

Research on the Impact Mechanism of Organizational-Based Psychological Ownership on the Intelligent Transformation of Manufacturing Enterprises: Based on the Perspective of Technological Change

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Abstract: The integration and development of next-generation information technology and manufacturing technology have made intelligent transformation an important driving force for the upgrading of manufacturing enterprises. Based on the perspective of technological change, this article sorts out the evolution process of technological change and the intelligent development of manufacturing enterprises from the business level and the management level, respectively. On this basis, it analyzes the formation path of organizational-based psychological ownership in the context of change in detail. Furthermore, the influence and mechanism of the psychological ownership dimension of different organizations on the individual level and the organizational level of the intelligent transformation of manufacturing enterprises are analyzed.

Keywords: technological change, psychological ownership, intelligence, influence mechanism

Introduction

In recent years, with the gestation and development of the technological revolution and industrial transformation centered on next-generation information technologies such as big data, cloud computing, Internet of Things, and AI, information technology has gradually merged with manufacturing technology, which has promoted the breakthrough and wide application of intelligent manufacturing with Industry 4.0 as the core, and brought revolutionary changes to the full life cycle and optimized integration of products like R & D, design, manufacturing, sales and service in the manufacturing industry. The continuous emergence and expansion of new products, new formats and new models have triggered a fundamental change in the technology-economic paradigm and has greatly changed the resource base and element structure of the core competitiveness of manufacturing companies. Under this background, manufacturing companies have begun to use smarter technology applications (self-learning, adaptive, self-organizing) to change management models and business processes, and use modern manufacturing technology and intelligent manufacturing systems to improve equipment operation efficiency, increase the

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flexibility and intelligence of the manufacturing process and strengthen product innovation capabilities, through these methods to meet the development requirements of the new technology-economic paradigm.

Driven by the new technological changes brought about by “Industry 4.0”, manufacturing enterprises take information/technology element input as an important support, and with the help of the new generation of network information technology, the intelligent transformation of the organization is effectively promoted to be the core-driving force for the transformation and upgrading of manufacturing enterprises in the aspects of transaction methods, business models, organizational forms, development concepts, management systems and technological processes. However, it is not easy to implement and maintain the smooth implementation of change, which depends on the attitude of employees, the direct participants of the change, towards the change and their behavior in the change.^{1,2} The positive attitude and behavior of employees to the change are the initial and necessary conditions for the success of the change,³ on the contrary, the negative work attitude and behavior will hinder the success of the enterprise change.⁴ As a kind of virtual ownership,⁵ organizational-based psychological ownership can not only affect the attitude of enterprise employees but also promote the behavior of employees. Because it is more likely to affect employees’ attitudes, motivations, behaviors and work performance, it has become the key to the success of the intelligent transformation of manufacturing enterprises under the industry 4.0 trend.⁶

Organizational-based psychological ownership means that employees see the organization as a part of them, and have strong feelings and responsibilities towards the organization,^{7,8} thus motivate employees to take more actions that are beneficial to the organization.⁹ Dirks et al¹⁰ explained the supportive or resistive (negative) behavior by employees in the process of organizational change based on the positive and negative effects of psychological ownership. Rousseau and Shperling¹¹ analyzed that psychological ownership that is consistent with organizational goals will reduce employees’ psychological conflicts and thus facilitate the reform of enterprises. Wagner et al¹² believe that in the process of enterprise reform, the level of ownership awareness of organizational members will increase as the degree of participation in the change increases, thereby prompting themselves to adopt behaviors that are conducive to change. Wang and Chen¹³ pointed out that when an enterprise needs to be reformed

