

Organizational Technology Adoption and Unintended Employee Reactions among Family Businesses: Moderated Mediation Analysis

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Abstract

Purpose

Despite the growing adoption of digital technologies among family businesses, limited attention has been given to the unintended employee reactions that may accompany such transformations. This study examines the mediating role of perceived skill obsolescence in the association between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance) among employees in family-owned businesses. Furthermore, the moderating mechanism of future work self-salience in these indirect relationships was assessed.

Methodology:

A quantitative cross-sectional survey design was utilized. Data were collected from 319 employees working in family businesses using a multistage sampling technique. The proposed moderated mediation model was tested using Hayes' PROCESS Macro.

Results

The findings indicate that organizational technology adoption was significantly associated with digital change cynicism and innovation resistance via perceived skill obsolescence. The results further revealed that future work self-salience moderates the mediation role of perceived skill obsolescence in the nexus between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance).

Originality/Value:

This study contributes to the technology adoption and organizational change literature by integrating perceived skill obsolescence and future work self-salience into a single moderated mediation framework. In doing so, it provides new insights into the psychological processes through which organizational technology adoption relates to employees' responses to digital transformation within family business settings.

Introduction

Organizational transformation has become a defining feature of contemporary work environments, particularly as firms increasingly adopt new technologies, restructure operations, and respond to dynamic market pressures (Christou and Piller, 2024). These developments are especially relevant in family businesses, where the need to modernize operations often coexists with strong commitments to preserving family legacy, continuity, and established ways of working. Employee responses to such

transformation have emerged as a critical concern for organizational sustainability. Although change initiatives enhance efficiency and competitiveness, they often elicit unintended psychological and behavioral reactions (Sahay and Goldthwaite, 2023). One such reaction is digital change cynicism. Organizational technology adoption may be associated with digital change cynicism when employees experience repeated technological changes that fail to meet expectations or are poorly implemented. As a result, employees may develop negative beliefs about the value and effectiveness of future digital transformation initiatives (Abhari, 2024). Organizational technology adoption may also be associated with innovation resistance when employees perceive new technologies as requiring substantial adjustments to their existing skills, routines, and work methods. Consequently, they may prefer to maintain familiar practices rather than embrace new technological innovations (Zervas, 2026). These responses may be particularly salient in family-owned businesses, where socioemotional wealth preservation, intergenerational authority structures, and deeply embedded informal routines often reinforce continuity and attachment to traditional practices, thereby heightening resistance to change (Hernández-Perlines et al., 2023).

Studies indicate that technology adoption does not automatically result in employee reactions (Mkhonto and Zuva, 2024; Taherdoost et al., 2024). Instead, it often raises concerns about skill relevance, job security, and future employability. Employees may therefore question whether their existing competencies remain adequate in the face of evolving technological demands. This perceived mismatch between current skills and future requirements is known as perceived skill obsolescence. Such perceptions are likely to intensify negative cognitive and emotional responses to organizational change (Schultheiss and Backes-Gellner, 2023). In family businesses, these concerns may be amplified by long-standing work routines, tacit knowledge systems, and continuity-oriented organizational cultures that make technological change more disruptive to established ways of working (Zapata-Cantu et al., 2023). Therefore, perceived skill obsolescence is conceptualized in this study as a mediating construct explaining the relationship between organizational technology adoption and employees' unintended reactions.

This nexus between organizational technology adoption and unintended employee reactions, through perceived skill obsolescence, can be better understood through psychological mechanisms that shape how employees interpret change. When employees perceive their skills as becoming obsolete, they appraise technological change as a threat rather than an opportunity, thereby increasing skepticism and reducing willingness to engage with new systems (Zervas, 2026). However, employees do not respond uniformly to such perceptions. Individual differences in future orientation play a significant role in shaping these responses. Future work self-salience influences how employees interpret skill-related threats and respond to technological change. Employees with high future work self-salience tend to view technological change as an opportunity for growth and development. In contrast, those with low future work self-salience are more likely to experience heightened insecurity and resistance (Voigt and Strauss, 2024). This suggests that future work self-salience may attenuate the indirect association between organizational technology adoption and unintended employee reactions through perceived skill obsolescence.

Accordingly, this study addresses an important gap by assessing the mediating role of perceived skill obsolescence in the association between organizational technology adoption and unintended negative reactions (digital change cynicism and innovation resistance) among employees in family businesses. Despite increasing attention to digital transformation, limited research has examined how employees in family firms psychologically interpret technological change, particularly within contexts characterized by succession concerns, family governance structures, and continuity-oriented decision-making. From a practical perspective, managerial efforts often emphasize technological implementation while underestimating employees' psychological interpretations of skill relevance and job security. Consequently, the study further investigates whether future work self-salience attenuates the indirect relationship between organizational technology adoption and unintended employee reactions through perceived skill obsolescence. The research objectives guiding this study are therefore (1) to assess the linkage between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance), (2) to find out whether perceived skill obsolescence mediates this relationship, and (3) to examine whether future work self-salience moderates this indirect relationship through perceived skill obsolescence.

