

Technostress and Job Outcomes: A Systematic Literature Review (Teknostres dan Hasil Kerja: Tinjauan Literatur Sistematis)

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ABSTRACT

The use of technology in daily life and tasks has led to a variety of job outcomes. These were previously referred to under various terms and concepts used by past researchers. A Systematic Literature Review (SLR) was conducted and since this phenomenon is still new and in the exploratory phase, this technique will give an overview of the trend shown in past studies as related to impact on job outcomes. Data for this article were gathered from the Scopus and Web of Science databases from 1982 to 2021. Seventy articles were finalized from 269 found at the initial stage through the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting method. The study has identified and combined as many as ten terms and concepts into job outcome dimensions and further developed a conceptual framework between technostress and job outcomes. The trend and combination of these dimensions will be a source of reference and guidelines for organizations to formulate intervention measures to reduce the impact of technostress on job outcomes. Meanwhile, further research is recommended to focus on the role of mediating and moderating factors that may also affect job outcomes.

Keywords: Technostress; job outcomes; systematic literature review; PRISMA

ABSTRAK

Penggunaan teknologi dalam kehidupan seharian serta pekerjaan telah mengundang kepada hasil pekerjaan yang pelbagai. Sebelumnya, terdapat pelbagai terma dan konsep yang digunakan oleh pengkaji lepas yang merujuk kepada hasil pekerjaan. Tinjauan literatur sistematik (SLR) dijalankan kerana fenomena teknostres ini masih baharu dan dalam fasa penerokaan maka teknik ini akan memberi gambaran terhadap arah aliran kajian lepas tentang kesannya kepada hasil pekerjaan. Data untuk artikel ini dikumpulkan daripada pangkalan data Scopus dan Web of Science dari 1982 hingga 2021. Tujuh puluh artikel telah dimuktamadkan daripada 269 artikel yang ditemui pada peringkat awal melalui kaedah penyataan Item Pelaporan Pilihan Untuk Semakan Sistematis dan Meta-Analisis (PRISMA). Dapatan kajian ini telah mengenalpasti dan menghimpunkan sebanyak sepuluh terma dan konsep menjadi dimensi hasil pekerjaan dan seterusnya membangunkan kerangka kerja konsep antara teknostres dan hasil pekerjaan. Arah aliran dan gabungan dimensi ini bakal menjadi sumber rujukan dan garis panduan bagi organisasi untuk mengatur langkah intervensi dalam mengurangkan kesan teknostres terhadap hasil pekerjaan. Kajian lanjut disaran untuk memberi fokus kepada peranan faktor pengantara dan penyederhana yang turut mempengaruhi hasil pekerjaan.

Kata kunci: Teknostres; hasil pekerjaan; kajian literatur sistematik; PRISMA

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INTRODUCTION

In the twenty-first century, the use of technology in an organization is unavoidable because it is a necessary requirement in various fields. This necessity is part of the global development due to digital transformation. New workplaces and commercial information technology have altered the way people work and live. Existing systems and work methods that were formerly traditional and paper-based have now been converted to online systems designed through engineering processes and in conjunction with technological advancements such as the internet, social media, smartphones, and automation software. Many organizations have benefited from the utilisation of such cutting-edge technology and trained best-in-class personnel with better education. However, incorporating technology into day-to-day operations in an organisation increases the chances of employees being techno-stressed, which can lead to positive or negative job outcomes.

Job outcome refers to an employee's response to their employment. Past literature tends to use several terms and concepts for various job outcomes such as organizational commitment, job satisfaction, turnover intention, job stress (Bozeman et al. 2001; Lobene & Meade 2013), work performance, organizational citizenship behaviour (Shen et al. 2014), job involvement (Griffin et al. 2010), motivation, burnout (MacDonald et al. 2019), and absenteeism (Cohen & Golan 2007). Numerous studies have also identified a connection between technostress and user satisfaction (Kiazad et al. 2015; Salanova et al. 2013). Since earlier researchers were inclined to study job outcomes individually, the adoption of different terms and concepts conceived separately have resulted in a certain degree of confusion and an imbalance in the terminology.

The utilization of Information and Communication Technology (ICT) facilities in daily life today is seen as very significant given its "anytime, anywhere" character that is capable of overcoming time and space (Lane & Stagg 2014). The rapid development of ICT has driven digital technology comprehensively and it is widely utilised by individuals in all areas of human activities (United Nations Conference on Trade and Development 2019). Digital technology changes the way things are accomplished and also in work conditions and relationships between the employee and his assigned job within the organization. The use of ICT in this century is accordingly inevitable, given its role in generating various benefits to consumers, both from the socio-economic and political aspects worldwide (Freund & Al-majeed 2021; Palvia et al. 2015). However, the continuous use of technology tends to lead to the phenomenon of technostress.

Technostress is defined as an individual's stress level due to ICT use (Ragu-Nathan et al. 2008). Clinical psychologist Craig Brod first expressed the concept of technostress in 1982 in a paper entitled "Managing technostress: Optimizing the use of computer technology" (Salazar-Concha et al. 2021). In 1984, he wrote in his book, entitled "Technostress: The human cost of the computer revolution", which stated, among other things, that technostress is a modern adaptive disease caused by the inability to deal with new technologies in a healthy way. This will result in non-acceptance of ICT or excessive introduction of new technologies which may lead to more severe responses such as anxiety and stress (Brivio et al. 2018). The sources of technostress are defined as factors that cause employees to experience this affliction (Krishnan 2017; Ragu-Nathan et al. 2008) and the manifestation of the response affects the behaviour, physiology and psychology of the employees (Salazar-Concha et al. 2021). The scope of study on technostress is very broad and existing studies tend to explore mainly through empirical investigations relative to other approaches (Salazar-Concha et al. 2021).