due to the external environment or new technologies, employees with a strong sense of organizational-based psychological ownership may feel psychological threats and interest threats, thus work hard to maintain the status quo and create difficulties for change. Gu¹⁴ believed that when employees recognize change autonomously, psychological ownership will promote organizational change; conversely, when employees face forced change, psychological ownership will hinder organizational change. Yu¹⁵ proposed that psychological ownership will make individuals resist changes, especially those reforms that are imposed, sudden, diminishing, and targeted at the targets of individual psychological ownership. Sheng and Chu¹⁶ believed that psychological ownership can explain the impact on employee behavior and job performance during organizational change. Avey et al¹⁷ believe that psychological ownership will cause individuals to have a strong sense of territory for the target, and individuals will resist in order to maintain their “territorial rights”, making organizational changes very difficult to implement. Lin¹⁸ found through empirical research that organizational change cognition has a significant negative impact on psychological ownership, and mentioned that when changes are frequent, unplanned, and employees believe that the changes are not good for themselves, it is more difficult for employees to form psychological ownership. Through empirical analysis, Zhu¹⁹ pointed out that for revolutionary organizational change, organizational-based psychological ownership has a more significant impact on employees’ behavioral stance in supporting change, but for progressive change, organizational-based psychological ownership has a more significant impact on resisting change. Ai and Liu²⁰ found in their research on family business that older employees with high psychological ownership may oppose organizational changes because they believe that the changes are a threat to their existing identities. Yuan²¹ believed that when organizational change activities were consistent with the psychological ownership of employees, it would be beneficial for employees to support the change; however, when organizational change activities are contrary to the psychological ownership of employees, it will lead to employees’ resistance and even destroy the change. Zhang et al²² found through empirical analysis that psychological ownership positively regulates the relationship between creativity efficacy and active change behavior, thereby inspiring capable employees to devote more energy to corporate change. Through the above analysis of some related research and opinions, it can be found that

psychological ownership, especially organizational-based psychological ownership, is considered to be one of the key factors affecting the success or failure of organizational change because of its stronger interpretation for the cognition and behavioral standpoint of employees on organizational change. However, most of these studies analyze the relationship between the psychological ownership of employees and their change response behavior in view of employees' change cognition, and pay less attention to the formation of organizational-based psychological ownership in the process of technological change and its impact on organizational change.

At this stage, the manufacturing industry is experiencing digital, networked, and intelligent technological changes, which has led to the transformation of intelligent transformation of enterprises. This process is inevitably affected by the individual emotions of employees and their attitudes, motivations and behaviors towards the intelligent transformation of the company. Therefore, we believe that in the context of intelligent transformation of technological evolution, clarifying the employee's organizational-based psychological ownership and its influence on the intelligent transformation of manufacturing enterprises is crucial to implement the intelligent reform successfully. Based on this view, our research aims to take the organizational-based psychological ownership as an important starting point for employees' choice of behavioral standpoint in the intelligent transformation practice of manufacturing enterprises, analyzes the formation of organizational-based psychological ownership in the process of strategic transformation of enterprises, and reveals its impact mechanism on the intelligent reform from the perspective of technological change.

We organize the rest of the article as follows. In the next section, we firstly elaborate on the connotation and composition of organizational-based psychological ownership, analyze in detail the technological change, the intelligent transformation of manufacturing enterprises and the formation of organizational-based psychological ownership in the context of change. Secondly, from the perspective of technological change, we focus on the analysis of the impact of different dimensions of organizational-based psychological ownership on the intelligent transformation of manufacturing enterprises and its mechanism. Thirdly, we summarize the research conclusions of the article, and put forward corresponding countermeasures and suggestions based on the conclusions. Finally, we analyze and

summarize the limitations of the research, and then make some recommendations for further research in the future.

The Formation of Organizational-Based Psychological Ownership in the Context of Intelligent Transformation – an Analysis from the Perspective of Technological Change

The Connotation and Structure of Organizational-Based Psychological Ownership

Psychological ownership is derived from the development of the legal ownership concept. Pierce et al²³ put forward the concept of psychological ownership on the theoretical basis of previous studies, believing that psychological ownership is an individual's sense that the target object or a part of the target object belongs to themselves, thus creating a sense of possession of the object; according to Furby,²⁴ sense of possession refers to people's feeling that a target object is "mine" or "ours", and sense of possession is the basis and core of psychological ownership.¹³

Mayhew²⁵ divided the psychological ownership in the organization into Job-based Psychological Ownership and Organization-based Psychological Ownership. Organizational-based psychological ownership is the expansion and application of psychological ownership in the field of management, that is, employees' sense of belonging and possession to the organization. Pierce et al²⁶ argued that psychological ownership stems from three basic types of needs, first, having a Place, a space that makes individuals feel comfortable and safe can create a sense of belonging, thereby establishing psychological ownership; second, Efficacy, the individual gains a sense of competence by influencing, controlling, and changing possessions to prove his own ability and life value; third, Self-identity, the connection between possession and "my" sense helps individuals recognize themselves. Meeting these three needs of employees is the main reason why organizations can make employees have psychological ownership. Organizational-based psychological ownership can make employees have a sense of identity and control of the organization, convince employees that they can rely on ability, resources, technology, etc., to achieve their goals, and then have a positive impact on personal work attitudes and behaviors.²⁷ Due to the differences between individuals and specific situations, the objective of

ownership also changes constantly,¹³ the goal of psychological ownership in an organization can be either the entire organization or a specific aspect of the organization such as the team, the position, the task, and the work itself.

