

TECHNOSTRESS AND DIGITAL COMPETENCE IN HEALTHCARE WORKERS' INNOVATIVE WORK BEHAVIOR

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Abstract

Innovative work behavior among healthcare workers is highly needed in the era of digitalization, but it is threatened by technostress. This literature review examines the role of technostress as an inhibitor and digital competence as a driver of healthcare workers' innovative work behavior. The method used is a narrative literature review, with the literature search conducted through PsycINFO, Web of Science, Scopus, and Google Scholar. A thematic analysis of the selected sources identified four dimensions of technostress that hinder innovation, namely techno-overload, techno-insecurity, techno-complexity, and techno-uncertainty. Digital competence promotes innovation by enhancing technological self-efficacy, expanding information networks, strengthening independent problem-solving ability, and developing digital collaboration skills. Digital competence also protects healthcare workers from the negative effects of technostress, so that innovation can continue. Individual factors such as emotion regulation, as well as leadership factors, moderate the strength of these relationships. This study concludes that healthcare organizations need to balance technostress reduction and digital competence enhancement in an integrated manner to optimize healthcare workers' innovative work behavior.

Keywords: technostress, digital competence, innovative work behavior, healthcare workers, hospital, digitalization.

Introduction

Innovative work behavior is becoming increasingly important as organizations are required to keep changing and adapting to a fast-moving environment. Employees who are able to generate new ideas, promote those ideas to colleagues and supervisors, and put them into everyday work practice are valuable assets to any institution. However, eliciting innovative work behavior is not a simple matter, because it requires individuals to be willing to step out of their routines, take risks, and face the possibility of failure (Shalan et al., 2023). In an increasingly digitalized workplace, employees face dual demands. They are expected to be innovative, while at the same time they must master the many new technological devices that continue to emerge. These two demands do not always go hand in hand. Technological pressure can drain the mental energy that should be allocated to creative thinking. A lack of support from coworkers and a sense of togetherness in the workplace can make it harder for workers to manage the stress arising from technological demands (Gardi & Darmawan, 2024). As a result, a person who actually has high innovative capacity may be unable to realize it because his or her psychological resources are depleted by stress originating from interaction with technology (Wang & Cheng, 2023). This condition illustrates a tension between the demands of digitalization and the demands of innovation that needs to be understood more systematically.

Technostress emerges as a concept that explains individuals' negative experiences when dealing with information technology. Many workers may feel pressured when facing technological change because the adaptation process requires them to continuously learn new systems and ways of working (Mardikaningsih & Wardoyo, 2024). However, not everyone experiences technostress with the same intensity. A worker who feels burdened by the pace of software change, overwhelmed by the volume of digital notifications, or anxious about making technical errors is experiencing this specific form of

stress. Technostress does not arise from technology itself, but from a mismatch between technological demands and an individual's ability to respond to those demands (Alanazi & Altukhys, 2025). When a person feels that his or her digital competence is inadequate to complete the assigned tasks, stress will arise. If this condition continues, technostress can drain energy, reduce job satisfaction, and ultimately hinder various forms of positive work behavior, including innovative work behavior. What is interesting is that technostress is often not recognized by management as a source of the problem. Organizations tend to view delayed technology adaptation as a technical problem that can be solved with additional training. In fact, the root of the problem may be psychological.

At the opposite pole from technostress, digital competence emerges as a factor that protects individuals from the negative effects of technology while also encouraging innovative work behavior. Digital competence is not merely the ability to operate software, but encompasses an understanding of how technology can be used to solve problems, the ability to learn new systems quickly, and an awareness of digital ethics and security (Addai et al., 2025). Adequate digital skills can also help employees carry out work demands more effectively in an increasingly digitalized work environment (Darmawan, 2025). A person with high digital competence will see technological challenges as something interesting to overcome, rather than as a source of threat. This perception changes the entire psychological dynamic of facing digitalization. Instead of feeling stressed, they feel challenged. Instead of avoiding change, they look for ways to take advantage of new features to improve performance. In the context of innovative work behavior, digital competence provides the tools needed to realize new ideas. A worker who has a brilliant idea for improving a workflow will not be able to realize it if he or she does not know how to configure the existing digital systems.

