



Technology Shock Awareness and Digital Creativity: a Theoretical Evolution and Research Frontier Review

Jian Hu, Yan Wang*, Jinhua Sun, Dan Chen

Chongqing University of Technology, School of Management, Chongqing,40054,China

*16647505242qq.com

Abstract. In the context of rapid digital technology advancement, talent is the core driver of the manufacturing industry's digital transformation. This study examines the impact of technology shock awareness on employees' digital creativity from an internal motivation perspective. By integrating the Conservation of Resources (COR) theory and the Cognitive Appraisal Theory of Stress, we reveal the dual-edged sword effect and dynamic evolution patterns of technology shock awareness. Our review identifies research gaps in the phased characteristics of technology shock awareness, the dynamic generation mechanisms of digital creativity, and their nonlinear relationships, offering theoretical insights and management strategies for enhancing human-machine collaboration and cultivating digital talents in manufacturing enterprises.

Keywords: Conservation of Resources Theory; Cognitive Appraisal Theory of Stress; Technological Shock Awareness; Digital Creativity

1 Introduction

The digital revolution has brought about significant changes in the workplace. As digital technologies become more integrated into business operations, employees are increasingly facing the threat of being replaced by these technologies, leading to the emergence of technology shock awareness. At the same time, digital creativity has become an essential skill for employees to adapt to the digital age. This literature review focuses on the relationship between technology shock awareness and digital creativity, in line with the requirement of emphasizing technology shock awareness.

2 Theoretical Foundations

2.1 Conservation of Resources (COR) Theory

Proposed by Hobfoll, the COR theory emphasizes individuals' efforts to acquire, retain, and restore resources in response to threats. This theory elucidates the spiral dynamics of technology shock awareness, where resource scarcity triggers anxiety about job displacement, while resource abundance fosters adaptive creativity.

© The Author(s) 2025

P. S. Borah et al. (eds.), *Proceedings of the 2025 5th International Conference on Enterprise Management and Economic Development (ICEMED 2025)*, Advances in Economics, Business and Management Research 346, https://doi.org/10.2991/978-94-6463-811-0_58

2.2 TCognitive Appraisal Theory of Stress

Lazarus' s two-stage evaluation model posits that technology shock awareness' s positive or negative effects depend on employees' primary (threat/challenge) and secondary (coping strategy) appraisals. Challenge-oriented evaluations activate cognitive restructuring and adaptive learning, thereby enhancing digital creativity, while threat appraisals elicit defensive behaviors.

2.3 Theoretical Summary

Work is the foundation of one's existence and the best vehicle for realizing self-worth. The potential substitution of digital technology in employees' work can lead to resource loss risks and instill a sense of uncertainty about future development. Under the impact of digital technology, it serves both as an important resource and a source of pressure. Employee behavior is more reflected in their perception and evaluation of digital resources and their motivation for self-improvement. Therefore, the theory of resource conservation and the theory of stress perception evaluation provide a theoretical perspective for studying technological impact awareness and digital creativity. According to the theory of resource conservation, when employees perceive technological impact awareness, they often have greater concerns about resource loss. Based on the theory of stress perception evaluation, when employees feel technological impact awareness, they worry about their career prospects, which intensifies their need for self-improvement.

In this situation, employees view the impact as a challenging assessment (primary assessment). In stressful situations, individuals first need to activate their self-regulation systems, complete cognitive restructuring, and engage in adaptive learning to acquire knowledge and skills for coping with stressors. Ultimately, they form a stress response strategy system that includes emotional regulation, resource optimization, and integration (secondary assessment).

When employees believe that digital technology will threaten or replace their career development, digital technology is both a source of resources and pressure. Therefore, resource conservation theory and stress cognitive evaluation theory provide theoretical basis for the research of both.

