Leveraging digital transformation in hybrid workplaces: current landscape, underlying challenges, and future prospects

Yu Han[1], Xiaohui Wang[2]* and Yuqi Bai[3]

[1]School of Economic and Management, Cangzhou Normal University, Cangzhou, China, [2]School of Economic and Management, Cangzhou Jiaotong College, Cangzhou, China, [3]School of Environment, Education and Development, The University of Manchester, Manchester, United Kingdom

Purpose: This review article discusses the challenges and opportunities of digital transformation in the dynamics of innovation in hybrid workplaces. Its objectives include reviewing the literature on digital transformation, defining the challenges and drivers of innovation and providing guidance on how to optimize organizational interactions and diversity within technology-enabled working arrangements.

Methods: This study adopts a systematic literature review approach to review the theoretical frameworks of digital transformation in management, hybrid work models, and cases. Technological, cultural, and organizational enablers and constraints are discussed, and success factors for innovation in ambidextrous organizations are highlighted.

Findings: This study identifies three key enablers of innovation in hybrid workplaces, including effective communication platforms, adaptive leadership and a culture of adaptability. Conversely, barriers include resistance to change, gaps in digital literacy and challenges to inclusivity. Strategic investments in technology, employee training, and cross-functional collaboration have emerged as key recommendations for organizations to achieve digital transformation.

Originality: This results addresses the literature gap by synthesizing knowledge on digital transformation with the effects of implementing a hybrid workplace. The suggested conceptual model focuses on practical recommendations for promoting innovation with reference to the technological and cultural challenges in today's workplaces.

Implications: This study focuses on hybrid work patterns that may restrict their applicability in other work organizations, suggesting the need of further research in the direction of digital transformation's long-term effects on innovation. This study also provides practical managerial implications that outline possible directions for establishing effective hybrid work environments for organizations by investing in technology, leadership, and employees.

KEYWORDS

digital transformation, hybrid workplaces, innovation management, adaptive leadership, employee engagement, technology adoption

1 Introduction

Effective application of digital technology is now widely recognized as mandatory in today's organizations to foster change and development of organizational activities, communication, and ideas. Due to the growing application of such tools as artificial intelligence, cloud computing, and collaborative software, traditional business models in organizations have evolved to be innovative and centered on data (Groeger and Waldehagen Berg, 2024). This transformation has, on its part, enabled companies to optimize their operational effectiveness, meet market dynamics, and create value by offering further value to clients. The current working environments are no longer limited by space or geographical regions; thus, the network and the ability to work with cross-teams from other regions can be increased (Nguyen et al., 2024; Esamah et al., 2023).

The COVID-19 pandemic increased the pace of digitalization and influenced further development of work organization, making remote and hybrid work more common. Companies quickly adapted to the tools that would help them remain functional, providing more evidence regarding the importance of technology during disruptions. Beyond the changes caused by the COVID-19 crisis, the digital world has become a powerful tool to attract talent, drive innovation, and build sustainability in today's global environment (Groeger and Waldehagen Berg, 2024). However, digital transformation does not merely mean embracing digital technologies. This requires a broad concept in which technological development must embrace organizational culture, leadership, and its employees. Considering that the emphasis on agility and innovation breaks the traditional hierarchy and workflow of an organization, more focus has been shifted to how teams collaborate, create, and share knowledge, especially where the teams are diverse and dispersed.

A hybrid work model implies working remotely and in an office setting. It allows employees and employers to enjoy high levels of self-organization. However, they also pose challenges to innovation management, which is a major determinant of organizational development and market competitiveness. Creativity needs close dialog, meetings, cross-sections, and the presence of diverse approach ideas and elements that can be largely limited in hybrid work setups (Imran et al., 2021). The members of a team are physically separated from each other, which hinders organic knowledge sharing and diminishes creativity. In addition, there is an issue of burnout when using digital platforms to channel these communications. Another challenge in hybrid workplaces is maintaining fairness and inclusion in diverse environments. Remote employees may feel that they are not involved in the decision-making process or are excluded from the social networks within an organization (Annosi et al., 2023). Organizational leadership requires effective ways to work with remote employees and others in the office.

New technologies also come with other barriers to their adoption. Some employees may not be proficient in computer skills. Therefore, technological advancement presents a challenge because of the rate at which it evolves; this overwhelms employee resistance to new technologies. Such difficulties are exacerbated by cultural and organizational factors. For example, the more formal, top-down organizational relationships that often characterize traditional organizations may smother the process interactivity and involvement necessary for innovation in hybrid organizations (Annosi et al., 2023).

There are even more ethical concerns regarding data privacy and security in digital technologies.

The purpose of this study is to synthesize existing research on digital transformation and its implications for innovation management in hybrid workplaces. This section aims to provide a deep understanding of the challenges and opportunities presented by hybrid work models, focusing on how digital transformation can be used to foster innovation, collaboration and inclusivity.

Specifically, this study seeks to answer several critical questions: What are the theoretical foundations of digital transformation and how do they apply to innovation management? How do hybrid work models impact collaboration and creativity? What are the key barriers to and facilitators of successful digital transformation in hybrid environments? By addressing these questions, this study proposes actionable strategies for organizations experiencing the complexities of hybrid work and digital transformation. These strategies emphasize building an adaptive culture, investing in technology and training, and fostering an inclusive environment that supports diverse perspectives and equitable participation in innovation processes.

2 Literature review and theoretical foundations

2.1 Seminal studies on digital transformation and hybrid workplaces

Digital transformation represents a paradigm shift in how organizations operate, innovate, and compete in modern business environments. It means the implementation of modern technologies into the company's activities, which transforms the mainstream management strategies, including artificial intelligence, cloud computing, and data analytics (Annosi et al., 2023). Digital transformation in management has a theoretical background that allows it to be considered from a critical perspective.