Since the phenomenon of technostress is still in the rudimentary phase, this study will thoroughly evaluate and synthesize comprehensively the relevant literature to identify the latest trends of the phenomenon and its influence on job outcomes. One of the techniques to undertake a thorough review of existing literature is to use the Systematic Literature Review (SLR) approach. The extant literature is reviewed in-depth on the specific topic based on clearly stated objectives, queries, and research techniques. SLR allows for a more extensive and comprehensive review of the literature in order to identify knowledge gaps for further research (Robinson & Lowe 2015; Xiao & Watson 2019) on the impact of technostress on job outcomes. This review would also provide a precise evaluation of trends as well as a synopsis of the subject. Although there are few existing literature reviews, they are however not focused and systematic in their treatment (Bondanini et al. 2020; Grummeck-Braamt et al. 2021; Salazar-Concha et al. 2021).

The SLR technique is the preferred of contemporary researchers since it is systematic in evaluating and organizing relevant empirical studies that provide a comprehensive interpretation of past findings (Xiao & Watson 2019). In addition, the technique is also commonly used by researchers to identify the current state of knowledge on the subject and to assess the quality of existing research. The collection of empirical studies reviewed will summarize past studies conducted in the area (Flemming et al. 2019). The findings of this study should inform and guide future research, set future research agenda, and make recommendations for policy and implementation. Furthermore, the SLR technique is suitable to address the problem under study since a review of the pertinent literature will focus and explore technostress affliction and its impact on job outcomes. An in-depth study of research papers related to technostress from 1984 to 2021 will help to provide managers and organizations with a clear understanding of its current state of research.

The themes for this study are presented in the following order: Part II demonstrates the methodological approach of the SLR, Part III comprises review and discussion (analysis on the findings), Part IV explains the theoretical and practical implications of the study. Finally, limitations and recommendations for future research concludes in Part V.

METHODOLOGY

REVIEW METHOD

The SLR approach systematically identifies, categorises, selects, and critically assesses past research and synthesizes specific themes in a methodical, valid, and repeatable way (Wright et al. 2007; Xiao & Watson 2019) to address research questions. In other words, SLR undertakes a thorough examination of search results (Munn et

al. 2018). The protocol or plan is first established before the SLR review process begins. The approach is a well-organised and transparent method in which researchers study numerous datasets or adopt a similar strategy. The approach provides academics to elucidate a specific issue through a systematic literature search process (Xiao & Watson 2019). It also includes information on the review process (e.g., keywords used, article selection) to enable other researchers to replicate the study, validate the findings, or investigate on result generality. The review technique adopted in this study was based on recommendations of earlier works (Munn et al. 2018; Xiao & Watson 2019).

The SLR process is divided into three parts, as summarised in Figure 1. This analysis comprised an SLR based on relevant criteria and was guided by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). This guidance also assist researchers to conduct systematic reviews and meta-analyses with a more accurate method (Moher et al. 2009; Page & Moher 2017; Pati & Lorusso 2018; Wright et al. 2007). The search methods used comprised inclusion and exclusion criteria, eligibility, data collection, and analysis.

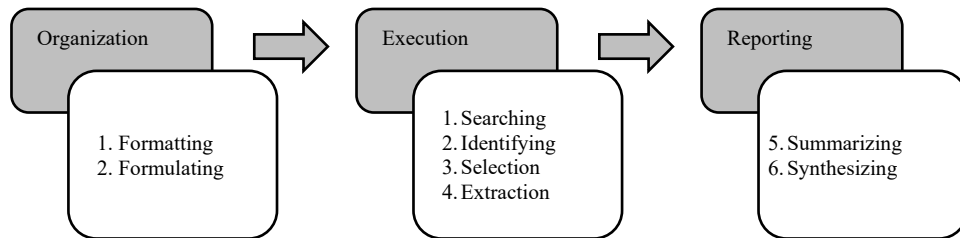


FIGURE 1. Process in systematic literature review

The database contains hundreds of thousands of journal articles. To search for the relevant publications, a systematic analysis was the appropriate method used. The first step was to organise, which entails setting the format (formatting) and formulating the research question. The researcher established several parameters and limitations in identifying journal articles in the database during this phase, as shown in Table 1. The next step was the execution, which required searching, identifying, selecting, and retrieving relevant research findings based on pre-determined criteria. To guarantee that the study's objectives were met, specific criteria, including keywords, were earlier established. Finally, the process of connecting all the components and elements were carried out in order to gather and provide valuable outputs from such investigations through summarising and synthesising the reports. A high degree of primary research overview is necessary, using this component, to respond to and discover evidence to address past research questions.

The researcher used two databases, Scopus and Web of Science (WoS). Since the review's objective was to provide a comprehensive overview on past research, as much useful information as possible was extracted from each piece of literature, including methodologies, variables, and analyses (Arksey & O'Malley 2005).