3 Core Concepts and Literature Review

3.1 Research on Digital Creativity

3.1.1 The Concept and Connotation of Creativity.

From the perspective of etymology, "creativity" essentially refers to the "creative process of creating something out of nothing," with its core meaning pointing to the meta-capability of an individual to achieve innovative generation under zero initial conditions. In 1950, J.P.Guilford, the president of the American Psychological Association, systematically argued for the disciplinary value of creativity research, marking the establishment of the modern empirical research tradition in creativity science. In the

1980s, Amabile^[1] 's pioneering research on creativity defined it as an individual's ability to propose innovative solutions to complex problems, specifically manifested in novel cognitive thinking and actionable constructive approaches.^[2] scholars such as Shalley argue that creativity fundamentally manifests as the systematic integration and refinement of existing methods, knowledge, and experience, leading to the development of innovative methods and thinking. Currently, there is no unified definition of creativity in academia, but it is mainly defined from three dimensions: "creative thinking," "creative process," and "creative outcomes."

Although the academic community has not yet unified the definition of the specific concept of creativity, the result theory is widely used in empirical research because of the operability and practicability of the "creative achievement" theory.

3.1.2 The Concept and Connotation of Digital Creativity.

In the digital age, digital technology has permeated every aspect of our lives, becoming an indispensable part of people's existence. Currently, scholars' research on creativity is undergoing a new transformation, giving rise to new forms of digital creativity. When traditional solutions face bottlenecks or constraints, digital creativity innovatively reconstructs cognition through digital technology and achieves breakthrough solutions to complex problems. Compared to traditional creativity, digital creativity actually involves the creative use of digital technology in the context of employees' creative activities within their work scenarios. The academic community presents multiple theoretical frameworks for studying digital creativity. Kaveri et al.^[3] point out that digital technology has become the backdrop of contemporary society. Based on this, the academic community defines the essence of digital creativity from three dimensions: the innovation process^{[3][5]}, technology application^[4], and work context^[6].See Table 1.

Table 1. The connotation of digital creativity

scholar	definition
Seo et al(2013)	Digital creativity is not just a simple technology. It is "the ability to solve problems and create new useful products when dealing with tasks in a digital environment"
Lee&Chen(2015)	Digital creativity is essentially the various forms of creativity expressed under the drive of digital technology.
Oldham et al.(2015)	Digital innovation refers to the innovative ideas generated by people under the influence of digital technology. The ability to generate and implement such innovative ideas is digital creativity.
Nambisan et al. (2017)	Digital innovation is the innovation of products, processes and modes in business activities caused by the use of digital technology, and digital creativity is the ability of digital innovation.
Liu Yang et al. (2020)	Digital creativity is actually people's ability to use digital technologies such as computing and information in the process of innovation, which leads to innovation in production processes, business models and products.

3.1.3 Research on Digital Creativity.

Digital creativity involves three dimensions:

Technical Application: Innovative use of digital tools (e.g., AI-driven process optimization).

Cognitive Restructuring^[7]: Nonlinear thinking enabled by digital technologies (e.g., data-driven decision-making).

Contextual Integration: Seamless fusion of digital technologies with work environments (e.g., industrial IoT collaboration).

Existing studies focus on individual traits (digital literacy, cognitive flexibility), job features (task diversity, autonomy), and environmental factors (leadership support, organizational culture), but rarely explore the role of technology shock awareness. See Table 2.

Table 2. Factors influencing employees' digital creativity

influence factor		author
individuality feature	Innovate self-efficacy	Tierney & Farmer (2002); Tierney & Farmer (2011); Seo et al. (2015);
	Individual absorption capacity	Seo et al. (2015); Cohen & Levinthal (1990); Wang Qian (2020);
	Work self-awareness	Slackers' Smile (2022); Guo Minyu (2024)
work feature	Job autonomy	Hammond et al (2011); Luo et al (2015); Wang et al (2014); Liang et al (2015);
	Task diversity	Seo et al. (2013); Lee & Chen (2015); Liang et al (2015); Seo et al. (2015);
	Work complexity	Hammond et al (2011); Liang et al (2015);
environment factor	Organize an innovative atmosphere	Hirst (2009); Maruping & Magni (2012);
	Leadership support	Amabile et al (1996); Zhang & Bartol (2010); Lee (2013); Pei Minyu (2024);
	leader style	Pieterse et al (2010); Zhang & Bartol (2010); Swati & Rajib (2015); Xue Xianfang (2023);

