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Job Replacement or Job Transformation? The Nature, Impact, and Sources of Insecurity in Technical Jobs

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Abstract

As Chinese enterprises undergo digital transformation, effectively alleviating and addressing employee job insecurity is crucial for building harmonious and stable labor relations. Traditional research on job insecurity has extensively explored the sources and effects of job insecurity, but has paid less attention to the rapid development and application of artificial intelligence technology—an important context in current organizational management practice and research. This paper innovatively proposes the concept of technology-based job insecurity in the context of artificial intelligence, reflecting job insecurity perceived by individuals due to the development and application of artificial intelligence technology. This paper has three research objectives: First, to explore the connotation and dimensional structure of technology-based job insecurity, aiming to extract two dimensions: job replacement insecurity and job transformation insecurity; Second, to explore the impact of technology-based job insecurity on employee work outcomes and career outcomes; Third, to explore the sources of technology-based job insecurity. This paper can not only enrich the conceptual and theoretical research on job insecurity in the context of artificial intelligence, but also provide practical insights for establishing harmonious and stable labor relations and enhancing employee work well-being as Chinese enterprises undergo digital transformation.

Full Text

Job Replacement or Job Transformation? Definition, Consequences, and Sources of Technology-Driven Job Insecurity

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Abstract

As Chinese enterprises undergo digital transformation, effectively alleviating and addressing employee job insecurity is essential for building harmonious and stable labor relations. While traditional job insecurity research has extensively examined its antecedents and consequences, it has largely overlooked the rapid development and application of artificial intelligence (AI) technology—a critical context for contemporary organizational management practice and research. This study innovatively proposes the concept of technology-driven job insecurity in the AI context, reflecting individuals' perceived threat to job continuity and stability resulting from AI development and application. Our research has three objectives: First, we explore the definition and dimensional structure of technology-driven job insecurity, proposing job replacement insecurity and job transformation insecurity as its two core dimensions. Second, we examine the effects of technology-driven job insecurity on employee work outcomes and career outcomes. Third, we investigate the sources of technology-driven job insecurity. This research not only enriches conceptual and theoretical work on job insecurity in the AI era but also provides practical insights for establishing harmonious labor relations and enhancing employee well-being during Chinese enterprises' digital transformation.

Keywords: technology-driven job insecurity, artificial intelligence, job replacement, job transformation

1. Introduction

Driven by big data, cloud computing, the Internet of Things, and artificial intelligence technologies, a new wave of technological transformation is underway. As digital economy has become a national strategy, Chinese enterprises are accelerating their digital transformation, exposing employees to the impact of digital technologies. AI technologies, represented by machine learning and algorithms, can automate not only simple transactional tasks but also complex cognitive work (Davenport & Kirby, 2016; Huang & Rust, 2018). The influence of AI on human work has extended from operational positions to marketing, technical, and managerial roles, and from production floors to marketing, finance, R&D, and human resources departments (Daugherty & Wilson, 2018). For instance, Vanke Group' s digital employee "Cui Xiaopan" processes accounts receivable reminders and anomaly detection tasks thousands of times more efficiently than

humans, while SPD Bank' s digital employee "Xiao Pu" communicates with customers emotionally and continuously improves its service capabilities through active learning. In light of these developments, society has begun to consider how AI will affect human work. Will human jobs be automated by machines? Will they be reshaped by AI technology? Therefore, as Chinese enterprises undergo digital transformation, examining employees' perceptions of job continuity and stability in the future holds significant practical importance.

Job insecurity research investigates individuals' perceived threat to the continuity and stability of their desired employment (De Witte, 1999; Greenhalgh & Rosenblatt, 1984), representing a hot topic in domestic and international research on work stress and occupational health (Jiang & Lavaysse, 2018; Lee et al., 2018; Hu, 2007). By definition, job insecurity reflects individuals' concerns about potentially losing their current job or valuable job features such as challenging tasks and promotion opportunities (Greenhalgh & Rosenblatt, 1984; Hellgren et al., 1999). Although previous studies have examined organizational and individual antecedents of job insecurity and its effects on employee well-being, work attitudes, and behaviors (Jiang et al., 2021; Lee et al., 2018; Shoss, 2017), they have largely neglected the context of AI technology development and application—a background that cannot be ignored in current organizational management practice and research (Luo et al., 2022). AI technology poses a substantial threat to the continuity and stability of human work (Daugherty & Wilson, 2018; Davenport & Kirby, 2016), yet theoretical research on job insecurity in the AI context remains scarce.

Only a handful of studies have examined the antecedents of job insecurity in the AI context—such as employee perceptions of smart technology (Brougham & Haar, 2020; Lingmont & Alexiou, 2020), occupational replacement risk (Dengler & Gundert, 2021), and robot exposure (Yam et al., 2022)—as well as its effects on employee burnout, work behavior, and career competence development (Koo et al., 2021; Yam et al., 2022; Chen et al., 2020). Unfortunately, these studies focus on overall job insecurity rather than job insecurity specifically caused by AI technology development and application. This limitation hinders researchers from deeply revealing the phenomenon of job insecurity in the AI context and prevents organizations from implementing targeted measures to alleviate and address the negative work experiences triggered by AI technology.

What specific aspects of job insecurity does AI technology development and application cause? What are their unique consequences? What are their distinct sources? Our primary research objective is to define job insecurity in the AI context by proposing the concept of technology-driven job insecurity and examining its dimensional structure. We define technology-driven job insecurity as the perceived threat to job continuity and stability caused by AI technology development and application. Given that AI may either automate human jobs (replacing humans), leading employees to fear job loss, or reshape human jobs, causing employees to worry about changes in job content, work methods, and skill requirements (Roos & Shroff, 2017; Qiu & He, 2020), we propose two core

dimensions: job replacement insecurity and job transformation insecurity.

Our second objective is to reveal the effects of technology-driven job insecurity on employee work and career outcomes. Our third objective is to explore its sources. By clarifying the definition and dimensionality, revealing its consequences, and identifying its antecedents, this study constructs a systematic theoretical framework of technology-driven job insecurity with both theoretical and practical significance. Theoretically, we innovatively propose the concept of technology-driven job insecurity and distinguish between job replacement and job transformation insecurity, thereby deepening conceptual research on job insecurity in the AI context. Second, by examining its consequences and antecedents, we advance theoretical research on job insecurity in the AI era. By identifying unique consequences and antecedents, we also reveal phenomena previously overlooked in the literature. Practically, our study provides insights for effectively managing the consequences of technology-driven job insecurity and offers guidance for targeted interventions to address employees' negative work experiences triggered by technological change.

