

Digital Resilience as an Inherent Capability in the Disruption Era: A Comprehensive Review

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Abstract: Background: Rapid advancements in technology are causing substantial disruption, leading to fundamental societal behavioral changes. This disruption also presents an elevated risk of mental health and behavioral issues, encompassing cyberbullying, cybercrime, burnout, and even instances of suicide. Cultivating digital resilience is crucial in addressing these challenges, as there is currently a scarcity of scientific literature on the subjects. **Objective:** This study delves into the existing literatures regarding how digital resilience can empower individuals to confront difficulties in an era of disruption. **Method:** A comprehensive scoping review was carried out, sourcing scholarly articles from ScienceDirect, PubMed, and ProQuest between 2014 and 2024, utilizing specific keywords including "digital resilience," "disruption era," "digital capabilities," and "digital challenges." Adhering to the PRISMA method and predetermined inclusion and exclusion criteria, 342 research articles were initially identified, with the final analysis focusing on 26 articles. **Results:** Digital resilience encompasses several critical components, including digital social support, digital health, and digital identity. To effectively manage technostress, individuals employ personal coping strategies while seeking assistance from family members, friends, educators, and social media platforms. Research demonstrates that digital resilience is influenced by an individual's adaptability to digital transformations, the resources available for alleviating stress, and the chosen strategies for stress management. Moreover, digital resilience is contingent upon an individual's comprehension of digital resources, which include literacy, self-efficacy, technology access, and social networks. Confidence in technological tools enhances engagement, while proficient literacy facilitates knowledge absorption. Strengthening resilience requires collaboration and effective resource management, with information and communication technology (ICT) pivotal in enabling real-time patient care. **Conclusion:** Digital resilience is an inherent capability that can be developed through targeted strategies, including resource reinforcement and social network support. The insights garnered from this study can effectively guide the development of educational programs, workplace policies, and community initiatives to enhance digital resilience.

Keywords: Changes, Comprehensive Review, Digital Resilience, Disruption Era, Inherent Capability.

المرونة الرقمية كقدرة متأصلة في عصر الاضطرابات: مراجعة شاملة

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المخلص: الخلفية: تُحدث التطورات السريعة في التكنولوجيا اضطرابًا كبيرًا، مما يؤدي إلى تغييرات سلوكية مجتمعية جوهرية. كما يُمثل هذا الاضطراب خطرًا متزايدًا على الصحة النفسية والسلوكية، بما في ذلك التنمر الإلكتروني، والجرائم الإلكترونية، والإرهاق، وحتى حالات الانتحار. يُعد تعزيز المرونة الرقمية أمرًا بالغ الأهمية لمواجهة هذه التحديات، نظرًا لندرة الأدبيات العلمية حول هذه المواضيع حاليًا. **الهدف:** تتعمق هذه الدراسة في الأدبيات المتوفرة حول كيفية تمكين المرونة الرقمية للأفراد من مواجهة الصعوبات في عصر الاضطراب. **المنهجية:** أُجريت مراجعة نطاقية شاملة لتحديد نطاق الدراسة، بالاعتماد على مقالات علمية من ScienceDirect و PubMed و ProQuest بين عامي 2014 و 2024، باستخدام كلمات رئيسية محددة مثل "المرونة الرقمية"، و"عصر الاضطرابات"، و"القدرات الرقمية"، و"التحديات الرقمية". وبالالتزام بمنهجية PRISMA ومعايير التضمين والاستبعاد المحددة مسبقًا، تم تحديد 342 مقالًا بحثيًا في البداية، مع تركيز التحليل النهائي على 26 مقالًا. **النتائج:** تشمل المرونة الرقمية عدة مكونات أساسية، بما في ذلك الدعم الاجتماعي الرقمي، والصحة الرقمية، والهوية الرقمية. وللتعامل بفعالية مع ضغوط التكنولوجيا، يستخدم الأفراد استراتيجيات شخصية للتكيف مع الضغوط، مع طلب المساعدة من أفراد الأسرة والأصدقاء والمعلمين ومنصات التواصل الاجتماعي. تُظهر الأبحاث أن المرونة الرقمية تتأثر بقدرة الفرد على التكيف مع التحولات الرقمية، والموارد المتاحة لتخفيف التوتر، والاستراتيجيات المختارة لإدارته. علاوة على ذلك، تعتمد المرونة الرقمية على فهم الفرد للموارد الرقمية، والتي تشمل محو الأمية، والكفاءة الذاتية، والوصول إلى التكنولوجيا، وشبكات التواصل الاجتماعي. فالثقة بالأدوات التكنولوجية تعزز المشاركة بينما يُسهل الإلمام الجيد بالمعرفة استيعابها. يتطلب تعزيز المرونة التعاون والإدارة الفعالة للموارد، مع دور تكنولوجيا المعلومات والاتصالات المحوري في توفير رعاية فورية للمرضى. الخلاصة: المرونة الرقمية قدرة متأصلة يمكن تطويرها من خلال استراتيجيات محددة، بما في ذلك تعزيز الموارد ودعم شبكات التواصل الاجتماعي. ويمكن للرؤى المستقاة من هذه الدراسة أن تُوجه بفعالية تطوير البرامج التعليمية، وسياسات مكان العمل، والمبادرات المجتمعية لتعزيز المرونة الرقمية.

الكلمات المفتاحية: التغييرات، المراجعة الشاملة، المرونة الرقمية، عصر الاضطراب، القدرة المتأصلة.

