity (H2c), and techno-insecurity (H2d) significantly influence psychological health. These findings suggest that excessive technological demands negatively affect employees' emotional and mental well-being. Employees who are constantly exposed to heavy workloads, continuous connectivity, complicated technological systems, and fear of technological replacement are more likely to experience stress, anxiety, fatigue, and emotional exhaustion (La Torre et al., 2019). Since the banking sector is highly dependent on technology-driven operations, employees are expected to continuously adapt to rapid digital transformation initiatives. Consequently, the pressure to maintain productivity and technological competency contributes to deteriorating psychological health. Recent literature similarly highlights that technostress increases psychological distress, burnout, anxiety, and mental fatigue among employees working in highly digitalized environments (Srivastava et al., 2015; Upadhyaya & Vrinda, 2021).

However, the relationship between techno-uncertainty and psychological health (H2e) was also found to be positive but not statistically significant. This finding indicates that continuous technological updates, system changes, and uncertainty regarding new technologies may contribute to psychological discomfort among employees; however, the effect is not sufficiently strong to significantly affect their psychological health. Employees in the banking sector may already perceive technological changes as a normal aspect of their working environment due to the highly digitalized nature of the industry. Organizational support, training programs, technical assistance, and previous experience in managing technological changes may help employees adapt more effectively and minimize negative psychological effects (Nagar & Rana, 2024). Consequently, although techno-uncertainty may create some level of stress or concern, it does not significantly deteriorate employees' psychological well-being. This finding supports previous arguments that employees with sufficient technological experience, coping mechanisms, and organizational

support are less likely to experience severe psychological distress resulting from technological uncertainty (Salanova et al., 2013).

In addition, psychological health was found to significantly influence work-life balance (H3a supported). This indicates that employees with poorer psychological health are more likely to experience difficulties balancing work and personal life responsibilities. Stress, emotional exhaustion, anxiety, and mental fatigue may reduce employees' ability to manage family obligations, social relationships, and personal well-being effectively (Liswandi, & Muhammad, 2023). In the banking industry, high work demands, performance expectations, and continuous technological pressures may further intensify this situation. Therefore, maintaining positive psychological health is essential in ensuring a better work-life balance among employees. This finding is supported by previous studies, which emphasize that psychological well-being plays a crucial role in reducing burnout and improving employees' quality of life and organizational outcomes (Kalliath & Brough, 2008).

The mediation analysis further demonstrated that psychological health significantly mediates the relationship between all dimensions of technostress creators and work-life balance (H4a-H4b supported). This finding indicates that technostress not only directly affects employees' work-life balance but also indirectly influences work-life balance through psychological health. Employees who experience technological stress are more likely to suffer psychological strain, which subsequently reduces their ability to maintain balance between work and personal life (Ayyagari et al., 2011). The mediating role of psychological health confirms that mental and emotional well-being functions as an important mechanism linking technological stressors and employees' overall quality of life. These findings are consistent with the Job Demands-Resources (JD-R) Theory and Person-Environment Fit Theory, which explain that excessive job demands and technological pressures may deplete employees' psychological resources, leading to stress and imbalance in life domains (Demerouti et al., 2001; Edwards et al., 1998). Recent studies also support the role of psychological distress as a mediator between technostress and work-related outcomes (Molino et al., 2020).

Overall, the findings indicate that not all dimensions of technostress necessarily produce strong negative outcomes. Employees' adaptability, organizational support, digital competency, and flexible working arrangements may

weaken the impact of certain technostress creators on work-life balance and psychological health. Nevertheless, most technostress dimensions remain significant predictors of employees' well-being, demonstrating the importance of effective organizational strategies to manage technological stress in the banking sector

5.3.1 Demographic Profile

For the demographic background, the respondents from this study examined the relationship between technostress creators and work-life balance among employees of local commercial bank in Klang Valley, while the mediating role is the psychological health. There are eight local commercial banks that have participated in this study. The data were collected from 384 respondents although 403 questionnaires were earlier distributed but after one extreme outlier was identified and removed (402 respondents for distribution of 384 questionnaires).

From the respondents' profile, it can be concluded that most of the respondents, 50.7% (n=204) were male and the remaining were female with 49.3% (n=198). Furthermore, the respondents were dominated by many of the respondents that hold 60.9% of age 26 to 35 years old and minority of age 46 to 55 years old at only 3.5%. With the percentage 78.6% (n=316), bachelor's degree contributed by the highest number of respondents, whilst the least 3.0% (n=12) with Master's degree. Moreover, a total of 34.3% (n=138) have been employed for a period of a year and below, while the smaller percentage of 11 years and above with 3.5% (n=14). From the data generated, the highest number of respondents on race is majority Malay that is 68.4% (n=275) and other groups is the minor with only 0% (n=0). Meanwhile, the highest number of respondents with the percentage of 60 % (n=241) were single and the minor respondents with only 0.2% (n=1) of the respondents is divorced.

5.3.2 Research Objectives and Research Questions of the Study

In this section, it discusses the independent variable and dependent variable, besides the discussion on research questions in this section.

5.3.2.1 Research Objective 1

Research Question 1: what is the relationship between techno-overload and work-life balance?

Hypotheses: H1a: there is a positive but no significant relationship between techno-overload and work-life balance.

The objective of the research and research question number one is to examine the relationship between techno-overload and work-life balance. From the result, it can be concluded that techno-overload has a relationship with work-life balance. With the purpose to explore the relationship between techno-overload and work-life balance, path coefficients were applied to answer the first research question that has been developed. Based on the data that has been analysed and interpreted, the researcher found that there was a positive, but not significant relationship between techno-overload and work-life balance. Hypothesis 1a is not significant because p-value should less than $p<0.05$. P-value for Hypothesis 1a is 0.123 that is more than $p>0.05$, ($\beta=0.058$).

Therefore, Hypothesis 1a is not supported for this study. The relationship between techno-overload and work-life balance is positive which is $\beta = 0.058$ but it is not a significant relationship between techno-overload and work-life balance as p-value is more than 0.05. The acceptance of p-value is less than 0.05. Table 5.3 below shows path coefficient for direct relationship between techno-overload and work-life balance.

Table 5.3
Path coefficient for direct relationships between techno-overload and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1a	TO > W	0.058	1.159	0.123	0.012	Not Supported

The hypotheses were not supported because employees in the banking sector are already used to high workloads and technology. They see techno-overload as normal, not stressful. Technology also helps them work faster and manage time better.

Differences in context, culture, and measurement may explain why the results differ from past studies. Although prior studies suggest that techno-overload is generally associated with negative outcomes, the findings of this study indicate that the hypotheses relationships were not supported, particularly in relation to work-life balance. This inconsistency warrants deeper critical examination.

First, sample characteristics play a crucial role. Employees in Malaysia's banking sector are typically exposed to high workloads, strict KPIs, and continuous digital interaction, which may lead to the normalization of techno-overload. Instead of perceiving it as a stressor, employees may view it as part of their routine. This aligns with recent findings that employees can adapt to technological demands by improving efficiency and time management, thereby reducing negative outcomes (Sun et al., 2024). Furthermore, recent evidence suggests that technostress does not always produce negative outcomes but may also enhance engagement depending on individual coping capacity and work environment (Tarafdar et al., 2019; Berger et al., 2023).

Second, contextual factors within the banking sector further explain the non-significant findings. The banking industry is highly digitalized, with structured workflows, system integration, and organizational support. Employees are often trained and equipped with the necessary digital competencies, which reduces the adverse impact of techno-overload. A recent study on digital transformation in banking shows that organizational support can moderate the impact of technostress, reducing its negative consequences on performance and well-being (Khalequzzaman et al., 2025). This supports Harris et al. (2022), who argue that technology can enhance efficiency and potentially improve work-life balance.

However, these findings contradict earlier studies such as Dutta and Mishra (2023), which found that techno-overload reduces commitment and increases strain. This contradiction can be explained by differences in research context. In less structured environments, employees may lack the resources or skills to cope with technological demands. In contrast, employees in the banking sector operate in a more controlled and technologically mature environment, which enables them to better manage techno-overload. This explanation is consistent with Ayyagari et al. (2011), who emphasized that technostress outcomes depend on the balance between technological demands and available resources.

Third, the findings support the "double-edged sword" perspective of technostress. A double-edged sword means techno-overload has both positive and negative effects at the same time. It increases workload and stress but also improves efficiency and flexibility. Because of these opposing effects, the overall relationship becomes weak or non-significant (Tarafdar et al., 2019; Califf et al., 2024). On one hand, techno-overload increases workload, pace, and constant connectivity, potentially blurring work-life boundaries. On the other hand, it enhances flexibility, speed, and efficiency, allowing employees to manage tasks more effectively. A recent systematic review confirms that the effects of technostress on outcomes such as work-life balance are inconsistent and context-dependent, with both positive and negative effects observed across studies (Califf et al., 2024; Tarafdar et al., 2019). This duality weakens the overall statistical relationship, leading to non-significant findings.

Fourth, cultural factors may also contribute to the divergence. In the Malaysian context, employees often demonstrate high work commitment and tolerance for workload, particularly in stable sectors such as banking. This cultural orientation may lead employees to underreport stress or perceive techno-overload as manageable, thereby reducing its observed impact on psychological health (Hofstede, 2011; Lu et al., 2023).

Fifth, measurement issues should be considered. The instruments used may capture perceived time management ability rather than actual strain. Employees may report that they can manage their workload effectively, even when working longer hours or sacrificing personal time. This mismatch between perception and reality can result in non-significant statistical relationships, despite underlying stress (Podsakoff et al., 2003; Spector, 2019).

Finally, the non-significant relationship with psychological health may indicate the presence of coping mechanisms and resilience that help them manage stress effectively. Recent research in banking contexts confirms that technostress is a multidimensional construct influenced by individual and demographic factors, suggesting that not all employees experience negative psychological outcomes equally (Porcari et al., 2023). Employees with higher experience, digital skills, or organizational support may be more resilient, thereby reducing the impact of techno-overload.

Overall, the non-supported hypotheses indicate that techno-overload is highly context-dependent. Its effects vary based on employee adaptability, organizational support, cultural expectations, and measurement approaches. In Malaysia's banking sector, techno-overload appears to function not only as a demand but also as a performance enabling resource, which explains why its negative effects on work-life balance were not statistically significant.

5.3.2.2 Research Objective 2

Research Question 2: what is the relationship between techno-invasion and work-life balance?

Hypothesis: H1b: there is a positive and significant relationship between techno-invasion and work-life balance.

With the purpose to explore the relationship between techno-invasion and work-life balance, path coefficients were applied to answer the second research question that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive and significant relationship between techno-invasion and work-life balance ($\beta = 0.047$, $p < 0.05$).

Therefore, Hypothesis 1b is supported. Table 5.4 below shows path coefficient for direct relationship between techno-invasion and work-life balance.

Table 5.4
Path coefficient for direct relationships techno-invasion and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1b	TI > W	0.047	13.414	0.000	0.084	Supported

It has been emphasized by Koçyigit and Akkaya (2020) that techno-invasion arises from the feeling of being constantly connected and reachable at any time due to digital technologies. Similarly, Kumar et al. (2013), highlight that constant connectivity blurs the boundary between work and personal life. This is further supported by Rock et al. (2024), who describe an "always-on" digital environment where employees remain accessible anytime and anywhere. Techno-invasion refers to the extent to which technology intrudes into employees' personal life space (Dutta &

Mishra, 2023; Galanti et al., 2021). The Covid-19 pandemic further intensified this condition by normalizing remote work and after working hours responsiveness (Tarafdar & Stich, 2018).

Recent literature continues to confirm that techno-invasion is a core technostress creators with strong links to work-life imbalance and psychological strain (Ramasamy & Thandar, 2026; Khalequzzaman et al., 2025). Systematic reviews also show that techno-invasion consistently contributes to work-family conflict and reduced recovery time, making it one of the most disruptive forms of technostress (Califf et al., 2024; Bottaro et al., 2024).

This study found techno-invasion to be statistically significant, highlighting its strong impact on employees' work-life balance outcomes. This is consistent with recent meta-analytic evidence showing that techno-invasion more powerfully affects work-life outcomes than other technostress creators due to boundary disruption mechanisms (Bottaro et al., 2024; Sun et al., 2024).

The significance of this relationship can be explained by the structural and contextual nature of the banking sector in Malaysia. The banking industry is highly digitalized and service oriented, requiring employees to remain responsive beyond formal working hours for operational continuity. This reinforces an "always available" culture, which increases boundary permeability between work and personal life. Recent studies in digital workplace environments confirm that technostress invasion is strongly associated with spillover effects and reduced psychological detachment from work (Kumar, & Singh, 2023).

Unlike techno-overload, which employees may adapt to through efficiency and time management, techno-invasion is more difficult to regulate because it directly affects personal recovery time and psychological boundaries. This explains why techno-invasion remains significant even among digitally skilled employees.

From a cultural perspective, Malaysian employees often operate within a collectivist and high-responsibility work culture, where responsiveness to organizational communication is expected. This may intensify the perceived obligation to respond to work related messages outside working hours, thereby strengthening the effect of techno-invasion on work-life imbalance.

Methodologically, techno-invasion is also a highly perceptual and emotionally sensitive construct, which directly captures employees' experience of boundary

violation. Unlike workload based stressors, intrusion into personal life is more easily recognized and therefore produces stronger statistical effects.

Finally, this finding supports the updated technostress framework, which conceptualizes technostress as a multidimensional construct where different stressors operate through different mechanisms. Recent evidence confirms that techno-invasion is particularly impactful because it disrupts role boundaries, recovery processes, and psychological detachment, making it one of the strongest predictors of negative employee outcomes (Tarafdar et al., 2019; Porcari et al., 2023)

5.3.2.3 Research Objective 3

Research Question 3: what is the relationship between techno-complexity and work-life balance?

Hypothesis: H1c: there is a positive and significant relationship between techno-complexity and work-life balance.

The finding has shown a relationship and significant towards work-life balance. The significant of the techno-complexity was related to new application that can take months to learn, while manuals can be unwieldy and impenetrable. With the purpose to explore the relationship between techno-complexity and work-life balance, path coefficients were applied to answer the third research question that has been developed. Based on the data that has been analysed and interpreted, the researcher found that there was a positive relation, but significant relationship between techno-complexity and work-life balance ($\beta = 0.049$, $p < 0.05$). Therefore, H3 is supported for this study.

Besides, Hypothesis 1c is supported. Table 5.5 below shows path coefficient for direct relationship between techno-complexity and work-life balance.

Table 5.5
Path coefficient for direct relationships between techno-complexity and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1c	TC -> W	0.049	1.071	0.000	0.009	Supported

Techno-complexity refers to situations where employees are required to spend time and cognitive effort in learning and understanding new or complex technological systems (Fieseler et al., 2014). Khan et al. (2022), further explain that techno-complexity occurs when technological systems force employees to continuously acquire new skills to operate organizational applications effectively. In modern workplaces, especially in digitally driven industries, employees often face difficulties in adapting to increasingly sophisticated systems, leading to emotional strain and cognitive overload (Nascimento et al., 2024).

In this study, techno-complexity was found to be statistically significant, indicating that difficulty in understanding and using complex systems has a meaningful impact on employees' work-life balance and/or psychological health. This finding is consistent with recent research, which shows that techno-complexity increases cognitive load, frustration, and emotional exhaustion, particularly when employees are required to continuously upgrade their technical skills (Bourlakis et al., 2023; Yeniaras & Altinegne, 2023).

The significance of this relationship suggests that techno-complexity is not merely a technical issue but a psychological and cognitive stressor. Unlike techno-overload, which relates to the quantity of work, techno-complexity directly affects employees' ability to perform tasks efficiently, thereby increasing mental effort, confusion, and decision fatigue. This aligns with Nascimento et al. (2024), who found that complex digital systems increase emotional distress and reduce employees' cognitive resources.

From the Malaysian banking sector perspective, this finding is particularly relevant. The banking industry is undergoing rapid digital transformation, including core banking systems, fintech integration, and automated service platforms. While these systems improve efficiency, they also require continuous learning and adaptation. Employees are often expected to master new applications within short timeframes, which increases pressure and reduces recovery time. This explains why techno-complexity significantly affects employees in this study.

This result also diverges from some expectations in the technostress literature, which suggests that employees in mature digital environments may gradually adapt to system complexity. However, the current findings indicate that adaptation is limited when technological change is continuous and cumulative. Even experienced

employees may struggle when systems are frequently updated or integrated across multiple platforms, leading to persistent cognitive strain.

In addition, organizational factors may explain the significant effect. Although banks provide training programs, the speed of technological change may exceed employees' learning capacity. This creates a gap between system complexity and employee readiness. Bourlakis et al. (2023), note, complex technological systems can lead to confusion, delayed decision-making, and reduced trust in systems, which affect employee performance and well-being.

Furthermore, techno-complexity may also impact collaboration and communication within organizations. Employees working with complex systems may experience misunderstandings or inefficiencies in cross-functional communication, especially when systems require high technical literacy. This indirectly contributes to work-life imbalance as employees spends additional time resolving technical issues after working hours.

From a cultural perspective, Malaysian employees often operate in a high-responsibility work environment where they are expected to continuously upskill and adapt to organizational changes. This cultural expectation may increase pressure to learn new technologies quickly, thereby amplifying the psychological burden of techno-complexity.

Practically, techno-complexity is also a skill-based and cognition-intensive construct, meaning that employees who perceive themselves as less technologically competent may report higher levels of strain. This subjective evaluation contributes to stronger statistical relationships, as it directly reflects perceived difficulty in handling job demands.

Finally, the finding supports the technostress framework, which suggests that techno-complexity is a key stressor because it requires continuous cognitive effort and learning. Recent studies confirm that techno-complexity is strongly associated with mental fatigue, reduced efficiency, and work-life imbalance, particularly in digitally intensive industries such as banking and finance (Tarafdar et al., 2019; Porcari et al., 2023; Nascimento et al., 2024).

5.3.2.4 Research Objective 4

Research Question 4: what is the relationship between techno-insecurity and work-life balance?

Hypothesis: H1d: there is a positive and significant relationship between techno-insecurity and work-life balance.

With the purpose to explore the relationship between techno-insecurity and work-life balance, path coefficients were applied to answer research question number four that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant relationship between techno-insecurity and work-life balance ($\beta = 0.027$, $p < 0.05$).

Therefore, Hypothesis 1d is supported. Table 5.6 below shows path coefficient for direct relationship between techno-insecurity and work-life balance.

Table 5.6
Path coefficient for direct relationships between techno-insecurity and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1d	TIN -> W	0.027	1.336	0.000	0.004	Supported

The supported hypotheses in this study require deeper critical interpretation beyond a mere description of statistical results. The findings indicate that technostress creators, particularly techno-insecurity, significantly influence employee outcomes. However, these relationships should be understood within a broader context, as their implications extend beyond statistical significance. They are shaped by interrelated factors, including sample characteristics, organizational context, cultural influences, and measurement considerations, which collectively provide a more comprehensive explanation of the observed outcomes (Tarafdar et al., 2019; Califf et al., 2024).

The significant relationship between techno-insecurity and employee outcomes can be explained by the rapid digital transformation of the Malaysian banking sector, which is increasingly driven by automation, artificial intelligence, fintech integration, and digital banking platforms. These changes are reshaping traditional banking roles and creating perceptions among employees that certain job functions may become

redundant or replaced by technology (Curcuruto et al., 2023; Khalequzzaman et al., 2025).

In Malaysia, major banks are actively adopting core banking digital systems, AI-based customer service (chatbots), mobile banking applications, and automated financial processing systems. While these innovations improve efficiency, they also increase employees' concerns that routine and operational tasks may be reduced or eliminated in the future. As a result, employees experience higher levels of job insecurity related to technological change (Porcari et al., 2023).

This finding is consistent with recent literature, which emphasizes that techno-insecurity is not only a psychological perception but also a structural outcome of digital transformation in modern workplaces (Curcuruto et al., 2023; Khalequzzaman et al., 2025). Employees in traditional banking roles are particularly vulnerable because their tasks are increasingly augmented or replaced by digital systems, reinforcing insecurity perceptions.

From a contextual perspective, the Malaysian banking sector is highly competitive and strongly performance oriented. Employees are expected not only to perform current job tasks effectively but also to continuously upgrade their digital competencies to remain relevant. This creates a perception that job security is increasingly dependent on technological proficiency, thereby strengthening feelings of insecurity (Dutta & Mishra, 2023).

This also explains why the findings may diverge from expectations in some previous studies that suggest employees gradually adapt to technological change. In contrast, the present study indicates that adaptation is limited in environments where technological change is continuous and accelerating. Unlike stable work environments, the banking sector undergoes frequent system upgrades and digital integration, requiring employees to repeatedly relearn systems and preventing full adaptation (Sun et al., 2024).

