Review of Employee Innovation Behavior Research and Prospects

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Abstract: Individual employee innovation is the cornerstone of an organization’s innovation, and all innovative activities of an organization are inseparable from the innovative behavior of employees. This paper retrieves the literature on employee innovation behavior published in SSCI journals between 2013 and 2022, and analyses and compares the overall number of published literature and journal sources. Meanwhile, CiteSpace visualization software was used to visualize and analyze the keywords of the literature, discover the current research hotspot focus and development trend, synthesize the hot topics of employee innovation research, and propose feasible suggestions for future research.

Keywords: literature review, employee innovation behavior, visualization analysis, CiteSpace

1. Introduction

Since the 1980s, science and technology have become important tools for economic gain, which requires companies to continuously innovate to survive in a turbulent market environment. Today, the COVID-19 pandemic continues to threaten human life and has led to organizational management issues on a global scale. The boom in science and technology requires companies to have the ability to continuously innovate to ensure that organizations meet challenges and seize opportunities in an uncertain environment. As a result, most organizations pursue innovation to maintain a competitive advantage and keep the organization sustainable. The subject of innovation can be divided into three levels: individual, team, and organization, where individual innovation is the source of innovation at all levels[1]. The existence of a group of proactive and innovative employees in the organization is one of the key elements for the sustainable development of contemporary enterprises. The creativity of employees is an important condition for organizational innovation, and the final externalized innovative behavior is the cornerstone of organizational innovation.[2]. Therefore, the study of employee innovation is a hot topic of research in organizational behavior.

The concept of employee innovative behavior is to some extent related to employee creativity, which refers to the ability to generate new ideas in the organization that are different from traditional thinking, novel, and of high value, including new products, services, manufacturing methods, and management processes that enable the organization to grow.[3]. In addition to the generation of employee creative ideas, employee innovative behavior also requires that these new ideas are effectively used and successfully implemented in the workplace.[1, 3]. Individual innovative behavior starts with problem identification, corresponds to the generation of new ideas and innovative solutions, and receives external support, and finally, the ideas are successfully applied in the organization to achieve "productization" and "institutionalization".[4] The idea is then successfully applied in the organization to "productize" and "institutionalize" it. Creative ideas are not always new and untouched by others, but can also be used in other situations and applied to the current one. Employee innovation is the act of generating and using new ideas within an organization to improve productivity.

Employee innovation behavior, as an important intangible resource in corporate organizations, can eventually be integrated and formed into organizational innovation outcomes, and therefore employee innovation behavior has been widely studied. Scholars conducting related research have continuously introduced and borrowed theories from different fields, providing diverse options for the study of employee innovative behavior, such as social exchange theory, self-determination theory, social cognitive theory, and resource conservation theory. At the same time, different research methods have been used to verify and analyze the antecedent variables and the results of the role of each dimension of employee innovative behavior, and to promote the improvement and development of theories.

In the context of the current era, individual innovative behavior is the smallest unit of innovation that
can promote individual and organizational development. To clarify the dynamic development trend of employee innovation behavior research, this paper uses the bibliometric method to select the literature related to employee innovation behavior in the ten years of 2013-2022, interpret the basic situation of literature publication, and use CiteSpace software to visualize and analyze the keywords to explore the hot directions of employee innovation behavior in this field in terms of research content. Based on having a clear understanding of the existing research results on employee innovation behavior, we identify the existing research omissions or deficiencies and provide ideas and references for future research directions.

2. The study object and analysis method

2.1. Study Object

The literature was retrieved from the Web of Science database, the SSCI journals in the core collection were selected, and the search condition was ”(TS=(employee innovative behavior)” with the time interval of 2013-2022, and the number of literature retrieved was 1168. Some of the literature obtained from the direct search did not meet the requirements of the study, and the original sample was screened for the accuracy of the subsequent analysis. Conference proceedings, materials, book chapters, and other documents that did not belong to the research category were screened out, and the final number of documents obtained was 1155.