2.1.1 Concept and Dimensionality of Job Insecurity

Table 1 summarizes definitions of job insecurity by scholars worldwide. Although these definitions vary, job insecurity generally has three characteristics. First, job insecurity is a subjective perception—different employees may experience varying levels of job insecurity in the same objective environment. Second, job insecurity reflects employees' future expectations of job loss rather than actual loss. Third, job insecurity concerns employees' feelings about their current employing organization and job. Regarding dimensionality, some scholars have focused on overall job insecurity (Greenhalgh & Rosenblatt, 1984), while others have distinguished different dimensions, such as quantitative versus qualitative job insecurity (Hellgren et al., 1999), cognitive versus affective job insecurity (Huang et al., 2010), and job-focused versus person-focused job insecurity (Ma et al., 2022).

Table 1 Definitions of Job Insecurity by Scholars Worldwide

Scholars	Concept	Definition
Greenhalgh & Rosenblatt (1984)	Job insecurity	In threatening work situations, individuals' powerlessness to maintain desired continuity in a job situation.
Jacobson & Hartley (1991)	Job insecurity	The discrepancy between the level of security individuals experience and the level they would prefer.

Scholars	Concept	Definition
De Witte (1999)	Job insecurity	Overall concerns about the continued existence of the job in the future.
Hellgren et al. (1999)	Quantitative and qualitative job insecurity	Quantitative job insecurity refers to concerns about the future existence of the present job; qualitative job insecurity refers to perceived threats to the quality of the employment relationship, including deterioration of working conditions, lack of career development opportunities, and slower salary growth.
Probst (2003)	Job security	Perceived stability and continuity of a job.
Hu (2007)	Job insecurity	Perceptions and concerns about threats to one' s job or important job features.
Huang et al. (2010)	Cognitive and affective job insecurity	Cognitive job insecurity refers to perceptions of potential deterioration in future employment status; affective job insecurity refers to negative emotional experiences of worrying about and fearing employment status deterioration.
Shoss (2017)	Job insecurity	Perceived threat to the continuity and stability of current employment.

Scholars	Concept	Definition
Ma et al. (2022)	Job-focused and person-focused job insecurity	Job-focused job insecurity refers to employees' subjective perception that their current job position will cease to exist within a certain period; person-focused job insecurity refers to employees' perception that they will be forced to leave their current position and be replaced by others.

2.1.2 Theoretical Perspectives on Job Insecurity Research

In traditional contexts, researchers have primarily drawn on cognitive appraisal theory, conservation of resources theory, social exchange theory, and social identity theory to examine the antecedents and consequences of job insecurity (see Figure 1 [Figure 1: see original paper]). Overall, existing research has focused more on consequences than antecedents. We briefly review this literature below.

Cognitive Appraisal Theory. Cognitive appraisal theory (Lazarus & Folkman, 1984) posits that individuals' cognitive evaluations and coping responses are determined by whether they perceive objective situations as affecting their well-being and whether they have adequate resources to address these situations. According to this theory, negative organizational contextual factors (e.g., low organizational performance, Debus et al., 2014; frequent organizational change, Çalışkan & Özkoç, 2020) trigger job insecurity. Employees who are sensitive to negative stimuli or lack coping resources (e.g., high negative affectivity, external locus of control, Debus et al., 2014) not only experience higher overall job insecurity but also show stronger job insecurity reactions to negative situations. Additionally, job insecurity triggers negative appraisals, thereby damaging employees' positive work attitudes, behaviors, and well-being (Debus et al., 2012; Vander Elst et al., 2014).

Conservation of Resources Theory. Conservation of resources theory (Hobfoll et al., 2018) suggests that individuals strive to maintain and protect existing resources while using them to acquire new resources. Actual resource loss and threats of potential loss cause stress reactions and trigger actions to protect resources. Moreover, resource gain and loss follow a spiral pattern—individuals with abundant resources tend to gain more, while those lacking resources or facing resource loss threats tend to experience further losses. According to this theory, employees with fewer resources or in resource loss states are more likely to experience job insecurity (Jiang et al., 2021; Vander Elst et al., 2018).

Meanwhile, job insecurity represents a threat of resource loss, leading to stress reactions and reducing job satisfaction, affective organizational commitment, and work engagement (Jiang & Lavaysse, 2018; Jiang & Probst, 2017; Sender et al., 2017).

Social Exchange Theory. Social exchange theory (Cropanzano & Mitchell, 2005; Zou et al., 2012) posits that in social exchange relationships, when one party benefits from another, they feel obligated to reciprocate to maintain the positive exchange relationship. Conversely, when one party is harmed by another, they retaliate to maintain fairness. Psychological contract theory represents a typical social exchange perspective. On one hand, job security is part of the psychological contract between employees and organizations. Perceived psychological contract breach damages employees' sense of control over their work environment, leading to job insecurity (Keim et al., 2014). On the other hand, when employees experience job insecurity, they perceive that the organization has violated the reciprocal relationship, feel emotionally exhausted, reduce job satisfaction and affective commitment, and decrease work engagement while engaging in counterproductive behaviors that harm organizational interests (De Cuyper & De Witte, 2006; Huang et al., 2017; Piccoli & De Witte, 2015).

Social Identity Theory. According to social identity theory (Ashforth & Mael, 1989), threats to individuals' social identity trigger negative consequences such as negative emotions, reduced group identification, and decreased work performance. Existing research shows that job insecurity threatens employees' organizational identity (Piccoli et al., 2017; Song et al., 2018) and their identity as employed individuals (Selenko et al., 2017), reducing work performance, organizational citizenship behavior, and well-being. Additionally, low-quality leader-member exchange reduces employees' perceived insider status, leading to job insecurity (Wang et al., 2019).

Self-Determination Theory. Self-determination theory (Ryan & Deci, 2000) posits that work environments satisfying individuals' three basic psychological needs—autonomy, competence, and relatedness—enhance work motivation and positive behaviors. Existing research has applied this theory to examine job insecurity' s effects on work behavior. Job insecurity, especially developmental job insecurity, threatens these three needs, reducing organizational citizenship behavior, creativity, and innovative behavior (Montani et al., 2021; Stynen et al., 2015) while increasing counterproductive work behavior (Van den Broeck et al., 2014).

Spillover and Crossover Effects. Spillover effects refer to the mutual permeation of work and family experiences, reflecting intra-individual influence processes across roles (Bolger et al., 1989). Crossover effects refer to how individuals' emotional experiences affect those around them, reflecting inter-individual influence processes (Westman, 2001). As a work stressor, job insecurity causes negative emotions such as tension and anxiety, which may spill over into family life and even affect family members. Research shows that fathers' job insecurity leads to financial anxiety in fathers, which in turn causes financial anxiety in

their children (Lim & Sng, 2006), while parents' job insecurity influences their parenting behaviors (Lim & Loo, 2003).

2.2 Job Transformation and Job Insecurity in the AI Context

Figure 1 [Figure 1: see original paper] illustrates the overview of job insecurity research in traditional contexts. AI technology will profoundly affect future work and employment. In this context, scholars have examined both the objective impact of AI on jobs (i.e., job transformation) and employees' perceived threats to job continuity and stability resulting from this impact (i.e., job insecurity). We review both aspects below.