Furthermore, Malaysia's banking sector operates in a highly regulated yet rapidly digitalizing environment, where financial institutions are encouraged to adopt fintech solutions to remain competitive in the ASEAN region. This accelerates digital transformation and increases employees' awareness of technological replacement risk, making techno-insecurity more salient and statistically significant (Rock et al., 2024).

From a cultural perspective, Malaysian employees may experience stronger perceptions of job insecurity due to the high value placed on job stability, financial security, and long-term employment. In collectivist cultures, job loss is not only an individual concern but also a family-level economic issue, which intensifies psychological reactions toward perceived job threats (Galanti et al., 2021).

The significance of techno-insecurity may also be influenced by its subjective and perception-based nature, where respondents report perceived risk of job loss rather than actual displacement. This type of measurement captures emotional responses such as fear and anxiety, which increases the likelihood of a statistically significant relationship (Tarafdar et al., 2019).

From his finding aligns with the technostress framework, which suggests that techno-insecurity is a strong stressor because it threatens employees' core employment identity and long-term career stability. Unlike techno-overload or techno-complexity, which are task-related stressors, techno-insecurity directly affects job survival concerns, making it more emotionally impactful (Califf et al., 2024; Porcari et al., 2023).

Overall, the significance of techno-insecurity in this study reflects the reality of digital disruption in Malaysian banking, where employees perceive that technological advancement may reshape or replace traditional job roles, thereby increasing psychological strain and affecting work-related well-being (Khalequzzaman et al., 2025).

5.3.2.5 Research Objective 5

Research Question 5: what is the relationship between techno-uncertainty and work-life balance?

Hypothesis: H1e: there is a positive and significant relationship between techno-uncertainty and work-life balance.

With the purpose to explore the relationship between techno-uncertainty and work-life balance, path coefficients were applied to answer the research question number five that have been developed. Based on the data analysed and interpret, the researcher found that there was a positive, and significant relationship between techno-uncertainty and work-life balance ($\beta = 0.032$, $p < 0.05$).

Therefore, Hypothesis 1e is supported. Table 5.7 below shows path coefficient for direct relationship between techno-uncertainty and work-life balance.

Table 5.7
Path coefficient for direct relationships between techno-uncertainty and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H1e	TU -> W	0.032	2.573	0.005	0.012	Supported

Techno-uncertainty refers to a situation in which employees feel uncertain, uncomfortable, and unsettled due to continuous technological changes, system upgrades, and the constant need to learn new technologies. Employees may feel stressed because their existing technological knowledge quickly becomes outdated, forcing them to continuously adapt to new applications, systems, and work processes (Nascimento et al., 2024). In the banking sector, where digital transformation occurs rapidly, employees are frequently required to update their technological skills and adapt to changing digital platforms. Such conditions may create frustration, confusion, anxiety, and feelings of insecurity, particularly when employees perceive that they lack sufficient time or capability to cope with technological changes (Asad et al., 2023). Furthermore, frequent upgrades and technological modifications may interrupt employees' familiarity with existing systems, causing employees to spend additional effort and time relearning work procedures (Kaltenegger et al., 2024). Ma et al. (2021), further argued that continuous technological disruptions interfere with employees' ability to psychologically detach from work, thereby affecting both personal well-being and work-life balance.

The findings of this study revealed that techno-uncertainty significantly influenced work-life balance (H5 supported). This suggests that continuous technological changes and system upgrades disrupt employees' ability to maintain a balance between work responsibilities and personal life. Employees in Malaysian local commercial banks may experience difficulties disconnecting from work because they need to continuously learn, adapt, and remain updated with changing technological systems even outside normal working hours. This finding supports previous studies, which found that continuous ICT changes and digital disruptions contribute to higher work-life conflict and stress among employees (Tarafdar et al.,

2019; Molino et al., 2020). It is also consistent with Malaysian banking studies, which reported that digital transformation significantly affects employees' well-being and work performance (Hashim et al., 2024; Mokhtar & Mohamad Yunus, 2024).

However, although techno-uncertainty significantly affected work-life balance, its relationship with psychological health (H10) was positive but not statistically significant. This finding diverges from previous studies, which identified techno-uncertainty as a strong predictor of stress, burnout, and psychological strain (Salanova et al., 2013; Upadhyaya & Vrinda, 2021). Recent Malaysian evidence also reported techno-uncertainty as a significant factor affecting employee well-being among younger employees (Nazri et al., 2024). Therefore, this suggests that the impact of techno-uncertainty may vary depending on organizational, individual, and contextual factors.

First, sample characteristics may explain this result. Employees in Klang Valley banking institutions generally possess high digital literacy and frequent exposure to technological systems due to the highly digitalized nature of the banking sector. As a result, they may perceive technological change as a normal part of their job, reducing its psychological impact (Nazri et al., 2024; Nga et al., 2024).

Second, organizational context also plays a crucial role. Malaysian banks provide continuous training, IT support, and structured digital transformation programs, which help employees adapt more effectively to technological changes. Such support reduces uncertainty-related stress by making technological transitions more manageable (Issa et al., 2024). Similarly, Malaysian financial sector studies highlight that organizational support and resilience can buffer technostress effects (Mokhtar & Mohamad Yunus, 2024).

Third, cultural factors may also contribute to the finding. Malaysian employees generally demonstrate collectivist values, adaptability, and acceptance of organizational change, which may reduce psychological resistance toward technological uncertainty. In such cultures, employees tend to prioritise organisational expectations and adapt to changes as part of professional responsibility.

Fourth, methodological factors may also help explain why techno-uncertainty significantly influenced work-life balance. The measurement items used for work-life balance may capture a broader and more stable perception of balance between work and personal life, rather than only short-term disruptions. However, in the context of

continuous technological change in the banking sector, even short-term adjustment pressures such as system upgrades, learning new platforms, and adapting to updated processes can accumulate and significantly disrupt employees' ability to manage their time between work and personal life (Tarafdar et al., 2019; Molino et al., 2020). Therefore, these repeated technological adjustments may still be reflected in respondents' overall evaluation of work-life balance. In addition, although respondents from the banking sector may be influenced by social desirability bias due to the strong emphasis on professionalism and efficiency, the consistent exposure to rapid technological changes in digital banking environments may override this tendency, leading employees to more accurately acknowledge that techno-uncertainty significantly affects their work-life balance (Ayyagari et al., 2011; Ragu-Nathan et al., 2008).

Finally, techno-uncertainty may not always translate into a strong direct disruption of work-life balance because employees may gradually adapt to continuous technological changes as part of their routine job demands. In the banking sector, frequent system upgrades and digital transformation initiatives are often embedded into daily operations, making technological change a normalised expectation rather than an exceptional disruption. Employees with higher exposure to digital systems may also develop coping mechanisms such as time management strategies and task prioritisation, which help them manage work demands more efficiently (Salanova et al., 2013). Therefore, the effect of techno-uncertainty on work-life balance may be weakened when employees perceive technological changes as part of standard work processes rather than extraordinary interruptions. This suggests that the relationship between technostress creators and work-life balance is context-dependent and influenced by employees' adaptation to continuous digitalisation in the banking sector (Tarafdar et al., 2019).

5.3.2.6 Research Objective 6

Research Question 6: what is the relationship between techno-overload and psychological health?

Hypothesis: H2a:: there is a positive and significant relationship between techno-overload and psychological health.

The objective for research question number six is to examine the relationship between techno-overload and psychological health. From the result, it can be concluded that techno-overload has a positive relationship with psychological health.

With the purpose to explore the relationship between techno-overload and psychological health, path coefficients were applied to answer the first research question that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and not significant relationship between techno-overload and psychological health (β=0.048, $p< 0.05$).

Therefore, Hypothesis 2a is supported. Table 5.8 below shows path coefficient for direct relationship between techno-overload and psychological health.

Table 5.8
Path coefficient for direct relationships between techno-overload and psychological health

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H2a	TO -> H	0.048	7.295	0.000	0.034	Supported

The finding that techno-overload significantly influences psychological health can be explained through several interrelated theoretical, contextual, cultural, and methodological factors, particularly within Malaysia's banking sector. Techno-overload occurs when employees are required to work faster, manage excessive digital information, and continuously respond to technology-related demands beyond their capacity to cope (Tarafdar et al., 2011). In the present study, the significant relationship suggests that excessive technological demands have adversely affected employees' psychological health, leading to stress, anxiety, mental fatigue, emotional exhaustion, and reduced psychological well-being (Pansini et al., 2023; Wang & Beh, 2025).

This finding is consistent with prior studies, which reported that techno-overload is one of the strongest dimensions of technostress affecting employees' mental and emotional conditions. Tarafdar et al. (2011), explained that constant interruptions from emails, notifications, and multitasking requirements increase cognitive burden and emotional strain among employees. Similarly, recent studies demonstrated that continuous digital connectivity and excessive technology-related

workload contribute to psychological distress, burnout, and emotional exhaustion among employees in digitally intensive environments (Wang & Beh, 2025). Malaysian based evidence also showed that technostress negatively affects employee well-being and psychological functioning, particularly among employees working in highly digitalized sectors (Mokhtar & Mohamad Yunus, 2024).

The significant relationship may also be explained through the characteristics of the banking sector itself. Malaysia's banking industry has undergone a rapid digital transformation involving online banking systems, automated workflows, cybersecurity compliance, digital customer service platforms, remote communication tools, and real-time transaction monitoring. Employees are therefore expected to manage multiple systems simultaneously while maintaining high service accuracy and productivity. Such conditions create continuous cognitive demands and information overload, which can gradually deteriorate psychological health (Khalequzzaman et al., 2025). Recent banking-sector studies similarly reported that digital overload and technology-driven work pressure significantly increase technostress and psychological strain among banking employees (Yıkılmaz et al., 2024; Khalequzzaman et al., 2025).

From a theoretical perspective, the finding supports the Job Demands-Resources (JD-R) Model and the Transactional Theory of Stress. Under the JD-R perspective, techno-overload functions as a job demand that consumes employees' psychological and emotional resources. When technological demands exceed employees' coping abilities or available organizational support, stress reactions emerge and negatively affect psychological health (Bakker & Demerouti, 2017). Likewise, the Transactional Theory of Stress explains that employees evaluate excessive technological demands as stressful when they perceive insufficient control, skills, time, or coping resources to manage them effectively (Lazarus & Folkman, 1984). This explains why continuous multitasking, constant digital communication, and pressure to remain technologically responsive can lead to emotional exhaustion and mental fatigue (Tarafdar et al., 2011).

Several contextual factors specific to Malaysia may further explain why techno-overload significantly affected psychological health in this study. In many Malaysian organizations, particularly within the banking sector, employees often experience collectivist work norms and high power-distance organizational cultures where responsiveness, availability, and compliance with organizational expectations

are strongly emphasized (Hofstede, 2011). Employees may therefore feel obligated to respond immediately to digital communications even beyond normal working hours. This "always connected" work culture can intensify psychological strain because employees may struggle to psychologically detach from work (Gaube, Cecil, & Wagner, 2021). Recent studies on digitalization and technostress similarly found that hyperconnectivity and continuous digital engagement contribute substantially to job stress and emotional exhaustion (Wang & Beh, 2025).

In addition, the post-pandemic working environment may also have strengthened the effect of techno-overload on psychological health. Hybrid work arrangements, remote communication systems, and digital collaboration platforms have blurred the boundaries between work and personal life. Employees are now frequently exposed to continuous online meetings, instant messaging, and after-hours communication, increasing feelings of mental exhaustion and psychological strain (Perry et al., 2018). Studies conducted within Malaysian banking environments reported that remote working arrangements and intensive technology usage significantly contributed to technostress and reduced employee well-being (Omar & Henry, 2024).

Methodological considerations may also explain why the hypothesis was supported. The measurement items used for techno-overload likely captured employees' direct day-to-day experiences of digital burden, multitasking pressure, and constant technological interruptions. These experiences are immediate, visible, and psychologically salient, making employees more aware of their mental and emotional strain (Tarafdar et al., 2011). Similarly, psychological health measures often assess emotional exhaustion, stress, anxiety, and mental fatigue, which are outcomes directly associated with excessive technological workload (Pansini et al., 2023). This close conceptual relationship may therefore strengthen the statistical association between techno-overload and psychological health.

The findings also diverge from some earlier studies, which reported weaker or insignificant relationships between techno-overload and psychological outcomes. One possible explanation is differences in organizational digital maturity and technological adaptation. Employees with stronger digital competencies, better organizational support, or more flexible work arrangements may perceive technology as helpful rather than stressful (Ragu-Nathan et al., 2008). In contrast, employees in highly

regulated sectors such as banking may face stricter compliance requirements, tighter deadlines, and greater performance monitoring, which intensify the stressful impact of technology (Khalequzzaman et al., 2025). Organizational support mechanisms such as supervisor support, training opportunities, and job clarity may therefore determine whether techno-overload becomes psychologically harmful (Ayyagari et al., 2011). Recent evidence suggests that supportive organizational environments can buffer the negative effects of technostress on employees' psychological outcomes (Yener et al., 2025).

Overall, the findings indicate that techno-overload is not simply a technological issue but also a psychological and organizational challenge. In the context of Malaysia's banking sector, excessive digital demands, continuous connectivity, multitasking expectations, and rapid technological changes appear to significantly deplete employees' psychological resources, thereby negatively affecting their psychological health (Khalequzzaman et al., 2025; Wang & Beh, 2025). The study, therefore, highlights the importance of organizational interventions such as workload management, digital wellness initiatives, psychological support systems, technology training, and clearer boundaries between work and personal life to reduce the negative psychological consequences of techno-overload (Gaube et al., 2021; Mokhtar & Mohamad Yunus, 2024).

5.3.2.7 Research Objective 7

Research Question 7: what is the relationship between techno-invasion and psychological health?

Hypothesis: H2b: there is a positive and significant relationship between techno-invasion and psychological health.

With the purpose to explore the relationship between techno-invasion and psychological health, path coefficients were applied to answer research question number seven that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant relationship between techno-invasion and psychological health ($\beta = 0.049$, $p < 0.05$).

Therefore, Hypothesis 2b is supported. Table 5.9 below shows path coefficient for direct relationship between techno-invasion and psychological health.

Table 5.9
Path coefficient for direct relationships between techno-invasion and psychological health

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H2b	TI -> H	0.049	15.085	0.000	0.115	Supported

The significant effect of techno-invasion on psychological health indicates that excessive technological connectivity has become an important source of emotional and mental strain among employees in the banking sector. Techno-invasion occurs when communication technologies allow work-related activities to enter employees' personal lives continuously, causing employees to feel permanently accessible to their organizations (Tarafdar et al., 2011). In this study, employees who experienced frequent work interruptions outside normal working hours were more likely to report psychological difficulties such as stress, anxiety, emotional exhaustion, and mental fatigue. This suggests that the inability to disconnect from work psychologically may gradually weaken employees' overall psychological well-being (Pansini et al., 2023; Borle et al., 2021).

The result corresponds with earlier studies, which emphasized that constant digital accessibility contributes significantly to psychological strain among employees. Research by Borle et al. (2021), showed that employees who are continuously connected to work through digital devices experience higher emotional exhaustion because they have fewer opportunities for psychological recovery. Likewise, recent studies found that expectations of immediate responsiveness through emails, messaging applications, and online platforms increase stress levels and negatively influence mental health outcomes (Wang & Beh, 2025). The present findings therefore reinforce the argument that technology-related intrusion into personal life has become one of the major stressors in modern workplaces (Pansini et al., 2023).

A possible explanation for the significant relationship is the highly digitalized nature of Malaysia's banking industry. Banking employees are required to manage

digital transactions, online customer services, cybersecurity procedures, and real-time communication systems daily. These technological demands frequently continue beyond official office hours because employees are expected to remain reachable and responsive whenever operational issues arise. Consequently, many employees may experience prolonged exposure to work-related interactions even during evenings, weekends, or holidays. Over time, this continuous exposure can create psychological fatigue because employees are unable to fully disengage from work responsibilities (Khalequzzaman et al., 2025; Yıkılmaz et al., 2024).

The outcome can also be interpreted through the perspective of work-life boundary disruption. When technology removes the separation between work and personal domains, employees may struggle to maintain emotional balance between professional and family responsibilities. Boundary Theory explains that individuals function more effectively when work and personal roles remain clearly separated (Ashforth et al., 2000). However, techno-invasion weakens these boundaries because employees remain connected through smartphones, emails, and virtual communication platforms. As a result, personal recovery time becomes interrupted, leading to emotional depletion and reduced psychological well-being. The Job Demands-Resources (JD-R) Model similarly suggests that continuous technological accessibility acts as an excessive job demand that drains employees' mental and emotional resources over time (Bakker & Demerouti, 2017).

Cultural characteristics within Malaysian workplaces may further strengthen the influence of techno-invasion on psychological health. In many Asian organizational settings, employees often place strong importance on respect for authority, teamwork, and organizational commitment. Because of these cultural expectations, employees may feel uncomfortable ignoring after-hours work communications from supervisors or colleagues (Hofstede, 2011). Even when employees are officially off duty, they may continue monitoring emails and responding to work requests to demonstrate responsibility and dedication. Such practices may increase psychological pressure because employees feel continuously obligated to remain available for work-related matters (Gaube et al., 2021; Wang & Beh, 2025).

The widespread adoption of hybrid and remote working arrangements after the Covid-19 pandemic may also have intensified techno-invasion among banking

employees. Digital communication tools became essential for maintaining daily operations, meetings, and customer interactions. Although remote work increased flexibility, it also extended employees' exposure to technology throughout the day. Employees working from home often had trouble separating work time from personal time because work communications continued beyond regular office hours (Perry et al., 2018). Studies conducted within Malaysian work environments similarly reported that extensive reliance on communication technologies after the pandemic increased employees' stress and negatively affected their psychological well-being (Omar & Henry, 2024).

Another possible reason why techno-invasion significantly affected psychological health relates to the psychological meaning employees attach to constant connectivity. Employees may perceive uninterrupted communication as a signal that they must always remain alert, responsive, and prepared for work demands. This constant anticipation can create cognitive tension and emotional exhaustion even when employees are not actively working. Unlike some work stressors that occur only during office hours, techno-invasion extends into employees' personal environments and recovery periods, making its psychological effects more persistent and difficult to escape (Borle et al., 2021; Tarafdar et al., 2011).

The measurement items used for techno-invasion likely focused on practical experiences such as receiving work-related notifications after working hours, feeling pressured to remain online, and having personal time interrupted by work communications. These experiences are relatively easy for respondents to recognize because they directly affect employees' daily routines and emotional conditions. At the same time, psychological health indicators commonly assess symptoms such as stress, emotional exhaustion, anxiety, and mental fatigue, which are strongly associated with continuous work intrusion (Pansini et al., 2023). The direct connection between these constructs may therefore contribute to the strong statistical relationship observed in the study (Tarafdar et al., 2011).

Nevertheless, some previous studies reported weaker relationships between techno-invasion and psychological outcomes. One explanation may involve differences in employees' technological readiness and organizational support systems. Employees with strong digital competencies or supportive supervisors may perceive constant connectivity as manageable rather than stressful. In certain organizations,

flexible communication technologies may even improve autonomy and convenience by allowing employees to complete tasks more efficiently (Ragu-Nathan et al., 2008). However, within banking institutions where work accuracy, responsiveness, and compliance are heavily emphasized, employees may experience stronger psychological pressure from constant technological accessibility (Khalequzzaman et al., 2025). This suggests that organizational context plays an important role in determining whether techno-invasion becomes psychologically harmful (Ayyagari et al., 2011).

Differences in demographic characteristics could also explain inconsistencies across studies. Younger employees who are more accustomed to digital communication may adapt more easily to constant connectivity, whereas older employees may experience greater difficulty balancing technological demands with personal recovery needs. Furthermore, variations in organizational culture, digital policies, workload intensity, and national work practices may produce different levels of techno-invasion across studies. Therefore, the significant findings in this study may reflect the combined influence of Malaysia's banking environment, organizational expectations, and employees' lived experiences with continuous digital connectivity (Borle et al., 2021; Hofstede, 2011).

Overall, the findings demonstrate that techno-invasion has significant implications for employees' psychological health because continuous technological accessibility limits opportunities for emotional recovery and psychological detachment from work. Within Malaysia's banking sector, the expectation to remain constantly connected appears to create ongoing psychological pressure that contributes to stress, fatigue, and emotional exhaustion (Khalequzzaman et al., 2025; Wang & Beh, 2025). The findings therefore suggest that organizations should establish better digital communication practices, encourage clearer work-life boundaries, and provide psychological support initiatives to reduce the harmful effects of techno-invasion on employee well-being (Gaube et al., 2021; Pansini et al., 2023).

5.3.2.8 Research Objective 8

Research Question 8: what is the relationship between techno-complexity and psychological health?