2.2. Research Methodology

In this paper, we chose to use the bibliometric method to analyze the published literature on employee innovation behavior in the last decade, and analyze the trend of employee innovation research in four parts: annual distribution of literature, literature sources, research hotspots, and research content. The first two parts serve as the basic situation to analyze the number of publications and journal sources of literature. The latter two parts sample the visual analysis of papers published in journals through CiteSpace software. The imported literature data are subjected to keyword co-occurrence analysis to show the highlighted words in the last ten years of employee innovation behavior research, based on which the keywords are analyzed by co-word clustering. The intuitive image and numerical display can reveal the changes of the alliance in the hotspots and research directions in the last decade, etc., and accurately grasp the research development direction of employee innovation in the last decade.

3. Bibliometric analysis

3.1. Trend of issuing documents

As shown in the Figure 1, from an overall perspective, foreign research on employee innovation behavior has shown an upward trend in the last decade, specifically, foreign literature has risen in small fluctuations between 2013-2018, the first six years are in a state of slight fluctuations at home and abroad, and the number of literature is small; to 2018-2022 the attention to employee innovation behavior has increased, and the number of literature published has skyrocketed in a straight leap, with the number in
2022 being five times that of a decade ago. It is clear that due to changes in organizational development requirements and work scenarios in recent years, the need for practice has catalyzed scholars' enthusiasm for theoretical research and a significant increase in attention to employee innovative behavior.

3.2. Distribution of published journals

Table 1: Ranking of journals by the number of publications

<table>
<thead>
<tr>
<th>Journal Name</th>
<th>Number of articles</th>
<th>Percentage of</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONTIERS IN PSYCHOLOGY</td>
<td>95</td>
<td>8.23%</td>
</tr>
<tr>
<td>SUSTAINABILITY</td>
<td>68</td>
<td>5.89%</td>
</tr>
<tr>
<td>EUROPEAN JOURNAL OF INNOVATION MANAGEMENT</td>
<td>38</td>
<td>3.29%</td>
</tr>
<tr>
<td>PERSONNEL REVIEW</td>
<td>37</td>
<td>3.20%</td>
</tr>
<tr>
<td>CREATIVITY AND INNOVATION MANAGEMENT</td>
<td>29</td>
<td>2.51%</td>
</tr>
</tbody>
</table>

As shown in Table 1, these are the top five journals published on the topic of employee innovation behavior in the past ten years. According to the nature of the journal, the subject is mainly in the field of psychology and innovation management, indicating that as an individual behavior, employee innovation should be analyzed more from the individual motivating factors to form the causes of innovation behavior, the individual level of psychological activity is worth studying in this field. At the same time, the implementation of innovative activities by individual employees needs to be effectively managed, and management journals will pay attention to employee innovation. From the point of view of the number and proportion of published articles, the number of published articles in journals is relatively low, and the sources of published articles are more and more dispersed, which indicates that the research on employee innovation involves a wide range and penetrates into all aspects of employee innovation.

4. Employee innovation research hotspots and trends

4.1. Literature strong keywords

As shown in Figure 2, the foreign literature outputs 14 strong keywords. Specifically, in 2013, "work environment", "innovative behavior" and "prediction" are highlighted, among which "innovative behavior" lasted for five years, emphasizing the impact of the work environment; in 2014, "perception of fairness", "productivity", "employee creativity The five highlighted terms "perception of fairness", "productivity", "employee creativity", "production innovation" and "knowledge management" appeared in 2014 and lasted until the end of 2018, during which the main focus was on the relationship between individual employee factors and employee innovation. In 2015-2017, "situational factors" and "orientation" were strong keywords, and then "R&D" and "intermediation" were introduced. In 2015-
In 2017, "situational factors" and "orientation" were strong keywords, and then "R&D" and "intermediation" were introduced to consider employee innovation behaviors in the broader context; in the past two years, "team" and "employee suggestion" have become hot topics, with employee innovation and team influencing each other, and suggestion behaviors further promoting team or organizational innovation.