SOURCE OF DATABASE

As strategy researchers take advantage of significantly more organised databases, which serve as suitable platforms for their studies (Bell 2018). Using multiple databases is advisable while implementing SLR. Since there is no such thing as a perfect electronic database, a mix of at least two databases would suffice for this study (Xiao & Watson 2019). The Scopus and WoS databases were sufficient enough to be used as principal search systems because they are well-suited to provide evidence for synthesis in the form of systematic reviews since they fulfilled all necessary performance requirements (Gusenbauer & Haddaway 2020). Past studies have also proven that the two databases are sufficient to conduct SLR (Kumpulainen & Seppänen 2022; Linnenluecke et al. 2020). Data search was accessed online through the Universiti Kebangsaan Malaysia library.

The purpose of this article is to provide readers with an overview of the topic. There were several techniques and methods that can be used to conduct SLR, such as narrative review, meta-analysis, meta-synthesis, scoping reviews, and rapid review. This study adopted the scoping review method to map the available research on a topic, identify the key concepts, and assess the breadth and depth of the literature. The scoping review method was thus used to conduct SLR wherein the relevant literature were perused for articles related to technostress and job outcomes. The researchers established many criteria as guidelines and constraints for identifying journal articles in the databases at the beginning of the study, including publication year, document type, and language used.

SEARCH STRATEGY

Researchers searched for journal articles in the Scopus and WoS databases using several keywords as guidelines in the first screening step. These words had previously been included in the query string and had been verified by subject matter experts before and after the search which focused on technology and job outcomes. For the Scopus

database, the advanced search menu was used through entering basic symbols and coding such as field codes functions (TITLE-ABS-KEY for title, abstract and keywords) in the query string column. Similarly, with the WoS database, for specialised search, researchers used the advanced search query builder, and entered field tags “TS”, meaning Topic, followed by inverted commas and pre-set keywords. Between each keyword Boolean operators (AND and OR) were placed to function as conjunctions to combine and exclude keywords. This facilitated the search to be more focused and inappropriate content removed. The Boolean operators were also used to widen or limit a search. In the query string columns for the Scopus and The WoS electronic databases, various phrases were used and concatenated.

Other synonyms for technostress creator used in the study include technostress, technology stress, technophobia, and techno-stressor. Similarly, other synonyms for “job outcomes” include organizational commitment, job satisfaction, turnover intention, intention to quit, intention to leave, turnover, work performance, job performance, organizational citizenship behaviour, job involvement, work involvement, motivation, burnout, absenteeism, and work-life balance. Researchers also used the Boolean operators to combine synonyms, abbreviations, and all related terms on a similar concept with relevant keyword searchers. For the identification phase, 124 publications from Scopus and 145 from WoS were identified to be relevant to the study (see Figure 2).

DATA COLLECTION

Data retrieved from each article were based on the following criteria; peer-reviewed publications with complete references, publications ranging from 1982 until 2021, and English journal articles (see Table 1).

TABLE 1. Criteria search in database

Database	Source area	Criteria
Scopus	Publication Year	All.
	Document Types	Journal Article
	Languages	English
Web of Science	Publication Year	All.
	Document Types	Journal Article
	Languages	English

The PRISMA Statement's flow is helpful in assisting the systematic literature search (Moher et al. 2009). Following search results, the researcher must perform three additional steps in both Scopus and WoS databases (Moher et al. 2009) to complete the process. As indicated in Figure 2, the steps include identification, screening, and eligibility. This is followed with quality appraisal of the selected articles reviewed, and explanation on the strategies used to ensure their quality.