Hypothesis: H2c: there is a positive and significant relationship between techno-complexity and psychological health.

With the purpose to explore the relationship between techno-complexity and psychological health, path coefficients were applied to answer research question number eight that has been developed. Based on the data analysed and interpreted, the researcher found that there has been a positive and significant relationship between techno-complexity and psychological health ($\beta = 0.041$, $p < 0.05$).

Therefore, Hypothesis 2c is supported. Table 5.10 below shows path coefficient for direct relationship between techno-complexity and psychological health.

Table 5.10
Path coefficient for direct relationships techno-complexity and psychological health

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H2c	TC -> H	0.041	13.073	0.000	0.068	Supported

The supported relationship between techno-complexity and psychological health indicates that employees experience psychological strain when they perceive workplace technologies as difficult to understand, complicated to operate, or constantly changing. Techno-complexity emerges when employees feel that they lack sufficient technological knowledge and skills to manage sophisticated digital systems effectively, forcing them to spend additional time and effort learning new applications and adapting to technological changes (Tarafdar et al., 2011). In the present study, the significant effect suggests that employees who struggled to cope with complex technologies were more likely to experience stress, mental fatigue, anxiety, frustration, and emotional exhaustion, which subsequently weakened their psychological health (Reddy et al., 2025).

The finding is consistent with earlier studies, which argued that complicated technological systems increase employees' cognitive burden and emotional pressure. Tarafdar et al. (2011) explained that employees often feel overwhelmed when organizations continuously introduce new systems requiring advanced technical competencies and ongoing adaptation. Likewise, Atanasoff and Venable (2017) reported that rapid technological change can disrupt employees' emotional stability because workers must constantly adjust to unfamiliar systems and work processes. More recent evidence also indicates that employees who perceive technology as difficult to understand are more likely to develop psychological distress and work-related anxiety, particularly in highly digitalized environments (Florea & Croitoru, 2025; Kemp et al., 2025). Therefore, the present findings reinforce the view that techno-complexity has become an important predictor of employees' psychological well-being.

One possible explanation for the significant relationship is the highly technology-oriented nature of Malaysia's banking industry. Banking institutions increasingly depend on advanced digital systems such as online banking platforms, automated financial services, cybersecurity protocols, artificial intelligence systems, and real-time transaction monitoring. Employees are therefore expected to continuously update their technological competencies and adapt to new digital procedures. However, not all employees possess the same level of technological readiness or digital literacy. Employees who lack confidence in using complex systems may require additional effort and time to understand organizational technologies, thereby increasing mental exhaustion and psychological pressure (Anshari et al., 2017; Wang & Yao, 2025).

Another factor that may explain the findings is the learning burden associated with continuous technological upgrades. In many organizations, technological systems are regularly updated to improve productivity and operational efficiency. Although these changes may benefit organizational performance, employees are often required to learn new functions, adapt to revised procedures, and solve unfamiliar technical problems within limited timeframes. This situation may create feelings of incompetence, uncertainty, and frustration, particularly among employees who are less technologically experienced (Iqbal, 2025). As employees spend additional cognitive and emotional energy understanding technological systems, their opportunities for rest

and psychological recovery may become reduced, eventually affecting their mental well-being (Kabir et al., 2025).

In the case of techno-complexity, employees may struggle to process large amounts of technological information, instructions, and system procedures simultaneously, increasing mental fatigue and psychological tension. Similarly, the JD-R Model explains that complicated technologies function as excessive job demands because employees must invest additional mental effort to manage digital systems effectively (Bakker & Demerouti, 2017). When employees lack sufficient organizational resources, such as training, technical support, or time to adapt, psychological strain becomes more likely to occur.

Workplace culture within Malaysian organizations may further contribute to the significant influence of techno-complexity on psychological health. In many organizations, employees may hesitate to admit technological difficulties due to fear of being perceived as incompetent or less productive, especially in highly competitive sectors such as banking. Employees may therefore attempt to learn complex technologies independently without requesting assistance from supervisors or colleagues. This pressure to appear technologically competent may intensify stress and emotional exhaustion, particularly among employees who already experience difficulties adapting to rapid technological changes (Hofstede, 2011).

The significant findings may additionally reflect differences in employees' demographic and professional backgrounds. Employees with limited technological exposure, lower digital confidence, or longer job periods may experience greater difficulty adapting to continuously evolving systems compared to younger or more technologically experienced employees. Older employees, for example, may require more time to understand complex systems and therefore experience higher levels of frustration and psychological strain. Such differences in technological familiarity and adaptability may strengthen the relationship between techno-complexity and psychological health within the study sample (Ragu-Nathan et al., 2008).

Although the findings align with many previous studies, some earlier research reported ineffective relationships between techno-complexity and psychological outcomes. One possible explanation is that certain employees perceive complex technologies positively because they provide opportunities for skill development, career advancement, and improved work efficiency. Employees who receive sufficient

technological training, organizational support, and sufficient adaptation time may therefore experience lower psychological strain despite technological complexity (Ayyagari et al., 2011). In contrast, employees working in demanding banking environments with limited time, high workloads, and strict performance expectations may experience stronger negative psychological effects from technological complexity. This suggests that organizational support systems may determine whether technological complexity becomes manageable or psychologically harmful.

Several measurement and research-related factors may also help explain the significant findings, as the techno-complexity items likely captured employees' direct experiences with difficult systems, continuous learning demands, and technological adaptation challenges, which are closely associated with stress, anxiety, frustration, and emotional fatigue (Tarafdar et al., 2011; Reddy et al., 2025).

Overall, the findings suggest that techno-complexity represents an important psychological challenge for employees within Malaysia's banking sector because continuous technological changes and complicated digital systems require ongoing adaptation and mental effort. Employees who perceive themselves as unable to manage effectively with technological complexity are more likely to experience emotional exhaustion, stress, and reduced psychological well-being. The study, therefore, highlights the importance of organizational interventions such as continuous technology training, user-friendly system design, technical assistance, and supportive learning environments to minimize the negative psychological consequences associated with techno-complexity (Florea & Croitoru, 2025; Kemp et al., 2025).

5.3.2.9 Research Objective 9

Research Question 9: what is the relationship between techno-insecurity and psychological health?

Hypothesis: H2d: there is a positive and significant relationship between techno-insecurity and psychological health.

With the purpose to explore the relationship between techno-insecurity and psychological health, path coefficients were applied to answer research question number nine that has been developed. Based on the data analysed and interpreted, the

researcher found that there was a positive, and significant relationship between techno-insecurity and psychological health ($\beta = 0.048$, $p < 0.05$).

Therefore, Hypothesis 2d is supported. Table 5.11 below shows path coefficient for direct relationship between techno-insecurity and psychological health.

Table 5.11
Path coefficient for direct relationships between techno-insecurity and psychological health

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H2d	TIN -> H	0.048	5.525	0.000	0.036	Supported

Technological advancement in the banking sector has intensified employees' perception of job vulnerability, particularly as automation, artificial intelligence, and digital systems increasingly replace routine human tasks. This situation heightens employees' fear of being replaced if they fail to meet evolving technological expectations, which directly contributes to psychological strain such as anxiety, stress, and reduced well-being (Hang et al., 2022; Gabr et al., 2021; Rohwer et al., 2022). Recent studies in digital workplaces further confirm that technostress job insecurity is strongly associated with deteriorating mental health outcomes, especially in highly digitalised financial environments where performance expectations are continuously increasing (Khalequzzaman et al., 2025; Jain et al., 2025).

Empirical evidence from recent banking and digital transformation studies consistently shows that techno-insecurity is one of the most psychologically damaging technostress creators. Employees who believe they may be replaced by advanced technologies often experience sustained anxiety, emotional exhaustion, and reduced psychological well-being due to ongoing uncertainty about their future job stability (Wang & Beh, 2025; Pires, 2025). This aligns with findings that digital transformation in financial institutions increases psychological pressure because employees must constantly prove their relevance through technological competence and adaptability (Khalequzzaman et al., 2025; Sansovini & Magida, 2025).

In banking contexts, rapid adoption of artificial intelligence, automation systems, and digital platforms has significantly reshaped job roles, reducing reliance on traditional human tasks and increasing fear of redundancy among employees. This perception becomes more severe when organizational communication emphasizes

efficiency, restructuring, and digital optimisation, which may unintentionally reinforce employees' insecurity about job continuity (Jain et al., 2025; Khalequzzaman et al., 2025). As employees continuously compare their skills with technological advancements, psychological strain increases due to persistent concerns about employability and career survival.

Conservation of Resources (COR) Theory explains that employees experience psychological distress when they perceive a threat to valuable resources such as job stability, professional identity, and career security (Hobfoll, 2001). Techno-insecurity directly threatens these resources, as employees feel their skills may become obsolete due to technological advancement. Similarly, Stress Appraisal Theory suggests that employees interpret technological change as stressful when they perceive insufficient ability or support to cope with new demands, resulting in heightened emotional strain and psychological exhaustion (Lazarus & Folkman, 1984; Tarafdar et al., 2019).

Organizational context also plays a crucial role in strengthening the relationship between techno-insecurity and psychological health. In highly competitive banking environments, performance is closely tied to technological efficiency, which may increase employees' fear of replacement if they fail to adapt quickly. When training opportunities and reskilling programs are insufficient, employees are more likely to perceive technological change as a threat rather than an opportunity, leading to chronic psychological stress (Rikala et al., 2025; Ayyagari et al., 2011). Recent research also highlights that organizational support significantly determines whether employees experience technological change as empowering or threatening (Jain et al., 2025; Khalequzzaman et al., 2025).

In collectivist work environments such as Malaysia, employees may be less willing to express concerns about job insecurity, leading them to internalise stress rather than seek support. This internalisation can intensify psychological distress over time. Additionally, employees with lower digital literacy or older age profiles may feel more vulnerable to technological displacement compared to younger, more technologically confident workers, thereby increasing their psychological strain (Wang & Beh, 2025; Borle et al., 2021).

Although consistent findings in recent literature, some studies suggest weaker relationships between techno-insecurity and psychological outcomes when strong organizational support systems are present. Training programmes, transparent

communication, and career development initiatives can reduce employees' fear of replacement by enhancing their confidence in adapting to technological change. In such environments, employees may perceive digital transformation as an opportunity for growth rather than a threat, thereby reducing psychological distress (Ragu-Nathan et al., 2008; Jain et al., 2025).

Overall, techno-insecurity emerges as a significant psychological stressor in modern banking environments because it directly affects employees' perception of job survival and professional relevance. The continuous fear of being replaced by technology, combined with ongoing demands to upgrade skills, creates sustained emotional pressure that negatively impacts psychological health. This highlights the need for organizations to strengthen reskilling initiatives, enhance communication transparency, and provide psychological support systems to mitigate the adverse effects of techno-insecurity on employee well-being (Khalequzzaman et al., 2025; Wang & Beh, 2025; Pires, 2025).

5.3.2.10 Research Objective 10

Research Question 10: what is the relationship between techno-uncertainty and psychological health?

Hypothesis: H2e: there is a positive and no significant relationship between techno-uncertainty and psychological health.

With the purpose to explore the relationship between techno-uncertainty and psychological health, path coefficients were applied to answer the research question number ten that has been developed. Based on the data analysed and interpreted, the researcher found that there is a positive, but not significant relationship between techno-uncertainty and psychological health. Hypothesis 2e is not significant because p-value is lower than $p<0.05$. P-value for Hypothesis 2e is 0.081 that is more than $p>0.05$, ($\beta=0.067$).

Therefore, the hypothesis statement is not supported for this study. The relationship between techno-uncertainty and psychological health is positive which is $\beta = 0.067$ but is not significant relationship between techno-overload and work-life balance as p-value is more than 0.05. Acceptance p-value is lower than 0.05. Table

5.12 below shows path coefficient for direct relationship between techno-uncertainty and psychological health.

Table 5.12
Path coefficient for direct relationships techno-uncertainty and psychological health

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H2e	TU -> H	0.067	1.398	0.081	0.006	Not Supported

Although previous studies have frequently associated techno-uncertainty with stress, anxiety, and emotional exhaustion, the present study demonstrated that techno-uncertainty did not significantly influence psychological health among employees in Malaysia's banking sector. This finding suggests that rapid technological change and ongoing system updates may no longer be perceived as major psychological threats among banking employees, despite the demanding nature of digital transformation in financial institutions. Earlier literature emphasized that frequent technological changes often create uncertainty because employees must continuously learn new systems, adapt to updated security procedures, and manage increasing digital expectations, which may negatively affect emotional well-being and mental stability (Tarafdar et al., 2019; Rohwer et al., 2022). Within banking institutions, where operational accuracy and cybersecurity are highly critical, employees are commonly expected to respond quickly to technological modifications while maintaining high service performance. Therefore, techno-uncertainty was initially expected to significantly reduce employees' psychological health (Han et al., 2025).

However, the insignificant finding suggests that employees in the Malaysian banking industry may have increasingly developed stronger adaptability toward technological change due to continuous exposure to digital systems over time. The banking sector has undergone extensive digitalization, including online banking platforms, automated systems, cybersecurity monitoring, and AI-supported services, making technological updates part of employees' routine work environments (Nedeljko & Bostan, 2023). As a result, technological uncertainty may now be perceived as a normal operational requirement rather than a psychologically disruptive event. Recent evidence also supports the argument that employees with greater digital familiarity and technological readiness are less likely to experience severe

psychological strain when facing technological change (Varma et al., 2025). Similarly, studies in the banking sector reported that employees with stronger technological competencies and greater flexibility are better able to manage digital transformation pressures without experiencing significant psychological deterioration (Khalequzzaman et al., 2025).

The organizational setting of Malaysian banks may further explain why techno-uncertainty did not significantly predict psychological health. Financial institutions generally implement structured adaptation mechanisms whenever new technologies or upgraded systems are introduced. Employees are frequently supported through technical training, workshops, digital guidance, helpdesk assistance, and peer collaboration to facilitate smoother technological transitions (Ranathunga & Rathnakara, 2022). These organizational interventions may reduce employees' feelings of uncertainty and emotional strain during periods of technological adjustment. Ranathunga and Rathnakara (2022), emphasized that organizational support functions as a techno-stress inhibitor because employees who receive adequate guidance and technical preparation are more capable of adapting to digital change effectively. More recent banking-sector evidence also confirmed that perceived organizational support can buffer the negative impact of digital stressors and improve employees' ability to cope with technological demands (Tran Thi et al., 2025; Khalequzzaman et al., 2025). Consequently, although employees may still experience temporary fatigue or frustration during system upgrades, these experiences may not be sufficiently intense to significantly damage their broader psychological health (Potocnik et al., 2025).

Cultural and workplace values may also contribute to the divergence between the present findings and earlier studies. Malaysian working environments are generally characterized by collectivist cultural orientations, where teamwork, organizational loyalty, and adaptability toward management decisions are strongly emphasized. Employees may therefore perceive technological adaptation as part of their professional obligations rather than as a personal psychological burden (Han et al., 2025). Supportive relationships among colleagues may additionally help reduce emotional distress during periods of technological uncertainty. This interpretation contrasts with findings from several Western contexts where employees often report stronger emotional reactions toward technological disruptions due to greater

individual pressure and lower collective support systems (Tarafdar et al., 2019). In Asian banking environments, employees may be more accepting of continuous technological changes because digital transformation has become strongly institutionalized within organizational culture (Mosharrafa et al., 2024). Similar observations were reported in recent studies conducted in Bangladesh, India, and Vietnam, where organizational support and workplace relationships reduced the negative psychological consequences of technostress among banking employees (Tran Thi et al., 2025; Varma et al., 2025).

Another possible explanation concerns methodological and measurement-related issues. The psychological health construct used in the present study may have captured broader and relatively stable emotional conditions rather than short-term psychological reactions arising from temporary technological adjustments. Employees may indeed experience brief periods of stress, exhaustion, or discomfort during technological transitions, but such reactions may not persist long enough to influence their overall psychological health significantly (Rohwer et al., 2022). Moreover, psychological health is influenced by numerous other workplace and personal factors, including workload, leadership style, work-life balance, family responsibilities, and organizational climate (Abasiama et al., 2021). Therefore, techno-uncertainty alone may not have been sufficiently dominant to independently predict psychological health among the sampled employees (Han et al., 2025).

In addition, the findings imply that not all dimensions of technostress produce identical psychological consequences. Certain dimensions, such as techno-overload and techno-insecurity, may exert stronger emotional pressure because they directly increase workload intensity or create fears related to job continuity (Tarafdar et al., 2019). In contrast, techno-uncertainty may represent a transitional adaptation challenge that employees gradually learn to manage through experience, technological exposure, and institutional support (Nedeljko & Bostan, 2023). Recent evidence also suggested that the impact of technostress creators differs depending on contextual and individual factors, indicating that techno-uncertainty does not always consistently predict negative psychological outcomes across organizational settings (Khalequzzaman et al., 2025; Varma et al., 2025).

Overall, the present findings contribute to the technostress literature by demonstrating that technological uncertainty within Malaysia’s banking sector may no

longer function as a major determinant of employees' psychological health. The combination of organizational preparedness, digital competency development, continuous technological exposure, and collectivist workplace culture may collectively explain why the hypothesized relationship between techno-uncertainty and psychological health was not statistically significant in this study (Ranathunga & Rathnakara, 2022; Han et al., 2025; Nedeljko & Bostan, 2023).

5.3.2.11 Research Objective 11

Research Question 11: what is the relationship between psychological health towards work-life balance?

Hypothesis: H3a: there is a positive and significant relationship between psychological health and work-life balance.

With the purpose to explore the relationship between psychological health and work-life balance, path coefficients were applied to answer research question number eleven that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant relationship between psychological health and work-life balance ($\beta = 0.041$, $p < 0.05$).

Therefore, Hypothesis 3a is upported. Table 5.13 below shows path coefficient for direct relationship between psychological health and work-life balance.

Table 5.13
Path coefficient for direct relationships psychological health and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H3a	H -> W	0.041	5.839	0.000	0.034	Supported

The present study found that psychological health significantly influenced work-life balance among employees in Malaysia's banking sector. This result demonstrates that employees' mental and emotional conditions play a critical role in determining how effectively they manage the demands between work responsibilities and personal life. Employees who experience positive psychological health are generally more capable of maintaining emotional stability, controlling stress, managing workloads efficiently, and sustaining healthy interpersonal relationships both at work and outside the workplace. Conversely, employees with poorer

psychological health often struggle to balance competing demands, resulting in emotional exhaustion, reduced family interaction, dissatisfaction, and work-related strain. The significant relationship identified in this study therefore supports previous literature suggesting that psychological well-being functions as an important predictor of employees' ability to achieve work-life balance (Humphries et al., 2020; Malik et al., 2021; Singh, 2025).

One possible explanation for the significant relationship is the demanding nature of the banking profession itself. Employees in banking institutions are frequently exposed to strict performance targets, long working hours, continuous customer interaction, compliance pressures, and rapid technological adaptation. These conditions can place considerable pressure on employees' psychological states and subsequently influence their personal lives (Althobaiti et al., 2020; Enli-Tuncay et al., 2020). When psychological health fails due to chronic stress, anxiety, or emotional fatigue, employees may find it increasingly difficult to separate work obligations from family and social responsibilities. This situation is especially relevant within Malaysia's banking sector, where digital transformation, customer expectations, and organizational competitiveness continue to intensify work demands. Recent studies similarly reported that employees experiencing psychological distress often face greater work-family conflict, emotional exhaustion, and reduced life satisfaction because their emotional resources become depleted over time (Muppidi & Manoharan, 2025; Singh, 2025).

The findings also align with Conservation of Resources (COR) Theory, which proposes that individuals who experience psychological strain gradually lose emotional, cognitive, and physical resources needed to manage multiple life roles effectively (Hobfoll, 1989). Employees with lower psychological health may therefore struggle to allocate sufficient energy toward family commitments, leisure activities, and personal recovery because most of their resources are consumed by workplace pressures. In contrast, employees with healthier psychological conditions are more capable of coping with stressors, maintaining productivity, and preserving healthier boundaries between work and personal life. Similar conclusions were highlighted by Oyewobi et al. (2022), who found that employees with stronger emotional well-being demonstrated greater commitment, work engagement, and life satisfaction because they possessed better psychological coping mechanisms. Recent evidence also

confirmed that emotional exhaustion significantly predicts poorer work-life balance and lower employee well-being in service-intensive industries (Araslar, 2021; Muppidi & Manoharan, 2025).