4.2. Keyword Knowledge Graph

As shown in the Figure 3, the keyword knowledge map of foreign countries in the past decade, the keyword frequency is at a more moderate level. The research hotspots are mainly the analysis of the factors influencing employees' innovative behavior, which can be divided into several levels. Among them, individual factors dominate, and keywords such as employee creativity, perception, intrinsic motivation, self-creative efficacy, and knowledge sharing have been the focus of research in recent years. More considering leadership factors, such as transformational leadership, the relationship between leadership and members' innovative behavior is explained through social exchange and leader-member exchange theories. In addition to the traditional empirical analysis, new meta-analytic research methods have been added to the research methodology, i.e., testing research hypotheses through a large body of literature.

4.3. Cluster analysis

As shown in the Figure 4, the keyword co-occurrences of the literature were clustered, and divided into nine clustering regions according to the frequency and degree of association of keywords. Transgressive innovation in the clustering phase in China and innovative work behavior abroad belong to the branch of employee innovative behavior. Removing the search keywords, the remaining regions are reclassified and focused into two major categories according to the current research hotspots: influencing factors and role consequences of employee innovative behavior. Among them, the influencing factors atmosphere individual, organizational, and job characteristics levels, while the role consequences are divided into individual and organizational levels.
4.3.1. Influencing factors

4.3.1.1. Individual factor level

Employee innovation behavior as an individual self-initiated action and intra-individual factors are the direct variables that influence employee behavior and have been widely studied. Employees trigger employees intrinsic motivation to realize their value, which is then externalized into behavior. And the individual factors of employees are divided into two kinds: one kind of employees initiate innovative behavior based on their characteristics; the other kind of employees' innovative behavior is due to their mood swings and attitude perceptions.

Among them, individual traits of employees include proactive personality, personality traits, and creativity. Employees with proactive personalities are found to be more inclined to share knowledge in the organization, positively influence individual innovative behavior, and can moderate the negative effects of hindering stress on employees' innovative behavior[5]. In terms of the traits employees possess, high emotional intelligence traits have a direct relationship with employees' innovative behavior[6]. The relationship between high emotional intelligence and innovative behavior is direct. When employees have a high level of creativity themselves, they can be stimulated in the organization and efficiently transformed into innovative behaviors[7].

From the perspective of employees' emotions and cognition, the factors that influence employees' innovation include work engagement, self-efficacy, and psychological empowerment. Employees' work attitude determines the degree of individual commitment to work, and the deeper the employee's commitment to work, the more willing he or she is to use his or her talents, which leads to individual innovation to achieve work goals. The deeper the employee's commitment to work, the more willing he or she will be to use his or her talents, which will lead to individual innovation to achieve work goals. The employee's sense of accomplishment in innovation will influence whether to choose innovation or not and when the employee has high creative self-efficacy, it will positively influence the employee's innovation behavior[9]. The employee's sense of creative self-efficacy positively influences the employee's innovative behavior. Psychological empowerment is a positive psychological process of an individual's perception of external power, motivation, and role orientation of work. When individuals have the corresponding perception of psychological empowerment, they will actively construct their work roles, explore the hidden values, make innovation their internal pursuit, and increase their innovative behaviors[10]. This leads to innovation as an intrinsic pursuit and increases innovative behavior. Based on social information processing theory, the emotional commitment generated by employees' identification with the organization's goals and values promotes employees' innovative activities by enhancing them. Employees with high organizational self-esteem are confident in their abilities and perceive their value and importance in the organization, are more willing to take risks, combine their personal goals with organizational goals, and still take risks to engage in innovative activities and behaviors that benefit the organization[11]. The changes in the external environment affect employees' organizational self-esteem, such as negative gossip in the workplace, which reduces organizational self-esteem and thus negatively affects employees' innovative behavior[12]. Work prosperity, as a psychological state in which individuals experience learning and vitality at work, is influenced by workplace spirit, etc. Employees adjust their psychological activities, embedding individuals in work situations to promote employee innovation, and when employee work prosperity is weakened, it negatively affects employee innovation[13].

4.3.1.2. Organizational level factors

External factors act directly on employees' psychological perceptions and thus influence their organizational-elevational level factors influence employee innovation behavior through direct exposure to objective or subjective events in the employee's organizational environment and through internalization. Organizational-level factors have direct and indirect effects on employee innovation behavior and have been studied in depth by previous authors, which can be specifically classified into three categories: leadership, organizational climate, and organizational management.