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Introduction

The pervasive integration of digital technology in a disruptive era across a wide range of applications and social platforms on online channels has resulted in both positive and negative consequences (Shanmugasundaram & Tamilarasu, 2023). Positively, users can engage in social interaction, collaboration, information sharing, communication, and the formation of virtual social connections (Ali *et al.*, 2023; Nanclares & Garcia, 2024). Conversely, the excessive use of digital technology can lead to various behavioral issues, including fatigue, stress, and mental health challenges stemming from unhealthy interactions such as cyberbullying and cybercrime, burnout, and even suicides (M. Sharma *et al.*, 2021; Sun *et al.*, 2022).

Many customary in-person activities, including meetings and social interactions, have transitioned to virtual platforms. This pervasive digitalization pertains not only to professional endeavours but also to social engagements. The experience of digital stressors in modern online life can exacerbate overall stress levels (Becker *et al.*, 2023). An individual's response to stress is multifaceted, influenced significantly by the specific nature of the stressor and the individual's evaluation of the situation. Stressors perceived as threats often trigger a pronounced biological stress response, while those perceived as challenges may evoke a different reaction (Rudland *et al.*, 2020).

The evolution of the human brain has equipped it to manage physical threats and survival incentives. However, the advent of technology introduces new risks, such as information overload and rewards, like social media engagement, which can be addictive and detrimental to mental health. Contrary to alleviating stress, technology frequently exacerbates it, complicating individuals' ability to adapt to organizational changes and new tools. Technostress represents a pervasive and modern form of stress increasingly observed globally due to technology use, impacting individuals and organizations. This phenomenon often renders work environments overwhelming and unfulfilling. Brod in 1984 stated that technostress refers to the challenges associated with healthily adapting to technology (Salazar-Concha *et al.*, 2021). It contributes to elevated work-related stress levels and can induce feelings of undervaluation among employees. Technostress refers to the adverse effects associated with the use of modern technology, which can contribute to both addiction and stress. It is acknowledged as a significant drawback associated with technology engagement. Technostress can be divided into two categories: techno-eustress, which signifies the positive form of stress derived from utilizing information systems, and techno-distress, which indicates the adverse stress experienced when technology is perceived as a threat. The phenomenon of technostress can give rise to various psychological, physiological, and behavioural issues, primarily resulting from the overwhelming presence of technology in contemporary life (Nimrod, 2018; Sanjeeva Kumar, 2024).

Cyberbullying represents a significant challenge among secondary school students, primarily attributed to the proliferation of digital technology, which adversely affects their mental health. A study conducted with a sample of 562 students in Egypt revealed that 38.3% of participants reported experiencing cyberbullying, with incidence rates being notably higher among female students, younger individuals, those with lower academic performance, and frequent internet users. Furthermore, students who were victimized by cyberbullying demonstrated elevated levels of stress and poorer mental health outcomes (Ramadan *et al.*, 2024). A prior study conducted with 144 academic staff members at a University in Nigeria found that 54.2% of respondents reported experiencing technostress. This form of stress was determined to significantly impact job performance, with an effect size of 39.6%. The most commonly reported symptoms of technostress included neck pain, experienced by 45.8% of respondents, and blurred vision, reported by 42.4% (Tagurum *et al.*, 2017). Additionally, digital challenges faced by nurses indicated that techno-overload ($\beta=0.259$, $p=0.004$) and techno-complexity ($\beta=0.161$, $p=0.043$) were significantly correlated with burnout. Furthermore, employer support was found to significantly moderate the relationship between the lack of technical support and burnout, as evidenced by a change in $R^2=0.026$, $F(1,292)=7.41$, $p=0.007$ (Wirth *et al.*, 2024).

An increasing array of environmental and socioeconomic challenges, coupled with significant global events, poses a threat to public mental health. Recent evidence indicates that stress stemming from societal conflicts adversely affects mental well-being, leading to a heightened emphasis on resilience. Resilience refers to the capacity to maintain cognitive health or recover swiftly following stressful periods. This capacity evolves and varies across different aspects of life. Enhancing resilience may enable societies to better prepare for future disruptions through various interventions that cultivate resilience factors and cognitive mechanisms, including individual traits and social support systems (Schäfer *et al.*, 2024).

Resilience, as an inherent capability (Mabon *et al.*, 2020), enables individuals to mitigate the adverse effects of excessive technology use. Resilience is the capacity to effectively withstand and recover from significant disturbances while maintaining or enhancing one's functionality (Shrivastava & Desousa, 2016). Critical attributes of resilience encompass the ability to 'bounce forward' or 'move on' following a disruption, the potential to reestablish and improve systems to a better state, and the capability to anticipate, prepare for, and successfully adapt to adverse events by recuperating and enhancing the foundational functioning (Weichselgartner & Kelman, 2015). Such issues exist partly because individuals need to prepare to safeguard themselves in the digital life (Navar, 2021).

As digital technologies become increasingly prevalent, researchers are actively investigating their effects on health, bringing attention to both the advantages and potential risks, such as fatigue and digital burnout. This exploration has created a new construct known as "digital resilience." Digital resilience refers to the capacity of individuals to modify their behaviours and mental states in response to the risks posed by digital technologies within society (Sun *et al.*, 2022).

The capacity for digital resilience is contingent not only upon financial resources but also on the presence of social networks and connections. Nevertheless, incorporating social networks and connections in crisis planning and management practices must be more utilized (Mabon *et al.*, 2020). It is recognized that the excessive use of technology has contributed to numerous psychological incidents stemming from mental health issues (Anderl *et al.*, 2024; M. Sharma *et al.*, 2021). The term "inherent resilience" encompasses the attributes of an individual that stem from day-to-day processes, which can enhance or diminish its capacity to prepare for, respond to, recover from, and mitigate the hazards. Routine community empowerment processes encompass participation in religious or civic organizations, volunteer work, training, engagement in religious or spiritual activities and informal interactions during daily work practices (Mabon *et al.*, 2020).