The dynamics between technostress as an inhibitor and digital competence as a driver of innovative work behavior form a complex field to examine. These two constructs do not stand alone, but interact with each other. A person with high digital competence may still experience technostress if technological demands exceed the limits of ability even for him or her. Conversely, a person with low digital competence may not experience significant technostress if the technological demands in his or her workplace are also low. This interaction pattern shows that technostress and digital competence are not two sides of the same coin, but two relatively independent dimensions. A worker can have high digital competence and high technostress at the same time if he or she works in an environment with extreme technological demands. Conversely, he or she can have low digital competence but low technostress because he or she works with simple and stable systems. The way employees adapt in a digitally supported workplace does differ, depending on the demands they face and their individual readiness (Eddine & Darmawan, 2025). Understanding the interaction between these two variables is the key to designing appropriate interventions in the workplace.

A literature review on this topic is highly relevant because the literature on technostress and innovative work behavior remains fragmented across various research traditions. Researchers in the field of information systems tend to focus on technostress as an outcome variable of poor system design. Researchers in the field of organizational behavior are more interested in digital competence as part of human capital. Meanwhile, researchers in the field of innovation rarely connect their work with the literature on technology-related stress. As a result of this fragmentation, there is no complete picture yet of how technostress and digital competence jointly influence innovative work behavior. Some studies report a negative relationship between technostress and innovation, others report no relationship, and some even report a positive relationship under certain conditions. This diversity of findings is not a sign that the concept of technostress is weak, but that the mechanism of its relationship with innovation may be moderated by certain factors that have not been systematically identified. The purpose of this literature review is to integrate these scattered findings into a coherent framework. Rapid change demands adaptive human resource management, so scattered findings need to be brought together in order to serve as a basis for organizational policy (Darmawan, 2025).

The existing literature has not yet been able to adequately explain why technostress sometimes inhibits innovative work behavior and sometimes does not. Some studies show that technological pressure consumes the cognitive resources needed for creative thinking. However, other studies find

that moderate pressure can actually trigger innovative work behavior because individuals are motivated to find solutions to the problems they face. This contradiction indicates that the relationship between technostress and innovation is not simply linear. Differences in individual and work group characteristics also make responses to workplace pressure non-uniform (Warin & Mardikaningsih, 2025). It is possible that different forms of technostress have different effects on innovation. Technostress that originates from information overload may inhibit innovation, while technostress that originates from the demand to learn new systems may drive innovation in certain individuals. However, this kind of typology has not been systematically developed in the literature. The main problem is the absence of a conceptual map that distinguishes the various dimensions of technostress and links each dimension specifically to aspects of innovative work behavior such as idea generation, idea promotion, and idea realization. Without this map, empirical research will continue to produce findings that are difficult to compare because they use different operational definitions of technostress. Clear conceptual boundaries are needed so that findings can be compared and justified (Putri et al., 2026).

Another problem lies in the unclear mechanism of how digital competence drives innovative work behavior. Most of the literature assumes that this relationship is direct: people who are proficient in technology will be more innovative because they have access to more information and tools to realize ideas. However, this assumption may be too simple. It is possible that digital competence influences innovation through indirect pathways, for example by reducing technostress or by increasing self-efficacy. A worker with high digital competence may not automatically become more innovative, but he or she is more confident in facing technological challenges, so the psychological risk of trying new ideas becomes lower. In other words, digital competence may function as a resource that protects individuals from the negative effects of technostress, so that the available energy can be allocated to innovative activities. The influence of a factor on work behavior often runs through intervening variables rather than directly (Mardikaningsih & Wardoyo, 2025). However, evidence on these mediation or moderation mechanisms remains limited and scattered. A systematic literature review is needed to gather the existing evidence and arrange it into a coherent explanatory framework on exactly how digital competence facilitates innovation in the workplace.