2.2.1 AI-Driven Job Transformation

AI technology uses machines to perform cognitive, recognition, and analytical functions, including artificial neural networks, machine learning, algorithms, and natural language processing. Unlike previous technologies, AI can automate not only simple transactional tasks but also complex cognitive work (Davenport & Kirby, 2016; Huang & Rust, 2018; Li et al., 2021). Scholars hold different views on how AI will affect human work.

Scholars advocating the **intelligent automation** perspective argue that AI will ultimately replace human work by automating various tasks (Tschang & Almirall, 2021). Huang and Rust (2018) proposed a job replacement theory to predict AI' s impact on human work, distinguishing four intelligence types—mechanical, analytical, intuitive, and empathetic—in order of increasing difficulty for machines. AI technology first automates tasks requiring "lower" intelligence types before upgrading to "higher" intelligence types, eventually completely replacing humans. Frey and Osborne (2017) estimated the risk of computerization for 702 occupations based on U.S. labor market data, finding that approximately 47% of U.S. jobs face potential disappearance due to computerization within the next 10-20 years. Arntz et al. (2016) assessed task automation levels and found that across 21 OECD countries, an average of 9% of jobs face high automation risk, ranging from 6% in South Korea to 12% in Austria. Zhou et al. (2020) estimated AI replacement rates for different occupations in China' s labor market, projecting that 278 million workers will be replaced by AI by 2049.

In contrast, scholars advocating the **intelligent augmentation** perspective argue that AI will automate non-core tasks, assist humans in completing core tasks, and ultimately achieve human-machine collaboration and complementary advantages (Daugherty & Wilson, 2018). Chui et al. (2015), based on U.S. labor market data, argued that AI will reshape human work, making humans more efficient and freeing them from repetitive, mechanical tasks to engage in more complex and creative work. For example, marketers use AI to obtain potential customer information and identify cross-selling and upselling opportunities to improve sales efficiency. Malik et al. (2022) found in a case study of an Indian

subsidiary of a global technology consulting multinational that AI applications in human resource management enhanced employees' personalized experiences of HR practices, increased job satisfaction and organizational commitment, reduced withdrawal intentions, and improved HR practice effectiveness. Upadhyay and Khandelwal (2018) noted that applying AI to recruitment can improve efficiency and reduce costs. As AI automates tedious resume screening tasks, recruiters have more time to focus on strategic issues and long-term planning.

2.2.2 AI-Driven Job Insecurity

A few scholars have begun to examine employees' perceived threats to job continuity and stability from AI technology, exploring antecedents and outcomes of job insecurity in the AI context. Regarding antecedents, Lingmont and Alexiou (2020) investigated the effect of smart technology awareness on job insecurity and the moderating roles of organizational learning culture and organizational authority culture. They found that smart technology awareness increases job insecurity, with organizational authority culture strengthening this relationship while organizational learning culture shows no effect. Brougham and Haar (2020) similarly found that smart technology awareness causes job insecurity, though employees with more job choices can better cope with its negative effects. However, Brougham and Haar (2018) found that smart technology awareness does not affect job insecurity. Additionally, Dengler and Gundert (2021) found that occupational replacement risk increases cognitive job insecurity but not affective job insecurity. Nam (2019) found that interpersonal interaction requirements in current jobs reduce job insecurity, while professional knowledge requirements, creativity requirements, and task repetitiveness have no effect. Yam et al. (2022) found that robot exposure increases job insecurity, which in turn leads to employee exhaustion and interpersonal deviance. Regarding consequences, Chen et al. (2022) examined the effect of job insecurity on employee career competence development in the AI context, finding a U-shaped relationship between quantitative job insecurity and career competence development, and a positive relationship between qualitative job insecurity and career competence development. Occupational replacement risk strengthens the U-shaped effect of quantitative job insecurity and weakens the positive relationship between qualitative job insecurity and career competence development.

2.3 Challenges and Opportunities for Job Insecurity Research in the AI Context

Concept and Dimensionality of Job Insecurity. AI technology affects job continuity and stability in multiple ways. On one hand, AI automation may cause employees to lose their jobs (Roos & Shroff, 2017; Qiu & He, 2020). For example, self-checkout systems have led to cashier unemployment. On the other hand, AI augmentation may force employees to undergo job transformation (Roos & Shroff, 2017; Qiu & He, 2020). For instance, AI technology reshapes HR specialists' work to focus more on decision-making, strategy, and

interpersonal communication tasks. Traditional job insecurity research has distinguished between quantitative and qualitative job insecurity (Hellgren et al., 1999), cognitive and affective job insecurity (Huang et al., 2010), and job-focused and person-focused job insecurity (Ma et al., 2022). However, these dimensional structures cannot effectively capture the threats to job continuity and stability caused by AI technology development and application (i.e., intelligent automation causing unemployment versus intelligent augmentation causing job transformation). Therefore, researchers must specifically examine the definition and dimensionality of job insecurity in the AI context.

Consequences of Job Insecurity. Traditional job insecurity primarily reflects employees' subjective perception of being replaced by others in their current jobs, whereas AI-driven job insecurity mainly reflects employees' perception of being replaced by technology or being unable to adapt to technology. Being replaced by others versus by technology triggers different psychological reactions. Research shows that being replaced by others more easily threatens individuals' self-worth, while being replaced by technology more easily raises concerns about future economic prospects (Granulo et al., 2019). Consequently, AI-driven job insecurity may affect employees differently than traditional job insecurity. Moreover, AI technology can lead to either intelligent automation or intelligent augmentation, and employees' psychological reactions to these two modes differ (Einola & Khoreva, 2022), suggesting that job insecurity in these contexts may have differential effects. Therefore, researchers must specifically reveal the consequences of AI-driven job insecurity and the differential impacts of its dimensions.

Sources of Job Insecurity. Traditional job insecurity research has primarily examined organizational contextual factors such as organizational communication, change, and performance, as well as personal factors including demographic variables, emotional traits, and self-evaluation traits (Lee et al., 2018; Jiang et al., 2021). In contrast, AI-driven job insecurity primarily stems from job transformation caused by AI technology. Current job and occupational characteristics largely determine the extent and type of transformation jobs will undergo in the AI context and the degree and type of job insecurity employees will experience (Dengler & Gundert, 2021; Nam, 2019). Additionally, technology-related personal characteristics such as smart technology awareness likely influence whether employees perceive AI' s impact on jobs and whether they experience job insecurity (Brougham & Haar, 2020; Lingmont & Alexiou, 2020). Therefore, researchers must examine unique antecedents of AI-driven job insecurity, such as current job characteristics and technology-related personal characteristics.

Accordingly, this study focuses on AI-driven job insecurity, proposes the concept of technology-driven job insecurity, and addresses three key issues: (1) the definition and dimensionality of technology-driven job insecurity, (2) the effects of different dimensions on employee work and career outcomes, and (3) the influence of current job characteristics and employees' technology-related personal

characteristics on technology-driven job insecurity.