Human resilience capability is distributed across a complex interplay of systems as a result of the inherently social nature of humans. Each individual possesses a fundamental adaptive system shaped by biological and cultural evolution, continuously evolving and adapting. As living human systems, we are in a constant state of interaction with our environment, reflecting an ongoing process. This concept can be applied to various contexts, such as the response to an online celebrity's content. Observers may express both positive and negative

reactions, and the subsequent response to harmful content on the internet demonstrates a product of adaptive evolution. While each individual possesses inherent adaptive capabilities, some are intrinsic and unique to each person.

Previous studies have established a correlation between resilience and health and the prognosis of diseases; however, there has been a lack of exploration into the concept of digital resilience, particularly in relation to the challenges presented by technological advancement. This study explores the current literature on how digital resilience can enable individuals to effectively navigate the challenges associated with technological advancements in a disruptive era.

Materials and Methods

The comprehensive scoping review extensively examined four data sources, specifically ScienceDirect, PubMed, ProQuest, and Google Scholar. The search concentrated on keywords such as "digital resilience," "disruption era," "digital capabilities," and "digital challenges." The study outlined specific inclusion and exclusion criteria, adhering to the rigorous PRISMA methodology. Articles eligible for inclusion must be peer-reviewed and published in English between 2015 and 2024. This time frame was established as a criterion to ensure the timeliness and relevance of references in scholarly articles. The focus was on empirical studies about digital resilience as an intrinsic capability for managing change in an era characterized by disruption. The selected articles encompassed both quantitative and qualitative research methodologies.

Furthermore, the research was augmented by a thorough review of grey literatures (e.g. news, market report), encompassing articles from prominent websites that examine digital resilience. Figure 1 of the PRISMA flow diagram depicts the literature identification process.

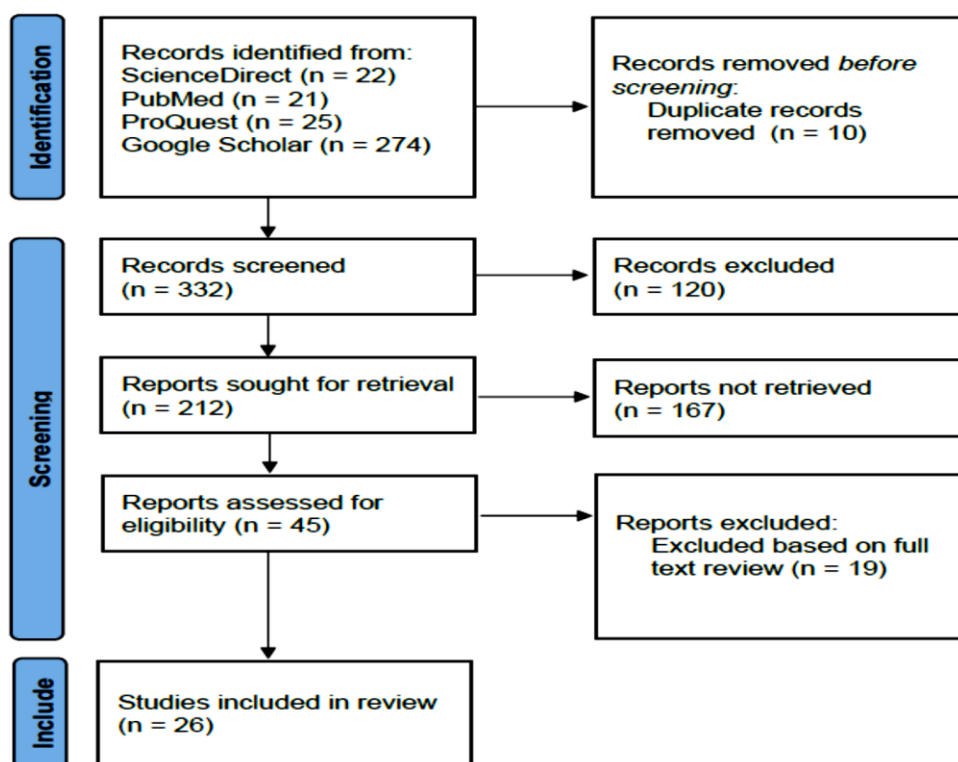


Figure (1): PRISMA Flow Chart; PRISMA Flow Diagram.

Source: (Lestari, 2024).

Figure 1 shows the initial dataset comprised articles gathered from 4 databases: ScienceDirect contributed 22 articles, Pubmed 21 articles, Proquest 25 articles, and Google Scholar 274 articles. Following a thorough review, ten duplicate articles were removed. Subsequently, 120 articles were excluded as they needed to align with the search objectives. Of the remaining 212 articles, 167 were deemed irrelevant to the study's scope. A detailed examination of 45 articles ensued, resulting in 26 articles meeting the criteria for inclusion in the review.

Table (1): Summary of Selected Articles.

Author (Year)	Findings
Fischer <i>et al.</i> (2021)	<ul style="list-style-type: none"> - The development of a tool for assessing stress induced by digital technology in the workplace has been undertaken. The Digital Stressors Scale (DSS) consists of 50 items categorized into ten distinct stressor categories derived from insights from 1,998 online questionnaires. - Digital stress, often called technostress, emerges from direct interactions with technology and potential future risks, such as job displacement due to automation. - The relationship between technology utilization and emotional responses results in digital stress within contemporary society
Sevic <i>et al.</i> (2024)	<ul style="list-style-type: none"> - Developing reliable measurement tools to assess the effects of ICT and formulate strategies to enhance employee well-being is imperative.