The rapid adoption of hybrid workplaces, accelerated by the COVID-19 pandemic, has prompted extensive research into its implications for organizational practices and employee experiences. A recurring theme in the literature is the adaptation of hybrid workplaces to suit current needs. The emergence of hybrid workplaces has generated significant scholarly interest, with researchers examining various aspects of this new work model from multiple perspectives. A central theme in the literature focuses on training and development adaptations for hybrid environments. Suravi (2024) proposes applying the ADDIE and Kirkpatrick models to enhance training effectiveness, while Farooq et al. (2024) trace the evolution of learning in hybrid settings. Peprah (2024) offers an African perspective, identifying challenges like inadequate technology and ergonomic issues that hinder team learning. Wang et al. (2023) contribute practical insights through their workshop approach for co-designing hybrid experiences in software development, emphasizing the importance of collaborative innovation. These studies collectively highlight the need for innovative, technology-enabled training frameworks tailored to hybrid work's unique requirements (Molleri and Mohagheghi, 2024; Petani and Mengis, 2023).

Employee well-being and organizational culture in hybrid settings constitute another major research focus. Azizan et al. (2024) examine burnout among Malaysian lecturers, finding hybrid work reduces but

does not eliminate burnout risks. Lathabhavan and Mehendale (2025) demonstrate mindfulness's role in easing transitions from remote to hybrid work, while Yang et al. (2023) document how hybrid arrangements affect work-life boundaries and productivity. Rupcic (2024) identifies both challenges and opportunities in hybrid learning environments, noting their transformative potential. Wu et al. (2023) provide crucial insights into how technology perceptions affect advice-seeking networks in hybrid workplaces. These findings underscore hybrid work's complex impact on employee psychology and social dynamics, suggesting organizations must address isolation risks while leveraging flexibility benefits (Naqshbandi et al., 2024; Oygür et al., 2022).

The broader organizational implications of hybrid work models have also attracted scholarly attention. Radonic et al. (2021) analyze hybrid work's positive impact on intangible assets in Serbia's ICT sector, while Hughes and Davis (2024) examine digital upskilling needs for graduate employability in hybrid contexts. Paul and Perwez (2023) employ machine learning to study work-life quality's effect on leadership psychological capital. Khatun et al. (2024) reveal significant differences in hybrid learning perceptions between public and private university faculty. Orr's (2009) early work on hybrid workplace law remains relevant for understanding regulatory dimensions. These diverse studies collectively paint a picture of hybrid work as a multifaceted phenomenon requiring holistic management approaches that integrate technological infrastructure, workspace design, policy frameworks, and human resource strategies to optimize organizational and individual outcomes (Molleri and Mohagheghi, 2024; Petani and Mengis, 2023).

2.2 Key theories supporting scholarly analysis

2.2.1 Dynamic capabilities theory

The foundation of the analysis of digital transformation in management is based on the framework of dynamic capability. Dynamic capabilities concern the capacity of an organization to integrate, create, and modify internal and external resources to manage dynamic environments. In the context of digital transformation, this theory saliently describes all the capabilities that an organization requires to sense opportunities and threats, capture them through innovation, and reconfigure its operations to regain its competitive advantage (Imran et al., 2021). For example, the sensing function may include questions about emerging technologies and markets that may cause drastic industry changes. Capturing involves taking a direct hold of those technologies, training employees, and reshaping organizational structures to incorporate new opportunities (Warner and Wäger, 2019). Transforming, therefore, encompasses the process by which business models and working processes are progressively redesigned and innovated to integrate with existing technological trends.

2.2.2 Sociotechnical systems theory

Sociotechnical Systems Theory (STS) is the second important theoretical perspective for considering digitalization in management. STS offers a view of social and technical systems as two overlapping components within an organization (Imran et al., 2021). It postulates that for technological change to be implemented, it is necessary to

consider both human and technological factors. Focusing on digital transformation, STS emphasizes that systems should be designed to encourage cooperation, increase organizational performance, and engage employees (Annosi et al., 2023). System and social misalignment can increase project and organizational performance. STS also emphasizes the importance of employee involvement.

2.2.3 Disruptive innovation theory

The theory of disruptive innovation explains how innovative technology can disrupt traditional business plans and construct new paths. The definition of disruptive innovation is that all new products begin as inexpensive, lower-performing products introduced in a limited market that is unattractive to industry leaders and then become the new standard, driving out incumbent technologies (Imran et al., 2021). In management, this theory emphasizes the need for continuity in innovation and disruption to maintain competition. Disruptive trends emerging in the digital era, such as cloud computing, automation, and blockchain, have blurred traditional industry lines. Managers are challenged to cope with such disruptions by supporting a culture that values experimentation and risk-taking. For example, Netflix used digital streaming technology to replace companies that rented DVDs (Annosi et al., 2023). Disruptive innovation theory also tests the managerial dilemma between committing resources to reinventing technologies (sustaining technologies) and investing in disruptive technologies.

2.2.4 Experimentation and learning

Indeed, adaptive leaders recognize that innovation requires a culture of experimentation and learning. Groeger and Waldehagen Berg (2024) emphasize that adaptive leaders excel in fostering resilience and agility by encouraging teams to embrace ambiguity and take calculated risks. In hybrid settings, this involves creating opportunities for experimentation, such as innovation sprints, hackathons, or pilot projects. Leaders must also normalize failure as a part of the innovation process. By framing setbacks as learning opportunities, they reduce the fear of failure and encourage employees to explore new ideas (Kraus et al., 2023). This approach aligns with Organizational Learning Theory, which highlights the importance of continuous knowledge acquisition and application in driving innovation.

2.2.5 Resource-Based View

The focus of Resource-Based View (RBV) is on creating and exploiting valuable, rare, inimitable, and organizational resources to obtain a sustainable competitive advantage. Regarding digital transformation, the existence of this theory postulates that particular intangible resources like digital platforms and information processing skills contribute most to innovation and organizational performance (Imran et al., 2021). RBV can be used to argue that digital transformation involves both obtaining superior technologies and linking them with the resources of the firm to generate value. However, RBV recognizes that resources can be heterogeneous and immobile. This means that not everyone is equally positioned for change, and organizations' abilities to innovate about digital disparities appear.