3.1 Research Objectives and Framework

This study centers on AI-driven job insecurity and proposes the concept of technology-driven job insecurity. We first examine its definition and dimensionality, then investigate its effects and antecedents. Specifically, we have three research objectives: (1) To clarify the definition and dimensional structure of technology-driven job insecurity by integrating job insecurity research and AI-driven job transformation literature, proposing job replacement insecurity and job transformation insecurity as two core dimensions. (2) To examine the effects of technology-driven job insecurity on employee work and career outcomes and their mediating mechanisms and boundary conditions based on signaling theory. (3) To investigate the effects of current job characteristics and employees' technology-related personal characteristics on technology-driven job insecurity, as well as their joint effects, based on cognitive appraisal theory.

Corresponding to these objectives, this study comprises three sub-studies, with the overall research framework shown in Figure 2 [Figure 2: see original paper].

3.2 Study 1: Definition and Dimensionality of Technology-Driven Job Insecurity in the AI Context

The core questions of this study are: What is the definition of technology-driven job insecurity in the AI context? What are its fundamental dimensions? Although previous studies have examined antecedents of job insecurity (e.g., employee smart technology awareness, Brougham & Haar, 2020; Lingmont & Alexiou, 2020; occupational replacement risk, Dengler & Gundert, 2021) and its effects on burnout, work behavior, and career competence development (Koo et al., 2021; Yam et al., 2022; Chen et al., 2020) in the AI context, they have not focused specifically on job insecurity caused by AI technology development and application. To more precisely reveal the phenomenon of AI-driven job insecurity, we propose the concept of technology-driven job insecurity, defined as the perceived threat to job continuity and stability caused by AI technology development and application. Building on this definition, this study first uses qualitative methods to identify core dimensions and then develops measurement instruments.

First, regarding core dimensions, we will conduct in-depth interviews to comprehensively understand how AI technology affects individuals' perceptions of job continuity and stability in management practice. Based on this information, we will construct a theoretical model of technology-driven job insecurity. Literature review reveals two primary modes of AI' s impact on human work: (1) **Intelligent automation**, where AI automates core tasks of human jobs, ultimately replacing humans with machines (e.g., self-checkout systems replacing cashiers); (2) **Intelligent augmentation**, where AI automates non-core tasks, enabling close human-machine collaboration on core tasks (e.g., AI automating resume

screening to assist HR specialists in decision-making and strategic planning). Both modes threaten job continuity and stability, leading employees to perceive technology-driven job insecurity, though the specific content differs. Interviews will reveal that intelligent automation tends to cause employees to worry about machines replacing humans and losing their current jobs (i.e., **job replacement insecurity**), while intelligent augmentation tends to cause employees to worry about important job features (e.g., job content, work patterns, skill requirements) changing (i.e., **job transformation insecurity**). In summary, we propose that technology-driven job insecurity in the AI context comprises two core dimensions: job replacement insecurity and job transformation insecurity.

Second, regarding measurement instruments, based on the above research and existing job insecurity measures (Ashford et al., 1989; Hellgren et al., 1999), we will develop a reliable and valid technology-driven job insecurity scale and conduct empirical validation. Sample items for job replacement insecurity include: "Due to AI technology development and application, I worry that machines may replace humans and cause unemployment" and "Due to AI technology development and application, I worry that machines may replace humans and cause me to be laid off." Sample items for job transformation insecurity include: "Due to AI technology development and application, I worry that the skill requirements of my current job may change" and "Due to AI technology development and application, I worry that the work patterns of my current job may change."

3.3 Study 2: Consequences of Technology-Driven Job Insecurity in the AI Context

Building on Study 1' s distinction between job replacement and job transformation insecurity, Study 2 examines the effects of technology-driven job insecurity on employees and reveals the differential impacts of its dimensions. The core questions are: How do different dimensions of technology-driven job insecurity affect employee work and career outcomes? What are the mechanisms and boundary conditions?

Signaling theory (Spence, 2002) posits that information asymmetry exists between individuals and larger entities (often unobservable). Lacking sufficient information, individuals seek and interpret signals from entities to make judgments and decisions (Taj, 2016). Employees' experiences in their current jobs serve as important signals about career prospects (Chang & Busser, 2020). Based on signaling theory, we propose that technology-driven job insecurity affects employees' perceptions of their career future (i.e., occupational future time perspective), which in turn influences work and career outcomes. The strength of these effects depends on whether organizations implement human resource practices that promote organizational-employee collaborative development (i.e., developmental HR practices). The research model is shown in Figure 3 [Figure 3: see original paper].

First, technology-driven job insecurity affects occupational future time perspec-

tive (focus on limitations and focus on opportunities). Occupational future time perspective reflects individuals' perceptions of their future career (Zacher & Frese, 2009). We focus on two dimensions: **focus on limitations** (perceived constraints and restrictions in future career) and **focus on opportunities** (perceived goals, choices, and possibilities in future career) (Rudolph et al., 2018; Zacher & Frese, 2009). As a signal from employees' current work experiences, technology-driven job insecurity conveys information about career prospects (Chang & Busser, 2020). Specifically, job replacement insecurity not only means employees must expend resources to cope with career discontinuity and instability (limitations) but also signals that their current job lacks development prospects and career opportunities (opportunities). While job transformation insecurity also means employees must invest personal resources to cope with uncertainty (limitations), it signals that adjusting work patterns, updating skills, and improving competence can create more choices and possibilities in future careers (opportunities). Therefore, we propose: Job replacement insecurity is positively related to focus on limitations and negatively related to focus on opportunities; job transformation insecurity is positively related to both focus on limitations and focus on opportunities.

Second, occupational future time perspective affects employee work and career outcomes. When employees focus on limitations, they concentrate on losses and negative outcomes (Zacher & Frese, 2009), triggering avoidance tendencies that prevent full work engagement, inhibit work performance and proactive career behaviors, and reduce career satisfaction (Zacher & Rudolph, 2021). When employees focus on opportunities, they concentrate on achievable goals and available opportunities (Zacher & Frese, 2009), triggering approach tendencies that motivate full work engagement, better performance, proactive career management, and increased career satisfaction (Zacher & Rudolph, 2021). We propose: Focus on limitations is negatively related to work engagement, job performance, proactive career behavior, and career satisfaction; focus on opportunities is positively related to these outcomes.

Third, technology-driven job insecurity indirectly affects employee outcomes through occupational future time perspective. Because job replacement and transformation insecurity have different effects on occupational future time perspective, their indirect effects on work engagement, job performance, proactive career behavior, and career satisfaction also differ. We propose: Job replacement insecurity has indirect negative effects on these outcomes through both focus on limitations and focus on opportunities; job transformation insecurity has indirect negative effects through focus on limitations and indirect positive effects through focus on opportunities.

