

Bootlegging Behavior of Knowledge-based Chinese Employees: A Review

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ABSTRACT: *Bootlegging is the behavior of employees who, when they cannot conduct innovation activities through formal channels, turn to "underground" and secretly practice innovative ideas through informal channels. Research on bootlegging behavior in China has grown rapidly. By combing through the research results of bootlegging behavior, This paper summarizes the connotation and structural measurement of bootlegging from the two expressions of "bootlegging" and "creative deviance", summarizes the promoting factors and inhibiting factors affecting bootlegging from the three levels of employees, leaders and organizations, and explores the positive impact and potential negative consequences of bootlegging as a double-edged sword. As the subject of innovation, knowledge-based employees are more likely to engage in bootlegging behavior. This paper defines the connotation of knowledge-based employees from three perspectives: work content, behavioral characteristics, education and occupation. It summarizes the characteristics of knowledge-based employees, such as strong learning needs, self-development, creativity and autonomy, pursuit of self-value, and extra pressure and challenges. It introduces the research results of scholars on the mechanism of bootlegging behavior of knowledge-based employees. Finally, The paper looks forward to the future research direction of bootlegging behavior from the perspectives of Deepening the research on bootlegging behavior in the context of Chinese culture, Expanding research on the mechanism of bootlegging behavior, Enriching the research paradigm of bootlegging behavior, and Paying attention to the impact of the environmental changes on the bootlegging. It can enhance managers' correct understanding of bootlegging, especially help organizations prevent and avoid the negative impact of bootlegging, and at the same time enable scholars to have a clear understanding of the existing research results in the field of bootlegging behavior in China.*

KEY WORD: *Bootlegging Behavior, Knowledge-based Employees, Influencing factors, consequences, mechanism*

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I. INTRODUCTION

In October 2022, the report of the 20th CPC National Congress made important arrangements for accelerating the implementation of the innovation-driven development strategy. Since 2023, General Secretary Xi Jinping has repeatedly proposed and emphasized the development of new productivity, which is essentially high-tech driven productivity (Han, Y.J., 2023), and promoted industrial innovation with scientific and technological innovation. According to the data in the Global Innovation Index (2023) report, China's national innovation index ranks 12th in the world, and China has become the country with the largest number of science and technology clusters in East Asia. As the core carrier of innovative knowledge, knowledge workers play an increasingly important role in corporate innovation and development. At present, knowledge workers have become the main force of high-tech enterprises and shoulder important responsibilities for the innovation and development of high-tech enterprises. Therefore, encouraging employees to put forward innovative ideas and stimulate their innovative behaviors are the key issues of corporate managers. However, due to the limited organizational resources and the uncertainty of innovation results, employees' innovative ideas may not be implemented (Augsdorfer, P., 2012; Zhao, L. et al., 2019). When employees cannot conduct innovation activities through formal channels, they will turn to "underground" and secretly practice innovative ideas through informal channels, or choose to disobey the orders of superiors and continue to implement innovative behaviors for the benefit of the organization (Augsdorfer, P., 2005; Mainemelis, C., 2010). This phenomenon is not an isolated case in corporate management. Relevant literature confirms that more than 80% of companies have experienced bootlegging, and more than 10% of individuals in R&D teams have participated in bootlegging (Augsdorfer, P., 2005).

Since the 1960s, when Knight, K. E. (1967) first proposed the concept of bootlegging, and Augsdorfer, P. (2005) formally introduced the concept of bootlegging into the field of organizational behavior, Western countries have increasingly studied bootlegging behavior. China's research on bootlegging behavior is later than that of Western countries, and there is no consensus on the conceptual connotation and structural measurement of bootlegging. As a "double-edged sword", bootlegging has both positive and negative effects. At the same time, due to the cultural differences between China and the West, bootleg innovation is more likely to occur in the context of Chinese organizational culture that focuses on Supervisor-Subordinate Guanxi orientation and high power distance (Wang, H.Y., & Zou, C.L., 2019). Therefore, bootlegging behavior in the local context of China is a topic worthy of study.

Based on the above analysis, this paper sorts out relevant literature and conducts research around three parts: bootlegging behavior, new generation knowledge-based employees, and bootlegging behavior of new generation knowledge-based employees. In the bootlegging behavior part, the four aspects of bootlegging, namely, its connotation, measurement, influencing factors and effects, are mainly explained. In the new generation knowledge-based employees part, the two aspects of The meaning of knowledge-based employees and Characteristics of knowledge-based employees are mainly explained. In the bootlegging behavior of new generation knowledge-based employees part, the two aspects of Factors influencing the bootlegging behavior of knowledge-based employees and the mechanism of knowledge-based employees' bootlegging behavior are mainly explained. Finally, a summary is made and the future research direction in this field is prospected, providing inspiration for further research in the future.

