

Review of employees' bootleg innovation behavior

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Abstract. Innovation behavior is an important factor to help enterprises gain competitive advantage. Bootleg innovation, as a special form of enterprise innovation, is becoming more and more common in enterprises. Bootleg innovation means that individuals continue to carry out hidden innovation behaviors because they firmly believe that innovative ideas are beneficial to the organization. Relevant studies show that employees, leaders and organizational factors all have an impact on bootleg innovation. However, the effect of bootleg innovation has not been universally recognized. Studies show that bootleg innovation can improve the innovation performance of employees and organizations, but it may also lead to the decline of organizational efficiency. In this paper, the formation factors and effects of bootleg innovation are sorted out, hoping to provide reference for subsequent research.

Keywords: Bootleg innovation; forming factors; Action result.

1. Research background

Innovation is the first driving force to lead the development of a country. Therefore, innovation is an important issue that every enterprise pays attention to. Every enterprise is encouraging innovation and supporting the innovative ideas of employees as much as possible. However, due to the limited nature of enterprise resources, as well as the limited time and energy of leaders, not all employees' innovative ideas can be concerned and supported. When leaders cannot provide sufficient support for employees, employees may implement innovative behaviors through other channels. This kind of innovative behavior is called bootleg innovation. This informal activity can often correct and compensate for the weaknesses of the formal organizational system [1].

Bootleg innovation is common in organizations. In the fierce market competition, enterprises encourage employees to put forward innovative ideas and hope to gain competitive advantage through innovation. Therefore, more and more employees are aware of the importance of innovative activities. The uncertainty of the environment and the background of innovation make the risk-taking spirit of employees stronger, and employees are more willing to take the initiative to gain competitive advantages for themselves and the organization. However, Chinese enterprises generally have a tendency of totalitarianism. The cumbersome organizational norms make employees more likely to produce bootleg innovation behaviors, and the limited organizational resources also promote the generation of bootleg innovation behaviors.

More and more scholars have realized the importance of bootleg innovation, which can bring many new technologies and products to the organization once it is successful. The emergence of Sogou browser supports this view. In 2008, Wang Xiaochuan, vice president of Sohu, wanted to study Sogou browser, but was rejected by the chairman of Sohu. In the end, Wang Xiaochuan succeeded in developing Sogou browser through private efforts. Therefore, bootleg innovation behavior can often train employees' innovation thinking and ability, improve their innovation performance, and then promote the innovation output of the organization.

But can bootleg innovation definitely bring benefits to the organization and employees? Current research has not reached a consistent conclusion. At present, most studies support the positive effect of bootleg innovation behavior on innovation performance. The process of bootleg innovation is a learning process, which is a kind of bold attempt and exploration, which can generate more novel ideas [2] and improve employees' creativity [3]. However, at the same time, this kind of behavior may be disliked by leaders and colleagues, because bootleg innovation violates organizational norms,

challenges organizational authority, threatens the status of leaders, triggers inhibition by supervisors [4], and brings troubles to colleagues, leading to their alienation and rejection [5].

At present, there is no academic consensus on the impact of bootleg innovation. Therefore, the effect of bootleg innovation is still the focus of current research. At the same time, many scholars pay attention to the formation factors of bootleg innovation, hoping to form a systematic understanding of bootleg innovation.

2. Connotation and measurement of bootleg innovation

Bootleg innovation was first proposed by Knigh (1967), who believed that when employees' innovative ideas were rejected by the organization, they would choose an unofficial and informal way to carry out their work, and if successful, it would bring many benefits to organizational innovation [6].

According to the expression forms of bootleg innovation, the definition of bootleg innovation can be divided into two perspectives. The first is defined from the perspective of concealability, which believes that bootleg innovation is an innovative behavior independently and secretly carried out by an individual and expected to benefit the organization, which is not included in the organization plan and therefore cannot be supported by the organization resources [7]. Subsequently, Criscuolo (2014) put forward four basic elements of bootleg innovation behavior. Deviant innovators take the initiative to initiate innovative ideas that are not formally supported by the organization and are not known by senior managers, which is subjectively conducive to the development of the organization [8]. Many scholars have adopted this view. Huang Wei (2017) defined bootleg innovation as an individual who believes that the innovative idea is expected to bring benefits to the organization, so he will continue to carry out the innovative behavior secretly. He summarized the three characteristics of bootleg innovation, namely, the concealment, bottom-up rather than project-style, the duality of illegal behavior and the legitimacy of purpose. That is, bootleg innovation is not supported by the organization, so it cannot be known by managers and is spontaneous by employees. Such behavior violates organizational norms, but employees believe that innovative activities are beneficial to the organization [3].