Fourth, developmental HR practices moderate these relationships. Developmental HR practices view employees as organizational partners and promote mutual development through diverse training, developmental assessment, job design, and communication feedback (Tang et al., 2021). Like technology-driven job insecurity, these practices serve as important signals about career prospects

(Rodrigues et al., 2020). Specifically, developmental HR practices not only develop employee potential and competence to create more future career opportunities but also provide resources to help employees cope with career uncertainty, reducing perceived limitations. Thus, developmental HR practices provide information consistent with job transformation insecurity' s signals about future opportunities but inconsistent with both job replacement and transformation insecurity' s signals about limitations. Signal consistency affects individual reactions—when different signals provide consistent information, individuals become more certain and signal effects strengthen; when signals conflict, individuals become confused and signal effects weaken (Connelly et al., 2011; Ho & Kong, 2015). Therefore, developmental HR practices will strengthen employees' focus on opportunities triggered by technology-driven job insecurity (especially job transformation insecurity) while weakening their focus on limitations triggered by both types of insecurity.

Since technology-driven job insecurity affects employee outcomes through occupational future time perspective, and developmental HR practices moderate the relationship between technology-driven job insecurity and occupational future time perspective, developmental HR practices also moderate the indirect effects. We propose: Developmental HR practices weaken the negative indirect effects of both job replacement and transformation insecurity on outcomes through focus on limitations, weaken the negative indirect effects of job replacement insecurity through focus on opportunities, and strengthen the positive indirect effects of job transformation insecurity through focus on opportunities.

3.4 Study 3: Antecedents of Technology-Driven Job Insecurity in the AI Context

To deeply understand AI-driven job insecurity and build a complete theoretical framework, researchers must identify its unique antecedents in addition to revealing its consequences. Since Study 2 shows that job replacement and transformation insecurity have different effects on employees, identifying the differential antecedents of these two dimensions can also guide targeted interventions by management practitioners. Study 3 extends Study 2 by examining the sources of technology-driven job insecurity.

AI technology development and application affect nearly all jobs, though the degree and mode of impact vary. AI typically automates iterative and information-processing tasks while assisting humans with complex problem-solving tasks (Daugherty & Wilson, 2018). Therefore, current job characteristics largely determine how AI will affect jobs. Additionally, whether employees recognize AI' s impact on jobs and how they evaluate this impact may cause them to experience varying levels of technology-driven job insecurity (Brougham & Haar, 2020; Lingmont & Alexiou, 2020). This study examines antecedents from both job characteristics and individual characteristics. The core questions are: Do current job characteristics affect perceived technology-driven job insecurity? What are the mechanisms? Which employees are more likely to perceive technology-

driven job insecurity? Do job and personal characteristics jointly affect perceived technology-driven job insecurity?

Cognitive appraisal theory (Lazarus & Folkman, 1984) posits that when individuals perceive objective stimuli as affecting their well-being, they evaluate whether the stimulus promotes or harms their well-being and whether they have adequate coping resources. When a stimulus promotes well-being, individuals make a challenge appraisal; when it harms well-being and resources are inadequate, they make a threat appraisal. Technology-driven job insecurity represents a threat appraisal of AI' s impact on future job continuity and stability (Yam et al., 2022). Job characteristics constitute important work contexts that affect cognitive appraisal and subsequently influence work attitudes, behaviors, and well-being (Ohly & Fritz, 2010; Jiang & Wang, 2022). Based on cognitive appraisal theory, we propose that job characteristics (information processing demands, job complexity, and problem-solving demands) affect technology-driven job insecurity through employees' expectations of AI' s impact on jobs. Technology-related personal characteristics (smart technology awareness and technology readiness) not only directly affect technology-driven job insecurity but also moderate the relationship between job characteristics and technology-driven job insecurity. The research model is shown in Figure 4 [Figure 4: see original paper].

First, **direct effects of job characteristics.** AI' s distinguishing feature is its ability to replace human mental labor, affecting knowledge work. Therefore, we examine three knowledge-based job characteristics: information processing demands (handling large amounts of data or information), job complexity (requiring multiple advanced skills and high cognitive demands), and problem-solving demands (requiring innovative ideas and solutions) (Morgeson & Humphrey, 2006). Jobs with high information processing demands, low complexity, and low problem-solving demands are well-suited for machines and tend to be automated by AI, causing employees to perceive future replacement and triggering threat appraisals and job replacement insecurity. Conversely, jobs with low information processing demands, high complexity, and high problem-solving demands are difficult to automate and require human-machine collaboration, causing changes in work patterns and skill requirements. This mismatch between current capabilities and future demands triggers threat appraisals and job transformation insecurity. We propose: Information processing demands are positively related to job replacement insecurity and negatively related to job transformation insecurity; job complexity is negatively related to job replacement insecurity and positively related to job transformation insecurity; problem-solving demands are negatively related to job replacement insecurity and positively related to job transformation insecurity.

Second, **mediating role of job intelligent automation/augmentation expectations.** According to cognitive appraisal theory, cognitive appraisal begins when individuals perceive that their well-being is affected. We propose that objective job characteristics affect technology-driven job insecurity through em-

ployees' expectations of AI' s impact (job intelligent automation vs. augmentation expectations). Intelligent automation means machines replace humans, while intelligent augmentation means human-machine collaboration. Jobs with high information processing demands, low complexity, and low problem-solving demands are easily automated and such automation improves organizational efficiency (Brynjolfsson & McAfee, 2014; Daugherty & Wilson, 2018), leading employees to expect these jobs will be intelligently automated. Conversely, jobs with low information processing demands, high complexity, and high problem-solving demands are difficult to automate (Huang & Rust, 2017) and require human-machine collaboration, leading employees to expect these jobs will be intelligently augmented. After expecting automation or augmentation (i.e., recognizing well-being is affected), individuals further evaluate whether the impact is positive or negative. Intelligent automation expectations may lead to perceived threats of machine replacement and unemployment (job replacement insecurity), while intelligent augmentation expectations may lead to perceived threats of changes in job content, patterns, and skill requirements (job transformation insecurity). We propose: Information processing demands, job complexity, and problem-solving demands affect job replacement insecurity through job intelligent automation expectations and affect job transformation insecurity through job intelligent augmentation expectations.

Third, **direct effects of personal characteristics.** Personal characteristics affect perception and cognitive appraisal of objective stimuli (Lazarus & Folkman, 1984), with different individuals showing varying appraisals of the same stimulus (Debus et al., 2014). We examine two personal characteristics: **smart technology awareness** (perceptions of how smart technology will affect one' s work in the future; Brougham & Haar, 2018) and **technology readiness** (the propensity to embrace and use new technologies to achieve goals; Lin & Hsieh, 2012; Parasuraman, 2000). Employees high in smart technology awareness are more conscious of AI' s impact on jobs and thus more likely to perceive technology-driven job insecurity. We propose: Smart technology awareness is positively related to both job replacement and job transformation insecurity. Employees high in technology readiness view technology-induced job changes more positively and have adequate resources to cope with them, making them less likely to perceive technology-driven job insecurity. We propose: Technology readiness is negatively related to both job replacement and job transformation insecurity.