Author (Year)	Findings
	<ul style="list-style-type: none"> - Digital Stressors Scale (DSS) was translated into Norwegian and administered it to 1,228 employees. The validity of the scale was evaluated utilizing confirmatory factor analysis. - The identified factors related to digital stress are Complexity, Conflicts, Insecurity, Invasion of Privacy, Overload, and Safety.
Pfaffinger <i>et al.</i> (2023)	<ul style="list-style-type: none"> - A study on digitalization's impact on employee well-being involved 95 participants over 14 days, testing three app-based interventions: 1) Meditation improved general well-being and recovery but did not reduce stress; 2) Cognitive-behavioral intervention decreased stress and enhanced well-being; 3) Informational intervention increased stress levels. No intervention affected ICT-specific well-being - While traditional app-based stress interventions can help with classic symptoms, they are ineffective for new stress types related to ICT.
S. Sharma & Gupta (2022)	<ul style="list-style-type: none"> - A survey conducted using Qualtrics collected data from 275 undergraduate students, and Partial Least Squares (PLS) analysis was employed to evaluate the data. - Digital stressors affect how individuals assess stress. Stress can be categorized as threats or challenges. - Interpersonal conflicts contribute to the overall stress experience. - Negative thought patterns contribute to emotion-focused coping strategies, while positive thoughts promote problem-focused coping strategies. - Emotion-focused coping has been found to diminish learning satisfaction, whereas problem-focused coping enhances it.
Ertl & Aal (2020)	<ul style="list-style-type: none"> - A qualitative study among 5 participants highlights barriers refugees face in accessing psychological support. - Insights from refugees, psychologists, and volunteers about mental health challenges. - ICT has the potential to increase awareness and resilience in refugee populations. - Innovative self-help methods like poetry therapy and bibliotherapy can be beneficial.
Nimrod (2018)	<ul style="list-style-type: none"> - A new scale has been developed to measure technostress in seniors. The scale focuses on five areas: overload, invasion, complexity, privacy, and inclusion. - Utilized in an online survey with 537 Internet users aged 60 and above. - Technostress affects both older adults and younger users, decreasing life satisfaction across age groups. - Individuals assess stress as a challenge or a threat based on their perceived ability to handle it. - Feeling competent leads to viewing stress as a challenge while feeling incompetent frames it as a threat.
Zhao <i>et al.</i> (2020)	<ul style="list-style-type: none"> - The survey focuses on full-time employees using ICTs at work. - A total of 513 respondents participated from 24 provinces in China. - Technostress affect how challenges are perceived, causing discomfort and lowering perceived benefits. - Psychological distancing offers mental relief but does not improve productivity.
Abbas <i>et al.</i> (2020)	<ul style="list-style-type: none"> - The study involved 301 surveys from university students in Surabaya, collected through random sampling. - Highlights the complexity and overload higher education students face due to increased technology. - Technostress (TS) has three dimensions: 1) Technology Overload: Feeling overwhelmed by too much technology; 2) Technology Complexity: Challenges arising from increased technology use; 3) Technological Uncertainty: Difficulties due to rapid technological advancements.
Natividad-Franco & Jesus (2022)	<ul style="list-style-type: none"> - The study was conducted with 515 students from the College of Information and Communications Technology, Bulacan State University, Philippines. - The survey was validated and sent to randomly selected students via messenger. Focus group discussion held with organization officers through Google Meet. - Students face new challenges in the "new normal" of education. - Common coping strategies include: Time management, Self-determination, Resting with mobile games, Socializing with friends, and Changing environments
Tafesse <i>et al.</i> (2024)	<ul style="list-style-type: none"> - The study focuses on the effects of excessive digital platform use on university students' well-being. - 142 students at a public university in the United Arab Emirates reported feeling overwhelmed by the vast content online. - Effective coping strategies enhance student engagement. - Coping strategies include: Reducing time on digital platforms, Limiting usage hours, Focusing on fewer platforms, and Utilizing educational resources like Wikipedia and Medium.
Galvin <i>et al.</i> (2022)	<ul style="list-style-type: none"> - A survey was collected from 894 university students in Greece, Italy, and the UK (April 7 - June 19, 2020). - The study investigated links between technology-related stressors, anxiety, and depression. - Coping styles were examined as potential mediators in these relationships. - Techno-overload is linked to increased work-home conflict and higher anxiety and depressive symptoms. - Both techno-overload and techno-ease influence anxiety symptoms through problem- and emotion-focused coping.
Hajriah <i>et al.</i> (2021)	<ul style="list-style-type: none"> - A qualitative study focuses on coping strategies of University students during social distancing. - The TikTok application is the primary platform being analyzed among four TikTok users - Implementing effective coping strategies during the social distancing associated with the COVID-19 pandemic is essential in mitigating boredom and minimizing stress. - Students predominantly utilized TikTok as emotional support during these challenging times.
Schmidt <i>et al.</i> (2021)	<ul style="list-style-type: none"> - The study employs a mixed-methods approach to investigate how adolescents cope with technostress. - It begins with qualitative research to identify coping responses. A quantitative survey follows to gather evidence on these responses and identify patterns and influencing factors.