2.2.6 Organizational learning theory

Digital transformation is aligned with the concept of organizational learning, which involves the continuous acquisition,

dissemination, and application of knowledge within an organization. Learning at personal and company levels facilitates firms' changes and responses to the prevailing environment (Imran et al., 2021). Organizational learning in a digital environment refers to employee training, sharing of best practices, and the use of analysis and evaluation of organizational learning (Groeger and Waldehagen Berg, 2024). For example, e-learning platforms allow employees to acquire new digital skills at scale, which positively influences their engagement in innovation processes.

2.2.7 Technology acceptance model

Under the framework of Technology Acceptance Model (TAM), it is argued that the realization and acceptance of a new technology in an organization depend on its perceived usefulness by its users and the ease with which they can use it. This theory is rightly placed in situations where digital transformation is planned as employees' support is essential (Viterouli et al., 2024). TAM can be used by managers to prevent low usage and possible dismissal of new tools by users by making changes in those technologies that may influence the perceived use, ease of use and usefulness by users to an optimal level (Annosi et al., 2023). TAM also takes into account the influence of external structures, including organizational commitment, peers and training courses concerning the usage of technology by users. This means that an organizational environment that fosters user needs would complement the effectiveness of transformational digital solutions, as unveiled in this paper.

2.2.8 Institutional theory

Institutional Theory as a lens through which to view digital transformation is grounded on sociological theory, where organizational arrangements are shaped and constrained by external forces. It highlights three types of institutional pressures: coercive (regulatory requirements), mimetic (industry benchmarking), and normative (professional standards) (John et al., 2024). External institutional pressures may compel an organization to use technology to discover new approaches to legal requirements and to adapt to industry developments and stakeholder demands. For instance, the use of electronic health records (EHRs) is broadly adopted within the healthcare sector because of legal requirements and benchmarking.

2.3 Conceptual model of digital transformation and innovation in hybrid workplaces

The conceptual model below visualizes the causal pathways and feedback loops among the key elements of digital transformation in hybrid work settings. The model is structured around a central process, showing how challenges can be addressed by enablers to drive positive outcomes (see Figure 1).

The model also highlights feedback loops that show how outcomes can reinforce the enablers, creating a self-sustaining cycle of improvement. For instance, increased organizational performance can justify further strategic investments in technology and training, while enhanced employee well-being strengthens the culture of inclusivity and adaptability. This illustrates that digital transformation is an ongoing process of strategic renewal, not a one-time event.

3 Impact of hybrid work models on collaboration and creativity

Although hybrid work models have been applied for their effectiveness in maintaining a good work-life balance and high rates of employee satisfaction, the results that can be observed concerning work collaboration and creativity are a subject of growing interest.

FIGURE 1
Conceptual model of digital transformation and innovation in hybrid workplaces.
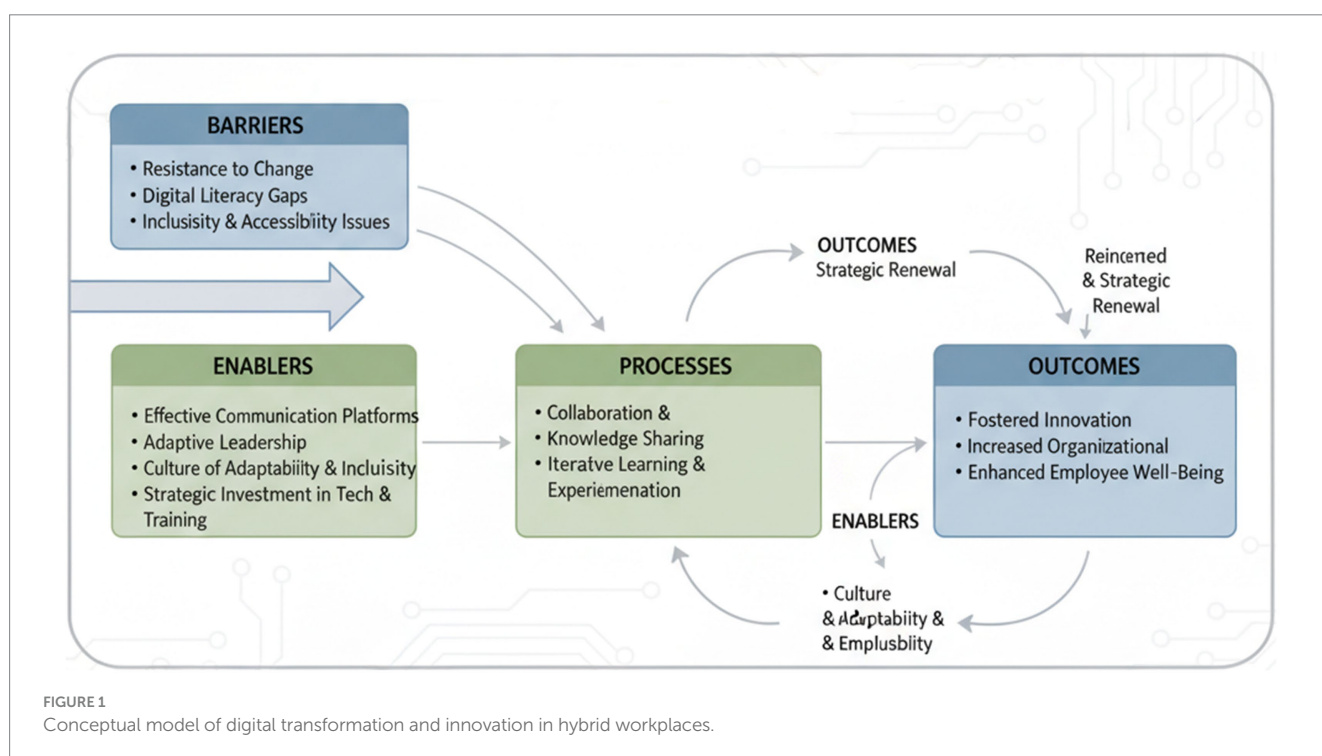
Cooperation is one of the principal organizational values that promote creativity, overcome challenges, and increase efficiency. New flexible working patterns disrupt team understanding because they are not physically located in the same place. According to John et al. (2024), hybrid teams, in particular those using digital communication tools, improved the integrated coordination of tasks and information support compared to fully remote teams. However, the study noted a reduction in the richness of interpersonal interactions, as nonverbal cues and informal conversations were often lost in virtual communication.