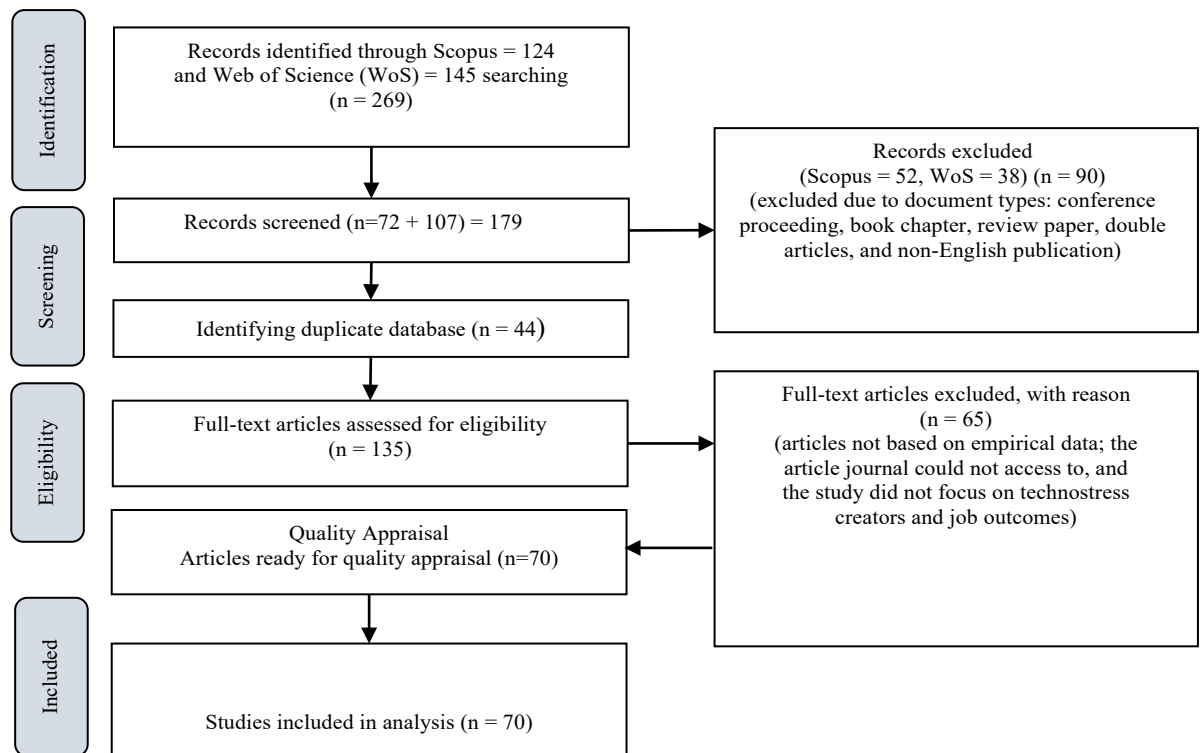


FIGURE 2. Flow of systematic review of searching

The article search using Scopus and WoS academic databases yielded 269 articles on technostress creators and job outcomes in the identification phase. These were reduced in the subsequent screening phase to 179 articles, with 72 Scopus and 107 WoS that met the initial criteria. A total of 90 articles (Scopus 52 articles, WoS 38 articles) were eliminated due mainly to subject irrelevance. The screening criteria also considered the type of documents thus excluding those in the form of conference proceedings, book chapters, review papers, duplicate articles, and non-English language publications. Priority was given to primary sources over secondary, conceptual/theoretical, and unreliable ones. Primary sources are usually in the form of articles published in reputable journals (Ramdhani et al. 2014). Further, sources of information journals are regarded as being more current than books. In the screening process, a total of 179 journal articles were selected, and a total of 44 duplicate articles were removed leaving 135 screened articles. The excluded articles bear similarities between them and were published in either one of the two databases used. There was no requirement for the identical article to be replicated in another database.

In the following eligibility phase, 65 full-text articles were further excluded from the remaining 135. Exceptions were made because the study conducted does not provide empirical data and was not fully accessible. In addition, the study also did not correlate with the technostress creators and job outcomes. After completing all the phases in the PRISMA Statement's flow, a total of 70 journal articles were retained for subsequent analysis.

QUALITY APPRAISAL

To ensure the quality of the articles, the 70 screened articles were then reviewed for quality assessment (Mohamed Shaffril et al. 2020) using the Mixed Method Appraisal Tool (MMAT). The articles were ranked on a scale of high, moderate and low quality, and only those with the two higher quality ratings were selected for further review (Petticrew & Roberts 2006). The researcher however agreed that at least one moderate quality article could suffice to qualify for acceptance for review in this study. As such, all 70 articles reviewed earlier were deemed appropriate for the present research. A total of 45 articles were rated high and 25 rated as medium quality.

REVIEW AND DISCUSSION

REVIEW OF ARTICLES IN SCOPUS AND WOS DATABASE

Prior to the study period, the number of articles published in the Scopus and WoS databases on the subject was uneven, ranging from one to four per year.

In the 10-year study period (2005 until 2015), the WoS database recorded one publication each in 2005, 2006, 2011, 2012, 2013, and this increased to two publications in 2015. No publication was recorded in 2007-2010 and in 2014. The Scopus database in comparison recorded one publication in 2008, two in 2013 and this increased to four in 2015. There was no publication however before 2007, and in 2009-2012.

In the following 2016, the number of articles published in both databases continued to be uneven, although there was a significant increase. No publication was reported in the WoS database but an upward trend was recorded between 2017 and 2019 with one, three and five publications respectively. The number decreased to three articles in 2020 followed with a significant increase of 10 publications in 2021. Likewise, the Scopus database recorded two publications in 2016, three in 2017, two in 2018, a significant increase in 2019 and 2020 respectively by nine and ten publications, before declining to seven in 2021.

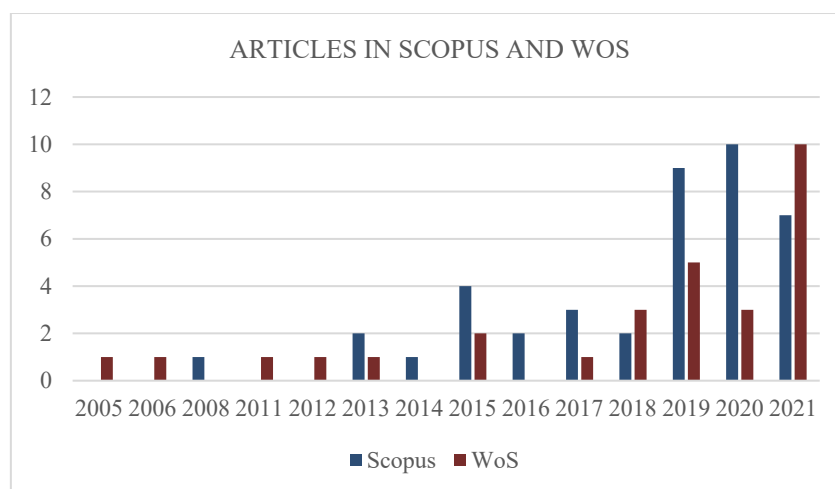


FIGURE 3. Number of articles in Scopus and Web of Science database

Figure 3 above clearly illustrates more publications on this theme in Scopus than in the WoS database. At the beginning of the 1982-2003 period, when the technostress phenomenon became recognised, data were not recorded as shown in Figure 3, since studies related to job outcomes were negligible and research tend to be oriented to medicine and health issues. Technological innovations was then newly introduced into the organisation, and employees were still learning and adapting to the new skills required. In this context, it is understandable that researchers were becoming aware of the impact of the new technology on human health and has begun their assessment. Prior to 2021, the number of publications on technostress and job outcomes was probably less than ten. One plausible reason for this was that the concept of technostress was still new and has only been recently studied. With mounting adoption of technology in the workplace, research on the phenomenon has rapidly increased due to the concurrent rise of its negative impact.

