

Incentive Model Research on Independent Innovation of R&D Staff in Private Enterprises from the Perspective of "Internet +"

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Abstract

Under the background of "Internet +", the integration of social production and life has deepened and products have changed frequently. Private enterprises are facing more fierce technological competition. Strengthening technological R&D and innovation has become a priority for private enterprises to survive and develop. R&D personnel are vanguard of independent innovation of private enterprises, how to effectively encourage R&D personnel is of great significance to the development of private enterprises. According to the characteristics of private enterprises and the work characteristics and ability characteristics of R&D personnel under the background of "Internet +". This paper selects the degree of scientific research professionalization and market orientation of R&D personnel in private enterprises to construct four scenarios for R&D personnel's independent innovation. It was found that R&D personnel should be given different emphasis on incentives in different situations, and thus an incentive model for R&D personnel's independent innovation was established.

Keywords

Internet +, Private enterprise, R&D personnel, Independent innovation.

1. Introduction

As the country raises the "Internet +" to a strategic level, the Internet-based information technology has spread and applied to all areas of social production and life. The Internet has gradually transformed from the role of a tool to a leading factor in the industry [1]. With frequent product changes and accelerated upgrades, private enterprises are facing increasingly fierce technological competition. Conducting and strengthening R&D work has become the only way for many private enterprises. However, because most private enterprises have problems such as small scale and lack of funds, according to the analysis report on the important data of private economic development and private investment from January to June 2016, the most prominent difficulty faced by private enterprises is the rising labor cost. It accounts for 42.9%, and the tax burden is over 50%. It can be seen that the restriction of capital cost has become a key issue for enterprise development [2]. Unable to bear the high R&D costs, many private companies have made full use of the Internet platform, signed agreements with some university institutions, and built their own R&D project teams. After the formation of the R&D team, companies can further reduce R&D costs and improve R&D efficiency. It is necessary to increase the willingness and ability of R&D personnel to tap their potential so that they can be fully utilized. In this case, how to provide reasonable incentives to R&D personnel to make the best use of their talents has become the key for private enterprises to reduce R&D costs and conduct R&D efficiently.

Different from the institutionalized and standardized talent incentive system of state-owned enterprises, the measures adopted by most private enterprises in China when motivating R&D personnel overemphasize humanity and are more arbitrary, and do not fully consider the different characteristics of different R&D personnel. The excessive randomness and low

continuity of incentives for R&D personnel in private enterprises have directly caused management confusion, resulting in low enthusiasm for existing R&D personnel and low R&D efficiency. In the introduction of external R&D talents, they were too eager for quick success and short-term gains, failing to form a perfect talent training and incentive system. At the same time, the concept of "Internet +" affects the business model and organizational structure of private companies. Private companies have more and more Internet-based functional adjustments. The incentives and investment of R&D personnel are indispensable for private companies to enhance their competitiveness.

Therefore, under the broad vision of "Internet+", how to connect with the characteristics of private enterprises, effectively motivate the internal R&D personnel of private enterprises in our country, and improve the independent innovation capability of private enterprises has become a major concern of scholars.

2. Literature Review

At present, the research on independent innovation incentives of R&D personnel in domestic and foreign theoretical circles can be roughly divided into three viewpoints. One is the independent innovation incentives of R&D personnel based on human resource management. Sun Jinting et al. believe that the salary level of R&D personnel should be motivated according to the market value of R&D results [3]. The salary level of R&D personnel depends on the value of R&D results. Yu Guixue et al. advocated that the performance incentive method can be used to motivate R&D personnel in combination with the ranking method for comprehensive performance evaluation [4]. Yang Dafeng believes that private enterprises should provide focused equity incentives to R&D personnel with core technologies [5]. Yu Zhong believes that companies should pay more attention to the role of performance on the basis of increasing basic wages and post wages [6]. Liu Hong et al. pointed out that due to differences in professional orientation, the methods and needs of incentives are also different. The incentives for employees can be carried out in terms of salary, tasks and organizational environment [7]. The second is independent innovation incentives for R&D personnel based on team management. Huang Jianbai et al. believe that rewarding R&D teams based on performance is conducive to the implementation of the team system [8]. Fan Ling et al. found that the motivation that stimulates the creativity of the R&D team is the goal motivation, which is more clear than other types of motivation [9]. Zhang Yunsheng et al. believe that shareholding is not conducive to R&D performance [10]. Chao-ying Tang found that to improve the internal motivation of R&D team members and improve the independent innovation ability of R&D team members, more attention should be paid to the growth and development needs of members. The growth needs of team members may be more important than payment [11]. The third is independent innovation incentives for R&D personnel based on knowledge management. Li Weidong et al. believe that the behavior of helping others to obtain satisfaction in internal incentives is the biggest factor that causes the willingness of R&D personnel to share knowledge [12]. Wang Yongqiang et al. believe that the motivation of R&D personnel should first solve the problem of the degree of effort of R&D individuals to transform tacit knowledge and carry out knowledge sharing [13]. Hu Xinping introduced the fairness preference factor into the knowledge sharing incentive model, and proposed that different incentive measures should be given according to the different sympathy preferences of R&D personnel [14].