Additionally, Viterouli et al. (2024) concluded that remote working reduces trust and organizational identification, with both playing important roles in collaboration. These alternatives sought to be solved in hybrid work models, which incorporate occasional face-to-face meetings so that team relations are reinforced and other common perspectives are recalibrated. Spatial and temporal divides further complicate collaboration in hybrid work settings. Viterouli et al. (2024) identifies "coordination delays" as a common issue in hybrid teams, where asynchronous communication leads to misalignment of priorities and delays in decision-making. However, periodic in-office collaboration days alleviate these issues by providing opportunities for teams to align goals and address challenges. Additionally, the distribution of team members across different locations often creates an "us versus them" dynamic, particularly when some employees work remotely while others are co-located in the office. John et al. (2024) observed that remote employees in hybrid models frequently perceive themselves as being excluded from critical discussions and decision-making processes.

Creativity performs best when there is a rich diversity of work roles and relationships, *ad hoc* communication arrangements, and a climate that fosters courage in idea expression. Different cases of hybrid work models show possible opportunities and challenges in cultivating creativity (Viterouli et al., 2024). In distributed work settings, these interactions are sometimes restricted because of the absence of meetings. However, structured hybrid work models ensure that employees explore creativity through virtual meetings and social gatherings. Annosi et al. (2023) reported that hybrid teams that employed structured brainstorming tools, such as digital whiteboards and breakout sessions, provided similar levels of creativity to fully physical teammates.

The freedom realized by defining a work environment in which employees can work from anywhere increases individual creativity. Freedom fosters a measure of flexibility so that employees can choose their preferred working conditions and minimize conditions that cause stress. According to John et al. (2024), employees with workplace flexibility showed higher job satisfaction and problem-solving potency. However, this flexibleness poses problems for team-level creativity because separate timings reduce face-to-face idea exchange and assessment. Synchronous collaboration is critical for honing and applying creative ideas, a process that is usually limited in current hybrid contexts.

Different people's thinking is used as an asset for innovation and organizational change. Hybrid work models can increase diversity because companies can hire employees from different locations with different origins. The diversity of the members involved in hybrid teams is a strength and helps enhance the creativity of the hybrid team (Viterouli et al., 2024). Nevertheless, the main issue when leading diverse employees is to address the questions of their inclusion and

equality. Remote workers may face challenges in contributing their perspectives, particularly if organizational culture prioritizes in-office interactions.

Psychological safety is a vital enabler of collaboration and creativity. Interestingly, hybrid work models can affect general psychological safety in several ways. Physical distancing and technology use to stay connected may erode psychological safety because people feel exposed and alone when physically separated from others (John et al., 2024). In a hybrid environment, cultivating good relationships with others becomes difficult, which is crucial for building psychological safety within the workplace. However, Viterouli et al. (2024) stated that inclusive leadership helps create an organizational climate in which people feel welcome and heard. The maintenance of virtual meetings, celebrations, and physical team gatherings are some of the strategies that help foster team culture and ensure psychological safety in hybrid modes of working.

Technology serves as a key enabler of cooperation and innovation in environments where work and collaboration are both remote and face-to-face. When it comes to digital tools like Miro, Trello, and Slack, which help in drafting, brainstorming, and facilitating real-time communication, productivity levels are higher. According to Annosi et al. (2023), these tools can eliminate physical distances so that hybrid teams can innovate accordingly. However, the extent to which such tools are effective will greatly depend on the level of their uptake as well as their implementation into organizational processes. Potential challenges include poor adoption of new technologies, low literacy levels, competency in the use of the technologies and poor training.

4 Challenges for hybrid work models

4.1 The adoption of technology

Since the global COVID-19 pandemic has forced a shift toward hybrid work models, changes in the organizational structure, processes, and culture have occurred. The adoption and integration of technology present challenges that may limit the efficiency of hybrid work arrangements (John et al., 2024). Resistance to change is an essential concern in organizations with mixed working models. Some employees may become overly fixated with their previous work routines. The perceived usefulness and ease of use are key determinants of technology acceptance. When employees think that the technology is difficult to use or does not apply to their working environment, adoption will not work well.

A crucial challenge is the unequal distribution of digital competency among the people in an organization. Although some employees have the skills required to use more sophisticated tools like cloud solutions, others do not. This gap is worst observed in organizations employing a pool of cross-generational workers (Groeger and Waldehagen Berg, 2024). In addition, another effect of hybrid work is increased cybersecurity threats. Hybrid work inclinations heighten the exposure to data leakages because networks are spread out.

The use of technology to enhance existing work practices is challenging, especially when an organization has made significant investments in technology. According to Trieu et al. (2024), companies face the issue of slow adoption of new technologies that inhibit work productivity and employee dissatisfaction. This problem worsens

when organizations offer little training or technical assistance to employees because they are ill-equipped to handle new tools.

4.2 Leadership shifts in hybrid work models

The challenge introduced by the hybrid work model is to foster a change of mindset regarding managing leaders of dispersed teams. Physical separation in hybrid work arrangements can result in feelings of exclusion from remote sites. Employees report feeling isolated from important organizational decision-making processes. Managers must ensure that everyone has an equal chance in the workplace, irrespective of the location they are in (John et al., 2024). Intentional and clear communication is a key factor that enables effective hybrid leadership. Unstructured communication hinders leaders' ability to understand team dynamics, deal with tensions, and provide immediate encouragement and constructive criticism. Leadership must ensure efficient communication that focuses on clarity, updates, and discussions within multi-team systems.