Fourth, **moderating effects of personal characteristics.** According to cognitive appraisal theory, appraisal depends first on perceiving that well-being is affected and second on interpreting the impact and having resources to cope. Converting job characteristic information into automation/augmentation expectations requires employees to recognize that AI will affect jobs. Employees high in smart technology awareness can recognize this impact and tend to process job characteristic information to judge how AI will affect jobs, whereas those low in awareness cannot (Brougham & Haar, 2018). We propose: Smart technology awareness strengthens the positive relationship between information pro-

cessing demands and job intelligent automation expectations (and the negative relationship with augmentation expectations), strengthens the negative relationship between job complexity and automation expectations (and the positive relationship with augmentation expectations), and strengthens the negative relationship between problem-solving demands and automation expectations (and the positive relationship with augmentation expectations).

Furthermore, whether automation/augmentation expectations translate into technology-driven job insecurity depends heavily on employees' attitudes toward technology and their resources to cope with change and uncertainty. Employees high in technology readiness hold positive attitudes toward technology and feel a strong sense of control over it (Lin & Hsieh, 2012; Parasuraman, 2000). Therefore, for these employees, intelligent automation expectations are less likely to cause job replacement insecurity, and intelligent augmentation expectations are less likely to cause job transformation insecurity. We propose: Technology readiness weakens the positive relationship between job intelligent automation expectations and job replacement insecurity and weakens the positive relationship between job intelligent augmentation expectations and job transformation insecurity.

Finally, integrating these mediating and moderating effects, we further propose that smart technology awareness and technology readiness moderate the indirect effects of job characteristics on technology-driven job insecurity through job intelligent automation/augmentation expectations.

4. Theoretical Contributions

This study examines job insecurity in the AI context by proposing the concept of technology-driven job insecurity. By clarifying its definition and dimensionality, revealing its consequences, and identifying its antecedents, we construct a systematic theoretical framework with three key innovations.

First, we innovatively propose the concept of technology-driven job insecurity and analyze its dimensional structure, deepening research on job insecurity in the AI context. Previous studies have primarily examined job insecurity in traditional contexts (Jiang et al., 2021; Lee et al., 2018; Shoss, 2017). Only a few have explored job insecurity in the AI context (Brougham & Haar, 2020; Lingmont & Alexiou, 2020; Nam, 2019) without focusing specifically on job insecurity caused by AI technology development and application. The concept of technology-driven job insecurity and its clear definition and dimensionality lay the foundation for future research on AI-driven job insecurity and its unique antecedents and consequences. Additionally, while previous research has distinguished quantitative versus qualitative job insecurity based on content (Hellgren et al., 1999), cognitive versus affective job insecurity based on nature (Huang et al., 2010), and job-focused versus person-focused job insecurity based on threat source (Ma et al., 2022), our study distinguishes job replacement versus transformation insecurity based on AI-induced job transformation, expanding

conceptual and dimensional research on job insecurity.

Second, we examine the effects of technology-driven job insecurity on employee work and career outcomes. Traditional job insecurity research has primarily drawn on cognitive appraisal theory, conservation of resources theory, social exchange theory, and social identity theory to examine effects on employee well-being, work attitudes, motivation, and behavior (Lee et al., 2018; Shoss, 2017). Based on signaling theory, we argue that technology-driven job insecurity conveys information about career prospects, affecting employees'perceptions of their career future and subsequently influencing work and career outcomes. Thus, our study enriches theoretical perspectives on job insecurity research and reveals unique consequences of technology-driven job insecurity. Furthermore, while a few AI-context studies have examined effects on burnout, work behavior, and career competence development (Koo et al., 2021; Yam et al., 2022; Chen et al., 2020), they have not revealed underlying mechanisms. Our study extends this research by examining differential effects of job insecurity dimensions and revealing mediating mechanisms and boundary conditions, providing theoretical guidance for future research on AI-driven job insecurity consequences.

Third, we examine the effects of job characteristics and personal characteristics on technology-driven job insecurity. Traditional job insecurity research has focused on organizational contextual factors such as communication, change, and performance, as well as personal factors including demographics, emotional traits, and self-evaluation traits (Jiang et al., 2021; Lee et al., 2018). In contrast, our study examines job characteristics (information processing demands, job complexity, problem-solving demands) and technology-related personal characteristics (smart technology awareness, technology readiness), revealing unique antecedents of technology-driven job insecurity. Additionally, while previous research shows that robot exposure causes both low-skill and high-intelligence workers to perceive job insecurity (Yam et al., 2022), our study extends this by proposing that employees in different jobs perceive different types of technology-driven job insecurity: those in jobs with high information processing demands, low complexity, and low problem-solving demands tend to perceive job replacement insecurity, while those in jobs with low information processing demands, high complexity, and high problem-solving demands tend to perceive job transformation insecurity. Moreover, while Nam (2019) found that professional knowledge requirements, creativity requirements, and task repetitiveness do not affect job insecurity in the AI context, we propose that the same job characteristic has opposite effects on job replacement versus transformation insecurity, with effect strength depending on personal characteristics (smart technology awareness and technology readiness). By revealing these differential effects and their boundary conditions, we deepen understanding of the relationship between job characteristics and technology-driven job insecurity.

This study also has practical value. AI technology poses a tremendous threat to the continuity and stability of human work. As Chinese enterprises undergo digital transformation, alleviating employees' perceived technology-driven job

insecurity and helping them effectively cope with it are crucial for building harmonious and stable labor relations. Therefore, examining the definition, consequences, and sources of technology-driven job insecurity in the organizational behavior domain can help organizations take effective measures to enhance employee well-being and promote harmonious labor relations during transformation.

References

Arntz, M., Gregory, T., & Zierahn, U. (2016). The risk of automation for jobs in OECD countries: A comparative analysis. Working Paper No. 189. Paris, France: OECD Publishing.

Ashford, S. J., Lee, C., & Bobko, P. (1989). Content, cause, and consequences of job insecurity: A theory-based measure and substantive test. Academy of Management Journal, 32(4), 803–829.

Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. Academy of Management Review, 14(1), 20–39.

Bolger, N., DeLongis, A., Kessler, R. C., & Wethington, E. (1989). The contagion of stress across multiple roles. Journal of Marriage and the Family, 51(1), 175–183.

Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. Journal of Management & Organization, 24(2), 239–257.

Brougham, D., & Haar, J. (2020). Technological disruption and employment: The influence on job insecurity and turnover intentions: A multi-country study. Technological Forecasting and Social Change, 161, 120276.

Brynjolfsson, E., & McAfee, A. (2014). The second machine age: Work, progress, and prosperity in a time of brilliant technologies. New York, NY: WW Norton & Company.