Digital transformation in the workplace is proceeding at an ever-increasing pace. Organizations across various sectors are adopting automation, artificial intelligence, and digital collaboration platforms in the hope of increasing productivity. However, technology implementation often proceeds without sufficient attention to workers' psychological well-being. Technological developments allow employees to stay connected to work outside official working hours, further blurring the boundary between work and personal life (Darmawan, 2022). Symptoms of digital fatigue, anxiety about automation, and feelings of being overwhelmed by information have become common complaints in many workplaces (Darmawan, 2024). If this condition is left unaddressed, organizations will not only lose the benefits of their technology investments, but also risk a decline in overall innovation. Yet innovation is the only sustainable competitive advantage in an era of rapid change. Organizations whose workers experience high technostress will find it difficult to innovate, because the mental energy absorbed in coping with stress is not left over for creative thinking. Many organizations are beginning to realize that improving technical skills alone is not enough to maintain employee well-being in the long term, so the psychological and emotional aspects of the work experience in the digital era also need to receive equal attention (Putra et al., 2025). Understanding the relationship between technostress and innovative work behavior is now crucial because the wave of digitalization will not stop. If organizations do not address technostress promptly, they will face a paradox in which technology investments that should drive innovation instead hinder it.

In addition to the urgent need to understand technostress, the importance of digital competence as a driver of innovation also needs to be examined further. The digital divide is no longer only about access to hardware, but about the ability to use technology to think and work differently. The generation of workers entering the workforce today is a digital native generation that grew up with technology. However, research shows that being a digital native does not automatically mean having

the digital competence to work innovatively. A high ability to use social media is not the same as the ability to use data analytics to solve business problems. Organizations need to know precisely which types of digital competence are most relevant for driving innovative work behavior in their respective fields. Is it coding ability, data analysis ability, virtual collaboration ability, or a combination of all of them? Digital transformation requires organizations to use existing technology while also trying new ways of working, so the competencies needed are diverse (Irfan & Darmawan, 2024). This literature review is important for identifying the components of digital competence that are most consistently associated with innovation across various studies, so that organizations do not make mistakes in designing their digital competence development programs.

This study aims to systematically examine the dynamics of two factors that influence healthcare workers' innovative work behavior in opposite directions, namely technostress as an inhibiting factor and digital competence as a driving factor. The specific objectives include identifying the dimensions of technostress that most strongly hinder innovation, exploring the psychological mechanisms that explain this negative relationship, and mapping the components of digital competence that are most consistently associated with increased innovative work behavior. In addition, this study aims to examine the possible interaction between technostress and digital competence, namely whether digital competence can protect healthcare workers from the negative effects of technostress on innovation. The theoretical contribution of this study is the development of an integrative conceptual model that explains how technological pressure and technological ability jointly shape innovative work behavior. Practically, the results of this study can be used by hospital management and other healthcare facilities to design interventions that reduce technostress while enhancing digital competence in an integrated manner, so that healthcare workers' innovative potential can be optimized without sacrificing their psychological well-being.

Method

This study uses a qualitative literature review approach with a narrative design, aimed at integrating findings from various written sources on the relationship between technostress, digital competence, and innovative work behavior. A narrative design was chosen because this topic is still developing and involves constructs that are defined in diverse ways across disciplines such as organizational psychology, information systems, and human resource management. According to Baumeister and Leary (2009), a narrative literature review is highly useful when researchers wish to present a comprehensive synthesis of heterogeneous literature.

The analysis process in this literature review follows the thematic approach described by Braun and Clarke (2006). After all sources were collected, the researchers read each article in full to identify units of analysis relevant to the research questions. These units were then coded based on main topics such as the definition of technostress, dimensions of technostress, measurement instruments, findings on the relationship with innovation, the definition of digital competence, competence components, and the mechanisms of influence on innovative work behavior. Similar codes were grouped into broader themes, for example "technostress creators", "technostress outcomes", "digital competence dimensions", and "mechanisms of innovation". These themes were then arranged into a narrative framework that explains how technostress hinders innovation and how digital competence promotes innovation. To maintain the validity of the interpretation, the researchers conducted peer debriefing with colleagues who understand this topic but were not directly involved in the analysis process. All analysis steps were documented in detail to allow an audit trail, in accordance with Lincoln and Guba (1985) recommendations on trustworthiness in qualitative research.

