

The Impact of Artificial Intelligence Applications on Employees' Deviant Innovation

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ABSTRACT

The integration of artificial intelligence (AI) has become a pivotal factor in modern enterprises, driving efficiency, cost reduction, and innovation. However, the impact of AI on organizations and employees extends beyond operational improvements, posing significant challenges to traditional management practices and fostering both opportunities and risks. This study explores the effects of AI applications on deviant innovation—a form of employee-driven, informal innovation often undertaken without organizational approval. Drawing on the Job Demands-Resources (JD-R) model, this research theorizes that AI serves as both a challenging job demand and a critical job resource, influencing employees' work engagement and propensity for deviant innovation. The literature review identifies gaps in existing research, particularly regarding the mechanisms through which AI applications shape deviant innovation. This study highlights the dual impact of deviant innovation on individual and organizational outcomes, emphasizing its potential to enhance creativity and organizational performance. The findings suggest that effective AI integration requires adaptive organizational strategies, flexible management systems, and the cultivation of employees' innovative potential. This research contributes to the fields of organizational behavior and innovation management by providing new insights into the interplay between AI applications and deviant innovation, offering theoretical and practical implications for the future of work.

KEYWORDS

Artificial intelligence; Deviant innovation; Job demands-resources

1 Introduction

The application of artificial intelligence (AI) has become increasingly important in modern enterprises. AI is used to enhance efficiency, save time, and reduce costs. According to a survey by Forbes, business owners have adopted AI in various domains, including customer service (56% of respondents use AI) as well as cybersecurity and fraud management (51%). A report by McKinsey suggests that applying AI can make organizations more efficient and profitable. However, the ultimate value of AI lies not in the systems themselves but in how organizations leverage these systems to assist humans.

Given the rapid changes in political and economic environments, maintaining stable and efficient business operations and workflows has become increasingly challenging and risky for organizations. AI applications, with their relatively user-friendly nature and the convenience of local deployment, are being integrated into business processes across enterprises of all sizes. This integration represents both opportunities and challenges for organizations and employees. Traditional incremental innovation strategies often fail to meet the demands of rapid adaptation and sustained competition. Cultivating and supporting innovation in the face of rapidly evolving technological landscapes has increasingly become a critical issue for the survival and development of enterprises.

While formalized management practices enhance efficiency, rigid organizational structures often become significant barriers to innovation, severely constraining employees' creativity and flexibility^[32]. In the digital and intelligent era, employees' innovative capabilities are the foundational drivers of developing new technologies, products, and services^[29]. To overcome innovation barriers, employees sometimes conceal their innovative activities or continue development efforts even after their supervisors have ordered the cessation of research and development^[2,6,27]. This dynamic leads to organizational norms becoming increasingly inadequate and ineffective in rapidly changing environments. It is not AI that replaces humans, but humans empowered by AI. As the adoption of AI technology in enterprises continues to grow, its impact on organizations and employees becomes increasingly significant and unavoidable.

2 Literature review

2.1 AI technology

2.1.1 Concept of AI technology

In 1956, Claude Shannon and other scientists convened at Dartmouth College in the United States, where they introduced the concept of "Artificial Intelligence" (AI) for the first time, defining it as machines capable of simulating, extending, and further expanding human intelligence^[24]. AI refers to the ability of systems to interpret data, leveraging

computational capabilities to enhance human performance in decision-making, problem-solving, and driving technological innovation (Haenlein et al., 2019a, 2019b; Mishra et al., 2020; Mustak et al., 2021a, 2021b)^[1,16,25-26]. With advancements in technology, the synchronization of information systems, and industrialization, the trend of enterprises adopting AI has become increasingly prominent, evolving into an unavoidable necessity (Ferrario et al., 2020; Mishra & Tripathi, 2020)^[11,25].

Fiske et al. (2019) highlighted that as AI technology advances, its application domains and nature have become increasingly specific^[12]. Salman Bahoo et al. (2023) categorized AI into three main types: (1) technology-driven AI, such as machine learning, deep learning, natural language processing, and artificial neural networks; (2) industry-application AI, encompassing applications like Industry 4.0, the Industrial Internet of Things, robotics, and smart wearable devices; and (3) system-application AI, which includes automation, the Internet of Things (IoT), soft computing, cloud computing, and information and communication technologies. These categories allow AI to be understood as technology-based tools, industry-specific applications, and systems and software developed to achieve specific objectives^[4].