From the above analysis, it can be seen that organizational-based psychological ownership is a multidimensional concept, which includes both promoting (“promotion-focused”) and defensive (“prevention-focused”) psychological ownership.¹⁷ Promoting psychological ownership emphasizes improvement and development, full of the spirit of adventure, often associated with pleasure, fun and other emotions, which is conducive to the positive attitude and behavior of employees; defensive psychological ownership emphasizes safety and stability, prefers risk avoidance, and is often associated with emotions such as tension and anxiety, which can lead to individuals defensive territory behaviors towards specific goals (including: things, duties, roles, etc.).²⁸ Territory behavior refers to the defensive psychology of individuals when they feel that their own target may be affected by external factors,²⁹ which leads to negative effects of employees, such as resistance, exclusion, and unwillingness to share.

Technological Changes and Intelligent Transformation of Manufacturing Enterprises

In recent years, led by next-generation information technology, the widespread penetration of new technologies such as new materials, new energy, and biology has driven a group of major technological changes in a range of fields. Based on the technological changes and their possible impact on economic development and industrial structure, this reform is a new round of industrial revolution led by the breakthrough application of information technologies such as Internet, cloud computing, big data and the Internet of Things, following the steam technological revolution marked by the improvement and widespread use of steam engine, the electric technology revolution marked by electrification and automated mass production line, and the information technology revolution marked by the application of information network technology, which has a profound impact on the manufacturing enterprise’s technical system, production methods, organizational forms, management models, and production relations, and has promoted the intelligent transformation of manufacturing enterprises.

In the face of the global economic paradigm change brought by the new industrial revolution and the continuous

development of scientific and technological innovation, the technology of manufacturing enterprises is also making continuous progress and improvement. This includes both embodied technical progress, such as new equipment, new materials, and new process applications, as well as disembodied Technical Progress, such as management technology upgrades.^{30,31} It can be seen that the intelligent transformation of manufacturing enterprises is a dynamic and multi-layered change process. In this process, manufacturing enterprises promote the transformation of their business and management methods and processes through the upgrading of original technologies or the introduction of new technologies, also eases the pressure of change brought about by the technological changes to the production, process, structure, management, and members of the enterprise. As business change and management method change in the process of intelligent transformation of manufacturing enterprises often occur in parallel, in order to further clarify the nature, process and results of intelligent transformation of manufacturing enterprises under the guidance of technological changes, this paper refers to the BMTC model constructed by Yang et al,³¹ namely, the technological change (TC) model of parallel business (B) and management technological (M) change, analyzes and discusses the technological change and the evolution of manufacturing enterprises to intelligence from two aspects: the business level (including manufacturing technology, production process and service mode) and the management level (including organizational structure, personnel composition and management system).

At the business level, corresponding to the four technological changes in the industrial revolution, manufacturing companies have also experienced four major changes in manufacturing technology, production processes, and service methods, namely: the era of mechanical manufacturing characterized by large-scale mechanized production, the era of electrification and automation characterized by large-scale mass production lines, the era of electronic information characterized by highly automated and flexible personalized production, and the era of intelligent manufacturing characterized by digitized, intelligent and personalized manufacturing. From the perspective of manufacturing technology, with the technological changes and evolution, especially the advancement of information technology, the development of artificial intelligence and so on, manufacturing technology is increasingly developing in the direction of intelligence, digitization and informatization. Driven by intelligent manufacturing (IM) based on

a new generation of information technology, more and more manufacturing companies are using intelligent manufacturing technology to intelligently transform and upgrade manufacturing technology, production equipment, etc., thereby promoting the development of high-end product technology, it also promotes the effective improvement of production efficiency and product efficiency of manufacturing enterprises at the same time. From the perspective of the production process, driven by technological progress, the manufacturing process of the enterprise has gone from

manual operation–mechanical production replacing manual labor–large-scale production of electric drive products–computer replacement of the human brain to form automated production–intelligent factory as the carrier of intelligent production.