The second type, from the perspective of disobeying leaders' orders, defines bootleg innovation as that when employees want to implement innovative ideas, they may be refused or prevented by leaders, while employees choose to violate superior orders and illegally pursue innovative ideas, which Mainemelis calls creative deviance [9]. Chen Wuyang (2017) also defined deviance from this perspective. He believed that deviance innovation is when a subordinate's innovative idea is denied by the supervisor, and the subordinate continues to implement it in violation of the superior's order [4]. Wu Yingxuan (2018) believes that creative deviance is an innovative activity carried out by employees in violation of leaders' orders, and it is an extreme form of bootleg innovation. Bootleg innovation emphasizes not being known by leaders and not paying attention to whether leaders agree or not, while creative deviance clearly points out that employees' innovative behaviors violate leaders' instructions [10].

Some scholars take a comprehensive perspective and believe that bootleg innovation has both concealment and resistance. Wang Hongyu (2018) defined bootleg innovation as that when an individual's innovation plan may conflict with the organization's R&D strategy and system, if an individual believes that the innovative idea is expected to bring benefits to the organization, then he is likely to continue to implement the idea [11].

No consensus has been reached on the connotation of bootleg innovation, and scholars have measured bootleg innovation from different perspectives. Criscuolo (2014) developed a 5-item scale for measuring bootleg innovation based on concealment characteristics [8]. Huang Wei (2017) and Wang Hongyu (2018) both used this scale for their research. From the perspective of resistance,

Lin (2016) developed a 9-item measurement scale [12]. Chen Wuyang (2017) and Liu Xiaoqin (2019) adopted the scale developed by Lin. Another scholar has developed a scale of bootleg innovation

based on the Chinese context. Wang Hongyu (2019) developed the scale of bootleg innovation behavior from the perspective of innovation process, which is divided into two dimensions: before and after managers know [13]. Wan Pengyu (2021) developed a 3-dimensional bootleg innovation scale through interviews, including role-based bootleg innovation, interpersonal bootleg innovation and organizational bootleg innovation, with a total of 12 items [14].

3. Comparison between bootleg innovation and related concepts

(1) Bootleg innovation and constructive deviance.

Warren (2003) divided deviant ways into constructive compliance behavior, destructive compliance behavior, constructive deviance behavior, and destructive deviance behavior [15]. Constructive deviance refers to the behavior of employees who violate important norms in order to improve the well-being of the organization or its members [16]. Bootleg innovation and constructive deviance are both spontaneous behaviors of employees, both of which aim to improve the interests of the organization rather than the individual interests of employees, and both of which are characterized by violation of organizational norms. However, bootleg innovation lays more emphasis on innovative activities, and employees disobey leaders' orders to implement innovative behaviors, while constructive deviant behaviors are more extensive, not just innovative behaviors.

(2) Bootleg innovation and pro-organizational unethical behavior.

Pro-organizational unethical behavior is an individual's behavior that violates social moral norms or customs, laws, and norms of proper behavior in order to protect the interests of the organization or its members [17]. Both pro-organizational unethical behavior and bootleg innovation are deviant behaviors, which are spontaneous behaviors outside the role of employees, and are committed for the interests of the organization. However, the pro-organizational unethical behavior mainly emphasizes the violation of social moral norms, not necessarily the violation of organizational norms, while the bootleg innovation mainly emphasizes the violation of organizational norms and leadership orders.

(3) Bootleg innovation and organizational citizenship behavior.