Author (Year)	Findings
	<ul style="list-style-type: none"> - Adolescents experience high technostress due to daily ICT use while developing their identities and social skills. - Girls tend to use avoidance strategies more than boys. - Increased device ownership may result in less adherence to rules. - Coping responses to technostress tend to increase, although they vary among individuals.
Shen <i>et al.</i> (2022)	<ul style="list-style-type: none"> - A study involving 367 Chinese textile firms, which utilized questionnaires and multiple regression analysis - The adoption of digital technology positively affects transformation performance, with this relationship being mediated by digital dynamic capability. A strong orientation toward digital innovation enhances this relationship. - Firms that adopt digital technology at higher levels experience more significant benefits from transformation than those with lower adoption levels.
Varshney (2020)	<ul style="list-style-type: none"> - An exploratory study identifies techniques that enhance worker digital awareness and capabilities. - Digital transformation is vital for various business sectors and relies on digital technologies. - Companies acknowledge the need for digital skills but often face a shortage of skilled workers. - Developing skilled teams is essential for success in digital transformation.
Wen & Deng (2023)	<ul style="list-style-type: none"> - The study analyzed the impact of Intellectual Property Protection (IPP) on digital transformation (DT) in Chinese-listed companies from 2012 to 2020. - A significant positive relationship was found between IPP and firm DT. - IPP helps alleviate financing constraints and encourages research and development (R&D) investments. - Results highlight the importance of IPP in supporting digital transformation. Insights are provided to policymakers and firms to enhance their digital capabilities. - Digital transformation is now a common practice in many business sectors, and the widespread use of digital technology drives this change.
Eri <i>et al.</i> (2021)	<ul style="list-style-type: none"> - A study focuses on 687 students' perceptions of their digital skills, confidence, and resilience during and after the pandemic. - Younger students tend to adapt more readily to online learning than older students, although prior online experience can aid adaptation.
Ruan <i>et al.</i> (2020)	<ul style="list-style-type: none"> - A qualitative study involved 17 experts in social media education. - Thematic analysis identified four themes of digital identity: 1) Origins of digital identity, 2) Parallel growth of digital and professional identities, 3) Management of personal and professional identities, 4) Alignment of real and digital identities. - Social media influences professional identity, highlighting the need for further research.
Zayed (2024)	<ul style="list-style-type: none"> - A survey of 600 undergraduate students from Kafrelsheikh University, Egypt. - The study examined the relationship between academic well-being, digital resilience, digital stress, and social support in university students. - Positive correlation between academic well-being, digital resilience, and social support. Negative correlation with digital stress. - No significant gender differences were found; fourth-year students performed better than first-year students. - Highlights the importance of digital resilience, stress management, and social support for academic well-being.
Concilio <i>et al.</i> (2021)	<ul style="list-style-type: none"> - A study tested a 6-week digital intervention providing supportive messages to newly licensed graduate nurses (NLGNs). - The control group felt more social support from medical facts, but neither group experienced changes in stress, resilience, or job retention intention. - The intervention may help NLGNs feel more supported during their first year.
Xu <i>et al.</i> (2022)	<ul style="list-style-type: none"> - A survey was conducted with 600 Primary Care Providers (PCPs) across 18 community healthcare centres. - Key focus areas included eHealth literacy, anxiety, depression, social support, and resilience during the SARS-CoV-2 Delta variant outbreak in Guangzhou, China. - A moderate level of self-perceived eHealth literacy among PCPs. - Higher eHealth literacy was associated with lower anxiety and depression, more social support, and greater resilience.
Davies <i>et al.</i> (2023)	<ul style="list-style-type: none"> - Digital sovereignty research focuses on data control and its impact on political and organizational decisions. - Many industries do not fully understand the potential and implications of digital technologies. - Digitalization presents challenges, but leveraging personal data can benefit sustainable development.
Rubbio & Bruccoleri (2023)	<ul style="list-style-type: none"> - Healthcare professionals increasingly use digital health (DH) technologies to improve patient care and reduce operational failures. - Key technology: Computerized Provider Order Entry (CPOE) enhances the benefits of DH. - A model based on interviews in Italian hospitals links DH adoption to resilience, emphasizing the importance of staff knowledge and skills. - Increased resilience is associated with improved patient safety.
Getenet <i>et al.</i> (2024)	<ul style="list-style-type: none"> - A survey of 110 first-year students at a regional Australian university. - Positive attitudes towards digital technology and strong digital literacy enhance self-efficacy. - Boosted self-efficacy leads to increased online engagement. - Research underscores the importance of digital technology efficacy for cognitive involvement. - Emphasizes the need for proactive inquiry and a solid understanding of

Author (Year)	Findings
Lee <i>et al.</i> (2024)	<ul style="list-style-type: none"> - Case study on Taiwan's pandemic management during COVID-19. - Data collected through interviews, observations, and archival reports. - Digital technologies are vital for effective crisis management. - Four key patterns of digital resource orchestration were identified: Dual-purposing existing information systems, Balancing data exploitation, Enacting online co-production, and Augmenting social network effects.
Capodiecici <i>et al.</i> (2015)	<ul style="list-style-type: none"> - A prototype was developed to analyze cultural digital resources using social network analysis. - Initial experiment visualized connections between cultural resources and providers on the DiCet platform. - A second experiment used a web application to gather data from Europeana, revealing insights into key providers and resources. - The prototype identified "content gaps" in platforms like Europeana. - Findings assist policymakers in crafting marketing campaigns to promote tourism for cultural objects.

The digital resilience model in Figure 2. delineates how individuals develop digital resilience to manage stressors in the current era of technological disruption effectively. This process commences with the identification of digital stressors, followed by stress assessment, digital coping, and utilization of existing resources to facilitate optimal digital adaptation, thereby enhancing individual digital resilience in facing stressors.