In the process of intelligent development, by using intelligent manufacturing technology, manufacturing enterprises realize intelligent production process and effectively solve the problems of “quality” and “efficiency” in the production process through building intelligent manufacturing systems and networked distributed production facilities based on intelligent production lines, intelligent processes, intelligent sensor networks, etc. From the perspective of service methods, with the continuous development of technology, especially the wide application of information technology and changes in the market environment, consumers and enterprises are getting closer and closer, and services occupy an increasingly important position in the market. In the past, manufacturing companies only produced products based on existing technologies to meet market demand; and then began to provide users with some simple product-related services; later, they paid more and more attention to the improvement of product service quality, and gradually took consumers as the center, which reflects the transformation of enterprises from production-oriented to “production + service” or service-oriented. Using Internet, cloud computing, Internet of Things, big data and other technologies, manufacturing companies provide users with real-time intelligent product value-added and “one-to-one” personalized services such as remote fault diagnosis, remote operation and maintenance.

At the management level, with the intensification of market competition and changes in the paradigm of technology applications, the management practices of manufacturing enterprises have been constantly changing, the

new round of scientific and technological revolution led by information technology has become an important driving force for the development of manufacturing to digitalization, networking and intelligence, which greatly promoted the transformation of manufacturing enterprises’ management. From the perspective of organizational structure, manufacturing enterprises have experienced the transformation of “U-shaped/linear functional–M-shaped/division–super division–matrix–multidimensional”,³² with the widespread penetration of information technology, under the trend of interconnection and intelligence of all things, manufacturing companies use interconnection, intelligence and other technologies to reshape their organizational structure and develop them in the direction of networking, flattening, virtualization and flexibility. From the perspective of personnel composition, the development of science and technology, especially the in-depth application of information network technology in modern enterprise management and the gradual maturity of information management technology, technology is developing rapidly, especially the continuous application of information network technology in modern enterprise management, and Information management technology is also maturing, the information system facilitates the horizontal (inter-departmental) and vertical (inter-management) information exchange and communication of the enterprise, shortens the information transmission and circulation time, reduces the level of organizational management and the number of employees needed by the enterprise, the efficiency of the organizational structure has thus been improved. In order to adapt to new technological changes like the Internet, artificial intelligence, and big data, manufacturing companies need to redefine employee capabilities such as innovation, collaboration, and decision-making capabilities, more and more enterprise employees need to collaborate effectively with virtual resources (robots, etc.), and the new manufacturing process and model require the enterprise to re-arrange the employees rationally, then build a new employee ecosystem composed of people, robots, artificial intelligence and so on. From the perspective of the management system, a reasonable management system can make the organization achieve organizational goals more clearly and systematically. For a long time, the value and function of a series of management systems such as quality management, environmental management, occupational health and safety management and risk management which are generally established and implemented by manufacturing enterprises cannot be denied. In the

environment of accelerated penetration of new-generation information technology and manufacturing technology, management technology, service technology, etc., informatization has become an indispensable endogenous factor for the development of manufacturing enterprises, promoting computer technology, data processing, information management, Internet, AI and other technologies extend and expand to the original management system, the combination of each other further drives the formation and development of a new generation of intelligent management system covering all-round production processes, data mining, and intelligent decision-making and other comprehensive management.

It can be seen from the above analysis that under the environment of technological change, the manufacturing technology, production processes, service methods, organizational structure and management system of manufacturing enterprises have also evolved with technological progress. At this stage, with the continuous application of emerging Internet technologies like mobile Internet, IoT, big data, cloud computing, etc., intelligent transformation has become the core driving force for the development of manufacturing enterprises, which promotes the upgrading of manufacturing enterprises towards the direction of digitalization, networking and intelligence.³³

The Formation of Organizational-Based Psychological Ownership in the Changing Situation

Pierce et al²⁶ believed that there are three ways to form psychological ownership in the analysis. First, the control of the object, which will make people feel the possession of the target, and the more control, the stronger the sense of ownership; second, the intimate understanding of the target, the more information about the target that the individual has, the deeper the understanding of the target, the closer the relationship between the individual and the target, and the stronger the feeling of the target; third, personal investment, the greater the individual's investment in a target, such as energy, time, effort, and attention, the easier it is for the individual to integrate with the target and share the same, thereby creating a sense of possession of the target.