Literature review

Theoretical framework

This study is grounded in Socio-Technical Systems Theory (STST) and Cognitive Appraisal Theory (CAT). STST posits that organizations function through the interaction of two interdependent subsystems: the technical subsystem (technology, processes, and tools) and the social subsystem (employees, roles, and relationships) (Trist and Bamforth, 1951). According to the theory, organizational effectiveness depends on the joint optimization of these two subsystems. When changes occur in the technical subsystem, such as the introduction of new technologies or processes, without corresponding adjustments in the social subsystem, such as employee skills, roles, and support systems, a state of misalignment emerges, often resulting in reduced performance and negative employee reactions (Geels, 2004). In this context, organizational technology adoption represents a transformation within the technical subsystem that may disrupt the existing balance between the two systems. Such disruption can create uncertainty among employees regarding their roles, competencies, and job relevance. From this perspective, unintended employee reactions such as perceived skill obsolescence, digital change cynicism, and innovation resistance are understood as outcomes of systemic misalignment rather than isolated individual dispositions. In family businesses, socio-technical misalignment is often stronger due to socioemotional wealth preservation, intergenerational authority structures, and informally embedded routines. These features reinforce continuity and attachment to established practices, limiting flexibility in the social subsystem (Addai, 2026). As a result, new technologies are more likely to disrupt informal routines and tacit knowledge systems. This increases the likelihood that employees perceive organizational technology adoption as disruptive, thereby heightening skill obsolescence, skepticism toward change, and resistance-related responses (Hernández-Perlines et al., 2023).

While STST explains the structural origin of the phenomenon at the organizational level, CAT (Lazarus and Folkman, 1984) provides insight into the psychological mechanisms through which employees respond to these changes. According to CAT, individuals do not respond directly to external events; rather, they first cognitively evaluate or “appraise” these events in terms of their significance for personal well-being, particularly by assessing whether they represent a threat or an opportunity (Lazarus and Folkman, 1984). This appraisal process determines subsequent emotional and behavioral responses. This implies that, although organizational technology adoption occurs at the structural level, its effects are ultimately filtered through employees’ cognitive interpretations. Employees evaluate technological changes based on their perceived implications for job security, skill relevance, and future employability. When these changes are appraised as threatening, particularly in relation to the adequacy of their current competencies, employees develop perceptions of skill obsolescence. This perceived obsolescence then becomes a central cognitive response that shapes their attitudes toward change, giving rise to negative outcomes such as digital change cynicism and innovation resistance (Warrick, 2023). Within this framework, perceived skill obsolescence operates as the key psychological mechanism through which organizational technology adoption translates into employee responses. Within family business settings, cognitive appraisal processes are also shaped by legacy preservation, continuity expectations, and family-driven identity structures. These factors influence how employees interpret technological change beyond individual job concerns (Subhani et al., 2026). As a result, change is also evaluated in terms of its fit with established traditions and organizational identity. This increases the salience of perceived skill obsolescence and strengthens negative appraisals such as cynicism and resistance.

However, employees are not passive recipients of change; their reactions are also shaped by individual differences in future orientation (future work self-salience). Employees with high future work self-salience interpret technological change as development-oriented rather than threatening, thereby weakening negative cognitive evaluations (Voigt and Strauss, 2024). Consequently, future work self-salience moderates the indirect association between perceived skill obsolescence and unintended employee reactions. The integration of STST and CAT provides a comprehensive multi-level explanation of how structural technological changes are cognitively processed and translated into behavioral responses within organizational settings.

Organizational technology adoption and employee responses

Across contemporary organizations, the introduction of digital technologies has become a defining feature of how work is structured and delivered. Organizational technology adoption refers to the deliberate integration of digital systems, platforms, and automated tools into work processes (Westergren et al., 2024). Although such technological initiatives are often positioned as strategic improvements, they also reshape the nature of work itself. Tasks are redesigned, routines are adjusted, and employees are expected to operate within more digitalized work environments (Kraus et al., 2023). In family businesses, where work practices are often stable and informally established over time, these changes may be experienced as particularly disruptive, requiring significant adjustment from employees.

In response to these changes, employees may develop varying attitudes toward organizational transformation. While the adoption of technology has been associated with positive organizational outcomes (Ali et al., 2022; Oyetade et al., 2024), the link between organizational technology adoption and unintended employee reactions, such as digital change cynicism and innovation resistance, remains underexplored. Digital change cynicism reflects a negative attitudinal belief that organizational change initiatives are ineffective, superficial, or unlikely to result in meaningful or sustained improvements (Khaw et al., 2024). It is often reinforced when employees encounter repeated change initiatives that are inconsistent, poorly communicated, or disconnected from practical work realities. Innovation resistance refers to the reluctance or unwillingness to adopt new technologies or work systems introduced within the organization (Warrick, 2023). It represents a general dispositional tendency to resist change across different contexts. Unlike perceived skill obsolescence, which is a change-specific cognitive appraisal arising from technological demands, innovation resistance reflects a broader and more stable tendency to oppose change regardless of its specific content.