II. BOOTLEGGING BEHAVIOR

The concept of bootlegging behavior was introduced to China in 2017. So far, the research on bootlegging behavior by Chinese scholars can be summarized into three stages: 2017 was the initial exploration stage, with relatively few research results, but it also involved the antecedent variables and consequence variables of bootlegging behavior, mainly focusing on the impact of different leadership styles such as narcissistic leadership and unethical leadership on bootlegging behavior (Li, M.Z., et al., 2017; Liu, X.Q., 2017), as well as the effect of bootlegging behavior on individual performance and supervisor inhibition (Huang, W., et al., 2017; Chen, W.Y., et al., 2017). 2018-2019 was the continuous development stage, during which bootlegging behavior became a hot topic in the research of organizational behavior, management, psychology and other disciplines. Scholars conducted empirical research on the influencing factors, effects, and production mechanisms of bootlegging behavior, and the research results were gradually enriched. Since 2019, it has been a stage of rapid growth. At this stage, the research perspectives and methods are diversified. The research on the local context of China is more in-depth and systematic. The concept of bootlegging behavior has been integrated (Wang, H.Y., et al., 2019), and a localized measurement scale has been formed (Zou, CH.L., 2020; Wan, P.Y., 2021).

2.1 The connotation of bootlegging behavior

In existing research, there are two generally accepted definitions of bootlegging behavior: one is the covert "bootlegging" represented by Augsdorfer, P. (2005), and subsequent representative scholars include Criscuolo, P., et al. (2014) and Globocnik, D., & Salomo, S. (2015). Chinese scholars Huang, W., et al. (2017), Zhang, Y.C., & Tu, X.Y. (2022), Qu, J.Z., et al. (2023), and Wang, Y.W., et al. (2023) also use this definition in their research. They believe that bootlegging is a bottom-up, secret but proactive innovation behavior of employees that is not formally authorized by the organization and upper management for the purpose of improving organizational interests. This meaning is generally recognized and accepted by most Chinese scholars based on the Chinese social and organizational cultural context. The second is the confrontational "creative deviance" represented by Mainemelis, C. (2010), and subsequent representative scholars include Lin, B., & Chen, H. (2012). Chinese scholars Liu, X.Q. (2017) and Jiang, Y. (2018) adopted this definition in their research. They believe that creative deviance is employees ignoring or violating management orders to stop innovation, believing creativity will bring value to the organization, and continuing to innovate according to their plans even though superiors have clearly ordered them to stop innovating. The difference between the above two concepts lies in whether the organization or superiors are aware of the employees' creative ideas or behaviors. With the continuous deepening of research on bootlegging, scholars have found that bootlegging and creative deviance are not mutually exclusive. They are both specific manifestations of bootlegging behavior (Wang, H.Y., et al., 2019) and proposed the integrated concept of "Bootleg Innovation" based on the Chinese social and organizational context. Wang, H.Y., et al. (2019) first divided bootlegging behavior into two stages from the perspective of dynamic innovation process: bootlegging and creative deviance, corresponding to bootlegging before managers are aware of it and creative deviance after managers are aware of it, which deeply and comprehensively reflects the connotation of bootlegging behavior. Based on the above analysis, combined with

the Chinese culture of collectivism and the emphasis on harmony, this article prefers to use the covert "bootlegging" represented by Augsdorfer.

2.2 The measurement of bootlegging behavior

In terms of measuring bootlegging behavior, there are currently two types of mature scales: First, the uni-dimensional scale developed by Criscuolo, P., et al.(2014), which includes 5 items to measure "bootlegging"; this scale is the most cited scale by Chinese scholars in studying bootlegging behavior (Huang, W., et al., 2017; Zhang, H., & Liu, S.P., 2020; Zhao, B., Gu, R., & Yu, W.X., 2020; Zhou, X.,& Wang, W.T., 2021; Liu, L.,& Wang, C.F., 2022; Zhang, P.C., et al., 2023), and has been verified in China's innovation management practice. Second, the scale developed by Lin, B. (2013), Lin, B. et al. (2016), with a total of 9 items to measure "creative deviance", and the number of citations by Chinese scholars has increased since 2019 (Chen, W.Y., et al., 2017; Liu, X.Q., 2019; Song, Y. & Shi, D.D., 2020). In addition, Wang, H.Y., et al. (2019) elaborated on the structural dimensions of Bootleg Innovation in the context of Chinese organizations, and Zou, CH. L. (2020) developed a Chinese localized Bootleg Innovation measurement scale, including "the sucker" and "a field commander must decide even against the king's orders" two dimensions, a total of 7 items, Wan, P. Y. (2021) based on China's large sample data, developed a Creative Deviance scale based on organizational norms, including three dimensions, a total of 12 items. Among them, is the Bootleg Innovation in the Chinese context developed by Zou, CH. L. (2020) The Innovation Scale has been adopted by Chinese scholars and has good reliability and validity (Wang, J. H., 2024). However, the measurement scale developed by Wan, P. Y. (2021) has not been cited and empirically tested by other scholars. In the future, scholars need to adopt it based on the actual research and verify its reliability and validity.