The complex and ever-changing external environment constantly breaks the balance between internal and external elements of the organization, often causing the organization to demand changes. Companies implement changes to

respond to changes in internal and external environments, improve and enhance organizational effectiveness to form more competitive organizational capabilities.¹⁶ Dirks et al¹⁰ advocated that the ways of organizational change can be divided into active and passive changes, gradual and radical changes, and additive and subtractive changes, etc. When the change is active, employees will have a stronger sense of control over the change, active participation will allow employees to understand the change in detail and invest more time, energy, effort, etc., so as to form organizational-based psychological ownership faster; when the change is carried out passively, it may arouse employees' resentment and create resistance to the change, thus preventing the formation of organizational-based psychological ownership. Gradual organizational changes are more easily accepted by employees, while radical organizational changes will have a greater impact on employees "original perceptions, thereby affecting employees" sense of identity and belonging to the organization. Additive change can meet the needs of employees to have space, gain efficiency and self-identification to a certain extent; and subtractive change may cause individuals to lose more important things, resulting in a reduction in employee belonging. It can be seen that different reform methods have different effects on the formation of employees' psychological ownership, active, gradual and additive changes are not only conducive to the formation of organizational-based psychological ownership but also beneficial to establish promoting psychological ownership; passive, radical and subtractive changes are not conducive to the formation of employee psychological ownership, and it is easier to form defensive psychological ownership.

In addition, from the perspective of technological change, there are still many elements that can play a regulatory role in the formation of organizational-based psychological ownership in the context of change. First of all, organizational change often involves changes or even subversion of the organization's original model, state, structure, etc.; therefore, employees often feel confused and hesitant during the process of change. If managers can give employees clear instructions for change, and promptly feedback their suggestions for change, employees can get a clear understanding of their own work tasks and objectives, so as to have a stronger sense of control over work,³⁴ and then stimulate the generation of organizational-based psychological ownership of employees. Secondly, the flat organization structure enables employees to have more autonomy, so that employees can exert their talents and realize their own value while working, the

appropriate incentive mechanism can provide employees with a safe and comfortable working environment during the period of change, thereby enhancing their sense of belonging. It can be seen that an organization that adopts a flexible and flat organization form, authorizes employees, and sets a reasonable incentive mechanism is more conducive to the formation of employee organization-based psychological ownership. Third, organizations that shape the corporate culture of communication and learning are better able to establish employees' psychological ownership of the organization. This is because such a corporate culture can increase the interaction between employees, enhance mutual understanding and identification, thereby promoting the formation of harmonious interpersonal relationships, allowing employees to better unite in a period of change, and have a clear recognition of organizational goals know. Recognition of goals will motivate employees to increase their investment in goals and improve organizational-based psychological ownership.³⁵ Based on the above analysis, the formation paths of employees' organizational-based psychological ownership under different types of change situations can be shown in Figure 1.

The Influence and Mechanism of Organizational-Based Psychological Ownership on the Intelligent Transformation of Manufacturing Enterprises

Through the above analysis, it can be seen that organizational-based psychological ownership is a multi-dimensional concept. In the context of enterprise intelligent transformation led

by information s, employees' feelings of promoting or defensive psychological ownership based on their knowledge of the change will have different effects on enterprise intelligent change, which are specifically manifested in whether employees' attitudes and behaviors towards the enterprise's intelligent change support or promote (promoting psychological ownership) or oppose/block or even resist (defensive psychological ownership). Among them, the former helps guide employees to produce positive attitudes and behaviors, while the latter may cause some negative results due to changes that damage their territoriality, and this impact is not only reflected at the individual level of the employees but also at the organizational level of the enterprise. Specifically, the influence process and mechanism of employees' different organizational-based psychological ownership perceptions on enterprise intelligent transformation are shown in Figure 2.