The above research results explained the necessity of stimulating R&D personnel and the measures for improvement or optimization from multiple angles. Research in the field of human resource management focuses on the individual needs of employees and explores how to use incentive measures such as salary, performance evaluation, and career management to stimulate employee enthusiasm. Research in the field of team management no longer only

focuses on individual employees, but uses the team as the main body of research to discuss how to motivate. Research in the field of knowledge management focuses on the sharing and transformation of individual knowledge. However, the above-mentioned studies often overemphasize the needs of R&D personnel themselves, blindly emphasize the use of various incentives to stimulate R&D personnel, and ignore the different situations in which R&D personnel are located under different environmental conditions. In addition, the above research emphasizes the impact of various incentives and various single factors on the R&D personnel themselves, and rarely sees a clear incentive combination, does not give a specific incentive combination plan, and does not consider the incentives of the R&D personnel and the R&D personnel themselves. The relationship of different situations. Therefore, this article combines the incentives of R&D personnel in private enterprises with the different situations of R&D personnel themselves, and analyzes the incentive strategies and combination schemes that private enterprises should choose to focus on in different R&D personnel's independent innovation scenarios and construct R&D personnel independent innovation incentives. The model is expected to provide a reference for increasing the willingness of private enterprise R&D personnel to improve their independent innovation capabilities.

3. Scenario Analysis of Private Enterprise R&D Personnel

In today's fast-changing science and technology, private enterprises rely more on the technical capabilities and performance of R&D and R&D personnel than ever before [15]. For the core employees of an enterprise, their first job is to externalize their own proprietary skills and knowledge and creatively apply them to the research and development process. In this process, the level of R&D personnel's scientific research ability directly affects the efficiency and quality of enterprise R&D. Especially for private enterprises, due to their limited scale and capital, they cannot afford the costs brought by a large R&D team. In order to save costs, private enterprises need to make full use of the scientific research capabilities of each R&D personnel. In addition, as the role of consumers in the value creation process is becoming more and more obvious [16], R&D personnel must not only understand consumer psychology, but also be proficient in product development. R&D personnel also reflect the importance of the technology and product development process. Market-oriented characteristics [17]. For enterprises, the R&D personnel's scientific research capability is the manifestation of its fundamental value, and market-oriented R&D can maximize the value of R&D. Therefore, this article believes that the R&D personnel's scientific research business capability dimension and the independent innovation market-oriented dimension are the key dimensions to measure R&D personnel's independent innovation capability.

3.1. Dimension of R&D Personnel's Scientific Research Business Capabilities

R&D personnel's scientific research business capabilities can be specifically divided into professional business capabilities and auxiliary business capabilities [18]. Professional competence is the core competitiveness of R&D personnel and its core value. It mainly refers to the professional knowledge of R&D personnel and the quality level of scientific research business. Different from the difficulty of imitating professional business ability, auxiliary business ability can often be obtained quickly through training, so auxiliary business ability is also easy to be imitated and replaced. In actual operation, private enterprises often pay more attention to the professional professional competence of R&D personnel when they introduce R&D personnel, and adopt a series of training to improve the auxiliary business capabilities that are not outstanding. In view of this, this article introduces the degree of scientific research business specialization to indicate the proportion of R&D personnel's own professional capabilities in scientific research business capabilities, and uses this as one of the dimensions to analyze and construct R&D personnel's independent innovation context. The high degree of

professionalization of scientific research business means that the professional competence of R&D personnel accounts for a relatively high proportion of the total scientific research business competence, while the auxiliary business competence is relatively low. Professional business capabilities are more prominent than auxiliary business capabilities. R&D personnel are highly specialized and have sufficient knowledge and skills. For private enterprises, such R&D personnel are of higher value. The low degree of professionalization of scientific research business means that the professional professional capabilities of R&D personnel account for a relatively low proportion of the total capabilities, the auxiliary business capabilities dominate, and the professional knowledge and expertise of R&D personnel are relatively weak. At this time, for private enterprises, the value of such R&D personnel is relatively low. Take ZTE Software as an example. As a national key private software company, the company implements a grading system for R&D personnel, divides R&D personnel into different levels according to their scientific research capabilities, and proposes different levels of R&D personnel according to different skill levels. Skill requirements, even employees in the same position, because of the difference in skill level, enjoy different benefits. This article introduces the degree of professionalization of scientific research business to intuitively see the degree of technical specialization of R&D personnel, and better construct and analyze the independent innovation incentive situation of R&D personnel.