It should also be noted that the field of study of technostress is interdisciplinary, since it encompasses areas such as psychology, sociology, management, and information technology. As a research area, technostress was not well-developed prior to 2021 hence the low number of publications (Bondanini et al. 2020; Salazar-Concha et al. 2021). It was also suggested that the lack of publications on technostress was also linked to the focus on the use of the term Occupational Stress or Job Stress in general by researchers. The relationship between technostress and job outcomes is indeed complex and multifaceted, and hence it may have been difficult for researchers to design studies that effectively measure and analyse this relationship. This may have also contributed to the limited number of articles on the topic prior to 2021.

FACTORS AFFECTING TECHNOSTRESS AND JOB OUTCOMES

According to the findings of a study published in a journal article, a total of ten major variables were used to correlate technostress and job outcomes. The phrase "job outcomes" describes the details shown in the diagram below.

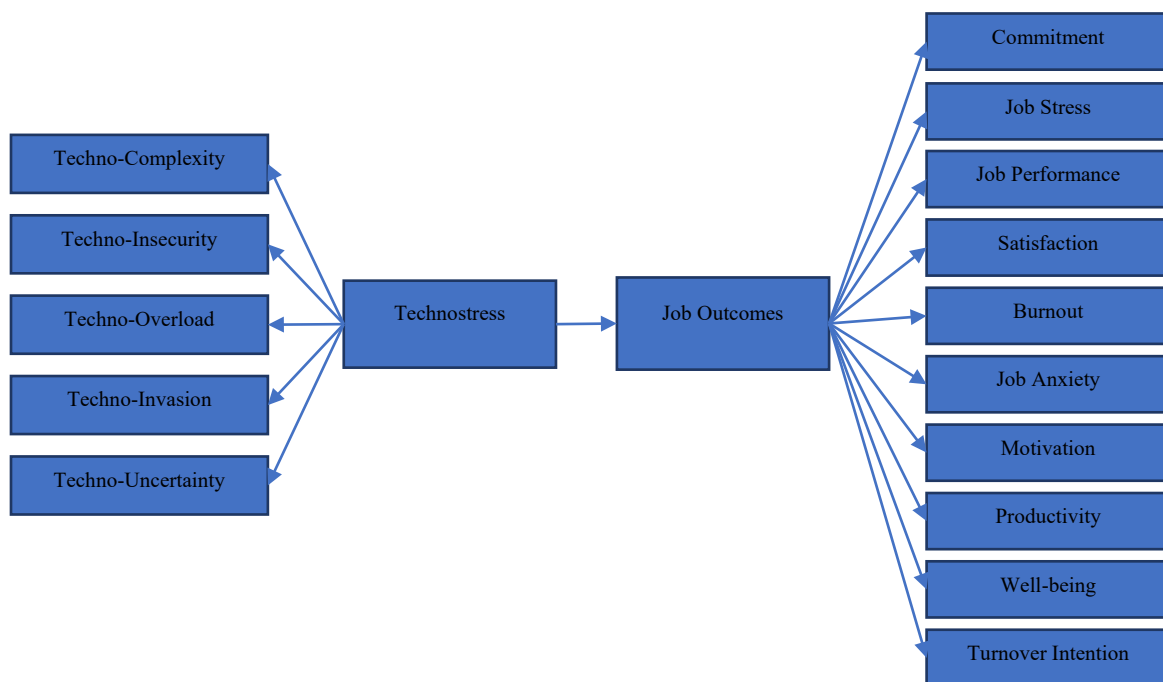


FIGURE 4. Framework of job outcomes dimension

There are various reactions or job outcomes shown by employees due to situations at the workplace. The findings of this study support those of previous studies in that the phenomenon of technostress will encourage employees to behave and respond accordingly to the situation they face (Kiazad et al. 2015; Salanova et al. 2013). Job outcomes were measured in various dimensions but can be summarised into ten. Previously, various terms were used to refer to these dimensions. To facilitate understanding and reference in future studies, some combinations of terms were used for job outcomes that are quite similar.

The dimension of job outcomes includes commitment or organizational commitment, job stress (which includes role stress or workplace stressor), job performance (the satisfaction which covers life satisfaction or job satisfaction or employee satisfaction), burnout (which contains family burnout or job burnout), job anxiety (which is also includes work exhaustion or techno strain or techno addiction) and motivation (which consists of counterproductive work behaviour or continuance intention or compliance intention or job engagement or achievement motivation), productivity (such as employee productivity or job productivity), well-being (which

among others includes work-life balance or work-to-home spill over or work-family conflict) and turnover (intention or intention to leave).

In summary, the most studied variables related to technostress and job outcomes is satisfaction, followed by job performance, burnout, organizational commitment, and motivation. In comparison, job stress, job anxiety, productivity, well-being, and turnover intention are variables that still lack researchers' attention. This revelation can prove that the indication shown by employees based on workplace experience can be established into the dimensions of job outcomes.