The Influence and Mechanism of Promoting Psychological Ownership

As shown in Figure 2, based on the individual level of employees, first of all, the self-identity motivation generated by the promoting psychological ownership will make it easier for employees to try and accept new things, actively learn and apply emerging information technologies, and shape the corporate culture of unity, learning, and intelligence, thereby, the implementation and application of new technologies of intelligent manufacturing in enterprises during the intelligent transformation are accelerated, and then the intelligent transformation and innovation of manufacturing technologies, production methods, production processes and service methods of enterprises are promoted. Secondly,

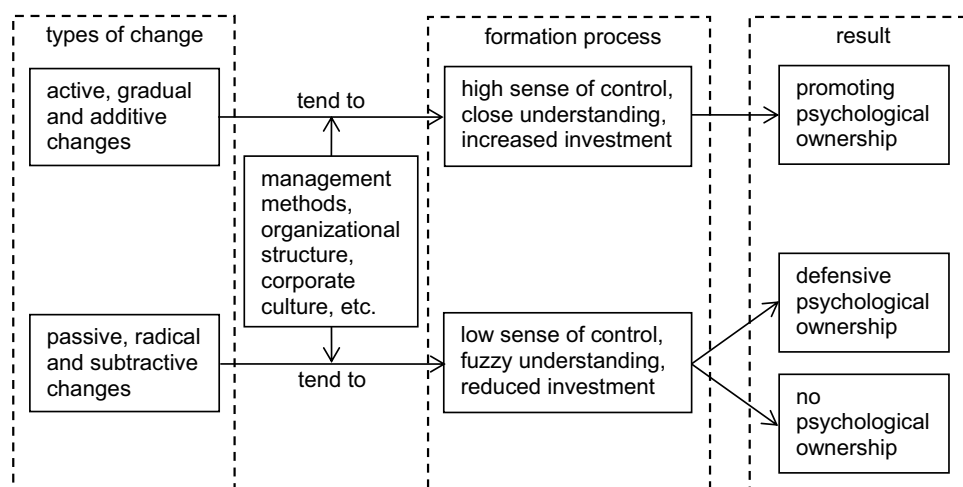


Figure 1 Formation paths of employees' organizational-based psychological ownership under different types of change situations.



Figure 2 The influence process and mechanism of different organizational-based psychological ownership on enterprise intelligent transformation.

promoting psychological ownership is conducive to improving employees' job satisfaction in the process of change,³⁶ increasing employees' understanding and identification of their work and gaining a sense of efficacy, and enhancing employees' sense of belonging and gain,³⁷ thus effectively inspiring individual employees' sense of identity and trust in the intelligent transformation, enabling the enterprise to further increase the investment in intelligent technology and equipment, optimize the management system and management process, then form a perfect and efficient intelligent management system. Thirdly, promoting psychological ownership can also be effective in promoting employees' sense of responsibility, which makes employees willing to sacrifice their personal interests for the organization when facing possible conflicts of interest in the process of enterprise intelligent transformation, thus contributing to the smooth realization of the transformation and upgrading goals of manufacturing companies. In addition, promoting organizational psychological ownership can also enable employees to more actively make positive behaviors that are conducive to change in the process of the enterprises' intelligent transformation, this not only can effectively save the cost of management in the enterprise, but the employees' active behavior will play a greater role in promoting the intelligent transformation of manufacturing enterprises than passive behavior.

Based on the organizational level of the company, as an important participant, implementer and bearer of organizational change, employees establish a promoting organizational-based psychological ownership, on the basis of showing some positive attitudes and behaviors conducive to corporate transformation at the individual

level, they have developed collective psychological ownership that considers the target to be "our". From the organizational level, collective psychological ownership can promote better information communication and sharing among employees, accelerate the speed of information circulation and feedback in the organization, as well as shorten the distance between levels; therefore, the organization structure of enterprises is more flattened and networked, and then meet the needs of intelligent development of enterprises. At the same time, collective psychological ownership also plays a role in promoting the creativity of the team. Through mutual communication and cooperation between employees, the learning atmosphere and enthusiasm of the team are increased, and the dissemination, sharing and transformation of various knowledge are accelerated, thereby improving the creativity of the team and supporting the intelligent transformation and upgrading of enterprises. Furthermore, collective psychological ownership at the organizational level can enhance employees' psychological security, allowing them to directly and frankly face their own problems and deal with the challenges brought about by the changes, so that employees can boldly try new methods without worrying about being punished for making mistakes, and constantly carry out active innovation and exploration for manufacturing enterprises' intelligent transformation and upgrading practices.

It can be seen from the above that promoting psychological ownership can support and promote the intelligent transformation of manufacturing enterprises through the positive attitude and supporting behavior of employees

on the individual level and the cooperation and learning among the members on the organizational level.