Organizational citizenship behavior refers to voluntary actions undertaken by members of an organization that are not directly and explicitly recognized by the formal compensation system, but contribute to the effectiveness of the organization as a whole. Bootleg innovation and organizational citizenship behavior are both extraterritorial behaviors that serve to advance the organization's interests. Organizational citizenship behavior just does not receive formal remuneration, and may not violate organizational norms. Besides, organizational citizenship behavior usually involves taking the initiative to help colleagues, which is conducive to maintaining interpersonal relationships. However, bootleg innovation may lead to rejection by colleagues and leaders.

(4) Bootleg innovation and forward-looking behavior.

Forward-looking behavior is a kind of predictive behavior that aims to change the environment or self [18] and has three characteristics: spontaneity, future orientation and change orientation. Both are voluntary behaviors of employees, but the prospective behavior does not involve whether it violates organizational norms, and the prospective behavior may be for the benefit of the organization or for the personal benefit of employees.

4. Forming factors of bootleg innovation

4.1. Individual Factors

In terms of personality traits, Augsdorfe (1994) first proposed the characteristics of employees prone to bootleg innovation behaviors, including higher understanding, unwillingness to stick to the rules, critical thinking, high achievement motivation, etc. [7]. In 2012, Augsdorfe continued to draw the characteristics of employees with bootleg innovation through empirical research, including risk-taking, good at proposing different opinions, loyalty to the organization, and love to communicate with others. Yang Jianzhao (2019) also conducted research from the perspective of personal

personality characteristics, and believed that employees with proactive personality have the characteristics of initiative, desire for success, and expect change, and are unwilling to be bound by rules, and may violate organizational norms and instructions to implement innovative activities [19]. Individuals with an adventurous spirit hold a more optimistic attitude towards success and are more likely to produce deviant innovative behaviors [20].

In terms of psychological perception, Wang Zhaohui (2019) starts from the positive role of employees' sense of excess qualification, which refers to the perception that individuals think their qualifications exceed the requirements of the position. Employees with high sense of excess qualification will feel the conflict between themselves and the position, which brings certain pressure to employees. Which makes them more motivated to put forward innovative ideas [21]. Shukla (2020) believes that prosocial motivation of employees can promote bootleg innovation [22]. Nanyangwe (2021) found that employees with a higher sense of work identity have a more positive attitude towards work, and have stronger self-motivation and perseverance to complete innovative ideas [23].

In terms of personal creativity, Yang Gang (2019) believes that employees' creativity will help employees to generate moral evasion and self-comfort, which is conducive to the generation of deviant innovative behaviors. The higher the psychological privilege of employees, the greater the positive impact of creativity on moral evasion [24].

4.2. Leadership factors

In terms of leadership style, Huang (2022) concluded that ambivalent leadership has a positive impact on employees' bootleg innovation, while psychological capital and job prosperity play an intermediary role [25]. Wang Hongyu (2018) explored the impact of differential leadership on bootleg innovation and found that differential leadership would induce bootleg innovation behavior through employees' sense of psychological privilege. The higher the cognitive conflict, the greater the positive impact of employees' sense of psychological privilege on bootleg innovation [11]. Subsequently, Wang Hongyu (2019) also found that transformational leadership would have a positive impact on employees' bootleg innovation [26]. Liu Xiaoqin (2019) also found that non-ethical leadership would bring work pressure to employees and lead to emotional exhaustion.

Furthermore, it reduces the intrinsic motivation of employees and is not conducive to bootleg innovation [27]. Wu Shijian, (2020) also studied the promotion effect of authentic leadership on bootleg innovation behavior [28]. The personal characteristics of leaders also have an impact on employees. Zheng (2022) research shows that leadership humor has a positive impact on employees' bootleg innovation through psychological empowerment, and the stronger the employees' emotional trust in leaders, the more obvious the positive impact [29].

The relationship between leaders and employees. Huang (2022) explored the double-edged sword effect of contradictions in leader-member exchange relations, and found that contradictions in leader-member exchange relations would promote bootleg innovation through employees' cognitive flexibility, and might also hinder bootleg innovation through employees' work anxiety [30]. If the relationship between leaders and employees is better, employees can gain the support and trust of leaders and have more resources, which can support employees' innovation activities and bear less cost after failure, so they are more likely to have bootleg innovation behaviors [31].