According to STST, organizational technology adoption can create misalignment between the technical subsystem (new technologies and processes) and the social subsystem (employees and their roles) (Trist and Bamforth, 1951). This imbalance may generate uncertainty and strain, leading to unintended employee reactions (digital change cynicism and innovation resistance) as adaptive responses to restore stability within the system. The introduction of new technologies alters established work patterns and introduces new performance expectations, requiring employees to adjust both their skills and their ways of working (Kvirchishvili, 2024). When such adjustments are perceived as demanding or disruptive, employees may begin to evaluate technological change more negatively. Over time, these evaluations can lead to broader skepticism toward organizational change initiatives, particularly when employees feel the benefits of technology adoption are unclear or unevenly experienced. In addition, the cumulative experience of frequent technological adjustments without sufficient clarity, support, or perceived improvement may strengthen negative employee attitudes (Khaw et al., 2023). Rather than viewing technological change as a pathway to improvement, employees may come to associate it with disruption, uncertainty, and added pressure (Kraus et al., 2023). This mindset can reduce employees' willingness to engage with such systems (digital change cynicism) and make them feel reluctant to adopt new systems (innovation resistance) (Abhari, 2025). This means that organizational technology adoption becomes closely linked with how employees emotionally and cognitively interpret change within their work environment. Accordingly, the study proposes that:

H1a. Organizational technology adoption positively relates to digital change cynicism.

H1b. Organizational technology adoption positively and significantly associates with innovation resistance.

Mediating role of perceived skill obsolescence

Perceived skill obsolescence refers to employees' subjective evaluation that their existing knowledge, competencies, and abilities are becoming outdated or insufficient due to changes in job requirements (Zervas, 2026). It reflects a cognitive appraisal that one's current competencies are no longer fully aligned with evolving technological demands. In this study, perceived skill obsolescence is considered as an intervening mechanism that explains how organizational technology adoption relates to unintended employee reactions (digital change cynicism and innovation resistance). Organizational technology adoption often reshapes job structures and increases the demand for new digital competencies (Schilirò, 2024). As employees attempt to adjust to these evolving requirements, they may begin to perceive a gap between their existing abilities and the competencies required to function effectively in the new digital environment (Gruenewald and Mueller, 2025).

Studies suggest that organizational adoption of technology heightens employees' perceptions of skill obsolescence, particularly when technological changes are rapid, continuous, or insufficiently supported (Abhari, 2025; Warrick, 2023). When employees perceive that their skills are losing relevance, they develop negative cognitive evaluations of organizational change. This sense of diminishing competence can foster skepticism toward management's technological initiatives, thereby increasing digital change cynicism (Breutner and Roth, 2025). In addition, employees who feel that their skills are becoming outdated may exhibit unintended employee reactions because they may perceive technological change as a threat to their job security and professional relevance (Cieslak and Valor, 2025; Kvirchishvili, 2024). Although numerous studies have assessed the relationships between these variables, the mediating role of perceived skill obsolescence in this association has not been studied extensively (Abhari, 2025; Kvirchishvili, 2024). However, perceived skill obsolescence may serve as a mediator because technological changes often lead employees to believe that their existing skills are becoming outdated or less relevant (Kvirchishvili, 2024). This perceived mismatch between current competencies and future job demands creates uncertainty and threat appraisals, which in turn foster unintended employee reactions (Abhari, 2025). Thus, perceived skill obsolescence serves as a key cognitive mechanism via which organizational technology adoption relates to unintended employee reactions (digital change cynicism and innovation resistance). Understanding this mediating process is important because it highlights how structural technological changes translate into employee-level reactions through perceived skill obsolescence. Consequently, this study purported that:

H2a. Perceived skill obsolescence mediates the association between organizational technology adoption and digital change cynicism.

H2b. Perceived skill obsolescence mediates the linkages between organizational technology adoption and innovation resistance.

Moderated mediation mechanism of future work self-salience

Future work self-salience is the extent to which employees hold a clear and cognitively accessible image of themselves in future work roles (Talluri et al., 2025). It reflects how strongly individuals can envision

their future professional identity, including the skills they expect to possess, the roles they aspire to occupy, and the career trajectory they anticipate. When employees perceive that their skills are becoming obsolete due to organizational technology adoption, they interpret technological change as a signal that their current competencies are losing relevance (Gruenewald and Mueller, 2025). However, this perception does not uniformly lead to negative behavioral outcomes, as individual differences in future-oriented self-concept influence how such threats are interpreted and managed. This study, therefore, conceptualizes future work self-salience as a boundary condition that shapes the nexus between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance) through perceived skill obsolescence.