2.3 The influencing factors of bootlegging behavior

In the current literature, there are a lot of studies on the factors affecting bootlegging behavior. This article summarizes them from three levels: individual factors, leadership factors, and organizational factors.

In terms of individual factors, Augsdorfer, P. (2005) believes that the personality characteristics of bootleggers are usually characterized by high enthusiasm, non-conformism, obsession with personal ideas, etc., and believes that individual personality characteristics are the basis for predicting bootleg innovation. Chinese scholars have conducted in-depth research mainly on the aspects of personality traits, individual cognition, and values. In terms of personality traits, Yang, J.ZH. and Li, X.D. (2019) pointed out that individuals with proactive personalities have a stronger desire for success and higher expectations for their careers and are therefore more likely to produce deviant innovation. Employees with strong creativity have stronger divergent thinking and critical thinking, and stronger innovation motivation and achievement motivation prompt them to engage in more creative deviance, and at the same time have the confidence to defend their deviant behavior (Yang, G., et al., 2019). Wang, Y.W., et al. (2023) believe that individuals with high creativity have stronger internal motivation for bootleg innovation and are more likely to produce bootleg innovation. In terms of individual cognition, employees who have a strong sense of self-identity with their work are more likely to participate in and persist in bootlegging behavior based on their organizational identity (Nanyangwe, C. N., et al., 2021). Li, M., and Ye, H. (2021) believe that employees with higher self-efficacy are more likely to hide new ideas, but they will not give up any innovation opportunities, so they are more likely to engage in bootlegging behavior to continue to implement new ideas underground through informal innovation. (Zhou, X. & Wang, W.T.,2021)'s research shows that Overqualification can positively affect Knowledge-based Employee's Bootlegging. Employees' self-perceived Overqualification is an effective way to stimulate Bootlegging. Employees will use their excess abilities to explore new things outside of their job duties. Even if they encounter external resistance, they will make full use of their own abilities and externally available resources to achieve Bootlegging (Li, F.D., et al. 2022; Qu, J.Z., et al., 2023). In addition, some studies have shown that the higher the degree of psychological ownership, the easier it is to stimulate employees' bootlegging behavior (Jia, J.F., et al., 2023). In terms of values, both individualism orientation and collectivism orientation have a positive impact on bootleg innovation (Xu, C., & Gong, W. T., 2024).

In terms of leadership factors, current research in China mainly focuses on the impact of different leadership styles and leadership behaviors on Bootlegging. According to the results of relevant empirical research in the current Chinese context, leadership style has an important impact on employees' Bootlegging behavior, and a good and appropriate leadership style is conducive to stimulating employees' Bootlegging behavior. For example, Temporal Leadership (Li, M., & Ye, H., 2021), Agile leadership (Hooi L. W., & Tan N. N., 2021), ethical leadership (Li, S., et al, 2021) paradoxical leadership (Jia, J.F., et al, 2021; Huang, D., et al, 2022), and Distributed Leadership (Lyu, L., Zhang, H., & Gao, K., 2022) all have a positive impact on employees' Bootlegging Behavior. However, there are also some negative and unhealthy leadership styles that negatively affect employees' Bootlegging behavior, such as unethical leadership increased employees' emotional exhaustion, reduced workplace security, and employees not having sufficient resources to engage in risky

deviant innovation behaviors (Liu, X.Q., 2017; 2019). Some scholars have paid attention to the impact of leadership behavior on Bootlegging. Different leadership behaviors will have positive and negative consequences on employees' Bootlegging behavior. In recent years, the humorous behavior of leaders has attracted extensive research from scholars. Leader affiliative humor (Jia, J.F., & Liu, ZH., 2021) can significantly improve employees' bootlegging. Zheng, X., et al. (2022) conducted an empirical study on six cities in Guangdong, Shanghai, and other cities in China and confirmed that leader humor, as an empowering work, can effectively enhance employees' active bootleg innovation. Dai, L., et al. (2023) also empirically analyzed that Linking a Leader's Positive Humor positively affects Chinese employees' Bootlegging. Leader Humility motivates employees to innovate and provides employees with endogenous resources and relationship energy, which can drive employees to engage in Bootlegging (Qu, J.ZH., et al., 2023). Yang, N., Chen, H., and Wang, X.H. (2024) confirmed that paradoxical leadership behavior promotes employees' bootlegging behavior. In Chinese companies under the collectivist cultural background, the blurred boundaries between employees' work and family make the positive impact of family-supportive supervisor behavior on employees' bootlegging behavior more prominent (Wang, H.Y., Sun, H.D., & Wan, P.Y., 2024). Supervisor communication openness is conducive to the bootlegging innovation of employees in state-owned enterprises (Wang, Y., & Huang, M., 2024). Some scholars have also begun to pay attention to the impact of negative leadership behavior. For example, leaders' abusive supervision, as a negative leadership behavior, has been proven to be detrimental to employees' bootlegging innovation behavior (Wang, X.L., Wang, M.Y., & Liu, J.N., 2023).