Another factor that may explain the significant relationship concerns the post-pandemic transformation of working environments within the banking industry. Following increased digitalization and hybrid working arrangements, employees are now more connected to work responsibilities outside formal office hours. Although technological advancement improves efficiency, it may simultaneously blur the boundaries between work and personal life (Bao et al., 2020). Employees who experience psychological distress may find it difficult to disengage mentally from work-related concerns after office hours, thereby reducing their ability to achieve work-life balance. Recent literature supports this argument by showing that psychological strain arising from work pressure, technology overload, and emotional exhaustion significantly contributes to work-life imbalance and burnout among service sector employees (Araslar, 2021; Cullen et al., 2020; Muppidi & Manoharan, 2025).

Cultural and organizational characteristics within Malaysia may further strengthen the relationship between psychological health and work-life balance. Malaysian society generally places considerable importance on family obligations, collective relationships, and social harmony. Employees are therefore expected to perform effectively both at work and within family environments simultaneously. When psychological health becomes negatively affected, employees may have trouble fulfilling these multiple social roles, causing work-life imbalance to become more visible (Malik et al., 2021). In collectivist societies, emotional strain experienced at work is often carried into family interactions because individuals tend to remain highly connected to social expectations and responsibilities. This cultural context may strengthen the relationship between psychological health and work-life balance compared to more individualistic societies where personal and professional roles are often more compartmentalized (Humphries et al., 2020; Singh, 2025).

The significant findings may also be associated with characteristics of the study sample. Employees in the banking sector often operate under highly structured environments involving strict deadlines, performance monitoring, customer complaints, and regulatory compliance. Such working conditions may heighten

employees' sensitivity toward psychological strain and work-life imbalance simultaneously (Althobaiti et al., 2020). Consequently, respondents who experience emotional exhaustion, stress, or anxiety are more likely to report difficulties balancing work and personal responsibilities. This explanation is supported by Cullen et al. (2020), who argued that employees exposed to prolonged occupational pressure frequently experience fatigue, sleep disturbances, emotional instability, and reduced personal well-being, all of which negatively influence work-life balance.

Practical considerations may additionally explain why the relationship was statistically significant. The measurement scales used for psychological health and work-life balance may conceptually overlap because both constructs involve emotional well-being, stress management, satisfaction, and quality of life perceptions (Singh, 2025). As a result, employees experiencing poor psychological health may naturally perceive lower work-life balance simultaneously. Furthermore, the cross-sectional nature of the study may capture employees' current emotional states during periods of high occupational demand, thereby strengthening the observed relationship between psychological health and work-life balance (Muppidi & Manoharan, 2025).

The findings of this study do not entirely contradict previous literature but rather reinforce the argument that psychological health functions as a central instrument influencing employees' overall well-being and work adjustment. While some earlier studies emphasized workload, organizational support, or technological stressors as direct predictors of work-life balance, the present findings suggest that employees' internal psychological condition may be equally important in determining whether they can successfully manage work and non-work responsibilities (Oyewobi et al., 2022; Malik et al., 2021). This implies that work-life balance problems within Malaysia's banking sector may not arise solely from organizational demands themselves, but also from employees' psychological capacity to cope with those demands effectively (Humphries et al., 2020).

Overall, the supported relationship between psychological health and work-life balance highlights the importance of prioritizing employees' mental well-being within banking organizations. The findings suggest that maintaining healthy psychological conditions is essential for employees to effectively balance professional responsibilities with personal and family life. In the context of Malaysia's banking industry, where digital transformation and performance expectations continue to

increase, organizations may need to strengthen mental health support, workload management strategies, flexible working arrangements, and employee assistance programs to sustain healthier work-life balance outcomes among employees (Bao et al., 2020; Araslar, 2021; Singh, 2025).

5.3.2.12 Research Objective 12

Research Question 12: does psychological health mediate the relationship between techno-overload and work-life balance?

Hypothesis: H4a: Psychological health positive and significant mediate the relationship between techno-overload and work-life balance.

With the purpose to explore the relationship mediating between techno-overload and work-life balance, path coefficients were applied to answer research question number twelve that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant mediating relationship between techno-overload and work-life balance ($\beta = 0.433$, $p < 0.05$).

Therefore, Hypothesis 4a is supported. Table 5.14 below shows path coefficient for indirect relationship between techno-overload and work-life balance.

Table 5.14
Path coefficient for indirect relationships techno-overload and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H4a	TO -> H -> W	0.433	6.055	0.000	Indirect Effect	Supported

The present study demonstrated that psychological health significantly mediated the relationship between techno-overload and work-life balance among employees in Malaysia's banking sector. This finding indicates that techno-overload does not merely influence employees' work-life balance directly but also affects it indirectly through weakening employees' psychological health. In other words, excessive technological demands, continuous digital communication, and increased workload pressure contribute to psychological strain, which subsequently reduces employees' ability to maintain a balance between work and personal life. The significant mediating effect suggests that psychological health functions as an

important explanatory instrument through which techno-overload disrupts employees' work-life balance. This finding supports earlier studies arguing that technology-related overload creates emotional exhaustion, mental fatigue, and stress, which eventually spill over into employees' family and personal domains (Pluut & Wonders, 2020; Zacher & Rudolph, 2021; Mohamed, 2025).

One important explanation for the supported mediation relationship concerns the increasing dependence on digital technologies within the banking sector. Banking employees are commonly required to manage large volumes of digital tasks, respond rapidly to customer requests, monitor electronic transactions, comply with cybersecurity procedures, and remain constantly connected through communication technologies. Such technological demands often increase employees' cognitive and emotional burden because they are expected to complete work efficiently within limited timeframes (Spytska, 2025; Zheng & Saigot, 2025). When employees experience techno-overload continuously, their psychological resources may gradually become depleted, resulting in stress, anxiety, emotional exhaustion, and mental fatigue. As employees' psychological health declines, their ability to detach from work and maintain healthy personal relationships becomes increasingly difficult. Consequently, work responsibilities begin to interfere with family life, leisure time, and personal recovery processes, leading to poorer work-life balance (Bottaro et al., 2025; Mohamed, 2025).

The findings are also consistent with Conservation of Resources (COR) Theory, which explains that individuals attempt to preserve valuable psychological, emotional, and physical resources when facing stressful conditions (Hobfoll, 1989). Techno-overload may consume employees' mental energy because they must continuously process information, respond to digital demands, and adapt to technology-intensive working environments. Over time, prolonged exposure to technological overload may reduce employees' psychological resilience and coping capacity. Once psychological health is negatively affected, employees may struggle to effectively manage competing demands between work and personal life. Therefore, psychological health becomes the mechanism through which techno-overload influences work-life balance. Similar findings were reported by Pluut and Wonders (2020), who found that work-related stressors impaired employees' emotional well-being, which subsequently reduced their ability to maintain satisfactory work-life

integration. More recent evidence also confirmed that technostress significantly predicts emotional exhaustion and lower work-life balance among digitally connected employees (Varma et al., 2025; Khalequzzaman et al., 2025).

Another possible explanation relates to the organizational context within Malaysia's banking sector. Banking institutions in Malaysia are currently undergoing aggressive digital transformation, including online banking services, automated systems, artificial intelligence integration, and digital customer engagement platforms. Although these technological developments improve organizational efficiency, they may simultaneously intensify workload expectations and increase employees' technological responsibilities (World Economic Forum, 2016; Khalequzzaman et al., 2025). Employees are no longer only required to perform old banking tasks but are also expected to multitask across digital platforms while maintaining high productivity and service quality. This may increase psychological pressure because employees feel continuously connected to work through emails, messaging applications, and online systems even after office hours (Zheng & Saigot, 2025). In such situations, psychological health becomes particularly vulnerable, and deteriorating mental well-being may eventually impair employees' work-life balance. Recent studies conducted in technologically intensive service sectors similarly found that techno-overload significantly contributes to emotional exhaustion, burnout, and work-family conflict through reduced psychological well-being (Mohamed, 2025; Spytska, 2025; Varma et al., 2025).

Cultural factors may additionally strengthen the mediating role of psychological health in Malaysia's banking environment. Malaysian employees generally emphasize collective responsibilities, family obligations, and organizational commitment simultaneously. Employees often attempt to fulfil both work and family expectations at high levels, even when experiencing psychological strain. However, when techno-overload weakens employees' psychological health, they may become emotionally exhausted and less capable of fulfilling these multiple social roles effectively (Malik et al., 2021). Emotional distress experienced in the workplace frequently extends into family interactions because work and family domains are psychologically interconnected. This cultural characteristic may therefore strengthen the indirect effect of techno-overload on work-life balance through psychological health. Such findings may differ slightly from studies conducted in more

individualistic cultures where employees may establish clearer psychological boundaries between work and personal life (Zacher & Rudolph, 2021; Singh, 2025).

The supported mediation effect may also be influenced by characteristics of the study sample. Employees in the banking sector often work under highly structured environments involving strict deadlines, performance monitoring, compliance obligations, and customer service demands. Such working conditions may increase employees' sensitivity toward technological overload and psychological strain simultaneously (Althobaiti et al., 2020; Enli-Tuncay et al., 2020). As a result, respondents experiencing higher levels of techno-overload may also report poorer psychological health and lower work-life balance. This explanation aligns with recent evidence indicating that service-sector employees exposed to continuous technological demands are more likely to experience emotional fatigue and work-life conflict because of prolonged cognitive overload (Bottaro et al., 2025; Spytska, 2025).

The constructs of techno-overload, psychological health, and work-life balance are conceptually interconnected because all three involve stress perception, emotional functioning, and quality of life experiences (Pluut & Wonders, 2020). Employees who perceive excessive technological demands may naturally report poorer psychological health and greater work-life imbalance simultaneously. Furthermore, the study captures respondents' experiences at a single point in time, which may strengthen the observed associations between psychological distress and work-life balance outcomes (Zacher & Rudolph, 2021). Nevertheless, the mediation findings remain theoretically meaningful because they demonstrate that psychological health plays a large role in explaining how techno-overload affects employees' broader life experiences (Khalequzzaman et al., 2025).

The findings also extend previous literature by highlighting that technological stressors do not influence work-life balance solely through operational workload increases. Instead, the results indicate that employees' psychological conditions represent a critical pathway through which technological overload translates into personal and family-related difficulties. While some earlier studies focused primarily on the direct relationship between techno-overload and work-life balance conflict, the present findings provide a deeper understanding by demonstrating the psychological processes underlying this relationship (Pluut & Wonders, 2020; Mohamed, 2025). This suggests that employees may still tolerate high technological demands when their

psychological health remains stable, but once psychological strain intensifies, work-life balance becomes substantially affected (Varma et al., 2025).

Overall, the supported indirect relationship indicates that psychological health functions as a crucial mediating link between techno-overload and work-life balance among banking employees in Malaysia. The findings imply that technological overload influences employees not only operationally, but also psychologically, which subsequently affects their personal and family well-being. Therefore, organizations should not only focus on improving technological efficiency but also prioritize employees' mental health through workload management, emotional support programs, digital well-being initiatives, and healthier work boundaries to reduce the negative consequences of techno-overload on employees' work-life balance (Khalequzzaman et al., 2025; Singh, 2025; Varma et al., 2025).

5.3.2.13 Research Objective 13

Research Question 13: does psychological health mediate the relationship between techno-invasion and work-life balance?

Hypothesis: H4b: Psychological health positive and significant mediate the relationship between techno-invasion and work-life balance.

With the purpose to explore the relationship mediating between techno-invasion and work-life balance, path coefficients were applied to answer research question number thirteen that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive and significant mediating relationship between techno-invasion and work-life balance ($\beta = 0.302$, $p < 0.05$).

Therefore, Hypothesis 4b is supported. Table 5.15 below shows path coefficient for indirect relationship between techno-invasion and work-life balance.

Table 5.15
Path coefficient for indirect relationships techno-invasion and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H4b	TI -> H -> W	0.302	14.400	0.000	Indirect Effect	Supported

The significant mediating role of psychological health in the relationship between techno-invasion and work-life balance indicates that continuous technological intrusion into employees' personal time affects work-life balance primarily through its psychological consequences. This finding suggests that the inability to detach from work-related communication beyond working hours not only creates direct boundary disruption but also gradually corrodes employees' emotional and mental well-being, which then reduces their ability to maintain a healthy balance between work and personal life.

A key explanation for this result lies in techno-invasion itself, which reflects the extent to which work extends into employees' private lives through mobile devices, messaging applications, and constant connectivity. In the banking sector, employees are often expected to remain reachable even after official working hours due to customer demands, digital banking operations, and internal coordination requirements. This constant connectivity reduces psychological detachment from work, which is a critical recovery process for maintaining mental health. Recent studies have shown that the inability to psychologically remove from work leads to emotional exhaustion, cognitive fatigue, and sleep disturbance, all of which are strong predictors of reduced well-being and poor work-life balance (Zhao et al., 2021; Molino et al., 2020; La torre et al., 2023).

The mediating effect of psychological health can be further explained using boundary theory, which argues that blurred boundaries between work and personal life increase role conflict and reduce individuals' ability to mentally switch off from work responsibilities. When employees are constantly exposed to work-related messages outside working hours, their psychological recovery time is reduced. This leads to the accumulation of stress and eventually weakens their emotional stability. Recent empirical evidence supports this mechanism, showing that techno-invasion significantly increases psychological strain, which subsequently reduces employees' perceived work-life balance (Zhang et al., 2024; Chen & Xie, 2023).

In the context of Malaysia's banking sector, this effect may be even more pronounced due to the highly digitalised and performance-driven nature of the industry. Banking employees are expected to respond quickly to clients and internal stakeholders regardless of time or location, especially with the integration of mobile banking systems and real-time communication platforms. This creates a "constant

availability norm," where employees feel obligated to remain connected even during non-working hours. Studies in similar financial service environments have shown that such constant connectivity significantly increases emotional exhaustion and psychological fatigue, which then reduces employees' ability to maintain balance between work and personal life (Wang et al., 2023; Khaleghy & Ahmad, 2024).

Cultural factors may also contribute to the strength of this indirect relationship. In collectivist societies such as Malaysia, employees tend to place strong emphasis on job commitment, organisational loyalty, and responsiveness to authority. This may intensify the expectation to remain available beyond formal working hours. As a result, employees may be less likely to disengage from work psychologically, even when they are physically off duty. This constant psychological engagement with work increases stress levels and reduces recovery time, and at the same time affecting work-life balance through deteriorating psychological health (Hassan et al., 2023; Malik et al., 2021).

The significant mediation effect is also consistent with the Job Demands-Resources (JD-R) model, which explains that excessive job demands, such as techno-invasion, reduce employees' emotional and psychological resources. When these resources are depleted, employees are more likely to experience burnout, reduced well-being, and difficulty managing work-life boundaries. Recent studies applying the JD-R model in digital workplace contexts have confirmed that techno-invasion increases psychological strain, which in turn negatively affects work-life balance outcomes (Bouziri et al., 2023; La torre et al., 2023).

Another explanation relates to methodological and perceptual factors. Employees experiencing high techno-invasion may perceive their work and personal life as highly intertwined, making psychological health a more immediate indicator of strain compared to direct work-life balance measures. Psychological health acts as a sensitive intermediate variable that captures emotional exhaustion, sleep disruption, and stress reactions earlier than broader work-life balance perceptions. This explains why mediation through psychological health appears significant in this study. Similar findings were reported in recent research showing that emotional exhaustion strongly mediates the relationship between constant digital connectivity and work-life conflict among service employees (Chen & Xie, 2023; Zhao et al., 2021).

The findings suggest that techno-invasion not only affects employees by increasing workload pressure, but more critically by disrupting psychological recovery processes. Without sufficient psychological detachment from work, employees are unable to restore emotional energy, resulting in long-term strain that spills over into their personal lives. This aligns with recent evidence showing that lack of psychological detachment is one of the strongest predictors of poor well-being in digitally connected workplaces (Wang et al., 2023; Molino et al., 2020).

Overall, the results highlight that psychological health is a crucial mechanism explaining how techno-invasion affects work-life balance among banking employees. The findings suggest that constant digital connectivity impacts employees' personal lives primarily through emotional and psychological pathways rather than direct behavioural imbalance alone. This is consistent with recent technostress research, which shows that continuous connectivity and after-hours work engagement reduce psychological detachment, leading to emotional exhaustion and poorer work-life outcomes (Chen & Xie, 2023; Wang et al., 2023; Zhang et al., 2024). Therefore, managing techno-invasion in banking organisations requires not only technological policies but also psychological interventions such as digital disconnection practices, after-hours communication boundaries, and employee well-being programmes to preserve employees' mental health and work-life balance (Bouziri et al., 2023; Zhao et al., 2021; Latorre et al., 2023).

5.3.2.14 Research Objective 14

Research Question 14: does psychological health mediates the relationship between techno-complexity and work-life balance?

Hypotheses: H4c: Psychological health positive and significant mediate the relationship between techno-complexity and work-life balance.

With the purpose to explore the relationship mediating between techno-complexity and work-life balance, path coefficients were applied to answer research question number fourteen that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant mediating relationship between techno-complexity and work-life balance ($\beta = 0.399$, $p < 0.05$).

Therefore, Hypothesis 4c is supported. Table 5.16 below shows path coefficient for indirect relationship between techno-complexity and work-life balance.

Table 5.16
Path coefficient for indirect relationship between techno-complexity and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H4c	TC -> H -> W	0.399	12.242	0.000	Indirect Effect	Supported

In digitally intensive banking environments, technological advancement has shifted from being a supportive tool to a continuous learning requirement that employees must constantly manage. Frequent system upgrades, digital platforms, and compliance-related technologies increase the need for ongoing skill acquisition and adaptation, which places sustained cognitive pressure on employees. Over time, this continued demand can shape employees' psychological responses, leading to mental fatigue, emotional strain, and reduced recovery capacity. Within this context, psychological health becomes a key mechanism through which employees experience and interpret technological demands, particularly when these demands extend beyond working hours and interfere with personal life boundaries. Recent studies confirm that continuous digital learning requirements and evolving technological systems significantly increase cognitive load and psychological strain in banking and service environments, which subsequently affects employees' ability to maintain overall well-being (Llorens et al., 2024; Zhang et al., 2024; Spytska, 2025; Bakker & Demerouti, 2023).

Techno-complexity reflects the requirement for employees to continuously acquire new technical skills, understand updated systems, and adapt to increasingly sophisticated workplace technologies. In the banking sector, this is particularly evident due to frequent system upgrades, cybersecurity requirements, digital banking platforms, and automated financial tools. Employees are not only expected to perform their daily tasks but also to continuously learn new technological processes. This dual demand creates cognitive strain, which gradually affects psychological health through stress, fatigue, and reduced mental recovery. Recent research highlights that continuous learning pressure in digitalized workplaces significantly increases

cognitive load and emotional exhaustion, which then reduces employees' ability to maintain balance between work and personal life (Stankeviciute, 2022; Haar et al., 2018; Wang et al., 2023).

The mediating role of psychological health can be further explained through the Job Demands-Resources (JD-R) model, which posits that high job demands, such as techno-complexity, consume employees' mental energy and lead to strain when not balanced with sufficient resources. When employees are constantly required to learn new systems, their psychological resources become depleted, resulting in anxiety, frustration, and reduced cognitive functioning. This psychological strain then spills over into their personal lives, making it difficult to manage non-work responsibilities effectively. Recent studies applying the JD-R framework in digital workplace contexts have confirmed that techno-complexity increases emotional exhaustion and decreases well-being, which in turn affects employees' work-life balance (Bakker & Demerouti, 2023; Llorens et al., 2024).

In the context of Malaysia's banking sector, this relationship may be particularly strong due to rapid digital transformation and continuous system upgrades. Banking employees are frequently required to operate multiple digital platforms, comply with regulatory technology systems, and adapt to fintech innovations. While these advancements improve organizational efficiency, they simultaneously increase employees' learning burden. Employees often need to learn new systems during or outside working hours, which reduces personal recovery time and increases psychological strain. This finding is consistent with recent evidence showing that digital skill requirements and continuous technological learning significantly contribute to employee stress and reduced well-being in financial institutions (Zhang et al., 2024; Khaleghy & Ahmad, 2024).

Cultural factors may also help explain the significant mediation effect. In terms of work environments, such as Malaysia, employees often feel a strong responsibility to meet organizational expectations and avoid underperformance. This may lead employees to invest additional personal time in learning new systems to ensure job competence. While this improves technical capability, it may also increase psychological pressure and reduce time for rest and family engagement. Over time, this imbalance contributes to emotional fatigue and weakened work-life balance through deteriorating psychological health (Malik et al., 2021; Hassan et al., 2023).

Another explanation lies in the sample characteristics of banking employees, who typically work in highly structured, performance-driven environments. Employees are expected to maintain high accuracy, comply with strict deadlines, and ensure data security while simultaneously adapting to technological changes. Such combined demands intensify cognitive overload, making psychological health a key mechanism through which techno-complexity influences life outcomes. Recent empirical findings support this by showing that employees exposed to high technological learning demands are more likely to experience burnout, sleep disturbance, and reduced psychological well-being (Spytska, 2025; Bottaro et al., 2025).