The Influence and Mechanism of Defensive Psychological Ownership

The intelligent transformation and upgrading of manufacturing enterprises is the change or even subversion of the original business model, business process and organizational structure of the organization, which is full of uncertainty. As a result, employees may have defensive psychological ownership to the enterprise changes. Based on the individual level of employees, defensive psychological ownership will make employees more inclined to avoid risks because they do not want to change what they are familiar with or possess. In turn, they oppose or even hinder the transformation of enterprises, such as reluctance to learn new smart technologies, not used to new organizational structures and management methods, which will lead to the mismatch between the abilities of employees and the needs of changes, making intelligent transformation difficult. Meanwhile, at the individual level, defensive psychological ownership induces individuals to produce defensive territorial behavior. The higher the defensive psychological ownership of employees, the stronger the responsibility burden and desire to protect their own possessions, which will cause employees to have a strong sense of stress and anxiety in the process of change, and once the implementation of the change has completely changed the target that the individual thinks belongs to him/her, it will further lead to the deterioration of employee self-consciousness. This is to say, when the intelligent transformation destroys the original state of the enterprise, it is easy to cause the employee's individual emotional instability, double pressure and low work efficiency, which is not conducive to the enterprise's intelligent transformation.

At the organizational level, for those employees who have a strong territorial awareness of the target due to defensive psychological ownership, in order to meet the needs of self-efficacy and self-esteem, they will be more inclined to take the action of hiding their own information or knowledge. Less communication and exchange with other members of the team, which makes the "resource reciprocity", "skill reciprocity" and other reciprocal behaviors in the team greatly reduced. Consequently, on the one hand, it hinders the transfer and sharing of information and knowledge among employees, teams, and departments

within the organization, which makes it difficult for companies to build corresponding intelligent manufacturing technical capabilities due to the lack of good interaction within the organization in the process of intelligent transformation and upgrading, besides, some problems such as difficulty in sharing knowledge and skills, lagging information transmission, and untimely feedback are also not conducive to the flat development of the organizational structure, nor can they meet the actual needs of intelligent management of manufacturing companies. On the other hand, the alienation of employee relations and the widening of interpersonal distances make it uneasy for information, knowledge and skills among employees to complement and cooperate, communication and coordination between teams and departments are also difficult, which against the formation of an intelligent transformation and upgrading organizational atmosphere. Moreover, individual goals and organizational intelligent change goals may not be completely consistent, employees with strong defensive psychological ownership will make some strong exclusions or even resist behaviors to the enterprise's intelligent change in order to avoid damage to their own interests, this may cause distortion of organizational reform behavior, reduce the cohesion of the enterprise, and make it difficult to promote the intelligent transformation and upgrading of enterprises.

As can be seen, defensive psychological ownership hinders the intelligent transformation of manufacturing enterprises by the negative attitudes and repulsion/resistance behaviors generated at the individual level and the reduction of communication and interaction at organizational level.

Furthermore, in the context of enterprise intelligent change, in addition to the formation of promoting or defensive psychological ownership, employees may not be able to establish organizational-based psychological ownership due to the instability of various factors in the process of intelligent transformation of enterprises. If employees do not form the corresponding psychological ownership of the organization, they will not have the necessary sense of responsibility and belonging to the organization, nor will they have a clear understanding of the goals of organizational change, so they may have a casual or refuse attitude towards the intelligent transformation of the enterprise. For the former, employees will not care about the success of the company's transformation, so they lack the motivation to learn new knowledge, new technologies, and new skills to deal with the intelligent transformation; for the latter, its

role is similar to defensive psychological ownership, employees will be more inclined to settle in the status quo and oppose or even hinder the intelligent change of the enterprise. Additionally, the lack of psychological ownership will also affect the degree of communication and cooperation of the members of the organization, and further affect the smooth progress of the enterprise's intelligent transformation.