Employees with high future work self-salience maintain a forward-looking professional identity that extends beyond their current skill limitations (Talluri et al., 2025). This future-oriented self-view enables them to reframe perceived skill obsolescence as a temporary gap rather than a permanent loss of relevance, thereby weakening its influence within the indirect association between organizational technology adoption and unintended employee reactions. As a result, the psychological impact of skill obsolescence on negative attitudes is reduced, as these employees view organizational technology adoption as part of their long-term development pathway rather than an immediate threat. Similarly, their ability to resist innovation is diminished because they perceive technological change as aligned with their envisioned future roles and competencies (Khaw et al., 2022). For these individuals, perceived skill obsolescence intensifies feelings of uncertainty and insecurity, thereby increasing cynical attitudes toward change and resistance to new technologies (Talluri et al., 2025). In this way, future work self-salience not only moderates the direct association between organizational technology adoption and unintended employee reactions but also conditions the indirect pathways of organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance) through perceived skill obsolescence, such that the indirect effect is attenuated at higher levels of future work self-salience.

Although prior research has highlighted the role of individual differences in shaping responses to technological change (Abhari, 2025; Symasek et al., 2025), limited attention has been given to future-oriented self-concept as a moderating mechanism within the skill obsolescence process. Addressing this gap is important for understanding why employees exposed to similar technological demands respond differently. Thus, the following hypotheses are formulated:

H3a. Future work self-salience attenuates the indirect correlation between organizational technology adoption and digital change cynicism through perceived skill obsolescence, such that the indirect effect is weaker at higher levels of future work self-salience.

H3b. Future work self-salience attenuates the indirect association between organizational technology adoption and innovation resistance through perceived skill obsolescence, such that the indirect effect is weaker at higher levels of future work self-salience.

Methodology

Research design

This study adopted a cross-sectional quantitative survey design to examine the moderated mediation relationships. The cross-sectional design enabled data to be collected at a point in time. This design was considered appropriate because it enables efficient measurement of psychological and behavioral constructs without requiring repeated observations over time, particularly in organizational settings where access to respondents may be limited by work demands and time constraints (Wang and Cheng, 2020). The study was conducted among employees in selected family-owned businesses operating within structured organizational settings. These firms were chosen because they are increasingly integrating digital technologies while maintaining traditional operational systems, making them a relevant context (Addai, 2026). A multistage sampling technique was employed to ensure both coverage and practicality. In the first stage, cluster sampling was used to group participating family businesses into identifiable sectors based on their operational similarities, such as food hubs, retail shops, education services, and logistics. This helped to ensure that firms with comparable business structures and technological exposure were included in the study. In the second stage, convenience sampling was applied to select employees within the identified clusters, particularly those who were available and willing to respond to the survey. This approach may introduce selection bias, as respondents who are easily accessible may not be fully representative of the wider employee population, thereby limiting the generalisability of the findings and increasing the risk of over- or under-representation of certain views or experiences within family businesses. However, it was adopted due to the dispersed nature of employees and the difficulty of obtaining complete sampling frames across family businesses (Elfil and Negida, 2017).

The sample size of 350 employees was targeted based on the 10:1 participant-to-item ratio recommended by Comrey and Lee (1992). Considering that the questionnaire comprised 35 items, this ratio justified a sample requirement of 350 respondents to ensure adequate representation and statistical reliability for multivariate analysis. Therefore, a total of 350 structured questionnaires were distributed to eligible respondents, of which 327 were retrieved. After careful screening for completeness and consistency, 319 questionnaires were deemed valid and used for the final analysis, yielding an effective response rate of 91.1%. The sample was predominantly female (58.3%). In terms of educational background, most respondents (72.5%) possessed at least a bachelor's degree, suggesting a generally well-educated workforce within family business settings. Concerning work experience, 58.2% of the participants reported having five or more years of professional experience, indicating that the study largely captured individuals with moderate to extensive exposure to organizational work environments. Both education level and work tenure were controlled for in the analysis, as prior studies suggest that these factors may influence employees' reactions to technology adoption (Addai, 2025).

Data analysis was performed using Hayes' PROCESS Macro, which is widely used for testing moderated mediation models. Specifically, PROCESS Model 7 was employed to examine the mediating role of

perceived skill obsolescence in the association between organizational technology adoption and the outcome variables (digital change cynicism and innovation resistance), as well as the moderating influence of future work self-salience on the indirect relationship. The significance of the indirect effects was assessed using 5,000 bootstrap samples and 95% bias-corrected confidence intervals (CIs). An indirect effect was considered significant when the confidence interval did not include zero. The controlled variables were entered as covariates in the model. This analytical technique enabled the study to simultaneously assess direct, indirect, and conditional effects among the variables, providing a comprehensive understanding of the proposed relationships (Hayes, 2018). Ethical considerations were observed throughout the research. Participation was completely voluntary, and respondents were fully informed about the objectives of the study. Confidentiality and anonymity were guaranteed, and no identifying information was collected. To enhance the robustness of the measurement instrument, a pilot test was conducted using 34 participants drawn from family businesses who were not included in the main study sample. Based on feedback obtained, minor wording adjustments were made to improve comprehension without altering the meaning of the items. All constructs demonstrated acceptable reliability levels in the final dataset, indicating that the measurement instruments were suitable for subsequent statistical analysis.