The significant mediation may also be influenced by the overlap between constructs. Techno-complexity inherently involves cognitive strain and learning pressure, which are closely related to psychological health indicators such as stress, fatigue, and emotional exhaustion. Therefore, psychological health acts as a sensitive intermediate variable that captures early signs of strain before broader work-life imbalance becomes fully evident. Recent studies have similarly noted that psychological well-being is a strong proximal predictor in technostress models, particularly in digitally intensive industries (Chen & Xie, 2023; Wang et al., 2023).

The findings suggest that techno-complexity does not simply create operational difficulties but more critically affects employees' psychological capacity to cope with ongoing technological demands. Once psychological health is weakened, employees struggle to maintain boundaries between work and personal life, leading to reduced overall work-life balance. This supports recent literature emphasizing that learning-related technostressors are particularly harmful because they continuously demand cognitive effort and do not allow full psychological recovery (Latorre et al., 2023; Zhang et al., 2024).

Overall, the study highlights that psychological health is a crucial mediating mechanism linking techno-complexity and work-life balance. The findings suggest that managing technological complexity in banking organizations should go beyond technical training and include psychological support systems, workload management, and structured learning schedules to reduce cognitive overload and protect employees' work-life balance. Recent research supports this position by showing that excessive learning demands and continuous digital adaptation significantly impair psychological

well-being, which subsequently reduces employees' ability to maintain work-life balance (Bakker & Demerouti, 2023; Zhang et al., 2024; Llorens et al., 2024; Wang et al., 2023).

5.3.2.15 Research Objective 15

Research Question 15: does psychological health mediate the relationship between techno-insecurity and work-life balance?

Hypotheses: H4d: Psychological health positive and significant mediate the relationship between techno-insecurity and work-life balance.

With the purpose to explore the relationship mediating between techno-insecurity and work-life balance, path coefficients were applied to answer research question number fifteen that have been developed. Based on the data that has been analysed and interpret, the researcher was found that there was a positive, and significant mediating relationship between techno-insecurity and work-life balance ($\beta = 0.255$, $p < 0.05$).

Therefore, Hypothesis 4d is supported. Table 5.17 below shows path coefficient for indirect relationship between techno-insecurity and work-life balance.

Table 5.17
Path coefficient for indirect relationships techno-insecurity and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H4d	TIN -> H -> W	0.255	5.144	0.000	Indirect Effect	Supported

The significant mediating effect of psychological health in the relationship between techno-insecurity and work-life balance indicates that employees' perception of job insecurity related to technology does influence work-life balance in isolation and operates through psychological strain also. In banking environments where digital transformation and automation are rapidly advancing, employees may experience persistent fear of being replaced by more technologically skilled individuals. This perceived threat creates emotional pressure that gradually affects mental well-being, which then spills over into employees' ability to manage work and personal life boundaries effectively. Recent technostress and digital transformation studies

highlight that job insecurity arising from technological change is strongly associated with psychological distress and reduced well-being, particularly in highly digitalised service industries (Ragu-Nathan et al., 2022; Tarafdar et al., 2023; La Torre et al., 2024).

Techno-insecurity is particularly relevant in the banking sector because technological advancement is often linked with restructuring, performance monitoring, and efficiency-driven expectations. Employees may interpret digitalisation not only as an opportunity for development but also as a risk to job stability. This dual perception increases psychological tension, as employees feel compelled to continuously upgrade their skills to remain employable. Recent empirical findings show that job insecurity in technology-intensive workplaces significantly increases anxiety, burnout, and reduced psychological well-being, which subsequently affects employees' work-life balance (Stich et al., 2023; Salanova et al., 2024; Wang et al., 2023).

The mediating role of psychological health can be explained through the Conservation of Resources (COR) theory, which suggests that individuals strive to protect their resources, such as energy, self-esteem, and emotional stability, when facing threats. When employees perceive techno-insecurity, they may invest excessive time and effort in upskilling and maintaining performance standards to avoid job loss. This continuous effort reduces psychological resources, leading to stress, sleep disturbance, and emotional fatigue. Once psychological health is compromised, employees struggle to maintain separation between work and personal life, resulting in poorer work-life balance outcomes (Hobfoll, 2018; Lee & Ashforth, 2022).

In the context of Malaysia's banking sector, this relationship may be intensified due to competitive job structures and performance-based evaluation systems. Employees often work in environments where technological competence is closely tied to job security and career progression. As digital banking systems become more advanced, employees may feel increased pressure to continuously prove their value. This creates a psychological burden that extends beyond working hours, as employees may engage in constant self-improvement activities to remain relevant. Recent studies in financial institutions confirm that technological job insecurity significantly increases emotional exhaustion and reduces employee well-being (Upadhyay & Venkatesh, 2024; Gupta et al., 2023).

Cultural factors may also strengthen this mediating relationship. In high power distance cultures such as Malaysia, employees may place strong emphasis on job stability, organisational loyalty, and compliance with employer expectations. As a result, the fear of job loss due to technological changes may have a stronger psychological impact compared to more individualistic contexts. Employees are more likely to internalise stress rather than express it openly, which increases psychological strain and reduces their ability to maintain work-life balance (Schein, 2021; Raina & Singh, 2022).

The significant mediation effect is also consistent with research showing that psychological health acts as a key mechanism linking job insecurity with employee outcomes. Employees experiencing techno-insecurity often report persistent worry, cognitive overload, and difficulty disengaging from work-related thoughts even during non-working hours. This constant mental engagement reduces recovery time and increases work-family conflict. Recent evidence confirms that psychological distress significantly mediates the relationship between job insecurity and work-life imbalance in digitalised workplaces (Kumar et al., 2023; Carlson et al., 2022).

Techno-insecurity and psychological health are closely linked because both involve subjective evaluation of threat, stress, and emotional response. Employees who perceive higher insecurity are more likely to report poorer psychological well-being, which naturally aligns with lower work-life balance perceptions. This explains why the mediating effect appears statistically significant in cross-sectional designs, where psychological states are captured at a single point in time (Beaudry & Pinsonneault, 2022; Tarafdar et al., 2023).

The findings suggest that techno-insecurity does not directly disrupt work-life balance in isolation but rather operates through the psychological burden it creates. Employees may still manage work-life balance effectively if psychological health remains stable; however, once emotional exhaustion and anxiety develop, the ability to maintain balance declines significantly. This supports recent literature emphasizing that psychological health is a critical instrument linking job insecurity and employee well-being outcomes in digital workplaces (Salanova et al., 2024; Wang et al., 2023).

Overall, the results highlight that psychological health plays a central mediating role in explaining how techno-insecurity affects work-life balance. The findings suggest that addressing technological job insecurity in banking organizations

requires not only career development and reskilling initiatives but also psychological support systems such as counselling services, stress management programs, and clear communication regarding job stability to protect employees' mental well-being and work-life balance. Recent research further emphasises that sustainable digital transformation in banking must integrate employee psychological resilience strategies to mitigate technostress and preserve work-life equilibrium (La Torre et al., 2024; Gupta et al., 2023; Carlson et al., 2022).

5.3.2.16 Research Objective 16

Research Question 16: does psychological health mediate the relationship between techno-uncertainty and work-life balance?

Hypothesis: H4e: Psychological health positive and significant mediate the relationship between techno-uncertainty and work-life balance.

With the purpose to explore the relationship mediating between techno-uncertainty and work-life balance, path coefficients were applied to answer research question number sixteen that has been developed. Based on the data analysed and interpreted, the researcher found that there was a positive, and significant mediating relationship between techno-uncertainty and work-life balance ($\beta = 0.312$, $p < 0.05$).

Therefore, Hypothesis 4e is supported. Table 5.18 below shows path coefficient for indirect relationship between techno-uncertainty and work-life balance.

Table 5.18
Path coefficient for indirect relationships techno-uncertainty and work-life balance

Hypotheses	Relationship	Path Coefficients (B)	T Value	P values	F2	Result
H4e	TU -> H -> W	0.312	1.322	0.000	Indirect Effect	Supported

The significant mediating effect of psychological health in the relationship between techno-uncertainty and work-life balance reflects a process where continuous technological change does not directly disrupt employees' life balance but instead operates through accumulated psychological strain. In banking environments

characterised by frequent system upgrades, employees are repeatedly required to adjust to new procedures, platforms, and compliance systems. This ongoing uncertainty creates a sense of instability regarding future work processes, which gradually weakens psychological resilience and emotional stability. As mental strain intensifies, employees become less able to maintain clear boundaries between professional and personal life, resulting in poorer work-life balance outcomes. Prior research has highlighted that continuous exposure to evolving digital systems in financial institutions generates sustained cognitive demands and emotional strain, particularly when employees perceive that technological change is unavoidable and recurring (La Torre et al., 2024; Salanova et al., 2024; Stich et al., 2023).

Recent technostress literature supports this relationship by showing that continuous exposure to evolving digital systems increases cognitive load and emotional exhaustion among employees in financial and service sectors. Studies indicate that techno-uncertainty is strongly associated with psychological fatigue because employees are required to constantly relearn and adapt, which limits recovery time and increases mental depletion (La Torre et al., 2024; Salanova et al., 2024). In banking contexts, where digital transformation is ongoing rather than episodic, this uncertainty becomes a persistent stressor rather than a temporary adjustment challenge.

From a theoretical standpoint, the Conservation of Resources (COR) theory explains this relationship by proposing that individuals experience stress when they perceive a threat to their resources or when continuous adaptation leads to resource depletion. In the case of techno-uncertainty, employees invest substantial cognitive and emotional effort in learning new systems to maintain performance standards. This repeated investment reduces available psychological resources, leading to emotional exhaustion, reduced recovery, and diminished capacity to manage competing life demands (Hobfoll et al., 2018; Lee & Ashforth, 2022). Once psychological health is compromised, employees struggle to disengage from work-related thoughts, which increases spillover into non-work domains and disrupts work-life balance.

In the Malaysian banking sector, this relationship may be further intensified due to strong regulatory requirements, digital banking expansion, and performance-driven organisational culture. Employees are expected not only to adapt quickly to new systems but also to maintain high productivity during periods of technological

transition. This creates a dual pressure of learning and performance, which accelerates psychological strain. Empirical studies in digital financial environments confirm that continuous system updates significantly increase employee exhaustion and reduce well-being, particularly when organisational support is limited (Upadhyay & Venkatesh, 2024; Gupta et al., 2023).

Cultural dynamics also help explain why psychological health plays a central mediating role. In collectivist and high power-distance cultures such as Malaysia, employees tend to comply with organisational demands even when these demands increase personal strain. Instead of resisting technological changes, employees are more likely to internalise stress and continue adapting, which amplifies psychological burden. This internalisation process reduces emotional recovery and increases vulnerability to work-life imbalance, consistent with findings that psychological distress mediates the relationship between continuous job demands and well-being in Asian organisational settings (Raina & Singh, 2022; Malik et al., 2021).

The significant mediation effect also aligns with recent empirical evidence suggesting that psychological health is a key explanatory pathway linking technostressors with employee outcomes. Employees experiencing techno-uncertainty often report reduced emotional stability, heightened worry about keeping up with technological changes, and difficulty mentally detaching from work. These conditions directly weaken recovery experiences and contribute to work-family interference. Recent studies confirm that psychological distress significantly mediates the relationship between technology-related uncertainty and work-life imbalance in digitalised workplaces (Stich et al., 2023; Wang et al., 2023).

The observed mediation may also be influenced by the nature of self-reported psychological measures. Techno-uncertainty and psychological health are conceptually close constructs, both reflecting subjective perceptions of stress, adaptability, and emotional strain. This nearness increases the likelihood that psychological health acts as a sensitive intermediate variable capturing early-stage stress responses before they manifest as behavioural work-life imbalance (Chen & Xie, 2023; Tarafdar et al., 2023).

Critically, the findings suggest that techno-uncertainty does not directly reduce work-life balance in a straightforward manner but instead exerts its influence through psychological depletion. Employees may still attempt to manage work-life boundaries;

however, when psychological resources are consistently drained by ongoing technological adaptation, their ability to maintain balance deteriorates. This supports recent research emphasising that psychological health is a critical mechanism through which continuous digital change affects employee well-being and life balance outcomes in modern workplaces (Salanova et al., 2024; La Torre et al., 2024).

Overall, psychological health functions as a crucial mediating pathway that explains how techno-uncertainty translates into work-life imbalance. The findings suggest that organisations should not only focus on technical training for system adaptation but also implement psychological support mechanisms such as structured learning schedules, workload management during system transitions, and employee well-being programmes. Recent evidence further highlights that sustainable digital transformation requires balancing technological advancement with psychological resilience strategies to prevent long-term technostress consequences and preserve employee work-life equilibrium (Bakker & Demerouti, 2023; Salanova et al., 2024; Wang et al., 2023).

5.4 limitations of the study

Each study has its own limitations, and this study is no exception. Several methodological and contextual limitations should therefore be acknowledged when interpreting the findings of this research.

First, this study was limited by its sampling coverage and generalizability. Although the Malaysian banking sector comprises a large workforce across various banking institutions nationwide, this study focused only on employees working at the headquarters of local commercial banks located primarily within the Klang Valley area. Consequently, the findings may not fully represent the broader Malaysian banking workforce, including employees from branch offices, international commercial banks, Islamic banks, investment banks, development financial institutions, and banking employees from other regions such as Sabah and Sarawak. While the sample size of 384 respondents satisfied the recommended requirement based on the Z-score formula and the sampling guidelines proposed by Krejcie and Morgan (1970), and a total of 403 questionnaires were distributed to reduce the effects

of non-response and unusable data (Sekaran & Bougie, 2019), the findings should still be interpreted with caution due to the limited geographical and institutional coverage of the study. A broader sampling frame involving more diverse banking institutions and wider regional representation could potentially improve the generalizability, representativeness, and robustness of future findings (Hair et al., 2022).

Second, this study adopted a cross-sectional research design in which data were collected at a single point in time. Although this approach was appropriate for examining the relationships among the study variables, it limits the ability to establish causal relationships or observe changes in technostress, work-life balance, and psychological health over time. Given the rapidly evolving technological environment within the banking industry, employees' experiences and perceptions may change continuously as digital systems, work demands, and organizational expectations develop. Therefore, longitudinal studies are recommended for future research to provide a deeper understanding of the long-term effects and causal relationships associated with technostress and employee well-being.

Third, data collection relied heavily on self-administered online questionnaires distributed through Google Forms during the Covid-19 pandemic period in Malaysia. Although the online survey method provided flexibility and accessibility during movement restrictions, it also introduced several limitations. Some respondents may have experienced survey fatigue, lacked sufficient time to complete the questionnaire, or demonstrated low engagement due to demanding work commitments. In addition, the use of self-reported measures may increase the possibility of common method bias and socially desirable responses, particularly when respondents were required to report sensitive information related to stress, work-life balance, and psychological health. Consequently, respondents may have unintentionally underreported or overreported their actual experiences and perceptions, which could affect the accuracy and objectivity of the findings.

Finally, this study relied primarily on quantitative survey data and did not incorporate other forms of data collection, such as qualitative interviews, supervisor evaluations, or organizational performance records. As a result, the findings may not fully capture the deeper contextual and experiential aspects of technostress among banking employees. Future studies are therefore encouraged to adopt mixed-method or multi-source research approaches to obtain richer, more comprehensive, and

balanced insights into employees' experiences within increasingly digitalized banking environments

5.5 Recommendations for Future Research

Based on the limitations identified in this study, several recommendations are proposed to strengthen future research on technostress creators, work-life balance, and psychological health within the Malaysian banking sector. First, future studies are encouraged to expand the sampling coverage by involving employees from a broader range of banking institutions, including international commercial banks, Islamic banks, investment banks, development financial institutions, and branch-level employees throughout Malaysia, including Sabah and Sarawak. Broader institutional and geographical representation may enhance the generalizability, representativeness, and robustness of the findings while providing a more comprehensive understanding of employees' experiences across different banking environments. In addition, future studies may benefit from employing larger sample sizes to improve statistical accuracy and strengthen the explanatory power of the research findings.

Second, future research should place greater emphasis on examining practical organizational and human resource management interventions that may help reduce technostress and improve employee well-being in banking institutions. Rather than focusing solely on theoretical relationships, future studies are encouraged to evaluate the effectiveness of specific organizational strategies, such as flexible working arrangements, digital literacy and technology adaptation training, mental health and stress management programmes, employee assistance initiatives, workload management practices, and organizational support systems. Such research may provide more actionable insights for banking institutions and human resource practitioners in developing healthier, more supportive, and sustainable work environments for employees facing continuous technological changes.

Third, future studies are recommended to adopt longitudinal, mixed-method, or multi-source research designs to overcome the limitations associated with cross-sectional and self-reported data. A longitudinal approach could provide deeper insights into how technostress, work-life balance, and psychological health evolve over time as technological demands continue to change within the banking industry.

In addition, incorporating qualitative methods such as interviews or focus group discussions may provide a richer contextual understanding of employees lived experiences. Future studies may also integrate multiple data sources, including supervisor evaluations, organizational records, or human resource reports, to improve the objectivity, credibility, and comprehensiveness of the findings.

Finally, future research is encouraged to further investigate the influence of demographic and organizational characteristics on employees' responses to technostress. Variables such as age, generational differences, job position, years of working experience, digital competency, and organizational support may influence how employees perceive and manage technological demands in the workplace. Understanding these differences may assist banking institutions in developing more targeted and employee-centred strategies to support work-life balance and psychological well-being across different employee groups.

In conclusion, the recommendations for future research highlight the importance of expanding and strengthening the current understanding of technostress, work-life balance, and psychological health within the Malaysian banking sector. Future studies should consider broader sample coverage, more comprehensive research designs, and practical organizational interventions to enhance the generalizability and applicability of the findings. In addition, greater attention should be given to organizational support strategies, such as flexible work policies, digital competency development, and employee well-being programmes, to better address the challenges associated with rapid technological changes in the workplace. By incorporating these improvements, future research may provide deeper theoretical contributions as well as more meaningful practical implications for banking institutions, policymakers, and human resource practitioners in promoting healthier and more sustainable work environments for employees

5.6 Conclusion

This study investigated the relationship between technostress creators and work-life balance among employees of local commercial banks in Klang Valley, with psychological health examined as a mediating mechanism. The study was theoretically anchored in Work-Family Border Theory, Transaction Theory of Technostress, Job Demands-Resources (JD-R) Theory, and Conservation of Resources (COR) Theory, providing a multi-theoretical lens to explain how technologically driven job demands shape employees' psychological functioning and work-life outcomes in a rapidly digitalising banking environment. Collectively, these theories explain that technostress operates as a persistent job demand that depletes individual cognitive and emotional resources (JD-R and COR perspectives), while employees continuously appraise and cope with such stressors through cognitive evaluation processes (Transaction Theory), and simultaneously negotiate the permeability of work and non-work boundaries in managing competing life domains (Work-Family Border Theory). Empirically, out of sixteen hypotheses tested, fourteen were supported, while two were not supported, thereby offering both confirmation and refinement of existing theoretical assumptions regarding technostress dynamics and employee well-being in organisational contexts. The findings further substantiate psychological health as a critical mediating mechanism, underscoring that the impact of technostress on work-life balance is not merely direct, but is substantially transmitted through individuals' psychological resource depletion and well-being deterioration, thereby strengthening the explanatory power of integrated JD-R and COR frameworks within the Malaysian banking context. Nevertheless, the study's contributions should be interpreted in light of its contextual and methodological boundaries, particularly its focus on employees from selected headquarters of local commercial banks within the Klang Valley, which may constrain the transferability of findings to other banking segments, industries, and geographical regions characterised by differing organisational cultures, technological infrastructures, and work demands. Accordingly, future research is encouraged to extend this work through cross-industry and cross-regional comparative studies to enhance external validity, deepen contextual understanding, and further test the robustness of the proposed theoretical relationships

across diverse settings. In conclusion, this study advances the understanding of technostress by demonstrating that digital transformation in the banking sector, while enhancing organisational efficiency and performance, simultaneously introduces complex psychological and behavioural challenges that must be strategically managed; it is therefore imperative for organisations to adopt a more human-centred technological approach that safeguards employee psychological health, strengthens work-life integration, and promotes sustainable workforce well-being, and it is hoped that the insights generated from this study will serve as a strong foundation for future scholarly inquiry as well as practical policy development in advancing healthier and more resilient banking workplaces in Malaysia and beyond.

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APPENDICES

APPENDIX A

Stage 1: PRELIMENARY STUDY



Assalamualaikum and Salam Sejahtera,

Dear Prof/Dr/Sir/Madam,

I am a PhD student in the faculty of business and management, University Teknologi MARA (UiTM) and currently undertaking a study on the above topic. The main aim of this preliminary study is to identify the relationship between technostress and work-life balance among employees of local commercial bank in klang valley:the mediating role of psychological health. I would greatly appreciate it if you could assist me in completing this brief survey.