ANALYSIS OF ARTICLE'S CITATION NUMBER

Citations are used as a success metric in research policy and research framework to indicate the influence or consistency of study analyses (Aksnes et al. 2019). As shown in Tables 2 and 3 (in Appendix A), researchers have compiled a list of the most prolific and prominent writers in the field of technostress, as well as the top 10 most cited articles in Scopus and WoS. The most cited article in Scopus is Ragu-Nathan et al. (2008). The consequences of technostress for end users in organisations has 535 citations as related to conceptual development and validation. The most cited article in WoS is Fischer & Riedl (2020). On the stress potential of an organisational climate of innovation, a survey study in Germany produced 150 citations.

The first articles on technostress were published in 1986 in Scopus and 2005 in WoS, but these were mainly concerned with the effect of this affliction on human health. Publications on technology and job outcomes became more frequent in the Scopus database in 2008 and the WoS database in 2011. During the 1982-2004 period, the growth of research on technostress was gradual since the focus was on studying the impact of recent technology use on individual health (Salazar-Concha et al. 2021). Furthermore, the term technostress was first coined by Craig Brod in the 1980s and it took some time for the term to gain traction and for researchers to work on related issues, thus explaining the slow growth. However, research gained momentum after 2015, when internet technology began to exert significant impact on society, transforming the workplaces and lives of the people. The public became clearly aware of the internet through social media, smartphones, workplace automation software, and company information systems. As technology advanced and became more integrated into society, its impact in the form of technostress became more apparent and thus spawning research on the new affliction.

In addition, the study on technology is evolving concertedly with the progress of the Industrial Revolution 4.0 and digital technology. The papers with the most citations are mostly the products of studies conducted in the last 10 years. A significant increase in citations was recorded between 2019 and 2021. This is linked to the growing awareness on the issues of technostress which were increasingly focused on the effects of behavioural strains rather than psychological and physiological ones. Another factor for poor citations prior to this period was the low visibility of the journal or conference document in which the articles were published.

ANALYSIS OF STUDY SETTING

The study setting may be understood of as the location where the research is carried out. Most of the research on technostress was conducted in China and the United States with eleven studies each. The remainder (Table 4 in Appendix B) were in Asia, Europe, Malaysia, and India, with three publications each. Sweden, South Korea, Romania, Nigeria, Italy, Germany, France, Finland, Canada had two publications each. In ten other studies, the study settings were not disclosed.

The research emphasis on China and the United States was related to the advancement of digital transformation that occurred earlier in both countries. This fast-evolving technology will have a domino effect on job outcomes. Organizations will not be spared from dealing with their employees' psychological behaviour due to the pressing need rising from this rapid development. Such behaviour refers to the response of employees to the conditions and environment encountered at their workplaces. The job results are indicative of the reactions from employees as a result of their work experience (Lee & Lee 2020). Uncontrollable technostress will clearly have a direct impact on job outcomes.

Other industrialised nations, such as Europe and India, are also paying close attention to the impact of technology on job outcomes as related to their citizens. Likewise, researchers in Malaysia, a developing country, are also beginning to publish scientific papers on the impact of technology which is becoming a growing concern due to the government's policies promoting digital transformation. The effort complements national development policies such as the 12th Malaysia Plan (12MP), Wawasan Kemakmuran Bersama 2030 (WKB2030), and the Blueprint Malaysian's Digital Economy 2021. Together these policies endeavour to transform Malaysia into a high-income country through leveraging digital technology so as to become a regional digital economy leader (Economic Planning Unit 2021).

The remaining fifteen countries that recorded one publication each on technostress include Austria, Bosnia and Herzegovina, Brazil, Caucasian, Hong Kong, Kuwait, Morocco, Netherland as published in the WoS.

Similarly, Norway, Pakistan, Qatar, South Africa, Spain, Turkey, Vietnam had one publication each, published in Scopus.

ANALYSIS OF METHODOLOGICAL APPROACH

Any research generally employs a procedure and technique to examine, analyse or discover ways for classifying, processing, and interpreting data on the chosen topic. The procedure used is determined by the study's objective. It reveals how these researchers articulate their problems, issues or objectives and how data are gathered and results presented in the research process (Devi 2017). Quantitative research is associated with facts and figures, whereas qualitative research is concerned with interpretations and notions. Essentially, the quantitative rule of thumb is to test or confirm results and often involves theory or hypothesis. Qualitative research, on the other hand, seeks to comprehend concepts or experiences in more detail. Analysis on the use of research methodology by past researchers is given in Table 5.

In this study, almost all the research conducted (65 studies or 92.9 percent) employed quantitative methodologies, as in Table 5 which shows 5 longitudinal and 60 survey methods used. There were also three qualitative studies (4.3 percent) and two studies with mixed-method (2.9 percent). Generally researchers tend to use a quantitative method approach when studying technostress and job outcomes.

TABLE 5. Methodology of study

Database	Quantitative		Qualitative	Mixed
	Longitudinal	Survey		
Scopus	2	35	2	2
Web of Science	3	25	1	0
Sub Total	5	60	3	2
Total		65	3	2

UNDERPINNING THEORY IN STUDY

The underpinning theory to a study is used to comprehend its social significance. Theories are developed to explain "how" and "why" society functions as it does (Keith 2006). A total of nine basic ideas were discovered as shown in Figure 5 given that some studies use more than one basic theory. Basic theory is also influenced by the variables, and constructs of the study conducted include several that are among the most popular and researched theories. These are the Conservation of Resources Theory, Person-Environment Fit Theory, Job Demand and Resources Theory, Transactional Theory of Stress and Coping, Davis' Technology Acceptance Model, Role Theory, Coping Theory, Job Characteristics Theory, and Self-Determination Theory.