2.1.2 Current research on AI

In existing literature, Xiuli Cui et al. (2022) argue that the impact of AI on the economy and industries has gradually shifted from the macroeconomic to the microeconomic level, significantly enhancing corporate governance^[7]. Bankins et al. (2024) conducted a systematic review of the application of AI in organizations and proposed a multi-level framework encompassing five key themes at the individual, group, and organizational levels. These themes highlight the potential challenges AI poses to employee well-being, job stability, and job satisfaction, even as it enhances work efficiency^[5]. POK MAN TANG et al. (2022) contend that more conscientious employees may not necessarily benefit from modern technology and may even encounter greater challenges^[22]. Yam and Tang (2023) examined the impact of robots on employees' job stability. Their findings indicate that exposure to robots significantly increases employees' feelings of job insecurity, which in turn contributes to burnout and uncivil behavior in the workplace^[34].

Currently, most research on the impact of AI on innovation focuses on the business and economic levels, with studies on micro-level organizational aspects remaining scarce. Salman Bahoo (2023) conducted a mixed review of 364 published articles over 56 years, concluding that AI drives organizations to redesign their innovation processes and identifying eight key intersections between AI and organizational innovation^[4]. Both Park (2024) and Derakhshan (2024) analyzed the "double-edged sword" effects of AI applications in the workplace on employee behavior^[9,28]. Meng Yin, Shiyao Jiang, et al. (2024) argue that creative work is becoming increasingly important for humans. They identified dual effects of AI assistants on employees' innovative behaviors mediated through creative self-efficacy and STARA awareness^[35]. STARA awareness is defined as employees' perceptions of how Smart Technology, Artificial Intelligence, Robotics, and Algorithms influence their future career prospects^[3].

Evaluation: In summary, this study identifies significant challenges to traditional human resource management within AI-enabled workplaces. The question of whether AI applications are beneficial or detrimental remains open, with scholars reaching different conclusions based on varying impact pathways and contextual factors. Existing research primarily examines the psychological mechanisms of employees, exploring the effects of AI applications on their mental states and behaviors. However, within the field of organizational behavior, studies on how AI applications influence deviant innovation are relatively underdeveloped. This study thus holds substantial theoretical significance in exploring the impact of AI applications on deviant innovation.

2.2 Deviant Innovation

2.2.1 Concept of deviant innovation

Augsdorfer (2005) defines "Bootleg Innovation" as spontaneous innovation activities initiated by employees, often conducted without formal approval from the organization and typically unknown to senior management. The ultimate goal of such behavior is to advance organizational progress and enhance performance. This definition highlights two core characteristics: the secrecy of the behavior and the positive innovation objectives aimed at benefiting the organization^[2]. Criscuolo et al. (2014) identify four key elements of deviant innovation: individual autonomy in initiation, lack of formal organizational support, unawareness of management, and contributions to overall organizational performance [18]. Norms can be formal or informal rules, systems, or behavioral standards, with most organizations requiring employees to comply with management directives. Innovation refers to the development and implementation of new ideas within an organization, usually resulting in socially beneficial outcomes^[27].

2.2.2 Current research on deviant innovation

(1) Antecedents of Deviant Innovation

Employees' innovative behaviors are influenced by both intrinsic motivations and organizational environments. From the perspective of employees' internal traits, Liu et al. (2024) argue that proactive employee behaviors promote deviant innovation, thereby improving innovative job performance, with felt responsibility for constructive change (FRCC) and creative self-efficacy (CSE) serving as positive moderators^[20]. Lu et al. (2023) examine how perceived overqualification (POQ) indirectly influences deviant innovation behaviors by enhancing creative self-efficacy, with perceived organizational support (POS) acting as a critical moderator^[21]. By reviewing existing research, this paper summarized factors influencing deviant innovation, including innovation role identity, creative self-efficacy, role-breadth self-efficacy, perceptions of overqualification, constructive sense of responsibility, psychological entitlement, and the perceived acceptability of norm violations^[13-14,17,19].

From the perspective of leadership styles and behaviors, Li et al. (2022) analyze, based on social exchange theory, how coaching leadership stimulates deviant innovation behaviors through interactional justice and organizational identification^[18]. Zhang et al. (2023) explore how leader humor influences deviant innovation by enhancing employees' relational energy, with the effects of leader humor being more significant in flexible work units^[36].