This questionnaire is meant for non-commercial or commercial bank employee at Malaysia. Please complete the survey based on your honest opinion. All replies will be strictly confidential. The information gathered will be used only for academic research purposes.

Participation in this survey is completely voluntary. All questionnaires are received anonymously and will be treated as such. If you have any comments, questions, or concerns with regards to the survey, the questions, or the purpose of the study, please contact Mohammad Amir Shah bin Mohammad Saim at Mohammadamirshah@yahoo.com or 012-3174494 Thank you very much for your time and kind assistance. Your response and support are highly appreciated.

Researcher,

Mohammad Amir Shah bin Mohammad Saim
PhD Candidate
Faculty of Business and Management, University Teknologi MARA (UiTM)
Email: Mohammadamirshah@yahoo.com
Mobile: 012-3174494

APPENDIX B

QUESTIONNAIRE

DEAR RESPONDENT

I am, PhD student of business management conducting a study on the Influences of Length of Service on the Relationship between Technostress towards Employee work-life balance: psychological health as a mediator among employee of commercial bank in Klang Valley. This questionnaire consists of three (4) parts such as below:

Part A: Demographic
PartB:Technostress Creator
Part C: Work-life balance
PartD: Psychological Health

your response is very important to this study. Responses will be kept strictly confidential. You are only required to spend approximately ten minutes to answer the questionnaire.

Thank you very much for your time and cooperation. Your willingness and support to this study is very much appreciated in furthering this research endeavour.

Tuan/Puan,

Saya merupakan pelajar kedoktoran dalam bidang pengurusan perniagaan sedang menjalankan kajian mengenai Pengaruh Tempoh Perkhidmatan di Hubungan di antara Teknostress dan Keseimbangan kerja: kesihatan psikologi sebagai moderator di kalangan pekerja perbankkan. Soal selidik ini mengandungi tiga (4) bahagian seperti dibawah:

Bahagian A: Demografi
Bahagian B: Pencipta Teknostress
Bahagian C: Keseimbangan kerja dan hidup
Bahagian D: Kesihatan Psikologi

Respon anda andalah sulit dan sangat penting dalam kajian ini. Jumlah masa yang diperuntukan untuk menjawab soal selidik ini adalah lebih kurang sepuluh minit.

Terima kasih di atas kerjasama dan masa yang anda luangkan untuk menjayakan kajian ini.

MOHAMMAD AMIR SHAH BIN MOHAMMAD SAIM

PhD of Business Management, Faculty of Business & Management University Teknologi Mara, (UITM) Shah Alam Mohammadamirshah@yahoo.com
(+60) 12-3174494

Part A: Demographic / Bahagian A: Demografi

Please tick (√) only the most appropriate responses in the space provided.

Sila tandakan (√) dengan pilihan yang paling tepat di ruang yang disediakan.

1. Gender/ Jantina
   ( ) Male / Lelaki

   ( ) Female / Perempuan
2. Age / Umur
   ( ) Below 25 / Bawah 25

   ( ) 26 – 35 / 26 – 35

   ( ) 36 – 45 / 36 – 45

   ( ) 46 – 55 / 46 – 55

   ( ) 56 – 65 / 56 – 65
3. Race / Bangsa
   ( ) Malay / Melayu

   ( ) Chinese / Cina

   ( ) Indian / India

   ( ) Other / Lain-lain
4. Education level / Tahap pendidikan
   ( ) Matriculation/ Matrikulasi ( ) STPM / STPM
   ( ) Diploma's / Diploma

   ( ) Bachelor's Degree / Sarjana Muda () Master's / Ijazah Sarjana
   ( ) Phd / Phd

5. Marital status / Taraf perkahwinan ( )
   Single / Bujang

   ( ) Married / Berkahwin

   ( ) Divorce / Bercerai
6. Number of years working in the current organization / Tempoh perkhidmatan di dalam organisasi sekarang
   ( ) year and below / 1 tahun ke bawah ( ) 2 – 4 / 2 – 4
   ( ) 5 – 7 / 5 – 7

   ( ) 8 – 10 / 8 – 10

   ( ) 11 years and above / 11 tahun ke atas

Part B: Technostress Creator / Bahagian B: Pencipta Teknostress *

Please read each statement and circle only one (1) of the number which most closely matches your opinion. Sila baca setiap kenyataan dan bulatkan hanya satu (1) nombor yang paling hampir dengan pilihan anda.

Strongly Disagree / Sangat Tidak Setuju	1
Disagree / Tidak Setuju	2
Somewhat Disagree / Agak Tidak Setuju	3
Nuetral / Neutral	4
Somewhat Agree / Agak Setuju	5
Agree / Setuju	6
Strongly Agree / Sangat Setuju	7

Techno-Overload/ Bebanan Tekno

7. I am forced by the technologies used in the organization to work much faster. Saya terpaksa bekerja dengan lebih pantas dengan teknologi yang digunakan di dalam organisasi.
   1 2 3 4 5 6 7

8. I am forced by the technologies used in the organization to do more work than I can handle.
   Saya terpaksa bekerja lebih dari keupayaan saya dengan teknologi yang digunakan di dalam organisasi.
   1 2 3 4 5 6 7

9. I am forced by the technologies used in the organization to work with very tight work schedules.
   Saya terpaksa bekerja dengan jadual kerja yang lebih padat dengan teknologi yang digunakan di dalam organisasi.
   1 2 3 4 5 6 7

10. I am forced to change my work habit to adapt to new technologies.
    Saya terpaksa mengubah cara kerja untuk menyesuaikan diri dengan teknologi yang baru.
    1 2 3 4 5 6 7

11. I have more workload because of the technologies complexity.
    Saya mempunyai bebanan kerja yang lebih banyak disebabkan kerumitan teknologi.
    1 2 3 4 5 6 7

Techno-Invasion/Penceroboha Tekno

1. I spend less time with my family due to the technologies used in the organization.
   Saya kurang meluangkan masa dengan keluarga disebabkan teknologi yang digunakan di dalam organisasi.
   1 2 3 4 5 6 7

2. I have to be in touch with my work even during my vacation due to the technologies.
   Saya perlu meluangkan masa untuk bekerja semasa bercuti disebabkan teknologi.

1 2 3 4 5 6 7

3. I have to sacrifice my vacation and weekend time to keep current on the new technologies used in the organization.
   Saya terpaksa mengorbankan cuti dan hujung minggu saya untuk mengeka
   1 2 3 4 5 6 7

4. I feel my personal life is being invaded by the technologies used in the organization.
   Saya merasakan kehidupan peribadi dicerobohi oleh teknologi yang digunakan di dalam organisasi.

   1 2 3 4 5 6 7

Techno-Complexity / Kerumit Tekno

1. I have limited knowledge and skill about the technologies used in the organization to handle my job satisfactorily.
   Saya mempunyai pengetahuan dan kemahiran yang terhad tentang teknologi yang digunakan di dalam organisasi.

   1 2 3 4 5 6 7
2. I need a longer time to understand and use new technologies in the organization.
   Saya memerlukan masa yang lebih panjang untuk memahami dan menggunakan teknologi terkini yang digunakan di dalam organisasi.
   1 2 3 4 5 6 7
3. I do not find enough time to study and upgrade my technology skills.

   Saya tidak mempunyai masa yang mencukupi untuk mempelajari dan meningkatkan kemahiran teknologi saya.
   1 2 3 4 5 6 7

4. I find new recruits to this organization know more about computer technology than I do.
   Saya merasakan pekerja baru di dalam organisasi ini lebih berpengetahuan tentang teknologi computer daripada saya.
   1 2 3 4 5 6 7

5. I often find it too complex for me to understand and use new technologies. Saya selalu merasakan teknologi terkini adalah terlalu rumit untuk saya

memahami dan digunakan.

1 2 3 4 5 6 7

Techno-Insecurity/ Tidak Keterjami Tekno

1. I feel constant threat to my job security due to the new technologies.

   Saya sentiasa merasakan pekerjaan saya terancam disebabkan teknologi terkini.

   1 2 3 4 5 6 7
2. I have to constantly update my skills to avoid being replaced.

   Saya perlu sentiasa mengemaskini kemahiran saya untuk mengelakkan daripada diganti.

   1 2 3 4 5 6 7

3. I am threatened to co-workers with latest technology skills.

   Saya berasa terancam oleh rakan sekerja dengan kemahiran teknologi terkini.

   1 2 3 4 5 6 7
4. I do not share my knowledge with my coworkers for fear of being replaced. Saya tidak berkongsi perngetahuan dengan rakan sekerja kerana takut akan digantikan.

   1 2 3 4 5 6 7

5. I feel there is less sharing knowledge among co-workers for fear of being replaced.
   Saya merasakan kurang perkongsian pengetahuan di antara rakan sekerja kerana takut akan digantikan.

   1 2 3 4 5 6 7

Techno-Uncertainty/ Ketidakpasitan-Tekno

1. There are always new developments in the technologies used in the organization.
   Sentiasa berlaku kemajuan yang baru pada teknologi yang digunakan di dalam organisasi.

   1 2 3 4 5 6 7
2. There are constant changes in computer software in the organization. Sentiasa berlaku perubahan dalam perisian komputer di dalam organisasi.

   1 2 3 4 5 6 7

3. There are constant changes in computer hardware in the organization. Sentiasa berlaku perubahan dalam perkakasan komputer di dalam organisasi.
   1 2 3 4 5 6 7

4. There are frequent upgrades in computer networks in the organization. Sentiasa berlaku kekerapan penambahbaikkan dalam rangkaian komputer di dalam organisasi.
   1 2 3 4 5 6 7

Part C: Work-Life Balance **
Bahagian C: Keseimbangan kerja dan hidup

5. I struggle with trying to manage both my work and non-work responsibilities. Saya berjuang mencuba untuk menguruskan tanggungjawab kedua-dua kerja saya dan bukan kerja saya.
   1 2 3 4 5 6 7

6. I feel dazed when I try to balance my work and personal life.

   Saya berasa bingung apabila saya cuba mengimbangi kerja dan kehidupan peribadi saya.
   1 2 3 4 5 6 7

7. I have difficulty scheduling vacation time because of my workload.

   Saya mempunyai kesukaran menjadualkan masa percutian disebabkan oleh beban kerja saya.
   1 2 3 4 5 6 7

8. I am unable to relax at home because I am preoccupied with work.

   Saya tidak dapat menenagkan diri saya di rumah kerana saya asyik dengan kerja.
   1 2 3 4 5 6 7

9. I am happy with the amount of time I spend doing activities not related to work.
   Saya gembira dengan jumlah masa saya yang diberikan untuk melakukan aktiviti bukan berkaitan dengan pekerjaan.
   1 2 3 4 5 6 7

10. I often have to make difficult choices between my work and my personal

life.

Saya sukar untuk membuat pilihan antara kerja saya dan kehidupan peribadi saya.

1 2 3 4 5 6 7

11. I have to put aspects of my personal life because of my work.

Saya mesti meletakkan aspek kehidupan peribadi saya disebabkan oleh kerja saya.

1 2 3 4 5 6 7

12. I am able to accomplish what I would like in both my personal and work lives. Saya mampu mencapai apa yang saya mahu dalam peribadi saya dan kehidupan bekerja.

1 2 3 4 5 6 7

13. I often neglect my personal life needs because of the demands of my work. Saya sering mengabaikan kehidupan peribadi saya disebabkan oleh permintaan kerja saya.

1 2 3 4 5 6 7

14. My personal suffers because of my work.

Peribadi saya kesengsaraan disebabkan oleh kerja saya.

1 2 3 4 5 6 7

15. I have to miss out on important personal activities due to the amount of time I spend doing work.

Saya hilang peluang aktiviti-aktiviti peribadi penting disebabkan jumlah masa yang saya lakukan untuk kerja.

1 2 3 4 5 6 7

16. I feel that I allocate appropriate amounts of time to both work and non-work activities.

Saya rasa yang saya memperuntukkan jumlah masa sesuai kepada kedua-dua kerja dan bukan aktiviti kerja.

1 2 3 4 5 6 7

17. I make personal sacrifices to get work done.

Saya membuat mengorbankan diri untuk menyiapkan kerja.

1 2 3 4 5 6 7

18. I come home from work too tired to do things I would like to do.

    Saya balik dari kerja dan terlalu penat untuk melakukan perkara-perkara apa saya mahu.

    1 2 3 4 5 6 7

19. My job makes it difficult to maintain the kinds of personal life I would like. Pekerjaan saya membuat ia sukar untuk mengekalkan jenis kehidupan peribadi saya yang saya mahu.

    1 2 3 4 5 6 7

Part D: Psychological Health ***
Bahagian D: Kesihatan Psikolog

45) General health in general / Kesihatan am secara umum,

How about your health today? Bagaimana dengan kesihatan anda pada hari ini?

( ) Excellent / Cemerlang

( ) Very Good / Sangat Baik ( ) Good / Baik

( ) Poor / Teruk

45) Mental Health / Kesihatan Mental

During the past 4 weeks have you been a very nervous person?

Sepanjang 4 minggu yang lalu, adakah anda seorang yang sangat gugup?

( ) 2 days ago / 2 Hari lepas

( ) A week ago / Seminggu

Lepas () 1 Month ago / satu
bulan lepas ( ) 3 Month ago /
3 Bulan Lepas
( ) 3 Month and above ago / 3 Bulan ke atas lepas

46) Behavioural Stress / Tekanan Tingkah Laku

During the past 4 weeks, I have not had the time to relax or enjoy myself?

Selama 4 minggu yang lalu, saya tidak mempunyai masa untuk berehat atau bersenang-senan?

( ) Yes / Betul

( ) No / Tidak

47) Cognitive Stress / Tekanan Kognitif

During the past 4 weeks have you found it difficult to think clearly?
Sepanjang 4 minggu yang lalu adakah anda mendapati sukar untuk berfikir dengan jelas?

( ) 2 days ago / 2 Hari lepas

( ) A week ago / Seminggu
Lepas () 1 Month ago / satu
bulan lepas ( ) 3 Month ago /
3 Bulan Lepas
( ) 3 Month and above ago / 3 Bulan ke atas lepas

(Do you have any problems with this factor?)

Adakah anda mempunyai sebarang masalah dengan faktor ini waktu sekarang?

48) Burnout

Worn-out, physically exhausted, emotionally exhausted,
tired? Keletihan, letih fizikal, keletihan emosi, letih?

( ) Yes / Betul

( ) No / Tidak

49) Stress / Tekanan

Problems relaxing, Irritable, Tense, Stressed?

Masalah-masalah yang rileks, Ragu-ragu, Tegang, Tertekan?

( ) Yes / Betul

( ) No / Tidak

50) Sleeping Troubles / Masalah Tidur

Slept badly, Hard to sleep, woken up early, Woken up several times? Tidur dengan teruk, Sukar tidur, bangun awal, Terkejut beberapa kali?

( ) Yes / Betul

( ) No / Tidak

51) Depressive Symptoms / Gejala-Gejala Depresi

Sadness, Lack of self-confidence, Feel guilty, Lack of interest in daily activity?

Kesedihan, Kurang keyakinan diri, Rasa bersalah, Kurang minat dalam aktiviti harian?

( ) Yes / Betul

( ) No / Tidak

52) Cognitive Stress Symptoms / Gejala Kognitif Tekanan

Problems concentrating, Difficult thinking clearly, Difficult taking decisions, Difficult remembering?
Masalah menumpukan, Pemikiran yang sukar dengan jelas, Keputusan yang sukar dibuat, Sulit mengingat?

( ) Yes / Betul

( ) No / Tidak

Sekian Terima Kasih

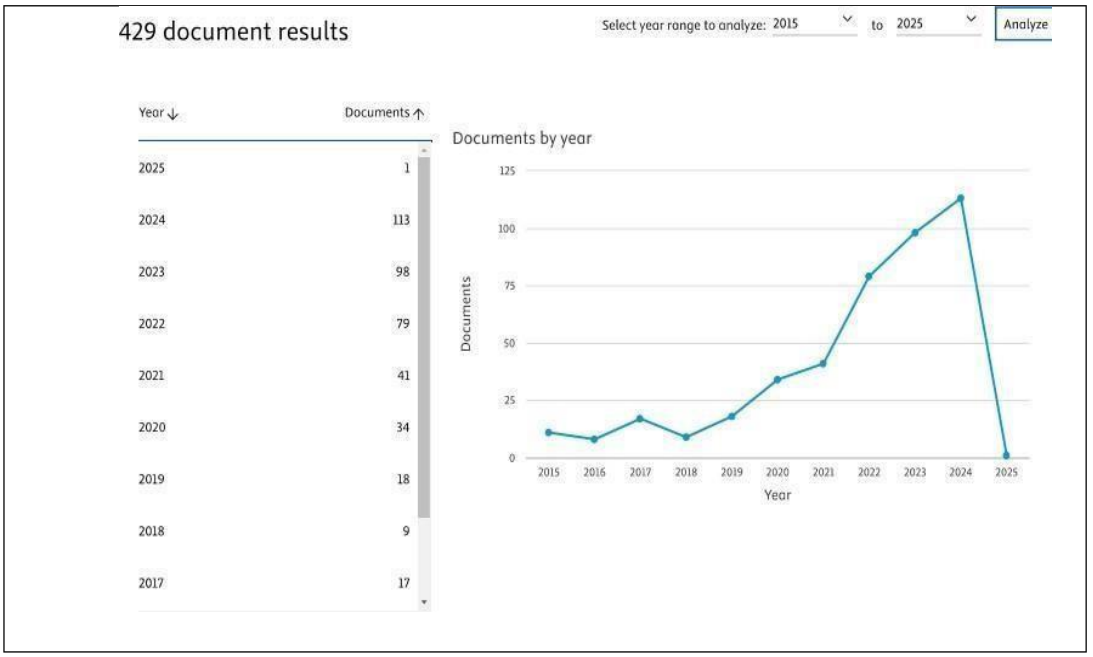
*Tarafdar, et al., (2011),

** Harris (2014),

*** Kristensen, et al., (2005)

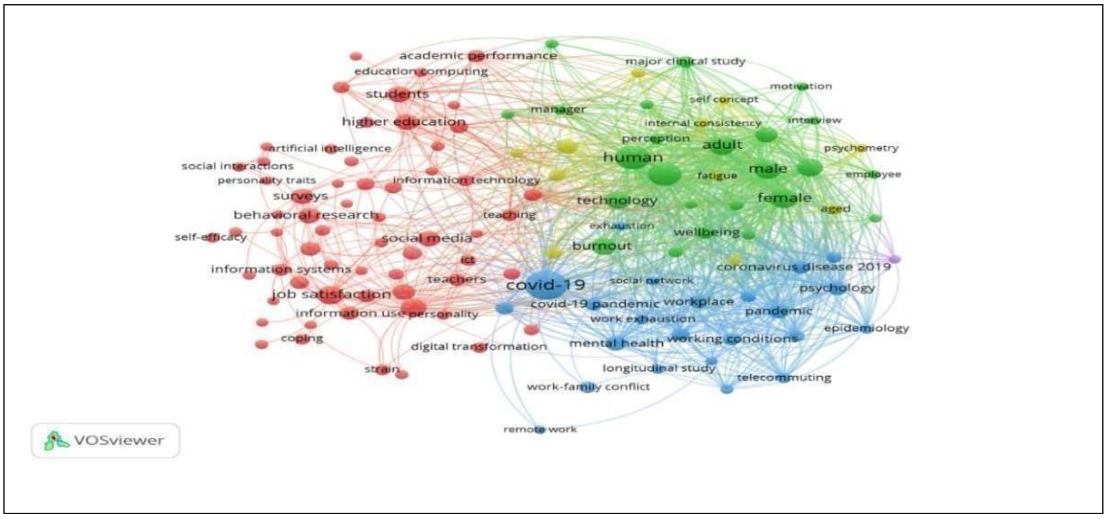
APPENDIX C

Publication In Scopus Database About Technostress, Taken On December 2024, Using Keyword Bibliometric. Detailed Information On How To Use The Data Is Explained Later (Al Husaeni & Nandiyanto, 2022).