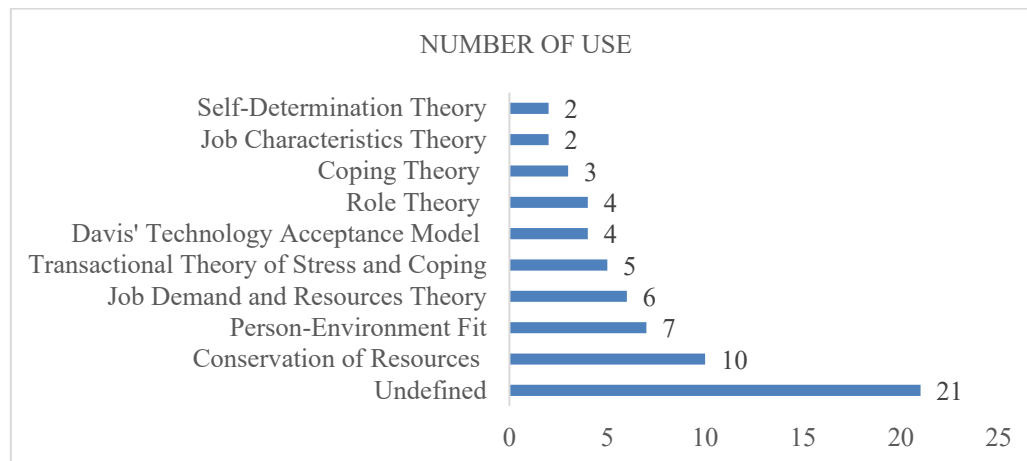


FIGURE 5. Underpinning theory in study

According to Figure 5, the theoretical model used in this paper is based on a theory that studies human behaviour as rooted in social psychology (Maier et al. 2015; Sonnentag & Frese 2013), such as the Conservation of Resources Theory (Harris et al. 2021; Ninaus et al. 2015; Srivastava et al. 2015), the Socio-Technical Theory and Role Theory (Jena 2015; Tarafdar et al. 2007), Social Cognitive Theory (Cao & Yu 2019; Salanova et al. 2013), Person-Environment Fit Theory (Ayyagari et al. 2011; Califf & Brooks 2020; Stich et al. 2019), Transactional Theory of Stress and Coping (Fischer & Riedl 2017; Hung et al. 2011; Ragu-Nathan et al. 2008), Job Demand and Resources Theory (Ma et al. 2021; Salanova et al. 2013), Davis' Technology Acceptance Model (Maier et al. 2015; Maier et al. 2015; Oksa et al. 2021), Coping Theory (Al-Ansari & Alshare 2019; Gaudioso et

al. 2017; Srivastava et al. 2015; Yu et al. 2018), Job Characteristics Theory (Brooks & Califf 2017), and Self-Determination Theory (Panisoara et al. 2020).

The two theories most frequently used are the Conservation of Resources (COR) and Person-Environment Fit (P-E Fit). Scholars believe that both theories fundamentally explain stress theories on motivation and balance between humans and their environment (Ayyagari et al. 2011; Califf & Brooks 2020; Stich et al. 2019). In comparison, other scholars did not concentrate on a particular theory. Despite this, the study revealed that 21 studies lacked an explicit theoretical basis or did not specify whether any supporting theory was used.

CONCLUSION

The phenomenon of technostress experienced by employees in an organization will lead to positive (techno-eustress) or negative (techno-distress) effects. The combination of using terms and concepts that refer to job outcomes reported by past researchers will help future researchers interested in studying dimensions as related to job outcomes. The findings of this study offer a broad overview of graphs and trends in papers published on technostress creators over the past four decades. The decade of technostress investigations is divided into three parts; 1982 to 1984 (First Phase), 2007 to 2014 (Second Phase), and 2015 to present (Third Phase). Starting with the Second Phase, the number of published articles have shown a very significant increase. This study revealed that the extent literature on technostress has grown significantly in recent years that can be used for future reference on trends and approaches on a particular subject. PRISMA-based SLR successfully discovers the latest trends in technostress research and highlights the dimensions under job outcomes.

The phenomenon of technostress in an organization experienced by employees will lead to positive (techno-eustress) or negative (techno-distress) effects. The combination of using terms and concepts that refer to job outcomes in past studies will help future researchers interested in studying dimensions related to job outcomes. The findings of this study offer a broad overview of graphs and trends in technostress creators published over the past four decades. The decade of technostress investigations is divided into three parts; 1982 to 1984 (First Phase), 2007 to 2014 (Second Phase), and 2015 to present (Third Phase). Published articles have shown a very significant increase in number beginning with the Second Phase. In this study a literature review was conducted on related articles that have grown significantly in number in recent years, and may serve as future reference on trends and approaches to a particular subject. A PRISMA-based SLR successfully discovered the latest trends in technostress research and has highlighted dimensions under job outcomes.