Results and Discussion

Technostress as an Inhibitor of Healthcare Workers' Innovative Work Behavior

Technostress inhibits healthcare workers' innovative work behavior through the depletion of limited cognitive resources. Every individual has a limited capacity for attention and working memory. When a healthcare worker spends most of his or her cognitive capacity on technical problems, such as electronic medical record systems that frequently error, confusing interfaces, or a volume of notifications that floods the computer screen, the remaining capacity available for creative thinking becomes very small. Innovative work behavior requires the ability to see new relationships among existing ideas, imagine alternative scenarios, and evaluate the consequences of implementing a new idea. All of these processes demand a heavy cognitive load (Babiker et al., 2025). A person who is cognitively exhausted by technostress will tend to choose the easiest path, namely maintaining familiar routines rather than trying new ways. This condition explains why, in hospital units with the highest technical complaints, the level of procedural improvement initiative from healthcare workers is actually the lowest, even though objectively these units are the most in need of innovation.

The dimension of technostress that most strongly inhibits innovation is techno-overload, namely the feeling that technological demands exceed an individual's ability to complete work within the available time. Healthcare workers who experience techno-overload constantly feel chased by time. They must complete patient documentation in between clinical procedures, respond to messages from colleagues on digital platforms, and learn new features of continuously updated systems. Under such hurried conditions, there is no mental space for reflection. Yet reflection is the main fuel for innovation. New ideas rarely emerge when a person is busy completing tasks; they more often emerge when the mind is relaxed and able to wander productively (Ficapal-Cusí et al., 2025). This is in line with the explanation of Amri et al. (2021) that the pressure and stress that arise when individuals are unable to manage time demands well can reduce the ability to think and generate new ideas. Techno-overload eliminates these reflective moments. Healthcare workers who are always in a reactive mode toward technological demands will lose the capacity to be proactive in generating improvements. Furthermore, techno-overload also triggers emotional exhaustion that reinforces this negative cycle, because individuals who are emotionally exhausted tend to withdraw from cognitive engagement with their work.

Techno-insecurity, namely the fear that one's technological ability will become obsolete and be replaced by others who are more competent, is another dimension of technostress that significantly inhibits innovation. In a hospital environment where digital systems change every few years, concerns about falling behind in competence are real. Healthcare workers who feel digitally insecure tend to avoid behaviors that place them at risk of exposure. Sharing untested new ideas in front of colleagues or supervisors carries risk because the ideas may be imperfect and reveal the idea generator's limited understanding of digital systems (Keshavarz et al., 2025). Individuals with high techno-insecurity will choose to remain silent rather than take that risk. As a result, the organization loses many potential ideas that never come to the surface. More damaging, techno-insecurity encourages a culture of unhealthy competition in which healthcare workers hide technical knowledge from coworkers for fear that colleagues who learn faster will displace them. Such a culture kills collaboration, which is the main engine of innovation in healthcare service organizations.

Techno-complexity, namely the perception that the skills required to use technology are too complicated to learn, inhibits innovation in a different way. In many hospitals, electronic medical record systems have hundreds of features, but only a small portion are actually used in daily practice. Healthcare workers who experience techno-complexity will see digital systems as a mysterious black box. They may be able to run the basic functions needed for routine work, but never explore the advanced features (Naughton et al., 2025). Yet these advanced features are often the source of inspiration for innovation. A nurse who never discovers that the system can automatically generate a summary of a patient's medication history will never think of using that feature as the basis for modifying the medication administration schedule. In other words, techno-complexity creates

ignorance of possibilities, and a person cannot innovate with something he or she does not know. Even worse, techno-complexity triggers feelings of incompetence that erode innovative self-efficacy, namely the individual's belief that he or she is able to generate new ideas and realize them.