Leaders, as the direct superiors of employees, have been studied in numerous empirical studies to show that their leadership style has a significant impact on employees' innovative behavior. Inclusive leadership enhances employees' perceived organizational support and thus stimulates innovative behavior[14]. Benevolent leadership, on the other hand, positively influences employees' innovative behavior by enhancing their perception of insider status, strengthening their identification with the organization, and enhancing the exchange relationship between employees and their leaders[15]. In recent years the impact of transformational leadership on employee innovative behavior has been emphasized in a volatile environment, and research has found that transformational leadership promotes employee
work-shaping behavior and thus effectively affects innovative behavior\(^{16}\).

Organizational climate is the implicit presence in an organization that can be felt by individuals in the organization, leading to mood swings, changes in the state of mind, and behavioral choices of members. Studies have shown that trust, communication, and a fair climate significantly influence employees' implicit knowledge-sharing behavior and enhance their innovation output, while good communication and emotional climate can directly influence employees' innovation. Innovation climate can be positively related to employees' innovation behavior indirectly through their enthusiasm for invention. When the organization has a strong proactive climate, it will enhance the relationship between innovation climate and invention enthusiasm, and the relationship between invention enthusiasm and employees' innovation behavior will be enhanced with the adventurous climate, and the interaction of multiple organizational environments will have an effect on employees' innovation behavior\(^{17}\).

In addition, to continuously promote employee innovation, the organization conducts effective management to deliver direct messages to employees and promote employee innovation. When human resource management and management training with incentive compensation systems and training can stimulate the intrinsic motivation of employees to apply their previous work experience to the current work to produce innovative behavior\(^{18}\). A process-based approach to human resource management in the digital era finds that formal performance evaluations are more likely to reduce the perception that performance evaluations promote innovation and creativity at work for individuals than informal feedback. In addition, we found that quantitative outcomes were more likely to positively influence employee innovative behavior when employee-perceived performance assessments focused on achieving pre-defined outcomes than assessments that focused on employees' demonstrated pre-defined skills to perform their jobs. However, performance evaluations that focused on employees' development of new competencies had a stronger positive impact than outcome-oriented evaluations\(^{19}\).

### 4.3.1.3. Work characteristic factors

Individuals perceive factors that facilitate or hinder the performance of behavior in the work itself and thus perceive how easy or difficult it is to perform a behavior. Factors related to work characteristics include work complexity, work autonomy, and telecommuting. Employees' perception of work complexity affects their psychological empowerment and thus determines the degree of individual innovation\(^{20}\). Employees with high job autonomy can determine the pace, sequence, and degree of approach to completing tasks, which directly or indirectly affects their innovative work behavior through work engagement\(^{21}\). Telecommuting is a product of employees leaving the fixed office in the network era due to the objective environment and the use of smart devices. The impact of telecommuting on employees is two-sided, on the one hand, telecommuting can improve employees' work performance\(^{22}\) On the other hand, the information asymmetry of online work makes it difficult for employees to feel supported by the organization, which greatly reduces their willingness to innovate\(^{23}\). On the other hand, the information asymmetry of the online office makes it difficult for employees to feel supported by the organization, which greatly reduces the willingness to innovate.

### 4.3.2. The results of the role of employees' innovative behavior

#### 4.3.2.1. Individual level

The individual-level outcomes of employees' innovative behaviors mainly include workplace well-being, individual performance, and behavioral tendencies, among which innovative performance as a direct outcome is studied most frequently. Based on social comparison theory and social exchange theory, employee implementation of innovative behavior is directly and positively related to workplace well-being, while employee innovative behavior indirectly and positively affects workplace well-being through leadership support for innovation\(^{24}\). The quality of the relationship between leaders and employees may affect employees' recognition of their innovative work behaviors. From a social cognitive perspective, when employees have high-quality leader-member exchange relationships, they receive more favorable performance ratings by engaging in innovative work behaviors\(^{25}\). Numerous studies have demonstrated that employees' innovative behavior is significantly and positively related to role job performance, but employee innovation will not always be a positive outcome. Employee innovation is an extra-role behavior that is positively correlated with relational conflict\(^{26}\).