A hybrid model forces leaders to be more flexible, emotionally mature, and able to work under conditions of risk and uncertainty, which defines the nature of adaptive leadership. Kraus et al. (2023) stated that adaptive leaders are developed by managing novelty and perspectives through innovative processes that build resilience. For hybrids, it means satisfying both the teleworking and in-office worker while conforming to technological and cultural changes (Groeger and Waldehagen Berg, 2024). In addition, conventional performance assessment methods are not suitable for environments with both physical and virtual settings. Leaders must transition from process-based monitoring of performance to product-based, with an increased emphasis on the quality of work (Kraus et al., 2023).

4.3 Employee engagement in hybrid work models

Adding complexity to the structures of workplaces, there is the risk of differential experiences of the employees where in-office staff benefits from accessing corporate resources and quick visibility and informality (Annosi et al., 2023). According to Trieu et al. (2024), request handling that gives equal regard to parties and discourages creation of 'us and them' confrontational attitude is critical for averting any destruction of staff unity and motivation within work teams.

On the same note, although most employees desire a working model that allows them to occasionally work from home, this can cause a conflict of time between work and personal life, leading to burnout. Therefore, championing the use of digital tools provides ideas on how employee engagement can be improved by responding, recognizing, or collaborating. For instance, managers can use Slack or Microsoft Teams to correct their subordinates (Groeger and Waldehagen Berg, 2024). However, excessive use of these tools results in "Zoom fatigue" and reduces the extent to which these tools are actually useful.

4.4 Barriers to digital transformation

Digital transformation has become a critical priority for organizations seeking to innovate, improve efficiency, and remain competitive in a rapidly changing world. However, its implementation is often hindered by significant barriers, such as resistance to change, gaps in digital literacy, and issues with inclusivity and accessibility (Mitra et al., 2019). Resistance to change is one of the most pervasive barriers to digital transformation. It arises from a fear of the unknown, a reluctance to adopt new practices, and concerns about potential disruptions to established workflows (Annosi et al., 2023). Resistance can appear at individual, team, and organizational levels, undermining the success of transformation initiatives.

At an individual level, resistance to digital transformation is often rooted in psychological factors such as fear of job displacement, loss of autonomy, or reduced competence. According to Lewin's Change Management Model, people naturally gravitate toward a state of equilibrium and are resistant to changes that disturb this balance (Groeger and Waldehagen Berg, 2024). Digital transformation, which emphasizes adopting new technologies and altering traditional workflows, can evoke anxiety and skepticism among employees. Mitra et al. (2019) also highlighted that perceived complexity and uncertainty about digital tools can intensify resistance. Employees may feel overwhelmed by the prospect of learning new systems, leading to a lack of engagement or rejection of the changes. These fears are particularly pronounced in older employees and those with limited technological exposure.

Resistance to change also occurs at organizational levels through inertia. Established organizations often rely on legacy systems and deeply ingrained processes that are resistant to overhaul. Mitra et al. (2019) suggested that organizations that fail to adapt to technological advancements risk losing relevance, yet many struggle to break free from their reliance on traditional practices. In addition, organizational resistance can stem from conflicting priorities or an insufficient alignment among stakeholders (Trieu et al., 2024). For instance, top management may champion digital transformation as a strategic imperative, but middle managers may resist its implementation because of concerns about short-term disruptions or resource constraints.

Overcoming resistance to change requires a combination of communication, engagement, and incentives. Leaders play a crucial role in addressing fears and fostering a culture of trust and collaboration. The Eight-Step Change Model emphasizes the importance of creating a sense of urgency, forming coalitions, and celebrating short-term wins to build momentum for change (Trieu et al., 2024). Organizations can also mitigate resistance by involving employees in the transformation process, soliciting their input, and addressing their concerns. Training programmes, workshops and change ambassadors can help bridge knowledge gaps and build confidence in new systems. Providing clear incentives, such as professional development opportunities and recognition for early adopters, can further encourage buy-in.

Digital literacy, defined as the ability to effectively use digital tools and technologies, is a critical driver of digital transformation. However, disparities in digital literacy among employees present a significant barrier to its successful implementation. Organizations often employ workers with varying levels of digital proficiency. Warner and Wäger (2019) found that employees in non-technical roles, older workers, and low-income positions are more likely to experience difficulties in adopting digital tools. These disparities create a divide between tech-savvy employees and those struggling to keep up, thus impeding collaboration and productivity. The rapid pace

of technological change has exacerbated this issue (Groeger and Waldehagen Berg, 2024). In addition, tools such as artificial intelligence, machine learning, and cloud computing require specialized skills that many employees lack. Without ongoing training and support, organizations risk falling into a cycle where the same employees are repeatedly sidelined by advancements in technology.

Organizations must prioritize digital literacy as a cornerstone of their transformation strategies. Hands-on training programs tailored to employees' skill levels are essential for building confidence and competence when using digital tools (Trieu et al., 2024). For instance, modular e-learning courses, on-the-job training, and mentorship programs can provide employees with the knowledge and skills needed to use new technologies (Groeger and Waldehagen Berg, 2024). Providing access to resources, such as online tutorials, technical support, and peer networks, can also help employees overcome challenges. Moreover, embedding digital skills in organizational culture through ongoing learning initiatives ensures that employees remain adaptable and ready for future technological advancements.

Digital transformation initiatives often overlook the importance of inclusivity and accessibility, leading to unintended consequences that exclude certain employees and communities. These issues not only create ethical and legal risks but also undermine the overall success of transformation efforts by limiting the diversity of perspectives and contributions. Hybrid work models and digital tools can marginalize employees with limited access to technology or stable internet connections (Annosi et al., 2023). This digital divide is particularly pronounced in developing countries, where infrastructure disparities hinder equal participation in digital transformation efforts. Employees who lack access to high-quality devices or reliable connectivity may struggle to engage in virtual meetings, collaborate effectively, or complete tasks efficiently.

Inclusivity issues also extend to employees with disabilities. Many digital platforms are not designed with accessibility in mind, making them difficult or impossible to use for individuals with visual, auditory, or motor impairments. Few global websites meet basic accessibility standards, highlighting the systematic neglect of accessibility in digital design (Mitra et al., 2019).