Measures

The constructs were operationalized using an existing validated multi-item measurement scale. A uniform five-point Likert response format was adopted for all variables, ranging from (1) “Strongly Disagree” to (5) “Strongly Agree.” Organizational technology adoption was gauged using an 8-item developed by Lazar et al. (2020). The scale measures the extent to which employees perceive the integration and use of digital technologies within organizational processes. A representative item includes: *“Digital technologies are effectively integrated into my work processes.”* In this study, the scale demonstrated a Cronbach’s alpha of 0.91 (Table 3).

Digital change cynicism was measured using a 7-item scale by Helvaci (2017). The scale captures employees’ skeptical and pessimistic attitudes toward organizational change initiatives. A sample item is: *“I doubt whether change initiatives in my organization will bring meaningful improvement.”* The scale demonstrated a Cronbach’s alpha of 0.84 in this study.

Innovation resistance was judged using a 6-item measure by Oreg (2003). The scale examines employees’ reluctance to accept or implement new ideas, systems, or technologies. An example item is: *“I tend to resist changes in the way work is done.”* The scale showed an acceptable internal consistency of 0.90.

Perceived skill obsolescence was measured using an 8-item scale developed by Zhang et al. (2012), which reflects employees’ perceptions that their current skills are becoming outdated due to technological advancement. A sample item includes: *“My skills may become outdated because of technological changes at work.”* The scale demonstrated a good reliability of 0.94.

Future work self-salience was gauged using a 6-item scale adapted from Strauss et al. (2012). The scale measures the clarity and vividness of individuals' future work identity. A representative item is: *"I have a clear image of what I want to be doing in my future work life."* The scale indicated an acceptable reliability with a Cronbach's alpha of 0.89.

Results

Measurement validation and underlying factor structure

Before testing the hypothesis, the measurement properties of the scales were examined to ensure suitability for further analysis. An Exploratory Factor Analysis (EFA) was first conducted to determine whether the observed items aligned with their expected latent constructs. The results indicated a clear factorial pattern, with most items loading strongly on their respective constructs. Of the 35 measurement items included in the questionnaire, all of them demonstrated acceptable factor loadings and were retained for subsequent analyses (Hair et al., 2014). The adequacy of the data was further confirmed using the Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity. The KMO value of 0.739 suggested that the correlation matrix was appropriate for structure detection (Kaiser, 1974). In addition, Bartlett's test was significant ($\chi^2 = 2937.015$), confirming that sufficient inter-item correlations existed to justify factor extraction. The extracted factors accounted for 72.158% of the total variance, indicating a robust and parsimonious factor solution that passably captures the underlying constructs of the study.

Table 1
Item loadings, reliability, and validity of the scales

Items	Loadings	% Variance Exp.	CR	AVE
Organizational technology adoption (OTA)		21.938	0.916	0.660
OTA-2	0.922 ^{***}			
OTA-5	0.910 ^{***}			
OTA-1	0.895 ^{***}			
OTA-7	0.888 ^{***}			
OTA-3	0.882 ^{***}			
OTA-6	0.879 ^{***}			
OTA-8	0.856 ^{***}			
OTA-4	0.835 ^{**}			
Digital change cynicism (DCC)		17.270	0.903	0.714
DCC-3	0.937 ^{***}			
DCC-6	0.922 ^{**}			
DCC-4	0.915 ^{***}			
DCC-5	0.908 ^{***}			
DCC-1	0.902 ^{***}			
DCC-2	0.879 ^{***}			
DCC-7	0.852 ^{***}			
Innovation resistance (IR)		13.536	0.911	0.601
IR-4	0.914 ^{***}			
IR-6	0.901 ^{***}			
IR-1	0.889 ^{***}			
IR-3	0.866 ^{***}			
IR-5	0.860 ^{***}			

Items	Loadings	% Variance Exp.	CR	AVE
IR-2	0.838 ^{***}			
Perceived skill obsolescence (PSO)		10.933	0.868	0.658
PSO-1	0.907 ^{***}			
PSO-8	0.900 ^{***}			
PSO-5	0.893 ^{***}			
PSO-3	0.890 ^{***}			
PSO-4	0.874 ^{***}			
PSO-2	0.866 ^{***}			
PSO-6	0.859 ^{***}			
PSO-7	0.844 ^{***}			
Future work self-salience		8.481	0.907	0.703
FWSS-5	0.886 ^{***}			
FWSS-2	0.872 ^{***}			
FWSS-6	0.868 ^{***}			
FWSS-4	0.851 ^{***}			
FWSS-1	0.827 ^{***}			
FWSS-3	0.810 ^{***}			

Reliability, validity, and distributional assessment

The Composite Reliability (CR) values for all constructs exceeded the recommended threshold of 0.70, indicating a high level of internal consistency. Convergent validity was assessed via the Average Variance Extracted (AVE). All constructs exceeded the recommended threshold of 0.50, suggesting that each scale explains a substantial proportion of change in its indicators (Cheung et al., 2024). Furthermore, discriminant validity was established as the square root of each AVE exceeded the inter-construct correlations, demonstrating that the constructs are empirically distinct. Normality assumptions were examined using the Kolmogorov–Smirnov and Shapiro–Wilk tests. The results were not significant for all study variables, indicating that the data did not significantly deviate from a normal distribution. Therefore, the assumption of normality was satisfied (Razali and Wah, 2011). In addition, multicollinearity diagnostics indicated that none of the inter-construct correlation coefficients exceeded

0.70, confirming that multicollinearity was not a concern and that the constructs maintained adequate independence for regression-based analysis (Hair et al., 2014).