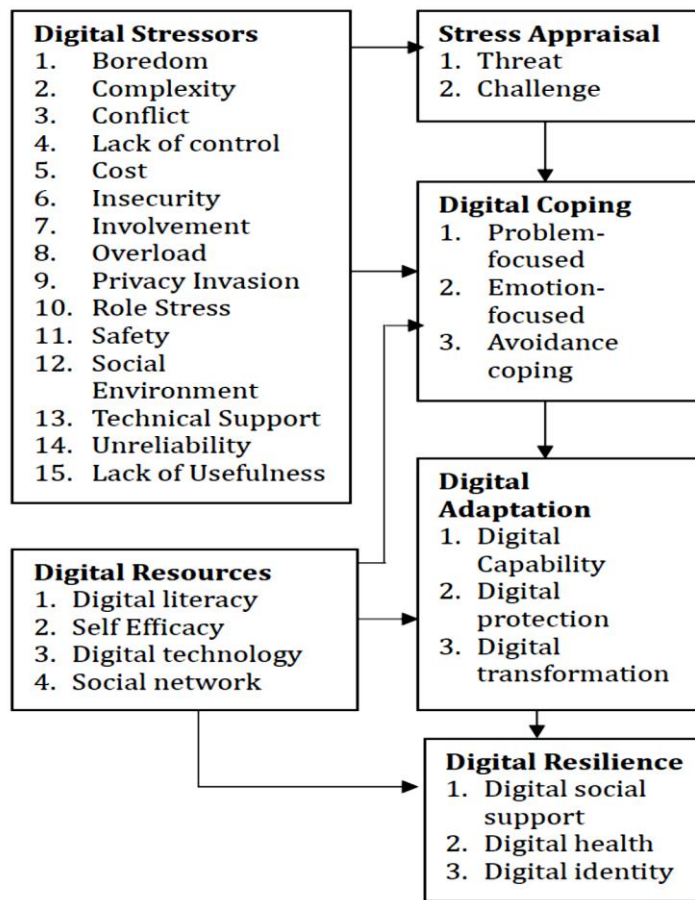


Figure (2): Framework of Digital Resilience as Inherent Capability to Dealing with Changes in Disruption Era
Source: (Lestari, 2024).

Digital stressors encompass boredom, complexity, conflict, lack of control, cost, insecurity, involvement, overload, privacy invasion, role stress, safety, social environment, technical support, unreliability, and usefulness. The presence of digital stressors significantly impacts an individual's stress appraisal, leading to the classification of these stressors as either threats or challenges. Subsequently, this stress influences the selection of digital coping mechanisms, encompassing problem-focused, emotion-focused, and avoidance coping. The effectiveness of these coping strategies directly influences an individual's capacity for digital adaptation. Digital adaptation, in turn, is shaped by Digital Capability, Digital Protection, and digital transformation. However, the efficacy of digital coping and adaptation is further augmented by providing adequate resources, enhancing an individual's agility in navigating technological advancements. These essential digital resources comprise Digital Literacy, Self-efficacy, Digital Technology, and Social Networks. Ultimately, adept digital adaptation fosters optimal digital resilience, further consolidated by Digital Social Support, Digital Health, and Digital Identity.

Results And Discussion

Resilience represents an inherent human capacity that is susceptible to cultivation and augmentation. It is an attribute attainable by all individuals, emphasizing acquiring essential skills. This capability entails the adept use of culturally relevant resources to preserve one's well-being, encompassing strategic planning, effective problem-solving, and proficient management of emotions and impulses. Resilience extends beyond a mere skill set; it embodies an adaptive quality. Therefore, it is crucial to have an in-depth knowledge of fundamental

concepts such as stress, coping mechanisms, and the complex array of coping resources that directly impact adaptation and resilience to gain a better comprehensive understanding of the digital resilience framework. The term "digital stress" or "technostress" denotes the challenges of integrating and using technology in individuals and organizations. This includes the stress caused by direct interaction with technology and the emotions and perceptions associated with adopting information and communication technology (ICT) in organizational settings and its widespread impact on society. Additionally, individuals may experience stress related to potential future ICT challenges, such as the perceived risk of job displacement due to automation. Collectively, these factors contribute to the experience of digital stress or technostress (Fischer *et al.*, 2021).

Digital stress involves exploring the various factors contributing to stress while using technology. These stressors can include feelings of boredom, dealing with complexity, experiencing conflicts, feeling a lack of control, incurring costs, feeling insecure, being overly involved, dealing with information overload, facing privacy invasions, experiencing role stress, safety concerns, navigating social environments, needing technical support, dealing with unreliability, and gauging the usefulness of technology. Incorporating Information and Communication Technology (ICT) can induce monotony by relegating essential tasks to automation, thereby augmenting the complexity of roles for individuals who face challenges in grasping software and blurring the boundary between professional and personal life (Fischer *et al.*, 2021; Sevic *et al.*, 2024). Furthermore, it can diminish occupational independence, increase costs, and evoke concerns regarding potential job displacement due to automation. Exclusion from involvement in decision-making processes related to technological changes may impact user satisfaction.

Digitalization has both good and bad effects on employees. A study with 95 participants over 14 days tested three app-based programs. The meditation program improved overall well-being and helped with recovery but did not reduce stress. The cognitive-behavioural program lowered stress, while the informational program increased it. None of the programs related to information and communication technology (ICT) affected well-being (Pfaffinger *et al.*, 2023). The stress experienced in confronting digital challenges must be addressed by considering the various factors that influence employees in this era of disruption. It is essential to employ therapeutic approaches tailored to the individual's needs.