Conclusion and Suggestion

The new industry and technological paradigm revolution led by breakthrough applications of information technology has promoted the continuous innovation and diffusion of intelligent, digital, and networked intelligent manufacturing technologies, technological changes, especially the breakthrough progress of information technology, have driven the transformation and upgrading of manufacturing enterprises towards intelligentization, which has led to a series of innovations and changes in production methods, management methods, and organizational structures. In this situation, the organizational-based psychological ownership formed by employees plays a very important role in the implementation and implementation of the enterprise's intelligent transformation. Based on the perspective of technological change, this paper studies the formation of employees' organizational-based psychological ownership under the changing situation and the impact of different organizational-based psychological ownership on the enterprise's intelligent transformation and its mechanism. Research shows:

1. Employee's organizational psychological ownership is a multi-dimensional concept. Under the impetus of technological changes, manufacturing enterprise business and management technology will also continue to evolve with technological development;
2. In the context of enterprise intelligent transformation brought about by the changes in information technology, the formation of employee organizational-based psychological ownership in different types of transformation (active, gradual or passive, radical) has different paths;
3. Different organizational psychological ownership will have different effects on the enterprise's intelligent transformation. Promoting psychological ownership can support and promote the intelligent transformation; defensive psychological ownership can hinder the intelligent transformation of enterprises; and

without establishing organizational-based psychological ownership, the influence on the enterprise's intelligent transformation is also mainly manifested as an obstacle.

Based on the effect of organizational-based psychological ownership on the intelligent transformation of enterprises driven by technological change, this paper further puts forward corresponding countermeasures and suggestions to establish organizational-based psychological ownership to promote the intelligent development of enterprises: (1) In the process of intelligent transformation, enterprises should make the change plan and information widely known and fully communicated by employees through incentives, training, authorization, and change of organizational structure (forming a "flat" organization), thus encouraging employees to establish organizational-based psychological ownership, especially promoting psychological ownership. By increasing the sense of belonging and responsibility of employees, employees and organizations are guaranteed to form a common goal and vision for change, thereby promoting employees to form a positive working attitude towards enterprise intelligent change, and to make more behaviors conducive to intelligent change. (2) From the formation path of employees' organizational-based psychological ownership in the context of change, we can find that their change attitudes and behaviors based on their knowledge of organizational change have two sides, namely positive and negative aspects. Therefore, in the implementation of intelligent transformation, enterprises cannot simply emphasize the positive impact of organizational-based psychological ownership, but also fully consider the negative impact. To this end, enterprises should actively intervene, strengthen two-way interaction, and communicate in a timely manner (such as giving a positive response), reduce employees' negative emotions, and increase employees' psychological attachment to the organization, thereby guiding employees to produce higher organizational psychological ownership of change, and initiatively avoids work attitudes and behaviors that are not conducive to the enterprise's intelligent change. (3) Different types of organizational changes will lead to differences in employee commitment to changes and their behavior in the implementation of changes, at the same time, different types of companies have different strength requirements for employee psychological ownership. Hence, when implementing intelligent transformation measures, enterprises should combine their own characteristics and adopt

corresponding transformation methods for different situations to reduce the resistance caused by the strong “territory awareness” of employees to the intelligent transformation of enterprises. Give full play to the positive role of promoting psychological ownership in the organizational-based psychological ownership dimension, and reduce the negative role of defensive psychological ownership dimension, thus helping companies successfully achieve the goal of intelligent transformation.

From the perspective of technological change, we analyze the formation process of employees’ psychological ownership based on the perception of different types of organizational changes, then reveals the action mechanism of different dimensions of organizational-based psychological ownership on the intelligent transformation of manufacturing enterprises driven by technological change, and put forward corresponding management suggestions accordingly. The research conclusions of this article have a positive significance on how to promote the development of enterprise intelligent transformation by promoting the positive effects of organizational-based psychological ownership. Although the research has reached meaningful conclusions, there are still some limitations: First, as a theoretical exploratory research, this article analyzes the impact of organizational-based psychological ownership on the intelligent transformation of manufacturing enterprises from the perspective of technological change, which needs to be tested empirically. Second, we explore the formation of organizational-based psychological ownership in the context of change, but mainly focus on the different impacts of different types of changes on the formation of employees’ organizational-based psychological ownership, while the analysis of other organizational change factors is lacking. Therefore, in follow-up research, on the one hand, empirical research can be carried out to further verify the mechanism of organizational-based psychological ownership on the intelligent transformation of manufacturing enterprises; on the other hand, other organizational change factors such as the intensity and depth of organizational change can be further introduced to conduct in-depth research on the formation of organizational-based psychological ownership of employees under various change factors and their interaction.

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