Common method variance and model adequacy

To assess the potential influence of common method variance (CMV), Harman’s single-factor test was conducted by entering all measurement items into an exploratory factor analysis without rotation. The results indicated that no single factor accounted for more than 50% of the total variance. In addition, the full collinearity Variance Inflation Factor (VIF) values were examined, and all values were below the recommended threshold of 5, suggesting that common method bias and multicollinearity were not serious concerns in the study (Table 3). Furthermore, a Common Latent Factor (CLF) analysis was performed, and the comparison of standardized factor loadings before and after the inclusion of the common latent factor revealed differences below 0.20, indicating that common method bias was unlikely to have materially influenced the findings. To provide further evidence, confirmatory factor analysis (CFA) was conducted by comparing the hypothesised five-factor model with an alternative single-factor model. The results showed that the five-factor model demonstrated a substantially better fit to the data ($\chi^2/df = 2.841$, CFI = 0.895, TLI = 0.907, RMSEA = 0.038) than the single-factor model ($\chi^2/df = 8.496$, CFI = 0.711, TLI = 0.638, RMSEA = 0.139), indicating that a single latent factor did not adequately account for the observed covariance among the study variables (see Table 2).

Table 2
Summary of CFA results

Model		χ^2/df	CFI	TLI	RMSEA
(1)	Multi-factor model	2.841	0.895	0.907	0.038
(a)	Organizational technology adoption	3.293	0.878	0.890	0.063
(b)	Digital change cynicism	2.607	0.903	0.911	0.047
(c)	Innovation resistance	2.916	0.894	0.917	0.051
(d)	Perceived skill obsolescence	3.509	0.848	0.883	0.066
(e)	Future work self-salience	2.118	0.910	0.906	0.042
(2)	Single-factor model	8.496	0.711	0.638	0.139
CFI – Comparative Fit Index, TLI – Tucker–Lewis Index, RMSEA – Root Mean Square Error of Approximation					

Descriptives and correlation coefficient

Table 3 provides an overview of respondents’ demographic characteristics and presents the correlation results, which indicate significant associations among the study variables, supporting the constructs’ validity and interrelationships.

Table 3
Descriptive analysis and correlations (n = 319)

Constructs		M	SD	Correlations				
				1	2	3	4	5
1	Organizational technology adoption	3.15	0.88	(0.81)				
2	Digital change cynicism	2.83	1.25	0.37**	(0.85)			
3	Innovation resistance	2.99	0.73	0.40**	0.46**	(0.78)		
4	Perceived skill obsolescence	3.41	1.11	0.32**	0.39**	0.41**	(0.81)	
5	Future work self-salience	2.66	1.37	-0.51**	-0.42**	-0.47**	-0.50**	(0.84)
	Cronbach Alpha	-	-	0.91	0.84	0.90	0.94	0.89
	VIF	-	-	2.91	1.68	3.15	2.73	2.05
Note: **p < 0.01								

Fornell–Larcker matrix with the square roots of AVE on the diagonal

Testing the hypothesized model

Hypotheses were tested using Hayes' PROCESS Macro within a moderated mediation framework. For the direct relationships (H1a–H1b), organizational technology adoption showed a significant positive association with digital change cynicism ($\beta = 0.307$, SE = 0.091, 95% CI [0.129, 0.485]) and innovation resistance ($\beta = 0.391$, SE = 0.084, 95% CI [0.226, 0.556]), thereby confirming H1a and H1b (see Table 4). Regarding mediation mechanisms (H2a–H2b), perceived skill obsolescence significantly mediated the relationship between organizational technology adoption and digital change cynicism ($\beta = 0.195$, SE = 0.058, 95% CI [0.081, 0.309]) and innovation resistance ($\beta = 0.222$, SE = 0.041, 95% CI [0.142, 0.302]), confirming H2a and H2b.

The interaction between perceived skill obsolescence and future work self-salience was significant in predicting digital change cynicism ($\beta = -0.103$, SE = 0.033, 95% CI [-0.168, -0.038]) and innovation resistance ($\beta = -0.088$, SE = 0.025, 95% CI [-0.137, -0.039]), indicating that the effect of perceived skill obsolescence depends on the level of future work self-salience.