In terms of organizational factors, scholars have conducted research on specific organizational management situations. Existing studies have confirmed that the organizational innovation atmosphere (Wang, H.Y., & Yu, J.L., 2019; Zhou, X., & Wang, W.T., 2021), Error Management Climate (Wang, H.Y., & Kou, X.L., 2023), and the perceived climate of team cha-xu (Wang, Y.W., et al., 2023) have a positive effect on employees' bootlegging behavior. Organizations with a high innovation atmosphere are more tolerant of employees' innovation, thus forming a safe and supportive organizational environment (Liu, F., et al., 2017). Subsequent studies have also confirmed that the higher the level of organizational innovation atmosphere perceived by knowledge workers (Zhou, X., & Wang, W.T., 2021), the better the Error Management Climate (Wang, H.Y., & Kou, X.L., 2023), and the higher perceived climate of team cha-xu (Wang, Y.W., et al., 2023), the more conducive to employees' bootlegging behavior. In addition, a series of measures in organizational management practices will affect bootlegging behavior, such as the impact of personalized contracts on bootleg innovation in the Chinese context (Jin, Y.X., Wang, CH.X., & Zhou, Y., 2018). Some scholars have enriched the research on the influencing factors of bootlegging from the perspective of human resource management. The research results of Jia, J., Li, Z.Q., Liu, W. and Hu, J. (2023) show that high-involvement human resource management practices can promote employees' bootlegging by improving employees' psychological. Huang, W.Y., Song, D. and Yin, Y.S.H. (2023) verified that Knowledge-Creation Human Resource Management promotes employees' bootlegging behavior by improving employees' innovative self-efficacy. In recent years, some scholars have also paid attention to the inhibitory aspects of organizational influencing factors. For example, negative workplace gossip, as a bad interpersonal experience, will have a negative impact on employees' bootleg innovation (Zhang, H.M., et al., 2022; Jia, C.X. & Rong, Y., 2023). These results have enriched the research perspective of the inhibitory influencing factors of bootlegging behavior.

2.4 The consequences of bootlegging behavior

Compared with the influencing factors, the research on the consequences of bootlegging behavior is not very rich. In the existing literature, there are more studies on the positive effects of bootlegging behavior, and the research on negative consequences is slightly insufficient. Some scholars also believe that bootlegging behavior is a double-edged sword (Jiang, Y. J. & Xu, Y.H., 2023). Next, this paper discusses the positive impact, negative consequences, and double-edged sword effect of bootlegging behavior from the three levels of individual employees, leaders, and organizations.

The positive impact of bootlegging behavior is mainly concentrated on the individual employee level and the organizational level. Studies have shown that for individual employees, bootlegging can enhance employee creativity (Li, X. M., Xu, Zh. T. & Huo, W.W., 2019) and significantly improve employees' innovation performance, especially employees with high self-efficacy (Liu, P.Q., et al., 2023; Zhao, B., Gu, R. & Yu, W.X., 2020; Wang, H.Y. & Wan, P. Y., 2020). Huang, W. et al. (2017) found that the higher the formal status of employees and the stronger their creativity, the stronger the positive impact of bootlegging on employee innovation performance. It is worth mentioning that the research of Wang, H.Y. and Zhao, D.(2023) confirmed that bootlegging failure event criticality helps to promote the innovation performance of new employees. This article believes that this is a breakthrough in the research field of bootlegging negative events. In addition, bootlegging can inspire employees to have more active responsibility behavior, especially for employees with high autonomy (Shi, H.H., 2023). For organizations, once the bootlegging of employees is successful, the possibility of producing revolutionary products is higher, which can more effectively support the

innovation and development of the organization and enhance the organization's innovation capabilities (Song, Y. & Shi, D.D., 2020), and the organization's innovation performance will also be improved in this process (Zou, CH.L., 2020). Chen, SH.SH., Lin, CH. P. and Qu, J. J. (2023) believe that if Cross-authority deviant innovation can be effectively handled, it will greatly improve the innovation performance of individuals and organizations, thereby promoting the realization of organizational goals; Cross-task deviant innovation may bring about a huge breakthrough in organizational innovation performance.