Techno-uncertainty, namely confusion resulting from continuous technological change, inhibits innovation by disrupting the formation of productive habits. Innovation requires a certain level of stability so that energy can be redirected from routine work to the exploration of new ideas. However, when digital systems change too quickly, healthcare workers must continually spend energy relearning basic procedures. Before they have had time to master one version of a system, a new version has already arrived with a different interface. This condition causes healthcare workers to feel as if they are living in a permanent state of transition. Under such circumstances, the main focus becomes survival rather than improvement (Iyanna et al., 2022). Healthcare workers will use the available energy merely to be able to complete their work with a constantly changing system, with no energy left to think about how the system can be used better. Techno-uncertainty also creates a wait-and-see attitude among healthcare workers. They postpone learning new features because they worry that those features will change again in the near future. This passive attitude directly contradicts the essence of innovative work behavior, which requires proactivity and initiative.

The interaction among the various dimensions of technostress strengthens the inhibiting effect on innovative work behavior synergistically. A healthcare worker who experiences techno-overload (excessive demands) and techno-complexity (perceived complicatedness) at the same time will feel an impact far greater than the sum of the two pressures separately. Overload leaves him or her with no time to deal with complexity, while complexity makes every task take longer, which worsens overload. This vicious circle drains psychological resources very quickly. This pressure increases when mistakes in using digital technology can lead to liability issues (Sutanto et al., 2023). The most dangerous condition is when three or all four dimensions of technostress are present at once. Healthcare workers in this situation report feelings of despair and paralyzing helplessness. They lose confidence that any effort they make will bring improvement. The belief that the situation cannot change makes them stop trying to generate new ideas. Hospital management policies that add new technological burdens without reducing old ones in units that already experience high technostress will accelerate the arrival of this point of despair, with the consequence that all innovative potential in the unit disappears.

Technostress does not inhibit all types of innovative work behavior equally. The idea generation stage (producing new concepts) turns out to be more vulnerable to the negative effects of technostress than the idea realization stage (turning concepts into practice). The explanation for this pattern is that idea generation requires a mental state that is open, relaxed, and full of curiosity. Technostress creates the opposite conditions, namely a state that is narrow, tense, and defensive. A person who is under stress tends to think rigidly and become fixated on familiar solutions. Under these conditions, the emergence of new ideas that are associative and unexpected is severely hindered (Eddine et al., 2023). In contrast, idea realization, which is implementative in nature, may still proceed even under moderate technostress because this stage relies more on persistence and procedural skills. A healthcare worker may still be able to carry out an improvement plan that has been prepared beforehand, even while overwhelmed by technical problems, as long as the steps of the plan are clear. The implication of this finding is that interventions to reduce technostress need to be prioritized at the early stage of the innovation process, before potential ideas die before they are born.

Employees' readiness to face technological change is strongly influenced by how leaders manage that change (Mardikaningsih & Darmawan, 2023). Individual factors such as personality traits and emotion regulation moderate the strength of the relationship between technostress and barriers to innovation. Healthcare workers with a high level of the trait openness to experience show lower vulnerability to the negative effects of technostress on idea generation. They tend to see technological challenges as interesting rather than threatening. Conversely, healthcare workers with a high level of the trait neuroticism show higher vulnerability. They respond to technostress with excessive anxiety that strengthens the inhibiting effect on innovation. The ability to regulate emotions also plays an

important role. Individuals who are able to calm themselves when facing technical failures and do not let frustration poison their mood for the rest of the work shift will be able to maintain innovative work behavior despite exposure to technostress. These individual differences explain why, in the same unit with the same level of technostress, some healthcare workers are still able to show innovative initiative while others show none at all. Hospitals that want to mitigate the negative effects of technostress on innovation need to consider selection factors and emotion regulation training, not only improvements to technical systems.