From the perspective of organizational norms and systems, Globocnik et al. (2022) demonstrate that combining formal management processes with informal innovation activities and supporting bottom-up innovation practices increases tendencies toward deviant innovation, thereby enhancing the diversity and novelty of organizational innovation^[15]. Ding et al. (2024) focus on the mediating role of deviant innovation in organizational performance, finding that as organizational scale expands, members' deviant innovation behaviors are gradually activated, further improving project-based organizations' collective task performance^[10].

(2) Outcome Variables

Scholars hold different views regarding the mechanisms and effects of deviant innovation. Augsdorfer (2005) summarizes existing studies, noting that 21 papers (47.7%) adopt a neutral stance, 20 papers (45.5%) recognize the positive effects of deviant innovation, such as overcoming obstacles and achieving unexpected outcomes, while 3 papers (6.8%) oppose deviant innovation, citing potential failure and resource waste^[2].

Deviant innovation has both positive and negative impacts on individuals and organizations. For employees, deviant innovation enhances resource integration capabilities, stimulates creativity, and allows for recognition of achievements by the organization, leaders, and peers^[27]. However, it may also lead to organizational suppression, with management imposing penalties, sanctions, demotions, or dismissals to restrict such behaviors^[31]. Additionally, if innovation attempts fail or employees abandon their efforts midway, it could result in wasted resources and energy, even straining relationships with colleagues^[23].

From an organizational perspective, deviant innovation improves overall innovation capabilities and performance. It facilitates long-term development by driving product, process, and managerial innovation, thereby improving management models and workflows. However, it may also challenge management authority and disrupt organizational processes^[23].

Evaluation: Past research has explored the effects of deviant innovation on organizations and employees under various contextual conditions. Studies on antecedents primarily focus on intrinsic employee traits and leadership styles, with limited attention to the role of technological applications in shaping deviant innovation. Thus, the influence of new technological contexts, work resources, and job designs on deviant innovation remains underexplored. The mechanisms and boundaries of AI applications affecting deviant innovation represent significant gaps in current research.

3 Theory and deduction

3.1 Theoretical foundation

The Job Demands-Resources (JD-R) model posits that every occupation has unique factors that impact employees' physical and mental well-being and work outcomes. These factors can be categorized as job demands or job resources. Job demands refer to factors requiring sustained physical or psychological effort, often leading to stress and exhaustion. Job resources, on the other hand, are supportive factors that help employees achieve work goals, alleviate stress, and promote growth and development (Demerouti et al., 2001)^[8].

As research on the JD-R model has advanced, scholars have discovered that not all types of job demands lead to negative outcomes like burnout. Certain job demands can promote work engagement. Van den Broeck et al. (2010) refine this categorization by dividing job demands into "hindrance" and "challenge" dimensions^[33]. Hindrance demands positively correlate with burnout, while challenge demands can enhance work engagement.

3.2 AI applications and deviant Innovation

First, AI introduces new job demands, such as learning and adapting to new technologies, altering workflows, and

redefining roles. Prolonged human-AI interaction aimed at achieving high-performance collaboration represents a challenging demand that fosters employee growth and work engagement. These new demands push employees out of their comfort zones, encouraging them to explore new methods and strategies.

Second, AI facilitates resource reallocation and innovation. Employees are freed from repetitive tasks, breaking conventional workflows and thought patterns, thereby enabling them to identify and implement new ideas and solutions more effectively.

Third, AI adoption affects management practices, empowering leaders with new resources. Flexible and intelligent management models replace rigid systems, enabling leaders to supervise and regulate deviant innovation more effectively. This creates psychological space for employees to perceive and pursue deviant innovation.

Based on the above reasoning, this study posits that AI applications act as both a challenging job demand and a critical job resource, significantly influencing employees' deviant innovation behaviors positively.

4 Conclusions and implications

The integration of AI into organizations does not automatically yield optimal outcomes. Existing studies show that AI applications may evoke employee resentment, resistance, or confusion. Thus, an exploratory and adaptive process is necessary, requiring managers to harness employees' bottom-up creativity and agency while establishing new workflows and organizational structures.