Çalışkan, N., & Özkoç, A. G. (2020). Organizational change and job insecurity: The moderating role of employability. International Journal of Contemporary Hospitality Management, 32(12), 3971–3990.

Chang, W., & Busser, J.A. (2020). Hospitality career retention: The role of contextual factors and thriving at work. International Journal of Contemporary Hospitality Management, 32(1), 193–211.

Chen, W., Kang, C., Yang, Y., & Wan, Y. (2022). Artificial intelligence potential replacement risk and employee career competence development: From the perspective of employee insecurity. Human Resources Development of China, 39(01), 84–97.

Chui, M., Manyika, J., & Miremadi, M. (2015). Four fundamentals of workplace automation. McKinsey Quarterly, 29(3), 1–9.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. Journal of Management, 37(1), 39–67.

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. Journal of Management, 31(6), 874–900.

Daugherty, P., & Wilson, H. J. (2018). Human + machine: Reimagining work in the age of AI. Boston, MA: Harvard Business Review Press.

Davenport, T. H., & Kirby, J. (2016). Only humans need apply: Winners and losers in the age of smart machines. New York, NY: Harper Business.

De Cuyper, N., & De Witte, H. (2006). The impact of job insecurity and contract type on attitudes, well-being and behavioural reports: A psychological contract perspective. Journal of Occupational and Organizational Psychology, 79(3), 395–409.

De Witte, H. (1999). Job insecurity and psychological well-being: Review of the literature and exploration of some unresolved issues. European Journal of Work and Organizational Psychology, 8(2), 155–177.

Debus, M. E., König, C. J., & Kleinmann, M. (2014). The building blocks of job insecurity: The impact of environmental and person-related variables on job insecurity perceptions. Journal of Occupational and Organizational Psychology, 87(2), 329–351.

Debus, M. E., Probst, T. M., König, C. J., & Kleinmann, M. (2012). Catch me if I fall! Enacted uncertainty avoidance and the social safety net as country-level moderators in the job insecurity–job attitudes link. Journal of Applied Psychology, 97(3), 690–698.

Dengler, K., & Gundert, S. (2021). Digital transformation and subjective job insecurity in Germany. European Sociological Review, 37(5), 799–817.

Einola, K., & Khoreva, V. (2022). Best friend or broken tool? Exploring the co-existence of humans and artificial intelligence in the workplace ecosystem. Human Resource Management. Advance online publication. https://doi.org/10.1002/hrm.22147

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerization?. Technological Forecasting and Social Change, 114, 254–280.

Granulo, A., Fuchs, C., & Puntoni, S. (2019). Psychological reactions to human versus robotic job replacement. Nature Human Behaviour, 3(10), 1062–1069.

Greenhalgh, L., & Rosenblatt, Z. (1984). Job insecurity: Toward conceptual clarity. Academy of Management Review, 9(3), 438–448.

Hellgren, J., Sverke, M., & Isaksson, K. (1999). A two-dimensional approach to job insecurity: Consequences for employee attitudes and well-being. European Journal of Work and Organizational Psychology, 8(2), 179–195.

Ho, V. T., & Kong, D. T. (2015). Exploring the signaling function of idiosyncratic deals and their interaction. Organizational Behavior and Human Decision Processes, 131, 149–161.

Hobfoll, S. E., Halbesleben, J., Neveu, J. P., & Westman, M. (2018). Conservation of resources in the organizational context: The reality of resources and their consequences. Annual Review of Organizational Psychology and Organizational Behavior, 5, 103–128.

Hu, S. (2007). Research status and prospects of job insecurity. Advances in Psychological Science, 15(6), 938–947.

Huang, G. H., Lee, C., Ashford, S., Chen, Z., & Ren, X. (2010). Affective job insecurity: A mediator of cognitive insecurity and employee outcomes relationships. International Studies of Management & Organization, 40(1), 20–39.

Huang, G. H., Wellman, N., Ashford, S. J., Lee, C., & Wang, L. (2017). Deviance and exit: The organizational costs of job insecurity and moral disengagement. Journal of Applied Psychology, 102(1), 26–42.

Huang, M. H., & Rust, R. T. (2018). Artificial intelligence in service. Journal of Service Research, 21(2), 155–172.

Jacobson, D., & Hartley, J. (1991). Mapping the context. In J. Hartley, D. Jacobson, B. Klandermans, & T. Van Vuuren (Eds.), Job insecurity: Coping with jobs at risk (pp. 1–22). London, England: Sage.

Jiang, F., & Wang, Z. (2022). Application of stress cognitive appraisal theory in management psychology: Scenarios, approaches, and myths. Advances in Psychological Science, 30(12), 1–12.

Jiang, L., & Lavaysse, L. M. (2018). Cognitive and affective job insecurity: A meta-analysis and a primary study. Journal of Management, 44(6), 2307–2342.

Jiang, L., & Probst, T. M. (2017). The rich get richer and the poor get poorer: Country- and state-level income inequality moderates the job insecurity-burnout relationship. Journal of Applied Psychology, 102(4), 672–681.

Jiang, L., Xu, X., & Wang, H. J. (2021). A resources–demands approach to sources of job insecurity: A multilevel meta-analytic investigation. Journal of Occupational Health Psychology, 26(2), 108–126.

Keim, A. C., Landis, R. S., Pierce, C. A., & Earnest, D. R. (2014). Why do employees worry about their jobs? A meta-analytic review of predictors of job insecurity. Journal of Occupational Health Psychology, 19(3), 269–290.

Koo, B., Curtis, C., & Ryan, B. (2021). Examining the impact of artificial intelligence on hotel employees through job insecurity perspectives. International Journal of Hospitality Management, 95, 102763.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal and coping. New York, NY: Springer.

Lee, C., Huang, G. H., & Ashford, S. J. (2018). Job insecurity and the changing workplace: Recent developments and the future trends in job insecurity research. Annual Review of Organizational Psychology and Organizational Behavior, 5, 335-359.

Li, L., Wang, X., & Bao, Q. (2021). Employment effects of robots: Mechanisms and Chinese experience. Management World, 37(9), 104-119.

Lim, V. K. G., & Sng, Q. S. (2006). Does parental job insecurity matter? Money anxiety, money motives, and work motivation. Journal of Applied Psychology, 91(5), 1078-1087.

Lim, V. K., & Loo, G. L. (2003). Effects of parental job insecurity and parenting behaviors on youth' s self-efficacy and work attitudes. Journal of Vocational Behavior, 63(1), 86-98.

Lin, J. S. C., & Hsieh, P. L. (2012). Refinement of the technology readiness index scale: A replication and cross-validation in the self-service technology context. Journal of Service Management, 23(1), 34-53.

Lingmont, D. N., & Alexiou, A. (2020). The contingent effect of job automating technology awareness on perceived job insecurity: Exploring the moderating role of organizational culture. Technological Forecasting and Social Change, 161, 120302.