In terms of the negative impact of bootlegging behavior, Cross-task deviant innovation will consume a lot of employees' time and energy, causing them to suffer certain psychological pressure and lead to material resource consumption. Cross-authority deviant innovation may lead to bad relationships between superiors and subordinates, and even affect and impact organizational management norms (Chen, SH.SH., Lin, CH.P.& Qu, J.J.,2023). When the leader has a high authoritarian orientation, bootlegging will induce the leader's sense of status threat, which will in turn lead to supervisor inhibition (Chen, W.Y. et al., 2017). In certain scenarios, the bootlegging behavior previously performed by employees may also trigger their subsequent counterproductive work behavior (Jia, J.F., Liu, W. P.& Zhao, R.N., 2022), and will also undermine the orderly management of the organization (Jiang, Y., 2018). Wang, H.Y. and Yu, J.L. (2019) also recognized that in mature enterprises, when the bootlegging performed by organizational members with lower informal status is successful, it will be detrimental to the cohesion of the organization due to the jealousy of other members.

The double-edged sword effect of bootlegging behavior. Since bootlegging behavior has two different attributes, purpose legitimacy, and behavior illegality, and the consequences it brings are not just a single positive consequence or a negative consequence, scholars have begun to study the double-edged sword effect of bootlegging behavior from an integrated perspective in recent years. Therefore, deviant innovation may bring positive or negative effects (Liu, L.L. & Wang, C.F., 2022), that is, it has a double-edged sword effect. Jia, J.F., Liu, W. P.& Zhao, R.N. (2022) confirmed that bootlegging has a double-edged sword effect from the perspective of employee work output. Bootlegging can reduce employees' counterproductive work behavior through psychological guilt and induce employees' counterproductive work behavior through psychological power. Wang, J.H. (2024) confirmed the double-edged sword of bootleg innovation behavior on employees' workplace interpersonal relationships at the interpersonal relationship level. Bootleg innovation behavior improves workplace status through colleague admiration and suffers co-worker ostracism through colleague jealousy.

III. KNOWLEDGE-BASED EMPLOYEES

3.1 The meaning of knowledge-based employees

In the 1950s, American management guru Peter Drucker first proposed the concept of knowledge-based employees, that is, "employees who can master and apply concepts, symbols, and use knowledge or information to complete their work." With the vigorous development of the knowledge economy, the importance of knowledge-based employees in corporate management has become increasingly prominent.

At present, there are three main perspectives on the definition of knowledge-based employees: First, from the perspective of work content, it is believed that knowledge-based employees are mainly engaged in management, R&D, technology, sales, and service, covering many fields such as R&D, accounting, finance, etc., including middle and senior managers, scientific researchers, programmers, auxiliary professionals with deep professional skills and ordinary white-collar workers, etc., who are highly educated and high-quality intellectual workers (Zhang, W.J. & Peng, J.F., 2001; Li, H., et al., 2016; Liu, H.S., 2017). Li, Y. (2024) believes that knowledge-based employees are intellectual workers who can bring value-added to enterprises and their organizations, covering senior managers, sales specialists, human resources specialists, and quality control personnel.

The second is the perspective based on behavioral characteristics. From this perspective, Chinese scholars Lv, W. and Tang, W. (2012) believe that in addition to engaging in mental labor, professional knowledge, and work experience, knowledge-based employees must also have the ability to re-learn and innovate, have high personal qualities and professional ethics, and their work can effectively improve corporate performance. Xu, Q. (2015) believes that knowledge-based employees are employees in an organization who have rich work experience and management talents, or have strong scientific research capabilities, and high professional technology and skills, and make significant contributions to the organization. They are high-quality employees with the ability to create, use, share, and add value to knowledge (Zhang, ZH.G, Li, J.J. & Li, Y.J., 2014).

The third is based on the perspective of academic qualifications and occupations. This perspective is recognized by most Chinese scholars. They generally believe that knowledge-based employees have received higher education, generally have a college degree or above, have a high cultural level, and have knowledge requirements in the corresponding field. They have more knowledge, skills, and experience than ordinary employees, and are good at carrying out innovative activities to transform their knowledge and skills into value

creation. They are mainly engaged in technical, marketing, and management work (Zhang, Z.S, Ning, T.T. & Wang, X., 2014; NI, W.B. & He, L.Y., 2016; Chen, L., 2022).

3.2 The Characteristics of knowledge-based employees

Strong learning needs: Knowledge-based employees are generally well-educated and have high learning and adaptability. They rely on their knowledge base to work and have a need to continuously absorb new knowledge (Zhang, ZH. G, LI, J.J. & Li, Y.J., 2014). They can quickly master new knowledge and new technologies and apply them to actual work.