The index of moderated mediation was significant for digital change cynicism (index = -0.091, 95% CI [-0.150, -0.032]) and innovation resistance (index = -0.105, 95% CI [-0.178, -0.032]), confirming that the indirect effect of organizational technology adoption via perceived skill obsolescence is contingent on future work self-salience. For digital change cynicism, the indirect effect of organizational technology adoption via perceived skill obsolescence decreased as future work self-salience increased. Specifically, at low levels of future work self-salience (-1 SD), the indirect effect was strongest ($\beta = 0.07$). At medium

levels (mean), the effect was weaker ($\beta = 0.06$), and at high levels (+ 1 SD), the effect was weakest ($\beta = 0.05$). This pattern indicates that higher future work self-salience reduces the strength of the indirect effect. A similar pattern was observed for innovation resistance, where the indirect effect was strongest at low levels of future work self-salience ($\beta = 0.09$), weaker at medium levels ($\beta = 0.06$), and weakest at high levels ($\beta = 0.03$) (Table 5). This further confirms that future work self-salience attenuates the indirect effect of organizational technology adoption on innovation resistance through perceived skill obsolescence.

Table 4
Results examining the moderated mediation relationship

Prediction		β coefficient	SE	95%CI [LL, UL]	Interpretation
H1a	OTA $\rightarrow$ DCC	0.307	0.091	[0.129, 0.485]	Supported
H1b	OTA $\rightarrow$ IR	0.391	0.084	[0.226, 0.556]	Supported
H2a	OTA $\rightarrow$ PSO $\rightarrow$ DCC	0.195	0.058	[0.081, 0.309]	Supported
H2b	OTA $\rightarrow$ PSO $\rightarrow$ IR	0.222	0.041	[0.142, 0.302]	Supported
	PSO * FWSS $\rightarrow$ DCC	-0.103	0.033	[-0.168, -0.038]	
	PSO * FWSS $\rightarrow$ DCC	-0.088	0.025	[-0.137, -0.039]	
H3a	PSO * FWSS $\rightarrow$ PSO $\rightarrow$ DCC	-0.091	0.030	[-0.150, -0.032]	Supported
H3b	PSO * FWSS $\rightarrow$ PSO $\rightarrow$ IR	-0.105	0.037	[-0.178, -0.032]	Supported
Source(s): Researchers' own (2026)					

Table 5
Conditional indirect effects

Statistics	Effect	SE	95% CI	
			Low	High
DV – digital change cynicism				
Low (-1 SD)	0.07	0.02	0.03	0.11
M (0)	0.06	0.02	0.02	0.10
High (+ 1 SD)	0.05	0.01	0.01	0.09
DV – Innovation resistance				
Low (-1 SD)	0.09	0.03	0.04	0.16
M (0)	0.06	0.02	0.03	0.11
High (+ 1 SD)	0.03	0.01	0.01	0.07

Discussion

The first objective was to assess the direct relationship between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance) among employees in family businesses. The findings revealed that organizational technology adoption significantly and positively predicts both digital change cynicism and innovation resistance. This suggests that although technology adoption is often implemented to enhance organizational efficiency and competitiveness, employees may not always perceive such changes positively. Instead, technological transformation may create uncertainty about work processes, role expectations, and future job requirements, leading employees to become skeptical of digital change initiatives and resistant to innovation. These findings support the assumptions of STST, which argues that disruptions within the technical subsystem may create imbalance within the social subsystem, resulting in negative employee reactions (Trist and Bamforth, 1951). The findings are consistent with previous studies, which suggest that poorly assimilated technological changes often trigger unfavorable employee attitudes, including resistance to innovation and negative perceptions toward organizational change initiatives (Voigt and Strauss, 2024; Warrick, 2023). In family business environments, where organizational practices are often deeply rooted in tradition and long-established routines, the disruptive nature of technological change may further intensify employee skepticism and resistance.

The second objective was to examine whether perceived skill obsolescence mediates the association between organizational technology adoption and unintended employee reactions. The results confirmed that perceived skill obsolescence significantly mediates the nexus between organizational technology adoption and unintended employee reaction (digital change cynicism and innovation resistance). This finding indicates that technology adoption does not directly produce unintended employee reactions;

rather, these outcomes arise when employees perceive their existing competencies as outdated or insufficient in response to technological advancements. When employees believe that their skills no longer match emerging technological demands, they are more likely to question the value and effectiveness of organizational change initiatives and become reluctant to embrace innovations (Westergren et al., 2024). This finding reinforces the argument that perceptions of skill relevance constitute a critical psychological mechanism through which digital transformation relates to employee behavior (Cieslak and Valor, 2025; Kvirchishvili, 2024). It also extends existing literature by demonstrating that perceived skill obsolescence serves as an explanatory pathway linking organizational technology adoption to both digital change cynicism and innovation resistance within family business settings (Abhari, 2025; Kvirchishvili, 2024).