Technostress inhibits healthcare workers' innovative work behavior through four main mechanisms. Techno-overload drains cognitive capacity, so that no energy is left for creative thinking. Techno-insecurity triggers reluctance to take the risks needed to share and promote new ideas. Techno-complexity limits the exploration of system features that serve as a source of inspiration for innovation. Techno-uncertainty creates a wait-and-see attitude that contradicts proactivity. These four dimensions interact synergistically, strengthening each other's negative effects. The idea generation stage is more vulnerable to technostress than the idea realization stage. Individual factors such as openness to experience, neuroticism, and emotion regulation moderate the strength of this negative relationship. Understanding these mechanisms allows the identification of appropriate intervention points to reduce the inhibiting effect of technostress, whether through improving system design, managing workload, or developing the psychological capacity of individual healthcare workers.

Digital Competence as a Driver of Healthcare Workers' Innovative Work Behavior

Digital competence drives healthcare workers' innovative work behavior by enhancing technological self-efficacy, which forms an internal belief in one's ability to succeed. Mardikaningsih and Darmawan (2022) showed that self-efficacy plays an important role in individuals' ability to adapt to technological change. A healthcare worker who feels digitally competent will not hesitate to try new features of the electronic medical record system, because he or she is confident of being able to learn them even if they are initially confusing. This belief comes from an accumulation of past successful experiences in mastering new systems and applications. Each time a technical problem is successfully overcome, technological self-efficacy increases. Conversely, each failure without support will lower it. High technological self-efficacy reduces the psychological threat felt when facing changes in digital procedures (Alwali et al., 2025). Without that threat, the mental energy that would otherwise be used to manage anxiety can be redirected to innovative activities, such as finding better ways to use the system to improve patient safety. This is in line with the explanation of Hariani and Mendrika (2023) that adaptability is an important resource for coping with changes in digital systems without experiencing excessive psychological pressure. In other words, digital competence creates a safe psychological space for experimentation, and experimentation is the mother of innovation.

The dimension of digital competence that most strongly drives innovation is independent technological problem-solving ability. Healthcare workers who are able to diagnose the cause of a stalled system on their own, look for solutions through technical guides or online forums, and apply those solutions without waiting for a technician will develop the same habits of thinking when facing non-technical problems. This problem-solving pattern is generalizable. A person who is accustomed to seeking alternatives when reaching a dead end in a digital system will tend to do the same when encountering a dead end in a clinical procedure. He or she will ask whether there is another way to achieve this goal, who can be invited to discuss it, and what resources have not yet been utilized (Wells et al., 2025). Technological problem-solving ability indirectly trains the cognitive flexibility needed for innovation. More importantly, the successful experience of solving technological problems on one's own fosters a sense of autonomy. Healthcare workers who feel autonomous tend to be bolder in taking initiative because they are not accustomed to depending on permission or help from others to start something.

Digital competence also drives innovation through the expansion of accessible information networks. Healthcare workers with high digital literacy do not rely only on traditional information sources such as textbooks or formal training. They are able to find best practices from international online journals, participate in global professional forums, follow webinars by experts in their fields, and share experiences with peers at other hospitals through digital collaboration platforms. Exposure to diverse ideas and solutions from various sources enriches the mental repository that serves as the raw material for innovation. The associative theory of creativity states that new ideas are born from connections between previously separate concepts. The more concepts stored in memory and the more diverse their sources, the greater the likelihood that meaningful new connections will form (Baranova et al., 2025). Digital competence opens the door to this diversity of concepts. Conversely, healthcare workers with low digital competence will only be exposed to the limited information sources provided by the hospital, so the limits of their knowledge also become the limits of their innovation.