Focus on self-development: Knowledge-based employees pay more attention to learning and training, pay more attention to growth and career development space in their work (Zhang, Z.S, Ning, T.T. & Wang, X., 2014), and regard personal growth and development as the primary motivation factor (Shi, G.F. & Han, H.W., 2014b). They hope to achieve self-breakthrough through continuous learning and innovation. Their strong thirst for knowledge makes them attach great importance to the training opportunities provided by the organization, and they have strong motivation for personal growth (Li, Z.X. & Ma, J.J., 2021).

Creativity and autonomy: Knowledge-based employees have a high pursuit of their goals, love innovative activities (Shi, G.F. & Han, H.W., 2014b), like challenging and rewarding work designs (Wang, CH.L. & Liu, J.Z., 2017), have stricter requirements and innovation capabilities for themselves, and will actively achieve their goals even when facing work challenges (Huang, L.M., 2018). They hope to arrange work content, progress, and location independently, pursue freedom and flexibility in work, and have a high demand for autonomy (Yan, X.J., 2020). This pursuit of autonomy is particularly important for young knowledge-based employees, as it reflects the love of knowledge-based employees for their work and their expectations for career development.

Pursuit of self-value: Knowledge-based employees have more diversified values (Shi, G.F. & Han, H.W., 2014a), have a higher need for self-value realization (Zhao, F. & Gan, Y.W., 2017), and attach importance to obtaining good development opportunities and resources in the organization to realize their own value. At the same time, they pay more attention to the fit between personal and organizational values. When employees can form a community with the organization, knowledge-based employees are more willing to support the development of the organization (Zhao, L., et al., 2023).

It is worth noting that knowledge-based employees will also face additional pressure and challenges. They often bear important responsibilities and tasks at work and are more likely to face negative psychological impacts such as high work pressure, high challenges, and strong frustration (Fang, H., Fu, H.J. & Zhang, H.J., 2022). In addition, high-intensity work may cross the dividing line between work and family, resulting in a phenomenon of losing one thing for the other, affecting the comprehensive development of knowledge-based employees (Qin, Y.L., Lin, Z. & Yang, J.X., 2022).

IV. BOOTLEGGING BEHAVIOR OF KNOWLEDGE-BASED EMPLOYEES

Knowledge-based employees are crucial resources for organizations, with their knowledge being a key determinant of competitive advantage and economic growth (Wang, Y., 2023). The tacit knowledge possessed by employees plays a vital role in improving organizational performance, innovation, efficiency, and team cohesion (Zhang, X.H., Long, CH.F., Wang, Y.B., & Tang, G.W., 2015). Because knowledge-based employees are well-educated and their work results are more creative and difficult to restrict or quantify, they are more likely to ignore organizational norms in their work, focus on work results, and generate Bootleg Innovation (Hu, X.X., 2022).

4.1 Factors influencing the bootlegging behavior of knowledge-based employees

Unauthorized innovation activities, known as bootlegging behavior, among Chinese knowledge-based employees, are influenced by various personal traits, leadership styles, and organizational contexts. Several studies have explored different aspects of this phenomenon by investigating the antecedents and consequences of bootlegging behavior, researchers aim to provide valuable insights for organizations seeking to foster innovation while managing potential risks associated with unauthorized activities.

Among various influencing factors, leadership style is a factor that scholars focus on. Research has confirmed, that distributed leadership can either foster or hinder bootlegging behavior based on factors like exploratory-exploitative learning tension and paradox mindset (Lyu, L., Zhang, H., & Gao, K., 2022). Paradoxical leadership has been linked to promoting bootlegging through mechanisms such as harmonious innovation passion and perceived error management culture (Jia, J.F., Liu, Z., & Zheng, Y.Y., 2021). temporal leadership can impact employees' bootlegging behavior, with self-efficacy mediating this relationship and perceived team efficacy moderating it (Li, M.Z & Ye, H. L., 2021). Additionally, Jia, J.F., et al. (2023) investigated the impact of high-involvement human resource management practices on employees' bootlegging behavior, emphasizing the role of psychological ownership. Wang, X.L., Wang, M.Y., and Liu, J.N. (2023)

focused on how leaders' abusive supervision influences bootlegging innovation behavior, highlighting the importance of psychological safety and mindfulness in the workplace. Zheng, X., et al. (2022) examined how leader humor influences bootleg innovation through psychological empowerment and affective trust in leaders. These studies aim to understand the factors that drive bootlegging behavior among Chinese knowledge-based employees by exploring leadership styles, organizational practices, and employee perceptions. They provide valuable insights for organizations seeking to manage and leverage employee creativity effectively. Beyond this, scholars are increasingly interested in exploring the organizational conditions and individual characteristics that lead to bootlegging behavior. Jia, J.F., et al. (2023) highlighted the moderating effect of employees' Chinese traditionalism on the relationship between high-involvement human resource management practices and bootlegging. Xue, Q.X., et al. (2023) focused on the influence of the "maker spirit" on knowledge workers' innovative behavior, shedding light on cultural factors that drive unauthorized innovation activities. This suggests that cultural factors may influence the propensity for unauthorized innovation activities.