In terms of leadership behaviors, Lin (2016) analyzed the impact of the role of leaders on employees' innovative behaviors from the perspective of the management style adopted by leaders. He believes that leaders have five reactions to employees' bootleg innovation behaviors, namely, forgiveness, reward, punishment, neglect and manipulation. Forgiveness and punishment will affect employees' bootleg innovation behaviors, while reward, punishment and manipulation will affect employees' innovation output [12]. Based on the theory of regulatory focus, Zhao Le (2019) argues that leader-promoting focused behavior will positively affect bootleg innovation, while leader-defensive focused behavior will negatively affect bootleg innovation. In this process, the structural tension of innovation resources and employees' creativity have a moderating effect [32]. Kang Xin

(2020) believes that managers' prosocial behaviors can create a relaxed working atmosphere, help employees break through time and resource constraints, and promote bootleg innovation [33].

4.3. Organizational factors

From the perspective of organizational factors, organizational atmosphere and organizational management mode will have an impact on employees' bootleg innovation. Innovation is not an accident of the enterprise, but is produced under the joint support of the enterprise's culture, organizational structure, process and other factors. Only by formulating a good innovation method and innovation mechanism can the enterprise ensure the generation of innovation [34]. Wang Hongyu (2019) studied the impact of organizational innovation climate on bootleg innovation behavior, and found that innovation self-efficacy plays an intermediary role. The higher the match between individuals and organizations, the greater the impact of innovation climate on innovation self-efficacy [35]. Zheng Chijian (2018) believes that the sense of organizational support in Internet enterprises is conducive to employees' bootleg innovation. Therefore, enterprises should improve their work support and interest concern for employees to improve their job satisfaction [36].

Organizational management practices also have an impact on employees' bootleg innovation behaviors. Globocnik (2022) concluded through empirical research that management practices that support new innovation initiatives will promote employees' bootleg innovation and increase the novelty of organizational innovation mix, while management practices that induce specific innovation directions are not easy to cause structural pressure

Bootleg innovations have less impact [37]. David (2018) investigated professional service firms and argued that the configuration and formalization of an organization's R&D process would have an impact on bootleg innovation. Specifically, the organization's technical concerns about efficiency and measurement, the suppression of metrological knowledge, and the separate management of violations of organizational procedures could all promote bootleg innovation in practice [38]. Jin Yuxiao (2018) believes that the personalized contract of an organization improves the flexibility of management work, is conducive to improving employees' job satisfaction, stimulating employees' innovative thinking, and ultimately promoting employees' deviant innovative behavior [39]. An organization's performance appraisal system may also affect bootleg innovation. According to the study of Moga (2021), developmental performance appraisal can stimulate employees' flexibility and creative thinking, and stimulate bootleg innovation behavior, while evaluative performance appraisal emphasizes strict system norms and enhances control, which is not conducive to employees' bootleg innovation [40]. Corporate social responsibility can convey positive signals to employees, create a good ethical environment, and enable employees to participate in innovative behaviors [41].

5. The effect of bootleg innovation

Bootleg innovation will have an impact on individual employees and the innovative products of the organization. However, according to the current research, bootleg innovation may not be beneficial to the innovation performance of the organization, and may also bring negative results.

5.1. At the individual level

From the perspective of individual employees, bootleg innovation may benefit their individual performance. Bootleg innovation is the process of employee learning, which can help employees to accumulate knowledge, help employees to explore the unknown field, and make it possible for employees to put forward innovative ideas and improve innovative performance. Huang Wei (2017) studied the positive impact of bootleg innovation on individual innovation performance, and the higher the creativity and status of employees, the greater the positive impact of bootleg innovation on employee innovation performance [3]. Li Xianmiao (2019) also recognized the positive effect of bootleg innovation on employees. He believed that bootleg innovation would stimulate employees'

creativity, while leaders' developmental feedback and ignoring behavior would strengthen this promotion effect, and leaders' obstructive feedback would weaken this promotion effect [42].