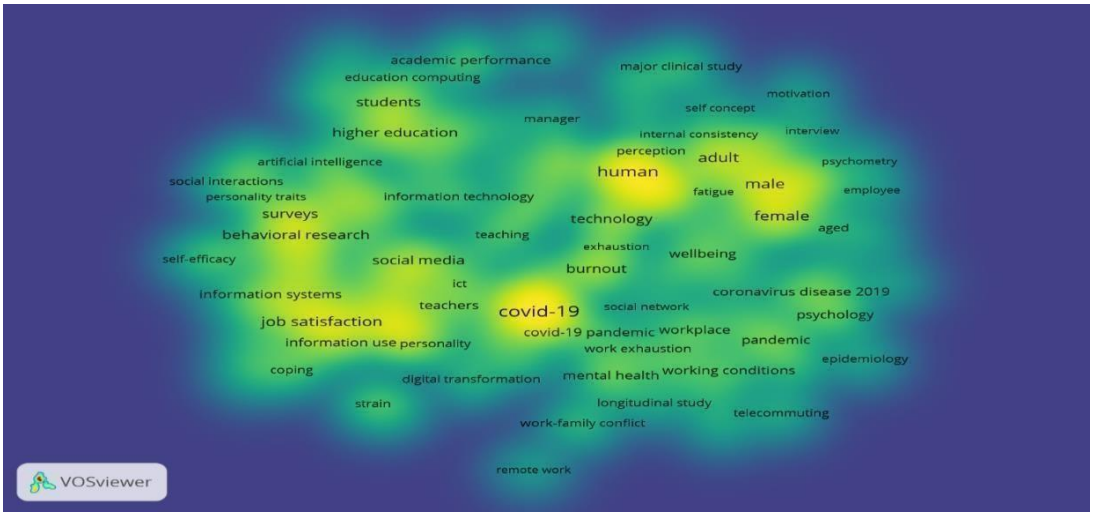
APPENDIX D

Technostress Research Topic Network Visualization



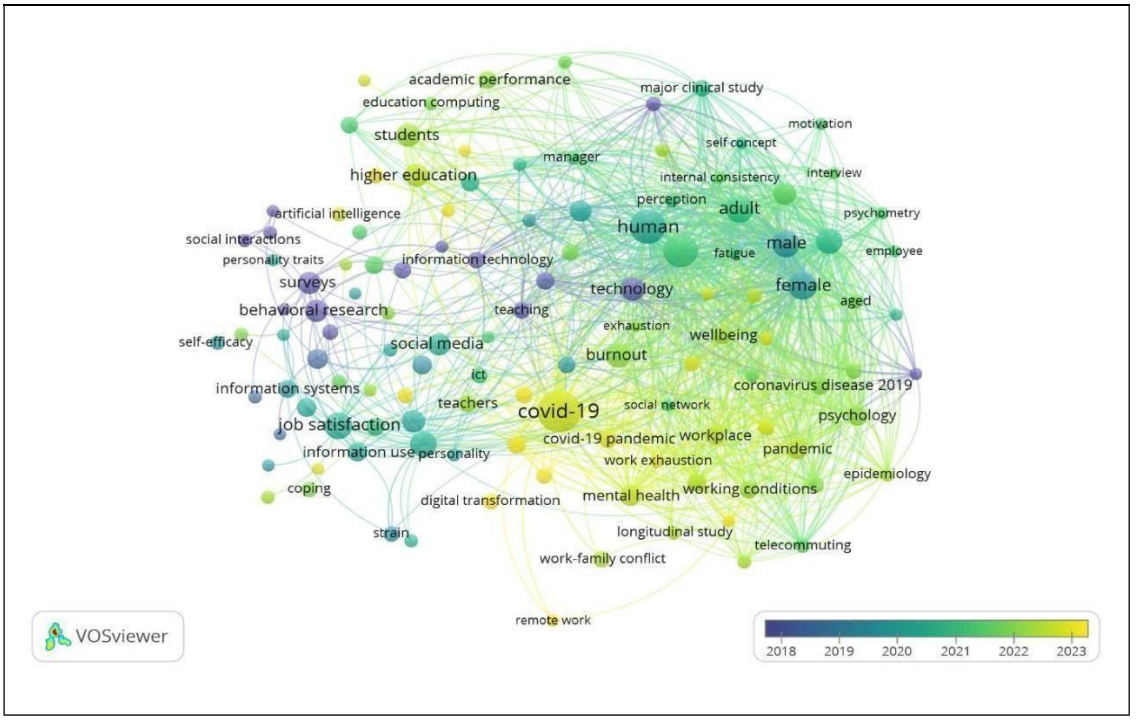
APPENDIX E

Technostress Research Topic Density Visualization



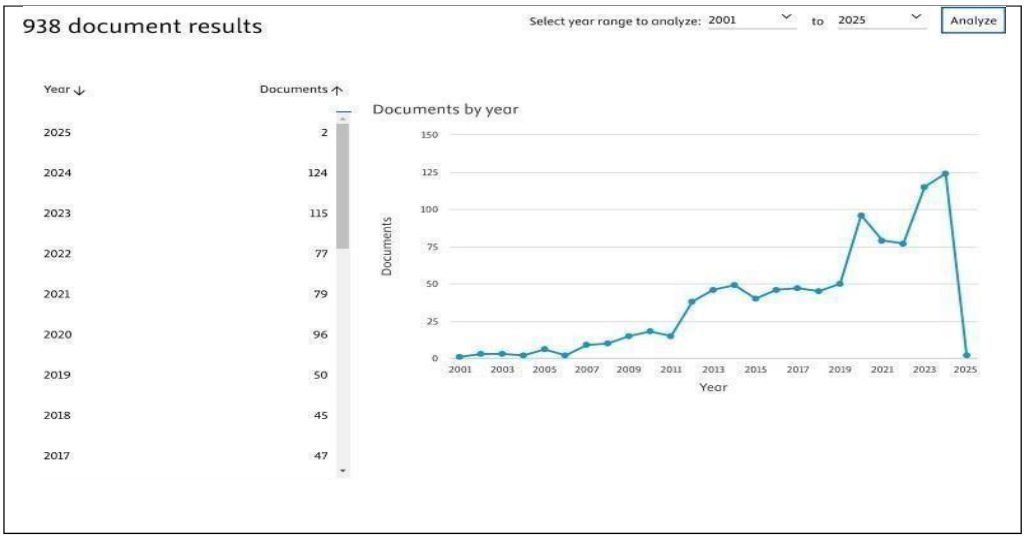
APPENDIX F

Technostress Research Topic Overlays Visualization



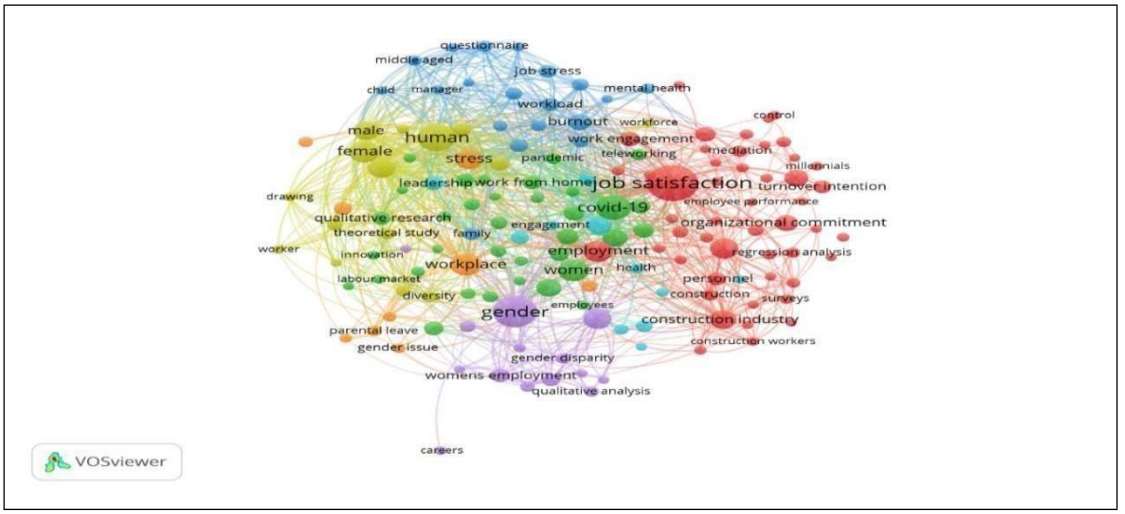
APPENDIX G

Publication in Scopus database about work-life balance, taken on December 2024, using keyword bibliometric. Detailed information on how to use the data is explained later (Azizah, Maryanti, & Nandiyanto, 2021).



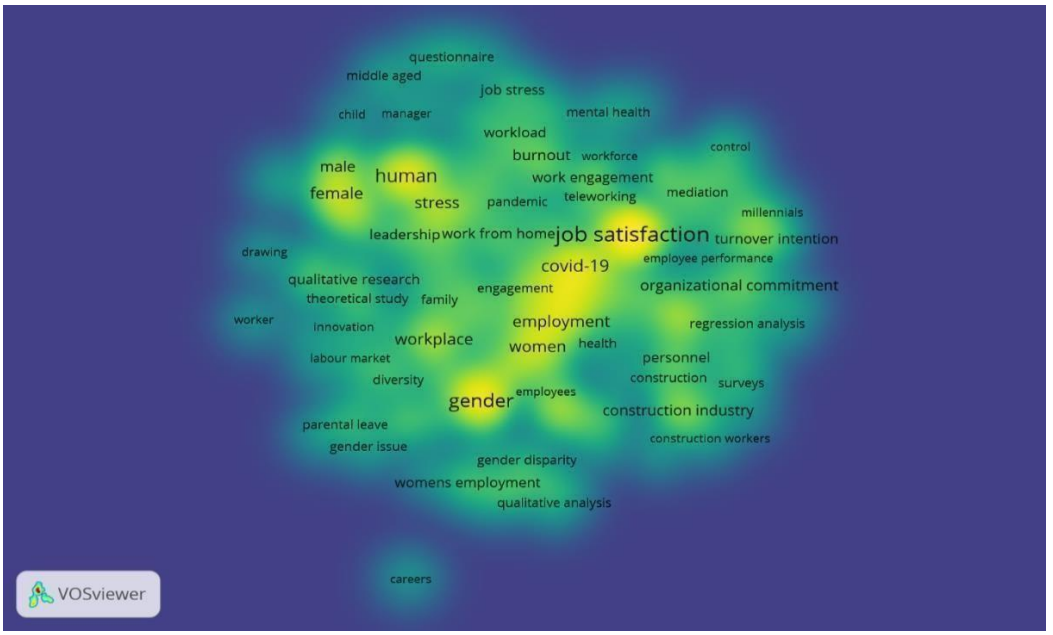
APPENDIX H

Network visualization of work-life balance keyword



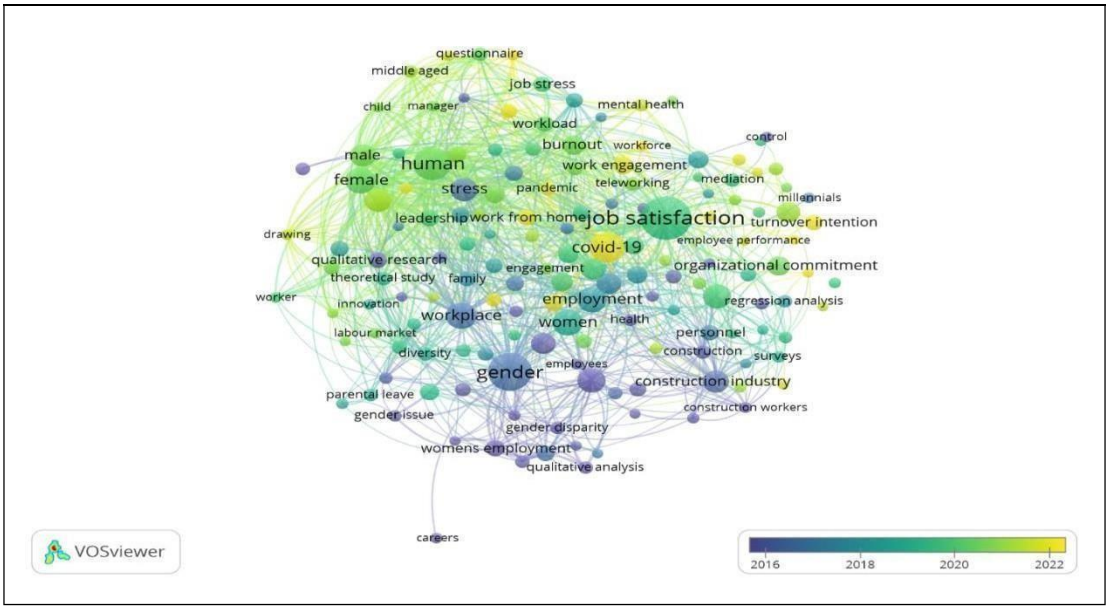
APPENDIX I

Density visualization of work-life balance keyword



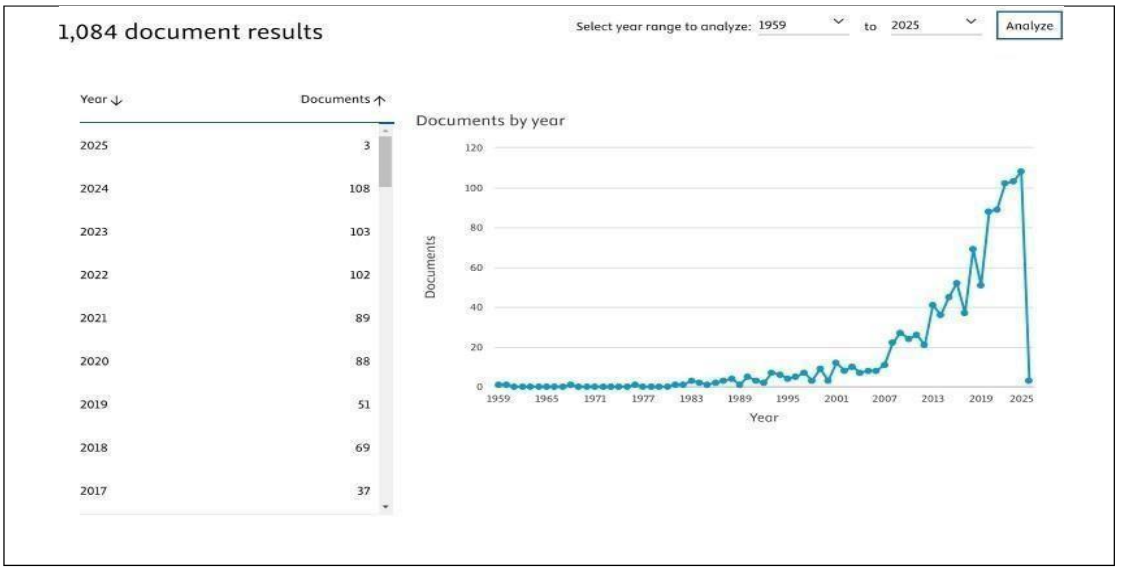
APPENDIX J

Overlay visualization of work-life balance keywords



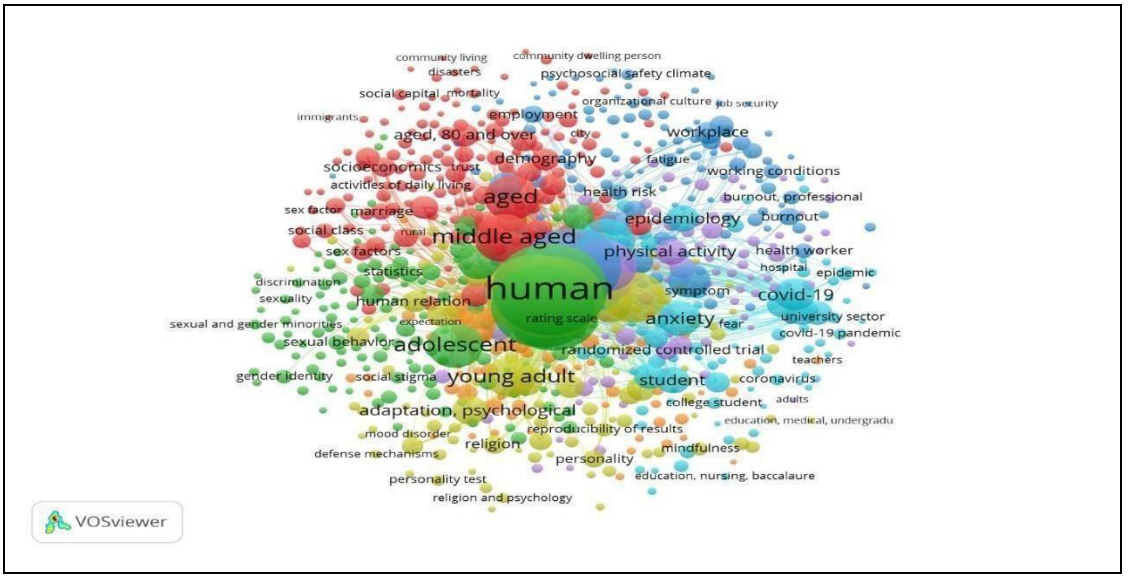
APPENDIX K

Publication in Scopus database about psychological health, taken on December 2024, using keyword bibliometric. Detailed information on how to use the data is explained later (Azizah et al., 2021).