#### 4.3.2.2. Organizational level

The results of the role of employee innovation behavior at the organizational level include mainly organizational innovation performance and product innovation. Employees in the service industry found that the most important factor affecting service innovation performance is the level of individual
employee innovation, and supporting their employee innovation and reflecting their innovative behavior in the services provided is important for improving the service innovation performance of the company [27]. Employee innovation behavior is a key factor in innovation and mediates the link between human resource management and innovation, the adoption of high-performance work systems is positively associated with employee innovation behavior, and employee innovation behavior promotes product innovation [28].

5. Conclusion and Future Prospects

5.1. Research findings

In terms of the number of literature published, the number remains stable in the first six years, while showing a rapid rise in the last four years. As the research on employee innovation deepens, the research follows the changing situation to explore the innovation points of employee innovation research, and the relevant papers are published with high enthusiasm.

In terms of literature sources, the top five journals are all involved in the category of innovation management, and the most published journals for employee innovation belong to psychology journals the study places employee innovation in the field of psychology for research.

In terms of research content, it focuses on the antecedent variables and consequences of employees' innovative behaviors and examines various aspects involved in employee innovation from multiple levels in depth. First, in studying the factors influencing employees' innovative behaviors, the individual level mainly includes individual employee traits and employee psychological perceptions; the organizational level research mainly includes leadership style, organizational climate, and organizational management; and job characteristics are the effects of some changes that occur in the job itself in new scenarios. Secondly, innovative behaviors can bring positive and negative effects on individuals and organizations. The literature focuses more on the positive effects of innovative behaviors for individuals and organizations, promoting individual employee growth and increasing organizational value, etc. Finally, recent scholars put employee innovation into groups and study the antecedents and consequences of employee innovation from a group perspective.

5.2. Future research outlook

Employee innovation research has developed to become the focus of academic research, and the research content and results have been enriched. According to the above, employee innovation research studies can be expanded in the following aspects in the future.

5.2.1. Deepen the study of the mechanism of the role of employee innovation behavior

In the process of visual analysis of the literature, the study concentrates on the antecedent variables and the results of the role of employee innovation. Among them, the research on antecedents mainly focuses on individual-level and organizational-level factors, while the research on the changes in the external environment of the organization is relatively lacking, and future research needs to explore more carefully the influence of macro factors such as social environment and organizational culture on employees' transgressive innovative behaviors. Employee innovation behavior is a positive behavior, and most of the research explores the positive influencing factors, but less research on the negative influencing factors. Future research needs to further explore the motivating and inhibiting factors on employee innovation behavior. At present, the outcome variables of employee innovation behavior are focused on the individual level, and the related studies focus more on the positive impact of innovation and less on the possible negative impact of various types of innovation behaviors. Future research can further deepen the research on outcome variables and further explore the various moderating variables and the mechanism of power variation.

5.2.2. Consider situational factors and implement cross-national type research

Current research on employee innovation is based on employee behavior in developed countries in the West, which has received attention from scholars in various countries through continuous in-depth research. Developing countries and developed countries show significant differences in organizational cultures, such as Chinese collectivism and Confucianism, which make the antecedents and consequences of employees' innovative behavior different from those of foreign employees to a certain extent. At the same time, developing countries are in the midst of dynamic development and are more likely to see the
emergence of new products, such as platform enterprises, whose employees are less connected to the organization and have great autonomy in their work. The research results will be more relevant to management practices in various economies.

5.2.3. Expanding research methods and diversifying data sources

The research object of employee innovation behavior is focused on employees, and to quantify the innovation behavior, most of the current research on employee innovation uses the questionnaire survey method for empirical analysis, which is a single way to collect data. Therefore, in the future, data such as text and publication-related data can be selected as data sources and combined with a questionnaire survey to verify and enhance the robustness of the conclusions. At the same time, the current method mostly uses empirical research methods, although meta-analysis has been used recently and research methods can be further expanded, and future research can adopt experimental methods and other in-depth research on employee innovation.

References

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