Luo, W., Huo, W., Zhao, Y., & Wang, Z. (2022). AI-driven organizational and human resource management transformation: Practical insights and research directions. Human Resources Development of China, 39(1), 4-16.

Ma, B., Yang, R., Du, J., & Ma, G. (2022). Danger begets change? The differential effects of job insecurity on innovative behavior. Advances in Psychological Science, 30(11), 2381-2394.

Malik, A., Budhwar, P., Patel, C., & Srikanth, N. R. (2022). May the bots be with you! Delivering HR cost-effectiveness and individualized employee experiences in an MNE. The International Journal of Human Resource Management, 33(6), 1148-1178.

Montani, F., Courcy, F., Battistelli, A., & de Witte, H. (2021). Job insecurity and innovative work behaviour: A moderated mediation model of intrinsic motivation and trait mindfulness. Stress and Health, 37(4), 742-754.

Morgeson, F. P., & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): developing and validating a comprehensive measure for assessing job design and the nature of work. Journal of Applied Psychology, 91(6), 1321-1339.

Nam, T. (2019). Technology usage, expected job sustainability, and perceived job insecurity. Technological Forecasting and Social Change, 138, 155-165.

Ohly, S., & Fritz, C. (2010). Work characteristics, challenge appraisal, creativity, and proactive behavior: A multi-level study. Journal of Organizational Behavior, 31(4), 543–565.

Parasuraman, A. (2000). Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. Journal of Service Research, 2(4), 307–320.

Piccoli, B., & De Witte, H. (2015). Job insecurity and emotional exhaustion: Testing psychological contract breach versus distributive injustice as indicators of lack of reciprocity. Work & Stress, 29(3), 246–263.

Piccoli, B., Callea, A., Urbini, F., Chirumbolo, A., Ingusci, E., & De Witte, H. (2017). Job insecurity and performance: The mediating role of organizational identification. Personnel Review, 46(8), 1508–1522.

Probst, T. M. (2003). Development and validation of the Job Security Index and the Job Security Satisfaction scale: A classical test theory and IRT approach. Journal of Occupational and Organizational Psychology, 76(4), 451–467.

Qiu, Y., & He, Q. (2020). Research progress on AI' s employment impact and a theoretical analysis framework in the Chinese context. Human Resources Development of China, 37(2), 90–103.

Rodrigues, R., Butler, C. L., & Guest, D. (2020). Evaluating the employability paradox: When does organizational investment in human capital pay off?. The International Journal of Human Resource Management, 31(9), 1134–1154.

Roos, G., & Shroff, Z. (2017). What will happen to the jobs? Technology-enabled productivity improvement–good for some, bad for others. Labour & Industry, 27(3), 165–192.

Rudolph, C. W., Kooij, D. T., Rauvola, R. S., & Zacher, H. (2018). Occupational future time perspective: A meta-analysis of antecedents and outcomes. Journal of Organizational Behavior, 39(2), 229–248.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78.

Selenko, E., Mäkikangas, A., & Stride, C. B. (2017). Does job insecurity threaten who you are? Introducing a social identity perspective to explain well-being and performance consequences of job insecurity. Journal of Organizational Behavior, 38(6), 856–875.

Sender, A., Arnold, A., & Staffelbach, B. (2017). Job security as a threatened resource: Reactions to job insecurity in culturally distinct regions. The International Journal of Human Resource Management, 28(17), 2403–2429.

Shoss, M. K. (2017). Job insecurity: An integrative review and agenda for future research. Journal of Management, 43(6), 1911–1939.

Song, J., Zhang, Y., & Wang, M. (2018). The effect of qualitative job insecurity on organizational citizenship behavior: The mediating role of organizational identification and the moderating role of interactional justice. Human Resources Development of China, 35(11), 54–64.

Spence, M. (2002). Signaling in retrospect and the informational structure of markets. American Economic Review, 92(3), 434–459.

Stynen, D., Forrier, A., Sels, L., & De Witte, H. (2015). The relationship between qualitative job insecurity and OCB: Differences across age groups. Economic and Industrial Democracy, 36(3), 383–405.

Taj, S. A. (2016). Application of signaling theory in management research: Addressing major gaps in theory. European Management Journal, 34(4), 338–348.

Tang, C., Li, Y., & Zhao, S. (2021). Developmental human resource management practices research: Conceptualization, scale development and validation. Nankai Business Review, (04), 85–97.

Tschang, F. T., & Almirall, E. (2021). Artificial intelligence as augmenting automation: Implications for employment. Academy of Management Perspectives, 35(4), 642–659.

Upadhyay, A.K., & Khandelwal, K. (2018). Applying artificial intelligence: Implications for recruitment. Strategic HR Review, 17(5), 255–258.

Van den Broeck, A., Sulea, C., Vander Elst, T., Fischmann, G., Iliescu, D., & De Witte, H. (2014). The mediating role of psychological needs in the relation between qualitative job insecurity and counterproductive work behavior. Career Development International, 19(5), 526–547.

Vander Elst, T., Notelaers, G., & Skogstad, A. (2018). The reciprocal relationship between job insecurity and depressive symptoms: A latent transition analysis. Journal of Organizational Behavior, 39(9), 1197–1218.

Vander Elst, T., Richter, A., Sverke, M., Näswall, K., De Cuyper, N., & De Witte, H. (2014). Threat of losing valued job features: The role of perceived control in mediating the effect of qualitative job insecurity on job strain and psychological withdrawal. Work & Stress, 28(2), 143–164.

Wang, H. J., Le Blanc, P., Demerouti, E., Lu, C. Q., & Jiang, L. (2019). A social identity perspective on the association between leader-member exchange and insecurity. European Journal of Work and Organizational Psychology, 28(6), 800–809.

Westman, M. (2001). Stress and strain crossover. Human Relations, 54(6), 717–751.

Yam, K. C., Tang, P. M., Jackson, J. C., Su, R., & Gray, K. (2022). The rise of robots increases job insecurity and maladaptive workplace behaviors: Multi-

method evidence. Journal of Applied Psychology. Advance online publication. https://doi.org/10.1037/apl0001045

Zacher, H., & Frese, M. (2009). Remaining time and opportunities at work: Relationships between age, work characteristics, and occupational future time perspective. Psychology and Aging, 24(2), 487–493.

Zacher, H., & Rudolph, C. W. (2021). Relationships between psychological contract breach and employee well-being and career-related behavior: The role of occupational future time perspective. Journal of Organizational Behavior, 42(1), 84–99.

Zhou, G., Chu, G., Li, L., & Meng, L. (2020). The effect of artificial intelligence on China' s labor market. China Economic Journal, 13(1), 24–41.

Zou, W., Tian, Q., & Liu, J. (2012). "Returning a favor"—A review of reciprocity theory in organizational behavior research. Advances in Psychological Science, 20(11), 1879–1887.

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