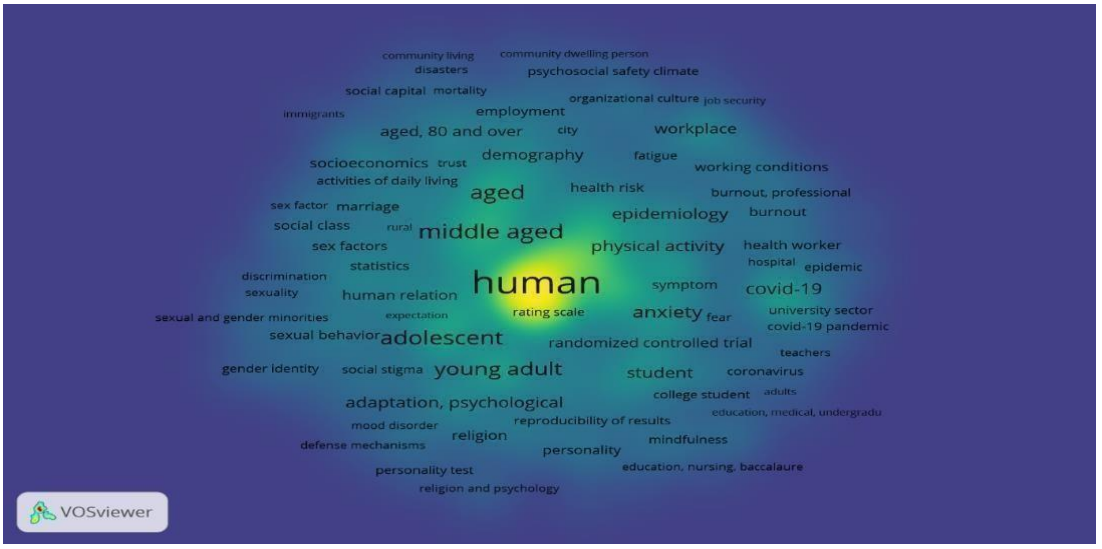
APPENDIX L

Network visualization of psychological health keywords



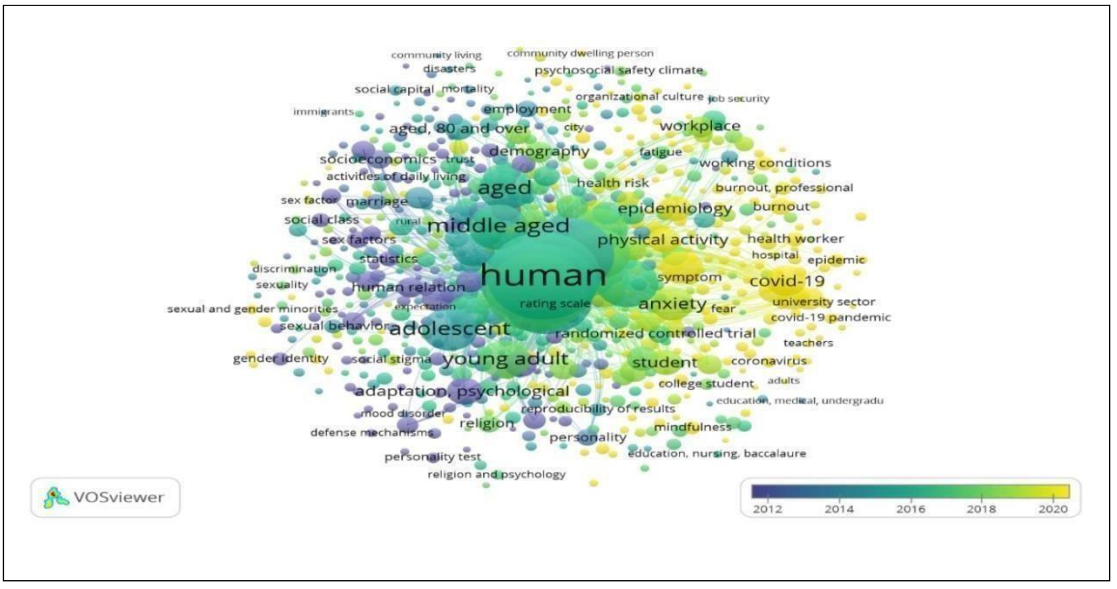
APPENDIX M

Density visualization of psychological health keyword



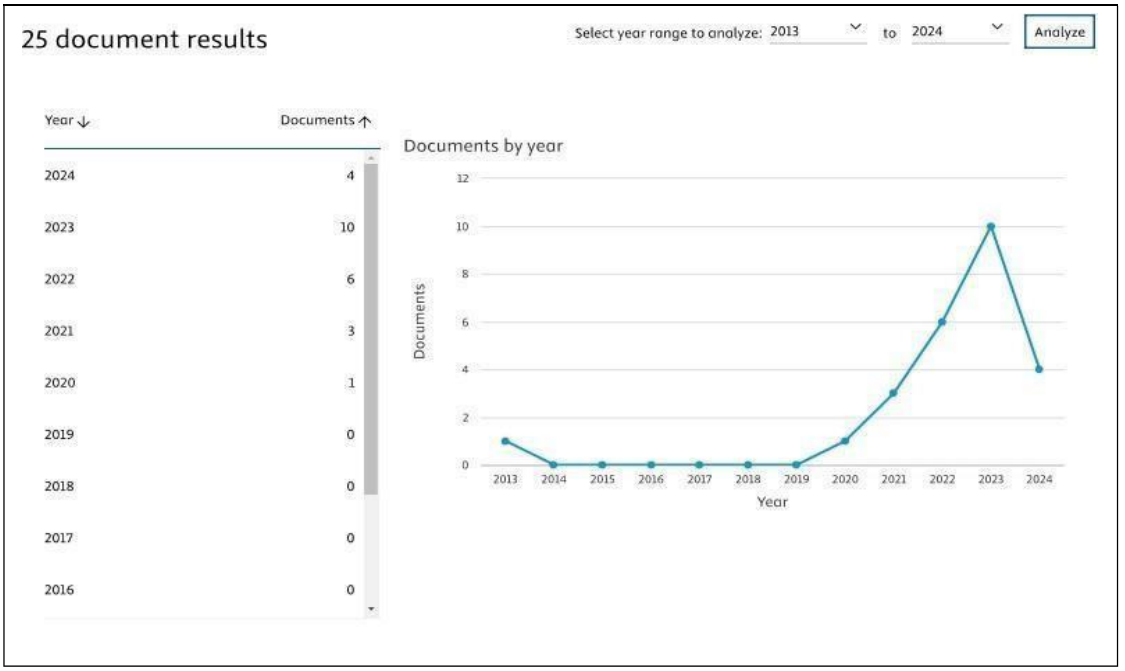
APPENDIX N

Overlay visualization of psychological health keywords



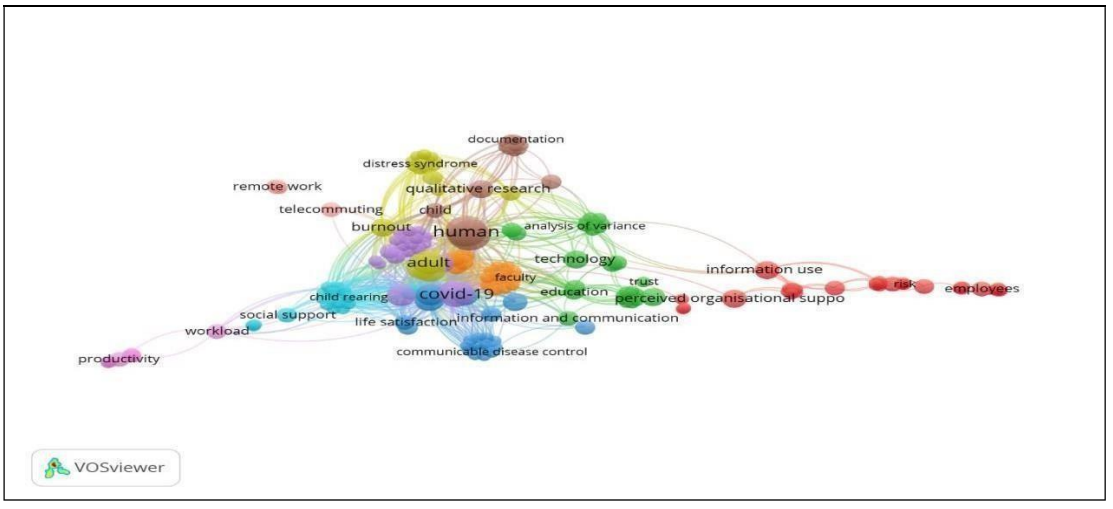
APPENDIX O

Publication in Scopus database on the relationship between technostress and work-life balance, taken on December 2024, using keyword bibliometric. Detailed information on how to use the data is explained later (Azizah et al., 2021).



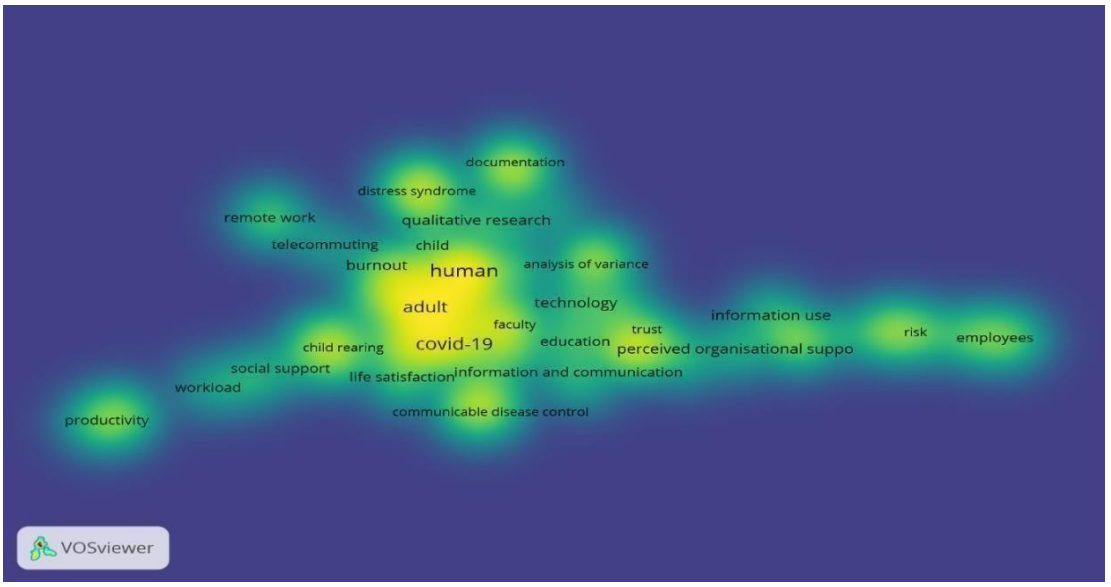
APPENDIX P

Network visualization of the Relationship between Technostress and Work-life Balance Keywords



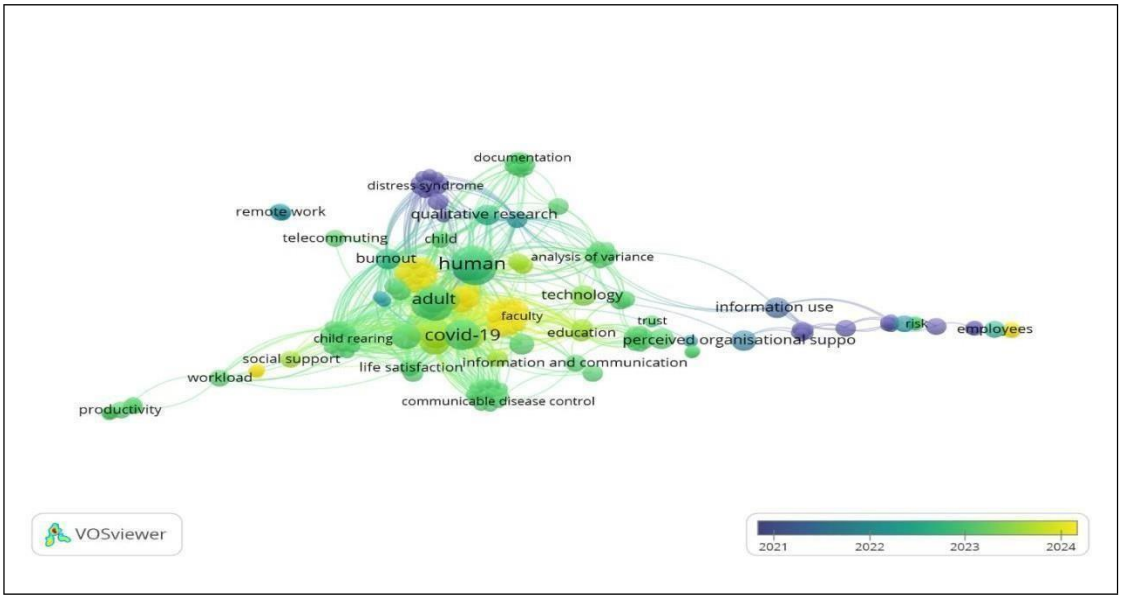
APPENDIX Q

Density visualization of the relationship between technostress and work-life balance keyword



APPENDIX R

Overlay visualization of the relationship between technostress and work-life balance keyword



APPENDIX S

Descriptives

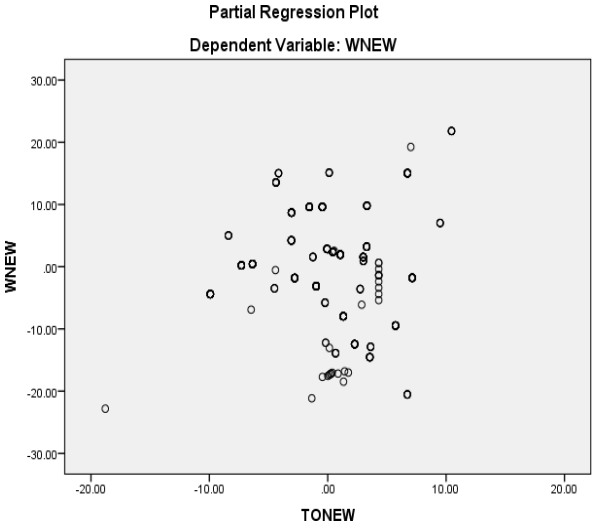
			Statistic	Std. Error
Mahalanobis Distance	Mean		4.4037191	.10157961
	95% Confidence Interval for Mean	Lower Bound	4.2039855	
		Upper Bound	4.6034527	
	5% Trimmed Mean		4.3612845	
	Median		4.0894972	
	Variance		3.900	
	Std. Deviation		1.97493339	
	Minimum		.53289	
	Maximum		8.91762	
	Range		8.38473	
	Interquartile Range		2.53261	
	Skewness		.366	.125
	Kurtosis		-.279	.250

Mahalanobis Distance Stem-and-Leaf Plot

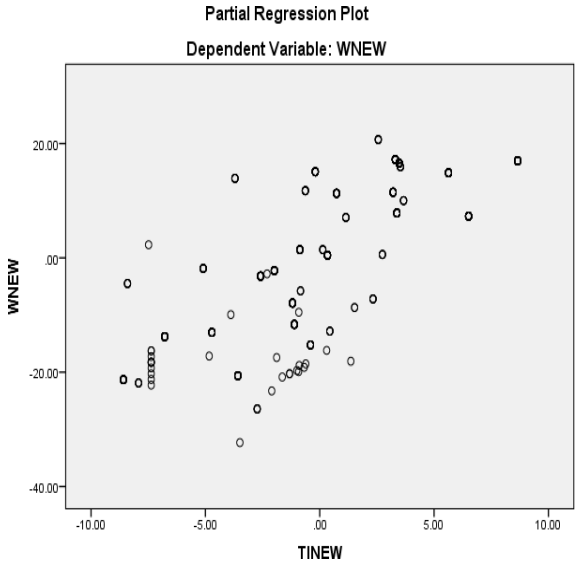
Frequency	Stem & Leaf
20.00	0 . 59999999999999999999
21.00	1 . 033333333333333333333
.00	1 .
7.00	2 . 3334444
36.00	2 . 55777777777777777779999999999999999
50.00	3 . 00000000000022222222222222223444444444444444444444
46.00	3 . 66667777777777777777777778899999999999999999999
54.00	4 . 00000000000001111222222222222234444444444444444444
5.00	4 . 66669
41.00	5 . 00000000000000000033333333333333333333334
27.00	5 . 55557777777777777777777778
11.00	6 . 23333333333
6.00	6 . 555589
18.00	7 . 333344444444444444
18.00	7 . 555555556666666666
4.00	8 . 0000
14.00	8 . 99999999999999

Stem width: 1.00000
Each leaf: 1 case(s)

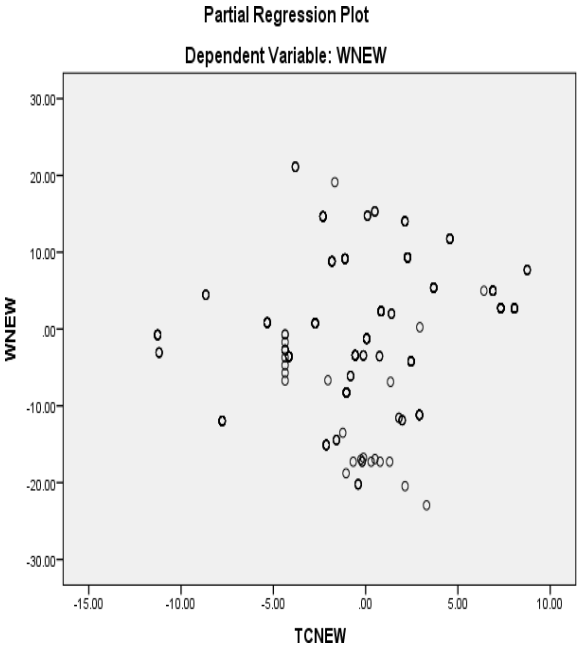
APPENDIX T



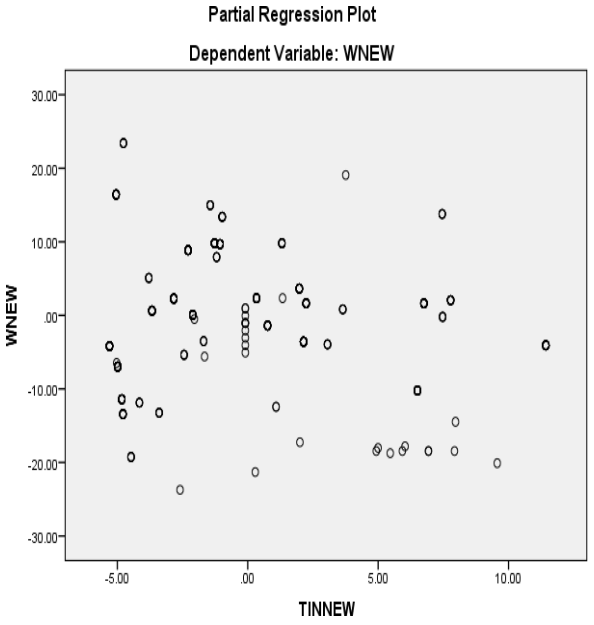
Variable: Techno-overload



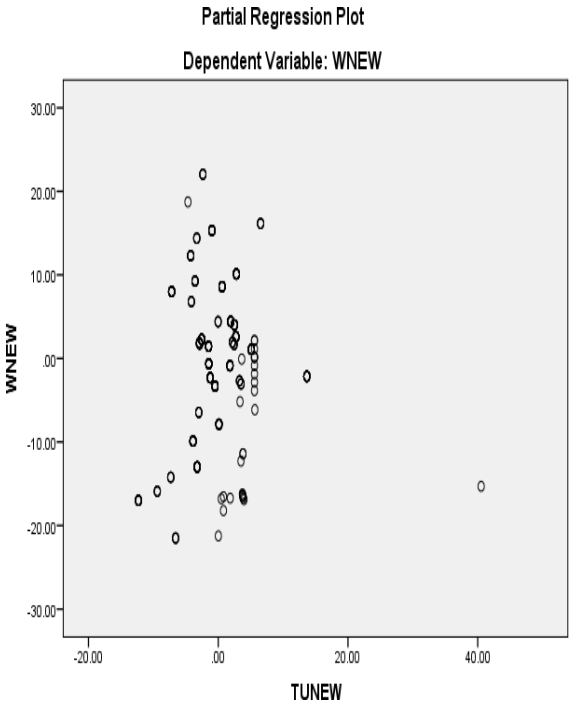
Variable: Techno-invasion



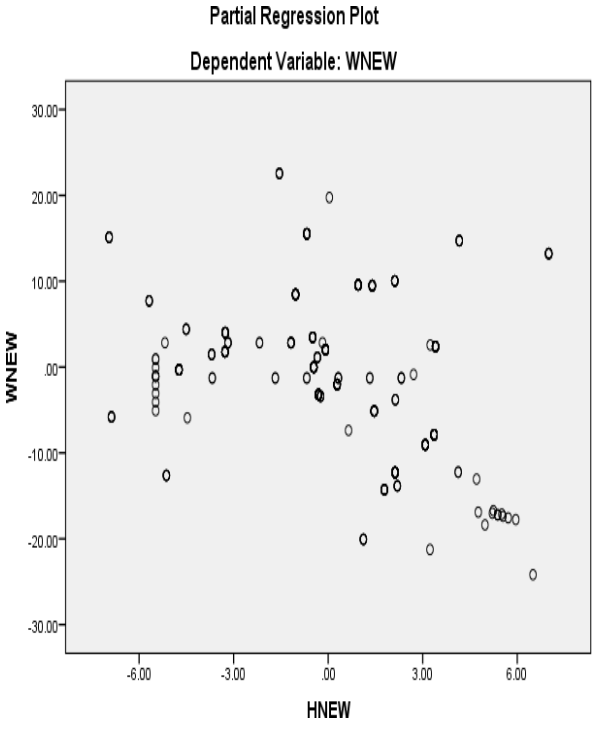
Variable: Techno-complexity



Variable: Techno-insecurity



Variable: Techno-uncertainty



Variable: psychological health

APPENDIX U

Durbin Watson

Model Summary[b]

odel		R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	.853[a]	.727	.723	8.36172	1.639

a. Predictors: (Constant), HNEW, TINNEW, TUNEW, TINEW, TONEW, TCNEW

b. Dependent Variable: WNEW

AUTHOR'S PROFILE



Mohammad Amir Shah bin Mohammad Saim is a dedicated academic and researcher in the field of human resource and office system management. He holds a Master of Office Systems Management in 2019 from Universiti Teknologi Mara (UiTM) and University Tenaga Nasional (UNITEN) for Bachelor of Human Resource Management (hons.) in 2017, For his doctoral research, he conducted a comprehensive statistical analysis examining the relationships among technostress creators, work-life balance, and psychological health among employees at Malaysian local commercial banks, employing structural equation modeling with partial least squares (PLS-SEM) as his primary analytical tool. Beyond his doctoral pursuits, Mohammad Amir Shah bin Mohammad Saim has accumulated valuable research and teaching experience. He served as a research assistant on high-impact projects, including *"organizational culture and the inclusivity of people with disabilities (pwd) in TNB organizations"* (2015) and *"kajian keberkesanan sistem perkhidmatan penyampaian kerajaan negeri"* (2017). Complementing his research acumen, he has also served as a lecturer, sharing his expertise and fostering students' academic growth. His unwavering dedication to research and education reflects his profound commitment to advancing the field of organizational management and contributing meaningfully to the academic community.

LIST OF PUBLICATIONS

Saim, M. A. S. M., Rashid, W. E. W., & MA'ON, S. N. (2021). Technostress creator and work life balance: a systematic literature review. *Romanian Journal of Information Technology & Automatic Control/Revista Romana de Informatica şi Automatica*, *31*(1)

Saim, M. A. S., Rashid, W. E. W., & Noorsuriani, S. (2021). The relationship between technostress creator and work-life balance at selected private sector in Selangor. *International Journal of Academic Research in Business and Social Sciences*, *11*(6), 1636-1650

Othman, A. K., Hassan, L. F. A., Hamzah, M. I., Razali, A. R., Saim, M. A. S., Ramli, M. S., & Azhar, M. A. A. (2019). The influence of social commerce factors on customer intention to purchase. *Asian Themes in Social Sciences Research*, *3*(1), 1-1.

Othman, A. K., Hassan, L. F. A., Hamzah, M. I., Razali, A. R., Saim, M. A. S., Ramli, M. S., ... & Azhar, M. A. A. (2019). *The Influence of Social Commerce Factors on Customer Intention to Purchase. Asian Themes in Social Sciences Research, 3 (1), 1–10*