4.2 The mechanism of knowledge-based employees' bootlegging behavior

At present, the research on knowledge-based employees' bootlegging behavior is basically carried out from the antecedent variables of bootlegging behavior. The basic idea is to use different theories as the entry point and construct a moderated mediation effect model to deeply examine the impact mechanism of different factors on the bootlegging behavior of knowledge-based employees. For example, the antecedent variables at the organizational level mainly involve job autonomy (Liu, B., & Zhao, J. J., 2018), job embeddedness (Zhou, Y., & Qian, H. CH., 2021), job complexity (Zhang, Y.C., & Tu, X.Y., 2021), etc.; the influencing factors of personal characteristics mainly involve overqualification (Zhou, X., & Wang, W.T., 2021; Chen, L., 2022), values and self-efficacy (Xu, C., & Gong, W. T., 2024; Hu, X.X., 2022;), etc.; the influencing factors of leadership style mainly revolve around platform leadership (Su, H., 2024); hindrance stressors perceived at the personal psychological level (Chen, M., et al., 2023), Work Stressors (Duan, Y.L., et al., 2024), etc. The following is a summary of some of the scholars' representative research results.

Based on the resource conservation theory, Chen et al. (2023) conducted an empirical study on employees of knowledge-intensive enterprises in China and found that the hindrance stressors faced by employees at the individual level, whether high or low, may lead to high levels of bootlegging behavior in employees, and the curvilinear (U-shaped) relationship between hindrance stressors and bootlegging is more obvious among employees of non-state-owned enterprises than among employees of state-owned enterprises. Xu & Gong (2024) drew on the trait activation theory, starting from university teachers, the knowledge group with the most innovative potential, and focusing on the impact of the two cultural values of individualism orientation and collectivism orientation on bootleg innovation, and concluded that individualism orientation can better predict the bootleg innovation of university teachers than collectivism orientation. In the past, scholars tended to study the Chinese cultural values of collectivist orientation. In the current Chinese social reality where some new generations of knowledge-based employees tend to be individualistic, this study enriched the research perspective of Chinese cultural values. Duan et al. (2024) based on cognitive transaction theory and job demand control model, studied how work stressors affect the bootlegging innovation of Chinese knowledge employees through emotional intelligence from a micro level. Specifically, emotional intelligence significantly strengthens the positive impact of challenge stressors on bootlegging innovation and the negative relationship of hindrance stressors on bootlegging innovation. Zhou, X. and Wang, W.T. (2021) combined the three theories of social cognitive theory, self-determination theory and structural strain theory to construct a moderated mediation model, using creative self-efficacy as the mediating variable and organizational creative climate perception as the moderating variable to study the impact of perceived overqualification on knowledge-based employee's bootlegging. Through survey data from 357 knowledge-based employees in patent-intensive enterprises such as high-tech manufacturing and high-tech services, the results show that the sense of over-qualification is conducive to promoting knowledge-based employees' bootlegging, and creative self-efficacy plays a mediating role between the two variables. The higher the organizational creative climate perception perceived by employees, the stronger the positive relationship between perceived over-qualification and creative self-efficacy, and the stronger the mediating effect of creative self-efficacy between perceived over-qualification and bootlegging. Wang, Y.W., et al. (2023) took personal-environment fit theory as the starting point, and his empirical research showed that in a high-difference atmosphere perception situation, employees with work autonomy will perceive trust from their leaders, will not be afraid of being punished for making mistakes, and will dare to break through conventional paths and achieve innovation goals through deviant innovation. In addition, some scholars have expanded the influence mechanism of leadership style based on social exchange theory. Study has shown that platform leadership has a positive effect on knowledge-based employees' Deviant innovation behavior, and Perception of responsibility plays a mediating role. The higher the level of private enterprises of knowledge employees, the stronger the positive effect of platform leadership on the Deviant innovation behavior of knowledge employees (Su, H., 2024).

Through the above analysis, it can be found that bootlegging behavior among knowledge-based Chinese employees is a complex phenomenon. In the face of the actual situation that deviant innovation is becoming more and more common in Chinese enterprises, it is crucial for leaders to understand and manage this behavior in order to promote innovation and utilize the knowledge potential within the organization.