First, managers should demonstrate support for AI and actively promote its integration into organizational processes to empower employees. This requires establishing AI management departments, integrating AI into routine tasks and human resource practices, and providing technical training and resources to employees. By enhancing employees' understanding and use of AI tools, organizations can foster creativity and experimental willingness.

Second, organizations should take time to identify potential use cases for AI, gradually accumulating successful cases to establish new norms. Defining new products, services, and workflows enabled by AI often requires bottom-up creativity rather than top-down planning^[30]. Management practices should encourage "planned emergence," combining formal processes with informal innovation activities to enhance organizational innovation capabilities^[14].

Third, Technology should support not only routine automation but also the exploration and experimentation of new methods in daily work. Managers should systematically accumulate successful cases, iteratively experimenting and scaling innovative practices to establish workflows and norms that align with new productive capacities and relations.

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References

- [1] Ai business model: an integrative business approach.
- [2] Augsdorfer P. . Bootlegging and path dependency. *RESEARCH POLICY*, 2005, 34(1): 1-11.
- [3] Babamiri M., Heidarimoghadam R., Ghasemi F., Tapak L., Mortezaipoor A. . Insights into the relationship between usability and willingness to use a robot in the future workplaces: studying the mediating role of trust and the moderating roles of age and stars. *PLoS One*, 2022, 17(6).
- [4] Bahoo S., Cucculelli M., Qamar D. . Artificial intelligence and corporate innovation: a review and research agenda. *TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE*, 2023, 188: 122264.
- [5] Banks S., Ocampo A.C., Marrone M., Restubog S.L.D., Woo S.E. . A multilevel review of artificial intelligence in organizations: implications for organizational behavior research and practice. *JOURNAL OF ORGANIZATIONAL BEHAVIOR*, 2024, 45(2): 159-182.
- [6] C, M. . Stealing fire: creative deviance in the evolution of new ideas. *ACADEMY OF MANAGEMENT REVIEW*, 2010, 35(4): 558-578.
- [7] Cui X., Xu B., Razzaq A. . Can application of artificial intelligence in enterprises promote the corporate governance? *Frontiers in Environmental Science*, 2022, 10.
- [8] Demerouti E., Bakker A.B., Nachreiner F., Schaufeli W.B. . The job demands-resources model of burnout. *JOURNAL OF APPLIED PSYCHOLOGY*, 2001, 86(3): 499-512.
- [9] Derakhshan A., Ghiasvand F. . Is chatgpt an evil or an angel for second language education and research? A phenomenographic study of research-active efl teachers' perceptions. *International Journal of Applied Linguistics*, 2024, 34(4): 1246-1264.
- [10] Ding X., Feng L., Huang Y., Li W. . The interactive effects of communication network structure and organizational size on task performance in project-based organizations: the mediating role of bootleg innovation behavior. *Buildings*, 2024, 14(1).
- [11] Ferrario A., Loi M., Viganò E. . In ai we trust incrementally: a multi-layer model of trust to analyze human-artificial intelligence interactions. *Philosophy & Technology*, 2020, 33(3): 523-539.
- [12] Fiske A., Henningsen P., Buys A. . Your robot therapist will see you now: ethical implications of embodied artificial intelligence in psychiatry, psychology, and psychotherapy. *JOURNAL OF MEDICAL INTERNET RESEARCH*, 2019, 21(5).