Inclusivity challenges is also mixed with a lack of representation in decision-making processes. Digital transformation initiatives are often driven by leadership teams that do not adequately reflect workforce diversity. This lack of representation can result in technologies and workflows that fail to address the needs of underrepresented groups, further perpetuating exclusion. For example, algorithms used in hiring or performance evaluations may introduce bias if they are not designed with diverse datasets or inclusive parameters. Groeger and Waldehagen Berg (2024) investigated algorithmic bias and highlighted the risks of perpetuating systemic inequalities through poorly designed digital systems.

Addressing the issues of inclusivity and accessibility requires a proactive approach. Organizations must adopt universal design principles to ensure that digital tools and platforms are accessible to all users, including those with disabilities. Compliance with standards such as the Web Content Accessibility Guidelines (WCAG) can help organizations create inclusive digital environments. To address the digital divide, organizations should provide employees with the necessary resources, such as high-quality devices, internet subsidies, and remote work infrastructure. Partnerships with local communities and governments can also help bridge access gaps, particularly in

underprivileged regions. Establishing diversity and inclusion committees, conducting bias audits, and soliciting feedback from underrepresented groups can ensure that digital transformation initiatives are equitable and reflective of the broader workforce. Promoting diverse representation in decision-making processes is equally important.

Digital transformation offers organizations the opportunity to innovate, improve efficiency, and remain competitive. However, its success is often hindered by barriers such as resistance to change, gaps in digital literacy, and issues with inclusivity and accessibility. Resistance to change stems from psychological fears, organizational inertia, and misaligned priorities, requiring leaders to foster trust, engagement, and a shared vision (Mitra et al., 2019). Gaps in digital literacy highlight the uneven distribution of digital skills, which necessitate hands-on training programs and support systems. Inclusivity and accessibility challenges show the need for equitable design, representation, and resource distribution to ensure that no employee or community is left behind.

Addressing these barriers requires a new approach that integrates leadership, technology, and culture. By fostering a culture of adaptability, providing targeted training, and prioritizing inclusivity, organizations can overcome these challenges and unlock the full potential of digital transformation (Trieu et al., 2024). Future research should explore the long-term impacts of these barriers and examine emerging technologies, such as artificial intelligence and virtual reality, to address these challenges (Mitra et al., 2019). Ultimately, organizations that prioritize people alongside technology will better address the complexities of digital transformation and drive sustainable innovation.

5 Solutions and strategic outlooks

The challenges associated with hybrid work require timely solutions. In terms of technology adoption, training initiatives, corporate culture and user-oriented tools must be supported as part of an organizational investment. These solutions include the implementation of sound cybersecurity measures and the incorporation of systems into processes, respectively (Kraus et al., 2023). Leadership development programs should also be provided to organizations. Engaging leaders to create cultures of inclusion, increase levels of openness and efforts to achieve relevant performance outcomes aids in hybrid environments (Groeger and Waldehagen Berg, 2024). Lastly, encouraging employees to become more involved involves processes such as technological advancement, culture, and policy adoption. To reduce social isolation, organizations must schedule virtual and face-to-face team bonding and provide opportunities for social conversations. Equal opportunities and access to resources are critical for meeting these goals.

5.1 Effective communication tools and platforms

Digital communication tools, such as Slack, Microsoft Teams, and Zoom, have revolutionized how teams collaborate in hybrid settings. These platforms enable both synchronous and asynchronous communication, allowing team members to exchange ideas, share

updates, and coordinate efforts regardless of location. Research has revealed that hybrid teams using digital platforms report higher levels of connectivity and task alignment, which are essential components of innovation (Annosi et al., 2023). Moreover, the integration of collaborative features, such as shared whiteboards, breakout rooms, and real-time document editing, fosters creativity and problem-solving. For instance, Miro and Google Workspace have become indispensable tools for brainstorming and co-creating solutions (Groeger and Waldehagen Berg, 2024). These platforms democratize participation, ensuring that remote employees can contribute to discussions and ideation processes on equal footing with their in-office counterparts.

While communication tools enable collaboration, they also introduce challenges such as "Zoom fatigue," information overload, and miscommunication. Overreliance on virtual meetings can lead to cognitive fatigue and reduced productivity. To mitigate these challenges, organizations must adopt a balanced approach that incorporates in-person interactions for in-depth discussions and strategic planning (Kraus et al., 2023). Additionally, organizations must invest in training programs to ensure employees can effectively use digital tools. Trieu et al. (2024) emphasized the importance of digital literacy in maximizing the potential of communication platforms. Providing user-friendly interfaces and integrating tools seamlessly into workflows further enhances their effectiveness.

Advanced communication platforms increasingly incorporate analytics and artificial intelligence (AI) to enhance innovation. AI-powered tools such as Otter.ai for transcription and sentiment analysis provide valuable insights into team dynamics and collaboration patterns (Groeger and Waldehagen Berg, 2024). These insights enable managers to identify bottlenecks, monitor engagement levels and make data-driven decisions optimize team performance. Leadership is a critical enabler of innovation, particularly in hybrid work environments where physical separation can create challenges in alignment, trust, and motivation. Adaptive leadership, characterized by flexibility, emotional intelligence and the ability to address uncertainty, plays a key role in fostering innovation in such settings.

Hybrid work models offer employees greater autonomy, which enhances creativity and motivation. However, excessive autonomy can lead to misalignment of goals and priorities. Adaptive leaders balance autonomy with alignment by setting clear expectations, providing regular feedback, and fostering a shared sense of purpose. This shows that outcome-based performance metrics, rather than traditional measures of attendance or working hours, are more effective in hybrid settings (Groeger and Waldehagen Berg, 2024).

Technology plays a vital role in enabling adaptive leadership. Tools such as Microsoft Viva and Workplace Analytics provide leaders with insights into team performance, engagement levels, and collaboration patterns. These insights enable leaders to tailor their approaches to the unique needs of hybrid teams and enhance their ability to foster innovation. A supportive organizational culture drives innovation in hybrid work settings (Annosi et al., 2023). Culture shapes employee behaviors, attitudes, and values, influencing how teams collaborate and respond to challenges. In hybrid environments, organizational culture must prioritize inclusivity, adaptability, and resilience to enable innovation.