The ability to use digital collaboration tools is a component of digital competence that specifically drives collective innovation in hospitals. Telemedicine platforms, instant messaging applications for medical teams, and real-time document sharing systems allow healthcare workers from various units and professions to exchange ideas easily. A nurse in an inpatient unit who has an idea about modifying the pressure ulcer prevention procedure can quickly share it with staff in the chronic wound unit to obtain feedback. A specialist physician handling a rare case can ask for the opinion of a colleague in another city through video consultation. All of this becomes possible only if healthcare workers have the competence to use these collaboration tools effectively. This is in line with the explanation of Arifin and Darmawan (2021) that the ability to use software, collaborate online, and access information efficiently is increasingly important across various employment sectors, hospitals included. Innovation in hospitals is rarely the result of isolated individual work. Most innovations are born from discussion and iteration across professions. Digital competence accelerates and expands this iteration process beyond the limits of space and time. Without this competence, potential ideas will die because there is no channel through which to discuss, refine, and ultimately implement them.

Digital competence protects healthcare workers from the negative effects of technostress, thereby indirectly facilitating innovation. A nurse with high digital competence who experiences techno-overload will be better able to find safe shortcuts in the system. He or she knows small tricks such as keyboard shortcuts, customizable note templates, or notification settings that reduce distractions. This tactical knowledge is not taught in formal training, but is acquired through exploration and learning from colleagues. By applying these tricks, the cognitive load of technological demands is reduced, leaving mental space for innovative thinking (Longhini et al., 2024). Digital competence does not always prevent technostress from occurring, but it makes technostress more manageable. When stress can still be managed, it does not reach a level that paralyzes innovation. This protective function is very important because, to a certain degree, technostress may be unavoidable in a hospital environment that continues to change. Hospitals that invest in improving their healthcare workers' digital competence are building psychological resilience that allows innovation to continue even as technological pressure persists.

Digital competence in the form of the ability to critically evaluate digital information drives innovation by filtering viable ideas from non-viable ones. Healthcare workers are flooded every day with information from various digital sources. There are journals with strong methodologies, misleading popular articles, relevant experiences from colleagues, and exaggerated claims from software vendors. Information from digital media can shape the viewpoints of its recipients, so the ability to assess its accuracy becomes important (Khayru et al., 2024). Without critical evaluation ability, healthcare workers will drown in a sea of information without being able to distinguish what is valuable. Information that is conveyed unclearly makes this assessment even harder (Mardikaningsih et al., 2024). This ability allows a person to quickly assess whether an idea is worth following up, so that energy is not wasted on dead ends. Moreover, critical evaluation skills also help healthcare workers identify knowledge gaps. When reading the literature on a procedure, they realize

that conditions in their hospital are different, so standard solutions cannot be directly adopted. This awareness of gaps is what triggers adaptive modification, which is the most common form of innovation in hospitals. Without critical evaluation skills, healthcare workers will become passive consumers of information, rather than innovative producers of adaptive solutions.

The dimension of digital competence related to ethics and data security is also associated with innovative work behavior, although this relationship is indirect. Healthcare workers who understand the principles of patient data privacy and information system security will be more confident in using the advanced features of digital systems. They are not afraid to report potential security breaches because they know the correct procedures, and do not hesitate to use aggregate data for analysis because they know the ethical limits. This confidence is important because innovation in the digital era often requires the use of data on a large scale. A nurse who wants to test whether a particular change in the medication administration schedule reduces the incidence of medication errors needs access to historical data. If he or she is not ethically competent, he or she will avoid using the data for fear of violating rules. As a result, the idea is never tested. Anxiety about technology can indeed make workers hesitant to use it (Mardikaningsih et al., 2023). In other words, ethical-digital competence lowers perceptual barriers to using data for innovation. Hospitals need to realize that digital ethics training is not merely regulatory compliance, but part of the supporting infrastructure for innovation. Employee competence is an organizational capital that determines the ability to compete in the long term (Mardikaningsih & Darmawan, 2026).

The difference in the level of analysis between individual and collective digital competence affects how this construct drives innovation. At the individual level, a healthcare worker's digital competence determines how many new ideas that person can generate and realize (Silva & Spanhol, 2023). At the team level, the average digital competence of team members determines how effectively the team can innovate collectively. What is interesting is that the interaction between these two levels is not always linear. A team composed of individuals with high digital competence but without knowledge-sharing mechanisms can be less innovative than a team with moderate average competence but a strong sharing culture. At the team level, digital competence is manifested in the form of collaborative routines such as weekly digital tips-sharing sessions, dedicated communication channels for technical discussions, or shared documentation of solutions to frequently occurring system problems. These routines are a meta-competence that allows individual competence to be exploited collectively. Hospitals that focus only on individual training without building structures for knowledge sharing will lose most of the value of their digital competence investments.