- [13] Gao Q., Xu J., Tao Z., Liu L., Wu C. . Exploration and analysis on the psychological capital of entrepreneurship and the deviant innovation behavior of employees. *Frontiers in Psychology*, 2020, 11.
- [14] Globocnik D., Haeufler B.P., Salomo S. . Organizational antecedents to bootlegging and consequences for the newness of the innovation portfolio. *JOURNAL OF PRODUCT INNOVATION MANAGEMENT*, 2022, 39(5): 717-745.
- [15] Globocnik D., Haeufler B.P., Salomo S. . Organizational antecedents to bootlegging and consequences for the newness of the innovation portfolio. *JOURNAL OF PRODUCT INNOVATION MANAGEMENT*, 2022, 39(5): 717-745.
- [16] Haenlein M., Kaplan A. . A brief history of artificial intelligence: on the past, present, and future of artificial intelligence. *CALIFORNIA MANAGEMENT REVIEW*, 2019, 61(4): 5-14.
- [17] Li L., Huang G., Yan Y. . Coaching leadership and employees? Deviant innovation behavior: mediation and chain mediation of interactional justice and organizational identification. *Psychology Research and Behavior Management*, 2022, 15: 3861-3874.
- [18] Li L., Huang G., Yan Y. . Coaching leadership and employees? Deviant innovation behavior: mediation and chain mediation of interactional justice and organizational identification. *Psychology Research and Behavior Management*, 2022, 15: 3861-3874.
- [19] Li M., Ye H. . Temporal leadership and bootlegging behavior of employees: the mediating effect of self-efficacy. *Frontiers in Psychology*, 2021, 12.
- [20] Liu P., Yuan Y., Yang L., Liu B., Xu S. . Innovation comes with responsibility: a dual moderation model of taking charge and innovative job performance. *European Journal of Innovation Management*, 2024, 27(8): 2966-2993.
- [21] Lu L., Luo T., Zhang Y. . Perceived overqualification and deviant innovation behavior: the roles of creative self-efficacy and perceived organizational support. *Frontiers in Psychology*, 2023, 14.
- [22] Man Tang P., Koopman J., Mcclean S.T., Zhang J.H., Li C.H., De Cremer D., Lu Y., Ng C.T.S. . When conscientious employees meet intelligent machines: an integrative approach inspired by complementarity theory and role theory. *ACADEMY OF MANAGEMENT JOURNAL*, 2022, 65(3): 1019-1054.
- [23] Masoudnia Y., Szejczerwski M. Bootlegging in the r&d departments of high-technology firms. *RESEARCH-TECHNOLOGY MANAGEMENT*, 2012, 55(5): 35-42.
- [24] McCarthy J., Minsky M.L., Shannon C.E. . A proposal for the dartmouth summer research project on artificial intelligence - august 31, 1955. *AI MAGAZINE*, 2006, 27(4): 12-14.
- [25] Mishra S., Tripathi A.R. . Ai business model: an integrative business approach. *Journal of Innovation and Entrepreneurship*, 2021, 10(1): 18.
- [26] Mustak M., Salminen J., Plé L., Wirtz J. . Artificial intelligence in marketing: topic modeling, scientometric analysis, and research agenda. *JOURNAL OF BUSINESS RESEARCH*, 2021, 124: 389-404.
- [27] Paola Criscuolo A.S.A.L. . Going underground: bootlegging and individual innovatie performance. *ORGANIZATION SCIENCE*, 2014, 25(5): 1287-1305.
- [28] Park H.E.G. The double-edged sword of generative artificial intelligence in digitalization: an affordances and constraints perspective. *PSYCHOLOGY & MARKETING*, 2024, 41(11): 2924-2941.
- [29] Perry-Smith J.E., Mannucci P.V. . From creativity to innovation: the social network drivers of the four phases of the idea journey. *The Academy of Management review*, 2017, 42(1): 53-79.
- [30] Sanchez M.A. A multi-level perspective on financial technology transitions. *TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE*, 2022, 181.
- [31] Shukla J., Kark R. . Now you do it, now you don't: the mixed blessing of creative deviance as a prosocial behavior. *Frontiers in Psychology*, 2020, 11.
- [32] VAN DE VEN A H, HA R G R A V E T J . A collective action model of institutional innovation. *Academy of Management Review*, 2006, 31(4): 864-888.
- [33] Van den Broeck A., De Cuyper N., De Witte H., Vansteenkiste M. . Not all job demands are equal: differentiating job hindrances and job challenges in the job demands-resources model. *European Journal of Work and Organizational Psychology*, 2010, 19(6): 735-759.
- [34] Yam K. C., Tang P. M., Jackson J. C., Su R., Gray K. . The rise of robots increases job insecurity and maladaptive workplace behaviors: multimethod evidence. *JOURNAL OF APPLIED PSYCHOLOGY*, 2023, 108(5): 850-870.
- [35] Yin M., Jiang S., Niu X. . Can ai really help? The double-edged sword effect of ai assistant on employees' innovation behavior. *COMPUTERS IN HUMAN BEHAVIOR*, 2024, 150: 107987.
- [36] Zhang L., Qin G., Yang F., Jiang P. . Linking leader humor to employee bootlegging: a resource-based perspective. *JOURNAL OF BUSINESS AND PSYCHOLOGY*, 2023, 38(6): 1233-1244.