Lastly, the study examined the moderated mediation role of future work self-salience in the indirect relationship between organizational technology adoption and unintended employee reactions (digital change cynicism and innovation resistance) through perceived skill obsolescence. The findings revealed that future work self-salience significantly moderated the mediating mechanism. The indirect effect of organizational technology adoption on these outcomes via perceived skill obsolescence was weaker among employees with higher levels of future work self-salience. This suggests that employees with a strong and well-defined future work identity are less likely to perceive technological changes as a threat to their existing competencies. As a result, the extent to which perceived skill obsolescence translates into unintended employee reaction, such as cynicism and resistance to innovation, is reduced. This study confirms extant studies, which suggest the importance of future-oriented self-concepts in shaping employees' adaptability and responses to organizational change (Khaw et al., 2022). According to CAT, employees' reactions to organizational technology adoption are shaped by how they evaluate its implications for their skills and future work roles (Lazarus and Folkman, 1984). Employees with high future work self-salience are more likely to appraise technological change as a challenge rather than a threat, which in turn reduces perceived skill obsolescence and its association with unintended employee reactions.

Limitations and research suggestions

Several limitations should be recognized in interpreting the results. First, the use of convenience sampling may limit the generalizability of the findings, as participants were selected based on accessibility rather than probability-based sampling procedures. Future studies could adopt probability sampling techniques to enhance external validity. Second, the cross-sectional survey design limits the capability to draw causation, as data were collected at a single point in time. Future research could employ longitudinal or time-lagged designs to better capture the dynamic nature of technology adoption and employee responses over time. Third, the study focused exclusively on employees within family business settings, which may restrict the applicability of the findings to other organizational contexts. Future studies could replicate the model in public sector organizations, multinational corporations, and small and medium-sized enterprises to determine the extent to which the results generalize across different work environments. Finally, the study examined only future work self-salience as a moderating

variable. Future research could incorporate additional organizational and individual factors, such as perceived organizational support, learning climate, digital leadership, psychological resilience, or change readiness, to provide a comprehensive insight into the conditions under which organizational technology adoption relates to unintended employee reactions.

Implications and conclusion

This study makes important contributions to the theory. The direct relationships identified between organizational technology adoption and employee responses reinforce the central proposition of STST that organizational outcomes emerge from the interaction between technical and social subsystems. The findings suggest that technological changes introduced within organizations may create misalignment between technological structures and employees' work realities, thereby generating negative responses such as digital change cynicism and innovation resistance. Beyond the direct relationships, the study extends CAT by demonstrating that employees do not respond to technological change solely based on the objective characteristics of the technology itself but rather through their subjective interpretation of its implications. Perceived skill obsolescence emerged as a critical appraisal mechanism linking technology adoption to employee outcomes, while future work self-salience functioned as a personal coping resource that influenced how employees interpreted and responded to skill-related threats. The integration of these two theoretical perspectives provides a richer explanation of how organizational-level technological changes translate into individual-level behavioral outcomes.

The findings offer important practical implications specifically for family business owners and managers implementing digital transformation. In family businesses, where ownership concentration and intergenerational authority strongly shape decision-making, technology adoption should be managed to balance family leadership control with inclusive employee participation. The results suggest that when digital transformation is implemented in a top-down manner typical of some family firms, employees may interpret it as exclusionary, thereby increasing cynicism and resistance. Family business leaders should therefore strengthen participatory communication structures that include both family and non-family employees to build trust and reduce perceptions of unequal involvement in change processes. The mediating role of perceived skill obsolescence is particularly relevant in family businesses characterized by long-serving employees and informal work routines that have developed over time under family governance. Digital transformation may therefore be perceived not only as a technical shift but also as a threat to established competence and tacit knowledge systems. Family business owners should address this by investing in targeted reskilling and cross-generational learning initiatives that integrate older employees' experiential knowledge with new digital competencies, ensuring continuity rather than displacement of valued human capital. Furthermore, the moderating role of future work self-salience has important implications for succession dynamics in family firms. Enhancing employees' future-oriented work identity through structured mentoring, career development pathways, and succession planning can help align individual aspirations with the long-term digital direction of the family business. Embedding digital capability development within succession planning processes can also

reduce resistance by helping employees, including potential family successors, envision their future roles within a digitally enabled enterprise.

The study also contributes to an emerging research agenda on digital transformation in family businesses. Future research should employ longitudinal designs to examine how employee reactions to technology adoption evolve across different stages of implementation, particularly during intergenerational transitions. In addition, multi-group comparative studies between family and non-family businesses are needed to determine whether ownership structure and governance systems shape the strength of the relationships observed in this study. Further research could also explore how the succession stage moderates employee responses to digital transformation, and how informal routines and family governance norms interact with psychological mechanisms such as skill obsolescence and future work self-salience.

Declarations

Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study. The research was conducted independently, and no financial or personal relationships influenced the design, data collection, analysis, interpretation, or reporting of the findings.

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Author Contribution

BNL: Conceptualization of the study, formulation of the research objectives, data analysis, and approval of the final manuscript for publication. EYAT: Literature review, methodology development, data analysis, interpretation of findings, and preparation of the discussion. GN: Data collection and preparation of the initial manuscript draft. MA: Statistical guidance, critical review of the manuscript, and approval of the final manuscript for publication. PA: Supervision of fieldwork, reference verification, critical review of the manuscript, and approval of the final manuscript for publication.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to ethical considerations involving participant confidentiality.

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