3.2 Research on Technology Shock Awareness

3.2.1 The Concept of Technological Shock Awareness.

In the context of the digital economy era, the impact of digital technology transformation on job positions is growing, sparking concerns that digital technology will replace their professions and causing panic over future uncertainties^[12]. Against this backdrop, Brougham and Haar^[14] introduced the concept of "technological shock awareness" to describe the threat that digital technology poses to employees. Technological shock awareness refers to the degree to which employees perceive that digital

technology threatens and replaces their career development^[15], representing an individual's "technological cognition" activity regarding digital technology^[13].

3.2.2 Research on Technology Shock Awareness.

Research on technology shock awareness follows three paradigms:

- Negative Impact Paradigm

Brougham et al. found that technology shock awareness increases turnover intentions via job insecurity. Kong et al. proposed a dual-damage model linking technology misfit to career path disruption.

- Positive Impact Paradigm

Ding et al. demonstrated that challenge appraisals enhance organizational commitment through work immersion.

Wang et al.^[9] validated the "anxiety-to-exploration" mechanism in AI contexts, where technology shock awareness boosts creativity.

- Dual-Path Paradigm

Liang et al.^{[10][11]} identified emotional exhaustion (negative) and intrinsic motivation (positive) as dual mediators 8.

Zhang et al. revealed that threat appraisals suppress innovation, while challenge appraisals promote skill reshaping 9.

Recent Advances:

Dynamic Evolution: Xu et al. proposed a phased model of technology shock awareness, highlighting nonlinear relationships between early anxiety (replacement fear) and later adaptation (technology internalization).

Cross-Cultural Studies: Presbitero et al. found that collectivist cultures trigger group-level innovation under technology shock.

Neuro-Mechanisms: Zhang et al. used fMRI to show distinct neural responses in the prefrontal cortex (challenge appraisal) and amygdala (threat appraisal).

4 Synergistic Mechanisms of Technology Shock Awareness and Digital Creativity

4.1 Integrated Theoretical Model

Based on COR and Cognitive Appraisal theories, we propose a dual-channel model: See Figure 1 and Figure 2

Threat Pathway:



Fig. 1. threat pathway

Challenge Pathway:

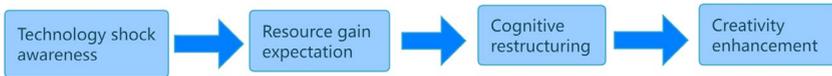


Fig. 2. challenge pathwa

4.2 Key Mechanisms

Resource Reprioritization: Technology shock awareness reallocates cognitive resources toward digital skill acquisition^[12] (Wang, 2023).

Cognitive Elasticity: Challenge appraisals activate divergent thinking, enabling unconventional digital tool applications (Guo, 2022).

Self-Efficacy Reinforcement: Successful technology adaptation reverses negative perceptions, creating positive feedback loops (Liang, 2023).

5 Future Research Directions

Longitudinal Studies: Develop phased measurement tools to track psychological evolution during digital transformation.

Multi-Level Models: Integrate individual-team-organizational dynamics to explore spillover effects.

Intervention Design: Leverage neuroplasticity theories to design positive awareness-guidance programs.

Ethical Dimensions: Investigate interactions between technology shock awareness, algorithmic bias, and digital divides.