Hybrid work models can create disparities in access to resources, opportunities, and recognition, particularly for remote employees. To address these inequities, organizations must cultivate a culture of inclusivity. Mele et al. emphasized the importance of establishing norms that ensure equal participation and recognition of contributions, regardless of location. Inclusion also extends the diversity of thought, a critical driver of innovation. Hybrid models allow organizations to recruit talent from diverse geographic and demographic backgrounds, thus enriching the ideation process (Trieu et al., 2024). However, organizations must actively create spaces where diverse perspectives are valued and integrated into decision-making processes.

Collaboration is at the heart of innovation, and hybrid work models require intentional efforts to foster a sense of community among dispersed teams. Organizations can achieve this by promoting cross-functional collaboration, organizing virtual and in-person team-building activities, and creating shared goals that unite employees across locations. The role of rituals and symbols in building culture must not be overlooked. Regularly scheduled events, such as all-hands meetings or virtual coffee breaks, reinforce a sense of belonging and shared purpose. The study highlights that employees in hybrid settings who feel connected to their teams are more likely to contribute to innovative initiatives.

An agile organizational culture is essential for overcoming the complexities of hybrid work and fostering innovation. Agility involves the ability to adapt quickly to changes, whether they involve market demands, technological advancements, or workforce dynamics (Warner and Wäger, 2019). Organizations can cultivate agility by embedding iterative processes, such as design thinking and agile methodologies, into their workflows. Resilience, on the other hand, involves the capacity to recover from setbacks and maintain momentum. A resilient culture encourages teams to view challenges as opportunities for growth, thus fostering a mindset critical to sustained innovation.

Organizational culture must align with the values and vision of hybrid work to drive innovation. For instance, companies that prioritize sustainability and social responsibility can integrate these values into their innovation efforts, inspiring employees to develop solutions that align with broader societal goals. The Triple Bottom Line framework highlights that organizations with strong alignment between values and innovation strategies are more likely to achieve long-term success.

In general, communication is the lifeblood of innovation, enabling the exchange of ideas, feedback and collaboration across diverse teams. Hybrid work models, with their mix of remote and in-office employees, require robust communication tools and platforms to bridge physical and temporal gaps (Kraus et al., 2023). These tools not only facilitate interaction but also ensure that all team members have equal access to information and opportunities to contribute.

5.2 Strategic approaches to leveraging digital transformation

Successfully leveraging digital transformation in hybrid work settings requires organizations to adopt strategic approaches that foster adaptability, invest in technological and human capital, promote collaboration, and emphasize diversity and inclusivity (Nadkarni and Prügl, 2021). These recommendations provide actionable insights to overcome barriers and maximize the potential of digital

transformation. A culture of flexibility is prudent in today's technological environment, in which organizational events occur frequently (Annosi et al., 2023). Employers and superiors constantly stay on their toes and are receptive to new ideas, technologies, and procedures that can make matters responsive to adversities as well as profits.

A growth mindset is fundamental for building resilience. Resources should be provided in which employees should be commissioned to treat challenges and failures as experiences for skill enhancement (Warner and Wäger, 2019). This can be done by acting on it every now and then, having organizational discussions of what has been learned, and appreciating, even if not rewarding, the efforts that were put into an innovation process even if it did not produce positive results (Nadkarni and Prügl, 2021). Additionally, the general idea about the agile approach can be directed to a various function in an organization for flexibleness. Iterative steps and feedback with constant modification procedures are the keys to swift adaptation to any organization. For example, regular application of the design thinking framework, such as integrating design thinking workshops during project implementation, can enhance the quick experimental approach of a team.

Leaders play a critical role in shaping an adaptable culture. Adaptive leadership, which is characterized by flexibility, emotional intelligence, and resilience, helps employees overcome uncertainty and embrace change (Trieu et al., 2024). Leaders should model adaptive behaviors, such as openness to feedback and willingness to pivot strategies, when necessary to set an example for their teams.

Technology is the backbone of digital transformation, but its success depends on an organization's ability to integrate it effectively and equip employees with the necessary skills to use it. Tools such as cloud computing, artificial intelligence, and data analytics can enhance efficiency, decision-making, and innovation. However, selecting the right tools requires a thorough assessment of organizational needs, scalability, and user-friendliness. Therefore, organizations should strategically invest in technologies that align with their goals and workflows (Zhang and Chen, 2024). Engaging employees in the selection process ensures that the chosen technologies address their pain points and improve productivity.

Training is critical for bridging gaps in digital literacy and ensuring that employees can fully use new tools. Organizations should offer tailored training programmes that cater to diverse skill levels, ranging from beginner to advanced. For example, e-learning modules, hands-on workshops, and mentoring programs can provide employees with confidence and competence to overcome technological change (Nadkarni and Prügl, 2021). Given the rapid pace of technological advancement, one-time training sessions are insufficient. Organizations must adopt a culture of continuous learning, providing employees with ongoing access to resources and opportunities to upgrade their skills (Zhang and Chen, 2024). Partnerships with educational institutions, certifications in emerging technologies, and online learning platforms, such as Coursera and LinkedIn, can support these goals.

Seamless integration of technology into existing workflows is vital for effective adoption. Organizations should ensure that digital tools are intuitive and compatible with existing systems to minimize disruptions. Providing robust technical support and creating user-friendly interfaces further enhances adoption and engagement (Trieu et al., 2024). Collaboration across teams and departments is essential

for fostering innovation and solving problems. Hybrid work models require intentional strategies to overcome physical and functional silos and promote cross-functional collaboration.

Digital platforms such as Slack, Microsoft Teams, and Trello enable real-time communication and project management across teams. These tools help bridge the gap between remote and in-office employees, ensuring that all team members can contribute to discussions and initiatives. Features such as shared workspaces, videoconferencing, and task tracking promote transparency and alignment (Nadkarni and Prügl, 2021). Establishing cross-functional teams brings together diverse expertise and perspectives, fostering creativity and problem-solving. For instance, a product development team comprising engineers, marketers, and designers can ensure that technical feasibility, market demand, and user experience are all considered (Zhang and Chen, 2024). Rotational programs that allow employees to work in different departments can also facilitate knowledge sharing and collaboration.