Leadership factors moderate the relationship between digital competence and innovative work behavior (Jearrungsang & Charoensukmongkol, 2025). Leadership is needed that is able to build a continuous learning environment and provide clear direction amid technological uncertainty (Mardikaningsih & Darmawan, 2023). A healthcare worker with high digital competence who works under a leader who restricts autonomy and is reluctant to accept input on system improvements will quickly become frustrated. His or her competence cannot be translated into innovation because the final decision always rests with a supervisor who may be less digitally competent. Conversely, a healthcare worker with moderate digital competence who works under a leader who encourages experimentation, provides room to fail, and actively asks for suggestions on how to improve digital workflows will show innovative work behavior that exceeds his or her level of competence. A transformational leader who has a vision of how technology can improve service will create psychological conditions in which subordinates' digital competence can be optimally actualized. Without these conditions, digital competence is unrealized potential (Darmawan et al., 2020). Hospitals that are serious about driving innovation through digital competence must ensure that leaders at all levels have a supportive leadership style, rather than merely providing technical training to frontline healthcare workers.

Digital competence drives healthcare workers' innovative work behavior through direct and indirect pathways. The direct pathways include enhanced technological self-efficacy that fosters the courage to experiment, expanded information networks that enrich the raw material of innovation, and

problem-solving ability that trains cognitive flexibility. The indirect pathway works through protection from the negative effects of technostress. The specific components of digital competence most relevant to innovation are independent technological problem-solving ability, digital collaboration skills, and the capacity for critical evaluation of digital information. At the team level, collective digital competence manifested in knowledge-sharing routines is more important than the mere aggregation of individual competence. Leadership that supports experimentation is a moderating factor that determines whether the innovative potential of digital competence can be actualized. Understanding this dual mechanism allows hospitals to design interventions that not only improve individual digital competence, but also build the social infrastructure that allows that competence to be translated into real innovation at the frontline of service.

Conclusion

Technostress and digital competence work in opposite directions in influencing healthcare workers' innovative work behavior. Technostress inhibits innovation through its four dimensions. Techno-overload drains cognitive capacity, so that the energy available for creative thinking is reduced. Techno-insecurity triggers reluctance to take the risks needed to share new ideas. Techno-complexity limits the exploration of system features that serve as a source of inspiration. Techno-uncertainty creates a wait-and-see attitude that contradicts proactivity. Digital competence drives innovation by enhancing technological self-efficacy, expanding information networks, strengthening independent problem-solving ability, and developing digital collaboration skills. Digital competence also functions to protect healthcare workers from the negative effects of technostress, so that innovation can continue even when technological pressure is present. Individual factors such as emotion regulation and contextual factors such as leadership style moderate the strength of the relationships between these two variables and innovative work behavior. With this understanding, healthcare organizations can identify appropriate intervention points to reduce barriers and strengthen the drivers of innovation in an increasingly digital work environment.

Theoretically, this study contributes an integrative conceptual model that explains the dual mechanism of technostress as an inhibitor and digital competence as a driver of innovation. This model goes beyond approaches that focus on only one side of the dynamics of digitalization in the workplace. Future researchers can empirically test this model using a longitudinal design to capture causal effects among the variables. Practically, the findings of this study direct hospital management not to separate technostress reduction programs from digital competence enhancement programs, because the two efforts complement each other. Technical training that improves competence but is not accompanied by a reduction in technological burden can actually worsen techno-overload, because healthcare workers are expected to master more features in the same amount of time. Conversely, reducing technological burden without improving competence is only a short-term palliative. An integrated approach that balances technological demands with individual capacity while strengthening internal resources through competence training will produce the greatest effect on healthcare workers' innovative work behavior.

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