However, bootleg innovation may also have a negative impact on employees' subsequent innovation behavior. When employees carry out innovation activities in a way that goes against leaders' orders, leaders may feel that their status is threatened, which will lead to main management inhibition, which is not conducive to inspiring employees' innovative ideas in future work [4]. Wang Yanzi (2020) also recognizes the double-edged sword effect of bootleg innovation. He believes that bootleg innovation can give full play to employees' creativity, induce organizational change, obtain a high sense of accomplishment, improve work happiness, and enhance individual innovation performance. However, bootleg innovation of employees

Innovative behavior may also be regarded as a troublemaker by leaders and colleagues, leading to alienation and rejection of colleagues, which is not conducive to the innovative performance of employees [5]. Shukla (2020) believes that bootleg innovation can promote organizational innovation performance from a positive perspective, while it may lead to resource waste and deterioration of member relations from a negative perspective. Employees' personal opinion selection and social skills, team network structure quality, team atmosphere, organizational structure and external environment uncertainty will all have an impact on the results of bootleg innovation [22].

From these studies, it can be seen that employees' bootleg innovation behaviors are not necessarily successful. Zhao Bin (2019) studied the factors that can effectively transform employees' bootleg innovation behaviors into innovation performance, requiring employees to have sufficient personal resources, including information capital and psychological capital, and the support of paradoxical leadership and colleagues [43].

5.2. Organizational level

At the organizational level, bootleg innovation may have an impact on the innovation outcomes of the organization. According to Wu Yingxuan (2018), resistant innovation can promote the team's innovation performance. The higher the team's voice behavior level and work autonomy, the stronger the effect of resistant innovation on the team's innovation performance [10]. Bootleg innovation can increase the number of team creativity, improve the probability of innovation success, accumulate experience for the organization's innovation activities, and help improve the organization's innovation ability. In addition, the more relaxed the working environment, the more the bootleg innovation can promote the organization's innovation output [44]. Compared with formal innovation, bootleg innovation is not restricted by organizational norms, employees will bear less psychological pressure, and the number and diversity of innovative ideas will be higher. Therefore, compared with formal innovation, the innovative results of bootleg innovation are more novel [37]. Augsdorfer 2005 believes that leaders do not need to worry that the results of bootleg innovation conflict with organizational strategies. Employees' innovative ideas are often affected by organizational processes and strategies and are associated with organizational knowledge base. Bootleg innovation has the characteristics of path dependence, so the results of innovation are often conducive to organizational development [45].

But bootleg innovation may also have a negative impact on the organization. Cui Zhisong (2020) proposed that there is an inverted U-shaped relationship between employees' constructive deviant behavior and team performance. He believed that employees' constructive deviant behavior is conducive to promoting organizational change and making up for team knowledge. However, if employees' constructive deviant behavior is too much, it may lead to information redundancy, make team members ignore organizational norms, and increase management costs. On the contrary, it is detrimental to the improvement of organizational performance [46].

6. Future research prospects

At present, a large number of scholars have studied the formation factors and effects of bootleg innovation, but through the review of previous studies, it is found that there are still some deficiencies in the future research on bootleg innovation.

First, there is no consensus on the connotation and measurement of bootleg innovation, and there is a lack of measurement of the comprehensive perspective of bootleg innovation. According to the two classifications of the connotation of bootleg innovation, its measurement is also divided into two angles: concealment and resistance, and there is a lack of measurement methods to integrate the two.

Secondly, the influence factors of bootleg innovation behavior are studied deeply. At present, scholars mainly explore the formation of bootleg innovation behavior from the three aspects of individuals, leaders and organizations, and can also deeply explore the influence of other factors, such as environmental factors, and further explore its boundary conditions. In addition, they can also explore whether there are differences in the formation process of bootleg innovation in different cultural contexts.

Third, expand the research on the effect of bootleg innovation behavior. Most of the current studies explore the impact of bootleg innovation from the perspective of innovation performance, and can also consider the impact of bootleg innovation on organizational culture construction, organizational innovation climate and other variables. The double-edged sword effect of bootleg innovation has gradually attracted the attention of scholars. Although most studies focus on the positive results of bootleg innovation, some scholars believe that bootleg innovation has negative effects, and it is still necessary to explore which situational factors can give full play to the positive role of bootleg innovation.

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