6 Conclusion

China's manufacturing sector is at a critical stage of digital transformation under the wave of the digital economy. Digital technology has permeated the entire process of production, management, and service, with data-driven decision-making at its core. This has initially achieved efficiency improvements and refined management, demonstrating the driving force of digital technology in transformation. However, the shortage of digital talent remains a major challenge^[8]. Employees need to master digital technology and demonstrate creativity (i.e., "digital creativity"), but their development

is constrained by career uncertainty caused by perceived technological shocks. This review systematically synthesizes theoretical frameworks and frontier research on technology shock awareness and digital creativity, revealing their nonlinear interplay. Future studies should prioritize cross-cultural validation, operationalize intervention frameworks, and provide evidence-based strategies for manufacturing digital transformation.

Acknowledgements

Chongqing Graduate Research and Innovation Project "The influence of technology shock awareness on employees' digital creativity —— A moderated mediation model"+CYS240749.

References

1. Amabile T M. The social psychology of creativity: A componential conceptualization[J]. *Journal of personality and social psychology*, 1983, 45(2): 357.
2. Chen Wenjing, Kang Cailu, Yang Yue et al. Potential replacement risk of artificial intelligence and employee career ability development: A perspective based on employees' insecurity [J]. *China Human Resource Development*, 2022,39(01):84-97.
3. Xu Hong, Yang Hongyan, Zhang Yan. The Impact of Challenging and Blocking Work Pressure on Employees' Innovative Behavior —— A Moderated Mediating Effect [J]. *Contemporary Economic Management*, 2021,43(12):58-65.
4. Nambisan S. Digital entrepreneurship: toward a digital technology perspective of entrepreneurship[J]. *Entrepreneurship theory and practice*, 2017, 41(6):1029-1055.
5. Oldham, G. R., & Da Silva, N. The impact of digital technology on the generation and implementation of creative ideas in the work-place[J]. *Computers in Human Behavior*, 2015, 42(0): 5-11.
6. Lee C, Huang G H, Ashford S J. Job insecurity and the changing workplace: Recent developments and the future trends in job insecurity research[J]. *Annual Review of Organizational Psychology and Organizational Behavior*, 2018, 5(1): 335-359.
7. Wu Huanwei and Sun Meiquan. The Impact of Uncertainty Perception on Employee Resource Rebuilding: A Study Based on Cognitive Evaluation Perspective [J]. *Management Review*, 2024,36(5):11-24.
8. Seo Y W, Chae S W, Lee K C. The impact of absorptive capacity, exploration, and exploitation on individual creativity: Moderating effect of subjective well-being[J]. *Computers in Human Behavior*, 2015, 42:68-82.
9. Wang Qian. Characteristics of work and individual characteristics in the digital age and employees' digital creativity —— The mediating role of innovative self-efficacy and the moderating role of gender [J]. *Technological Economy*, 2020,39(7),72-79.
10. Liang H, Peng Z, Xue Y, et al. Employees' exploration of complex systems: An integrative view[J]. *Journal of Management Information Systems*, 2015, 32(1): 322-357.
11. Xue Xianfang, Qiu Zemin, Guo Han, et al. The influence mechanism of empowering leadership on digital creativity [J]. *Applied Psychology*, 2023,29(06):493-502.
12. Wang H, Zhang H, Chen Z, et al. Influence of artificial intelligence and robotics awareness on employee creativity in the hotel industry[J]. *Frontiers in Psychology*, 2022, 13: 834160.

13. Yu Minyu and Yongyue Zhu. The Impact of the Framework of Positive Leadership Outcomes on Employees' Digital Creativity from the Perspective of Meaning Construction Theory [J]. *Journal of Management*, 2024,21(04):550-559.
14. Brougham D, Haar J. Technological disruption and employment: The influence on job insecurity and turnover intentions: A multi-country study[J]. *Technological Forecasting and Social Change*, 2020, 161: 120276.
15. Brougham D, Haar J. Smart technology, artificial intelligence, robotics, and algorithms (STARA): employees' perceptions of our future workplace[J]. *Journal of Management & Organization*, 2018, 24(2): 239-257.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