Additionally, ICT can lead to excessive workloads, intrusions on privacy, role-related stress, safety concerns, undesirable social norms, and insufficient technical support. The unforeseeable behaviour of ICT and its lack of efficacy can also serve as stressors for individuals. Cumulatively, stressors associated with ICT can yield significant adverse effects on individuals' professional experiences and well-being, underscoring the importance of considering these factors in the development and implementation of technological frameworks.

The impact of digital stressors significantly influences an individual's stress appraisal, leading to their categorization as either threats or challenges. The use of technology inherently induces stress for individuals who must grapple with pressure, interpersonal conflicts, and personal responsibilities. This study demonstrates that negative thought patterns significantly influence the adoption of emotion-focused coping strategies, whereas positive thought processes promote the utilization of problem-focused coping strategies. Research indicates that emotion-focused coping tends to diminish learning satisfaction, while problem-focused coping is associated with enhancing this satisfaction (S. Sharma & Gupta, 2022).

Understanding how to cope with stress is essential, and interventions such as mindfulness have been developed to manage stress. Individuals can assess and respond to stress by categorizing it as either a challenge or a threat based on their evaluation of their ability to handle the situation. When individuals feel competent, they perceive stress as a challenge; when they do not, it is seen as a threat. This assessment triggers specific physiological responses, with challenges leading to improved performance compared to threats. Consistent perception of situations as threatening in the long term can have detrimental effects on mental and physical health. Therefore, an individual's ability to sense and respond to stress is crucial for enhancing performance and promoting overall well-being (Nimrod, 2018; Zhao *et al.*, 2020).

The obstacles to accessing therapy often include societal stigma, a shortage of multilingual mental health professionals, and pervasive feelings of shame associated with seeking help. This insight highlights the potential for information and communication technology (ICT) to enhance awareness and foster resilience among these populations. Furthermore, innovative approaches, such as poetry therapy and bibliotherapy, are recognized as valuable self-help resources (Ertl & Aal, 2020).

Technostress refers to the inability to effectively adapt to information and communication technologies (ICT), leading to excessive stress that surpasses available resources and disrupts an individual's adaptive state. The concept of technostress (TS) encompasses three distinct dimensions: technology overload, technology complexity, and technology uncertainty. Technology overload pertains to the sensation of being inundated by technology. Technology complexity pertains to the challenges that arise from the increased use of technology. Conversely, technological uncertainty denotes the difficulties encountered due to rapid technological advancements (Abbas *et al.*, 2020).

Coping mechanisms play a crucial role in preserving mental well-being and reducing perceived threats associated with technostress, which has been linked to conditions such as anxiety, depression, burnout, and suicidal ideation. Notable sources of technostress include techno-overload, work-home conflict, and the swift pace of change. Coping resources and environmental factors influence an individual's capacity to manage technostress. Coping styles encompass problem-focused, emotion-focused, and avoidance coping, with problem-focused coping recognized as the most effective. The efficacy of coping strategies may vary depending on the stressor and specific circumstances, and individuals may demonstrate diverse coping choices and levels of engagement in the given situation (Abbas *et al.*, 2020; Tafesse *et al.*, 2024).

Effective coping strategies to address challenges in the digital landscape encompass strong time management, self-determination, recreational mobile gaming, social interaction with peers, and altering one's environment. Furthermore, additional strategies may include minimizing the time spent on digital platforms, establishing usage limits, concentrating on a select number of platforms, and leveraging educational resources such as Wikipedia and Medium. Implementing such effective coping strategies correlates with enhanced engagement among students (Natividad-Franco & Jesus, 2022; Tafesse *et al.*, 2024).

The excessive use of technology has been linked to the onset of mental health issues. Employing problem-focused coping strategies help mitigate existing problems, while emotion-focused coping techniques can exacerbate symptoms of mental health issues. However, emotion-focused coping, such as seeking online social support, may positively influence an individual's well-being. The increased reliance

on technology may have contributed to the heightened prevalence of mental health issues among students. Communication through various ICT channels can be mentally taxing and stressful, potentially leading to heightened mental health symptoms. On the other hand, technology-induced stress may enhance productivity for specific users, creating a perception of increased efficiency despite potential adverse effects on mental health (Galvin *et al.*, 2022; Hajriah *et al.*, 2021; Natividad-Franco & Jesus, 2022; Schmidt *et al.*, 2021).

Schmidt *et al.* (2021) discovered that adolescents experience significant technostress due to their daily use of information and communication technologies (ICT) while they develop their identities and social skills. Research also indicates that females are more likely to employ avoidance strategies in response to technostress than their male counterparts. Additionally, increased device ownership may lead to a diminished adherence to established rules. Although coping mechanisms employed to manage technostress are generally on the rise, they differ among individuals.

In digital resilience, the efficacy of specific coping mechanisms may influence an individual's capacity to acclimate to the digital landscape. Digital adaptation under the digital resilience framework encompasses digital capability, digital protection, and digital transformation. Adopting digital technology and implementing digital transformation can be made more accessible by using digital dynamic capabilities (Shen *et al.*, 2022). Digital adaptation is exemplified through digital innovation, which can positively influence technological advancements. For instance, effective leadership is crucial in developing digital technology within the facilities and infrastructure staff and other stakeholders utilize. This process is designed to be sustainable over time. This approach enables adaptive leaders to make informed decisions regarding digital transformation strategies. The prevalence of digital transformation practices across diverse business sectors can be attributed to the comprehensive integration of digital technologies. Digital transformation has become a common practice across various business sectors, thanks to the extensive integration of digital technology. Furthermore, establishing an agile team is crucial for achieving goals and helping employees align with ongoing digital transformation efforts (Varshney, 2020; Wen & Deng, 2023).