Articles in the form of SLR are increasingly crucial in the era of research development, especially in the phenomenon of technostress which is seen to be gaining the attention of researchers from various fields. Therefore, the publication of articles in the form of SLR can indirectly provide an overview of trends as well as a summary of past studies. This research contributes to knowledge on stress due to use of technology and its influence on job outcomes by providing a comprehensive and critical evaluation of existing studies followed by integrative analysis of several notable research papers from the Scopus and WoS databases. These past investigations have identified as many as ten dimensions of job outcomes emanating from the technostress creator phenomenon. This study importantly contributes to structuring the technostress-job relationship which is complex and multifaceted. It developed a conceptual framework connecting technostress creators and job outcomes through linking several dimensions of the latter from individual and specific past studies.

Most of the 70 studies reviewed were quantitative, and cross-sectional (Carlotto et al. 2017; Ragu-Nathan et al. 2008; Tarafdar et al. 2014). This is attributed to longitudinal data being widely recognized as the most effective method for studying causal relationships as well as historical and developmental changes (Lewis-Beck et al. 2004). Accordingly, future researchers on technostress should thus conduct such longitudinal quantitative studies. Additionally, the relationship between technostress and job outcomes need to be elucidated, with emotional intelligence, job embeddedness, and work involvement as mediating or moderating factors. The findings should assist human resource practitioners in organizations to design appropriate programs for their employees (Bergiel et al. 2009) with focus on specific technologies (Berg-Beckhoff et al. 2017).

The results of this study provide managers and organizations with a clear understanding of the current state of research on technostress and its effects on job outcomes. SLRs should assist managers to identify the intervention measures to reduce the impact of technostress, its key contributing factors and develop strategies to manage and reduce the affliction in the workplace. The findings may also provide managers with evidence-based recommendations for managing technostress, such as providing training for employees on how to use technology effectively, encouraging frequent rests and vacation time, and promoting healthy work-life balance. In addition, this study can also help managers understand the potential negative effects of technostress on job outcomes, such as on employee well-being and job performance, and to develop strategies to mitigate these impacts.

In conclusion, despite mounting research interest in technostress with more than 40 years of research (Salo et al. 2017; Stich et al. 2017), there are still some issues that have not been addressed or being identified with appending research. Future research need to focus on subsets of techno-stressor deemed to receive inadequate attention relative to the single construct of technostress. Considering the far reaching consequence of such subsets

which are not limited to only one area, a broader picture of the positive (eustress) and negative (distress) consequences of technostress on work performance may be realised.

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APPENDIX A. NUMBER OF CITATION IN SCOPUS AND WEB OF SCIENCE DATABASE

APPENDIX A1. Scopus Database		
Author / Year	Title	Number of citations
Ragu-Nathan et al. (2008)	The consequences of technostress for end users in organizations: Conceptual development and validation	535
Srivastava et al. (2015)	Technostress creators and job outcomes: Theorising the moderating influence of personality traits	139
Gaudioso et al. (2017)	The mediating roles of strain facets and coping strategies in translating techno-stressors into adverse job outcomes	59
Jena (2015)	Technostress in ICT enabled collaborative learning environment: An empirical study among Indian academician	51
Hwang & Cha (2018)	Examining technostress creators and role stress as potential threats to employees' information security compliance	47
Maier et al. (2015)	Information technology as daily stressor: pinning down the causes of burnout	45
Suh & Lee (2017)	Understanding teleworkers' technostress and its influence on job satisfaction	42
Brooks & Califf (2017)	Social media-induced technostress: Its impact on the job performance of it professionals and the moderating role of job characteristics	38
Vaziri et al. (2020)	Changes to the work-family interface during the COVID-19 pandemic: Examining predictors and implications using latent transition analysis	31
Califf et al. (2020)	The bright and dark sides of technostress: A mixed-methods study involving healthcare it	20

APPENDIX A2. Web of Science Database		
Author / Year	Title	Number of citations
Fischer & Riedl (2020)	On the stress potential of an organisational climate of innovation: A survey study in Germany	150
Ayyagari et al. (2011)	Technostress: Technological antecedents and implications	144
Maier et al. (2019)	Technostress and the hierarchical levels of personality: A two-wave study with multiple data samples	134
Wang et al. (2021)	Accelerating AI adoption with responsible AI signals and employee engagement mechanisms in health care	116
Day et al. (2012)	Perceived information and communication technology (ICT) demands on employee outcomes: The moderating effect of organizational ICT support	104
Parayitam et al. (2021)	Knowledge management and emotional exhaustion as moderators in the relationship between role conflict and organizational performance: Evidence from India	100
Bauwens et al. (2021)	Can leaders prevent technology from backfiring? Empowering leadership as a double-edged sword for technostress in care	91
Ninaus et al. (2015)	Benefits and stressors - perceived effects of ICT use on employee health and work stress: An exploratory study from Austria and Hong Kong	90
Oksanen et al. (2021)	Covid-19 crisis and digital stressors at work: A longitudinal study on the Finnish working population	90
Yu et al. (2018)	Excessive social media use at work exploring the effects of social media overload on job performance	88

APPENDIX B. NUMBER OF STUDY BASED ON COUNTRY			
Country	Database		Total
	Scopus	Web of Science	
China	7	4	11
United States of America	6	5	11
Undefined	6	4	10
Asia	2	1	3
Europe	2	1	3
Malaysia	3	0	3
India	1	2	3
Canada	1	1	2
Finland	1	1	2
France	1	1	2
Germany	0	2	2
Italy	0	2	2
Nigeria	2	0	2
Romania	2	0	2
South Korea	2	0	2
Sweden	1	1	2