V. CONCLUSION

Regarding the connotation and measurement of bootlegging behavior, Chinese scholars generally recognize the two expressions "bootlegging" and "creative deviance", which has reached a consensus in academia and practice. When choosing which expression, researchers will choose the corresponding connotation and cite the most matching scale based on the research perspective and research objectives, combined with the specific organizational management context.

The research on the influencing factors of bootlegging mainly includes three levels: employees, leaders, and organizations, and is mainly summarized into two categories: promotion and inhibition. In the existing literature, the research on promotion factors is more abundant, but the attention to inhibition factors needs to be strengthened.

Bootlegging is a double-edged sword, and its consequences mainly involve three levels: individual employees, leaders, and organizations. A large number of existing studies support the positive impact of bootlegging, and a few scholars have gradually begun to explore the potential negative consequences of bootlegging, but from an integrated perspective, there is still a lack of research on the double-edged sword effect of bootlegging behavior.

Bootlegging behavior has become a common phenomenon in Chinese companies, but the process and management research on knowledge-based employees' bootlegging behavior is still a complex field, which requires a detailed understanding of organizational dynamics, leadership style, and cultural influences.

VI. FUTURE RESEARCH PROSPECTS

At present, Chinese scholars have conducted in-depth and expanded research on bootlegging behavior from multiple angles and disciplines, however, there is still room for improvement in research in the Chinese context. Future research can focus on the following aspects.

6.1 Deepening the research on bootlegging behavior in the context of Chinese culture

scholars have conducted in-depth and sufficient research on collectivism, superior-subordinate, and high power distance. However, the face culture in China is deeply rooted and far-reaching (Zhou, K., & Zhang, X.A., 2023), which will have an important impact on the behavior of employees in the organization. The research on Confucian culture is not in-depth enough, especially the lack of cross-cultural comparative research on the bootlegging behavior of knowledge-based employees from different cultural backgrounds. Future research can further explore how localized cultural factors affect the bootlegging behavior of employees and expand the cross-cultural comparative research on bootlegging behavior in different countries and regions.

6.2 Expand research on the mechanism of bootlegging behavior

At present, the research on the negative consequences of bootlegging is not rich enough, which makes it easy to magnify its positive effects and mislead the organization's understanding of bootlegging. Future research can explore the impact of bootlegging on employee job satisfaction and organizational identity at the micro level, and can also expand the impact of bootlegging on the organizational atmosphere and organizational norms at the macro level; or from an integrated perspective, use a more comprehensive theoretical model, based on specific situations, explore the double-edged sword effect of bootlegging behavior, and analyze its contingency influencing factors, further clarify the mechanism of bootlegging behavior, and thus form a systematic study. Thereby strengthening the comprehensive and correct understanding of bootlegging behavior by enterprises and managers.

6.3 Enrich the research paradigm of bootlegging behavior

Test the measurement scale: At present, Chinese scholars have developed a localized bootlegging measurement scale (Zou, CH.L., 2020; Wan, P.Y., 2021), but it is not mature enough, and the scale lacks widespread adoption by other scholars and needs to be tested for reliability and validity by more empirical studies. Subsequent papers with similar research directions can cite the local scale developed by Chinese scholars and conduct empirical verification.

Expand the research object: The research objects of bootlegging behavior are front-line employees, and there is not much literature involving bootlegging behavior at the leadership and colleague levels. In addition, the research areas are mainly high-tech enterprises, and government agencies, education, and service industries have not received much attention. Future research can further explore the impact mechanism of bootlegging on

leaders and colleagues, and further enrich the theoretical and empirical research on the bootlegging behavior of employees in different industries and organizations.

Enrich research methods: Most of the current empirical studies obtain the required data through self-evaluation of the research subjects, which will contain some subjective elements and cause research bias. It is recommended to use a combination of multiple methods, such as textual analysis, quasi-experimental design, or cross-lagged method (Li, F.D., et al. 2022; Lyu, L., Zhang, H., & Gao, K., 2022), and conduct empirical research in combination with specific actual cases of enterprises to enhance the reliability and robustness of the conclusions.

6.4 Pay attention to the impact of the environmental changes on bootlegging

The advent of the digital economy era has broken the traditional organizational structure and management model to a certain extent. The control of leaders over employees will be weakened in both intensity and magnitude (Chen, SH.SH., Lin, CH. P.& Qu, J. J., 2023). Knowledge workers with high creativity are more conducive to the integration of innovative resources and are more likely to implement bootlegging behavior in a relatively relaxed digital workplace. Although existing studies have confirmed that digital transformation and data literacy are conducive to employees' bootleg innovation (Jiang, SH.Y., & Yu, ZH.Y. 2022; Jiang, Y.F., et al., 2024), the research results are very limited. In the future, scholars can strengthen the research on the influencing mechanism of employees' bootlegging under the background of the digital transformation of Chinese enterprises.

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