Digital resilience encompasses the aspects of digital social support, digital health, and digital identity. When individuals address technostress, coping strategies entail internal management, while social support originates from external sources, such as family, friends, and educators, and social media platforms. Social support substantially contributes to individuals' ability to adapt to stress (Eri *et al.*, 2021; Ruan *et al.*, 2020; Zayed, 2024). Seeking guidance and support constitutes a coping mechanism, and diverse forms of social support—informational, tangible, and emotional—prove more effective in varying stress-inducing scenarios. Action-oriented support is most advantageous in controllable situations while nurturing support is more suitable in uncontrollable circumstances. Problem-focused coping strategies are effective in controllable situations, while emotion-focused coping is more applicable in uncontrollable situations. The utilization of digital media can be considered a controllable situation, whereas the use of other forms of digital media is deemed uncontrollable (Concilio *et al.*, 2021; Pfaffinger *et al.*, 2023). Furthermore, a higher level of eHealth literacy was associated with reduced anxiety and depression, increased social support, and enhanced resilience during pandemic in community health center. Recommendations were made to improve primary care providers' access to reliable online information (Xu *et al.*, 2022).

In the current era of disruption, resilient social systems are expected to demonstrate the ability to adapt and respond to various threats (Brende & Sternfels, 2022). Strategies to enhance individual resilience encompass collaborative approaches, capacity building, demand aggregation, and the careful management of production and outsourcing. The role of information and communication technology (ICT) in the healthcare sector has significantly evolved, posing challenges in sustaining essential healthcare services while addressing the changing crisis. Incorporating ICT from Society 5.0, including big data and cloud computing, has become indispensable in Healthcare 5.0 for real-time customization and patient-centred care. Digital health applications can bolster resilience in individual health status, afford health protection and elevate the quality of healthcare services (Davies *et al.*, 2023). A study conducted through interviews in Italian hospitals establishes a correlation between adopting digital health (DH) technologies and organizational resilience. It highlights the significance of staff knowledge and skill development. Enhanced resilience is linked to improvements in patient safety outcomes (Rubbio & Bruccoleri, 2023).

The secure management of digital identities is crucial for accessing various digital services. In the face of growing cyber threats, safeguarding these identities has become increasingly important. Supporting individual identities is also necessary for digitalizing credentials, which improves security and convenience. Self-sovereign identity (SSI) gives individuals control over their data through encrypted credentials stored on their devices, ensuring privacy and security. SSI credentials are managed using an owner-centric algorithm and privacy-preserving measures, with threat modelling done through the Owasp Dragon tool. A key recovery algorithm and trust score mechanism are also implemented to enhance security and establish trust in verified credentials. By leveraging Hyperledger Fabric, intelligent contracts enforce context-aware policies for controlled access and auditability within the Digital Health Ecosystem. Electronic healthcare involves IoT devices such as wearable health monitors and electronic health records (EHRs), storing sensitive information to enhance healthcare services for relevant stakeholders (Rubbio & Bruccoleri, 2023).

Digital resilience's effectiveness hinges on carefully considering individuals' digital resources. These resources encompass digital literacy, self-efficacy, access to digital technology, and the strength of their social networks (UNESCO, 2021). Cultivating social connections is paramount in fostering interpersonal relationships and a feeling of inclusion, particularly in an era where numerous activities are carried out in virtual spaces. Research indicates that confidence in utilizing digital technology has a constructive influence on individual involvement, as evidenced by the propensity to seek assistance, establish connections, and foster a sense of community. Moreover, the study underscores the significance of social networking and digital technology efficacy in facilitating more effective task accomplishment. Conversely, proficiency in digital literacy and the adept utilization of existing technology can enhance the assimilation of prior and novel knowledge. The research validates the contribution of digital technology efficacy in enriching cognitive involvement, emphasizing the importance of proactive inquiry and comprehensive disciplinary understanding. Active engagement on an individual level in various undertakings can bolster the favourable impact of digital technology efficacy (Getenet *et al.*, 2024; Lee *et al.*, 2024). In another study by Capodieci *et al.* (2015), a prototype was developed to analyze cultural digital resources utilizing social network analysis, identifying "content gaps" within platforms such as Europeana. These findings provide valuable insights that assist policymakers in formulating marketing campaigns to promote tourism related to cultural resources. Providing ample resources and bolstering individuals' capacity to navigate technological advancements to maximize digital coping and adaptation adeptly is crucial (Capodieci *et al.*, 2015; Getenet *et al.*, 2024).

A previous study assessing factors that can enhance digital literacy has demonstrated that motivation plays a crucial role in learning, particularly in the growing adoption of e-learning methodologies. The availability of tablets and smartphones significantly increases individuals' motivation, as these devices facilitate the acquisition of essential knowledge and skills necessary to achieve academic and professional objectives (Monaem & Aljarousha, 2023). Furthermore, the adaptive factors enhancing individuals' resilience include faith, education, optimism, love, joy, and social support (El-Nabih & Firwana, 2021).

This study provides a broad overview of the relationship between stress and the challenges of navigating digital advancements. However, there is a scarcity of empirical research that effectively supports this examination across various countries that are encountering similar obstacles in pursuing digital resilience.

Conclusion

In conclusion, the discourse above underscores the importance of cultivating digital resilience through a deliberate and systematic approach. This approach commences with identifying and comprehending digital stressors, followed by evaluating their impact. Subsequently, it entails the development and implementation of digital coping mechanisms, along with the utilization of available resources to facilitate successful digital adaptation. This process empowers individuals to strengthen their capacity to navigate and manage stress stemming from the pervasive use of modern technology.

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