Organizations can encourage collaboration by hosting events such as hackathons, innovation challenges, and brainstorming sessions. These events provide opportunities for employees from various functions to work together on specific problems, generate innovative solutions, and strengthen team bonds. Hybrid events that combine in-person and virtual participation ensure the inclusion of remote workers. Knowledge sharing is a critical enabler of collaboration. Creating a centralized knowledge repository, such as a company wiki or intranet, allows employees to access and contribute information easily (Trieu et al., 2024). Encourage informal learning through peer-to-peer mentoring and cross-departmental presentations enhances knowledge exchange and collaboration.

Diversity and inclusivity are essential for driving innovation and ensuring that digital transformation benefits all employees and stakeholders. A diverse workforce brings varied perspectives and experiences, thus enriching problem-solving processes. Inclusivity ensures that all employees, regardless of background or ability, can fully participate in transformation efforts (Nadkarni and Prügl, 2021). To ensure inclusivity, organizations must address the disparities in access to technology and resources. Providing employees with high-quality devices, internet subsidies, and technical support ensures that all team members can engage effectively in hybrid work settings (Zhang and Chen, 2024). Partnerships with community organizations and governments can help bridge the digital divide in broader contexts.

Accessibility should be a core consideration in the design and selection of digital tools. Following standards such as the Web Content Accessibility Guidelines (WCAG) ensures that tools are usable by employees with disabilities. Features such as screen readers, voice commands, and adjustable interfaces enhance inclusivity and engagement. Inclusive leadership is critical for fostering diverse and equitable workplaces. Organizations should prioritize diversity in leadership roles and ensure that decision-making processes reflect the perspectives of underrepresented groups (Trieu et al., 2024). Leadership training programs that address unconscious bias and cultural competence can further support this goal.

6 Conclusions and reflections

Digital transformation is a critical enabler of innovation and competitiveness in today's hybrid work environments, but its success depends on addressing key barriers and leveraging strategic enablers.

This study has explored the challenges of resistance to change, gaps in digital literacy and issues with inclusivity and accessibility, as well as identified enablers such as effective communication tools, adaptive leadership and a culture of collaboration and inclusivity. The analyses above lead to three aspects of reflective insights:

First, digital transformation offers immense opportunities for organizations to innovate and thrive in hybrid work settings. By addressing barriers and leveraging strategic enablers, organizations can overcome the complexities of transformation and unlock its full potential. Practitioners and policymakers must work together to create inclusive, adaptive, and technologically empowered workplaces that not only drive productivity but also foster equity, innovation, and sustainability. This collective effort will ensure that digital transformation is a catalyst for positive change in both organizational and societal contexts.

Second, gaps in digital literacy affect not only individual employees but also organizational performance. Low digital proficiency can lead to inefficiencies, errors, and underutilization of technology investments. For example, employees who struggle to use project management software may revert to manual processes, undermining the efficiency gains of digital transformation (Mitra et al., 2019). These gaps also impact employee morale and engagement. Employees who feel inadequately equipped to handle technological demands may experience frustration, stress, and decreased job satisfaction, leading to higher turnover rates (Warner and Wäger, 2019). This creates additional costs for organizations in terms of recruitment, onboarding, and training. To fully harness the potential of digital transformation, organizations must adopt strategic approaches, including fostering adaptability, investing in technology and training, promoting cross-functional collaboration, and emphasizing diversity and inclusivity (Qiao et al., 2024).

Third, fostering an inclusive culture requires creating spaces where employees feel valued and heard. Organizations should implement policies that promote equity, such as flexible work arrangements, mentorship programs for underrepresented employees, and diversity-focused hiring practices. Employee resource groups (ERGs) and regular diversity workshops can also help build a more inclusive workplace. Inclusivity should be embedded in all stages of innovation, from ideation to implementation. Organizations can achieve this by soliciting input from diverse stakeholders, conducting impact assessments, and ensuring that new technologies address the needs of various user groups (Nadkarni and Prügl, 2021). For instance, involving employees with disabilities in the development of accessibility features ensures that solutions are practical and effective.

In addition, based on an analysis of public policy frameworks, international approaches to supporting digital transformation in human capital supply chains vary, though they often share the goal of fostering technological adoption and skill development. This model focuses on providing financial and technical support to small and medium-sized enterprises (SMEs) to digitize operations and upskill their workforce, thereby strengthening overall supply chain resilience. Conversely, other regions might focus on broad regulatory environments that promote data-sharing, interoperability, and cybersecurity to enhance technology-finance synergies. This approach seeks to reduce information asymmetry between financial institutions and supply chain participants, making it easier for banks to offer tailored financing solutions, such as Supply Chain Finance (SCF), which is often integrated with digital platforms. A comparative analysis reveals that while some policies directly subsidize technology and training, others create a favorable regulatory climate that allows market forces to drive innovation and attract private investment, ultimately shaping the effectiveness of how technology and finance synergize.

In general, the insights discussed have several implications for both academic researchers and real-world practitioners. In academia, future research should explore the long-term impacts of digital transformation on organizational performance, employee well-being, and societal equity. Additionally, the role of emerging technologies (such as artificial intelligence, blockchain, and virtual reality) in addressing challenges like inclusivity and collaboration warrants further investigation. Longitudinal studies examining the effectiveness of strategic interventions, such as adaptive leadership models and inclusive design principles, can provide valuable insights for refining organizational practices.

For practitioners, the focus must shift toward creating adaptive cultures that embrace change and continuous learning. Leadership development programs, robust training initiatives, and accessible technology design are crucial to bridging skill gaps and addressing resistance. Policymakers, on the other hand, play a key role in ensuring equitable access to digital resources and promoting inclusivity. Policies supporting digital literacy programs, infrastructure improvements, and incentives for organizations to adopt accessible technologies can help reduce the digital divide and ensure that digital transformation benefits are widely shared.

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