3.2. The Market-Oriented Dimension of Independent Innovation

Independent innovation of private enterprises refers to the process by which private enterprises organize and establish their own R&D departments, through their own exploration and efforts, to achieve technological breakthroughs and innovations, and to market products or services. The market orientation of independent innovation refers to a series of research and development activities that start from customer needs and create and meet customer needs during the process of independent innovation by enterprise R&D personnel. R&D personnel coming out of closed laboratories are no longer limited to enterprise-centric technology research in the traditional sense, but market-oriented features are becoming more and more obvious. They pay more attention to market demand and carry out targeted innovations. The creation of new technologies for products. In enterprises with a high market orientation for independent innovation, R&D work is closely focused on consumer needs, and the effectiveness of R&D has been maximized [19]. In enterprises with a low degree of independent innovation market orientation, the research and development activities of R&D personnel have no clear direction, and the products developed may not be favored by the market, which will lead to a certain degree of waste of R&D resources. This will undoubtedly cause huge cost losses for private enterprises. Therefore, in the wave of "Internet +", the research and development of private enterprises should also pay full attention to market demand, pay attention to the market orientation of R&D personnel's independent innovation, and regard the degree of independent innovation market orientation as another key factor affecting R&D personnel incentives. Give incentives for sex.

3.3. Independent Innovation Situation of R&D Personnel

Under the "Internet+" vision, the two key factors affecting the independent innovation situation of R&D personnel in private enterprises are the degree of professionalization of scientific research business and the degree of market orientation. Based on this, from the two dimensions of R&D personnel's R&D professionalization and market orientation, conduct contingency analysis on the independent innovation situation of private enterprise R&D personnel, and organize R&D personnel from two levels of R&D professionalization and market orientation. The context of independent innovation (see Figure 1). A high degree of specialization of scientific research business means that professional business is more prominent than auxiliary business, and a low degree of specialization of scientific research

business means that its auxiliary business is outstanding, and the professional level gap is obvious. A high degree of market orientation means that R&D personnel have obvious market-oriented characteristics, while a low degree of market orientation means that R&D personnel's market-oriented characteristics are not obvious [20].

Market-oriented dimension

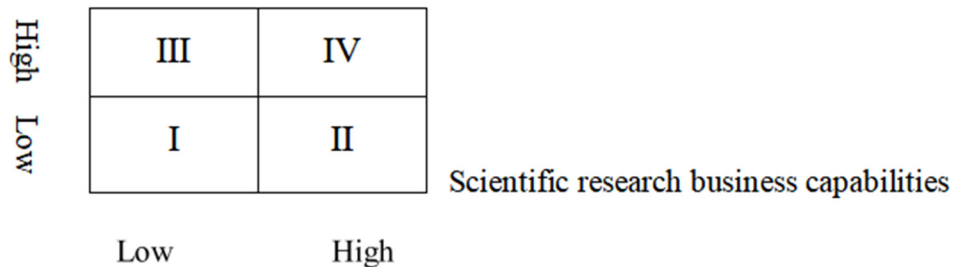


Figure 1: Independent innovation scenario diagram of private enterprise R&D personnel

From the relationship diagram constructed in Figure 1, it can be seen that there are four different independent innovation scenarios for private enterprise R&D personnel, namely, independent innovation scenario I, independent innovation scenario II, and independent innovation Scenario III, independent innovation scenario IV.

3.3.1. Independent Innovation Scenario I of R&D Personnel

The degree of professionalization and market orientation of R&D personnel in private enterprises is relatively low. In this situation, the auxiliary work of R&D personnel is relatively large in the R&D work, the level of specialization is not high, and the attention to market demand is not enough, and the overall R&D of the enterprise is at a relatively low level. R&D personnel need to improve their own professional knowledge, and the independent innovation of enterprises should be more closely linked with market demand and customer needs.

3.3.2. Independent Innovation Scenario II of R&D Personnel

The R&D personnel of private enterprises have a high degree of professionalization and low market orientation. In this situation, R&D personnel are highly specialized in their work, and R&D personnel have solid professional basic knowledge and can be competent for most R&D tasks. However, due to their low market orientation and insufficient attention to customer needs, R&D exists at this time A certain degree of waste of resources.

3.3.3. Independent Innovation Scenario III of R&D Personnel

The R&D personnel of private enterprises have a low degree of specialization in scientific research and a high degree of market orientation. In this situation, R&D behavior generally relies on market demand, with high work efficiency, and R&D results meet the needs of market consumers. However, due to the low level of professionalism of R&D personnel, the professional technical capabilities of R&D personnel and the quality level of R&D products Urgently need to be enhanced.

3.3.4. Independent Innovation Scenario IV of R&D Personnel

The degree of professionalization and market orientation of R&D personnel in private enterprises is relatively high. In this situation, the professional skills and R&D efficiency of R&D personnel are relatively high, reaching an ideal state.

These four scenarios respectively represent the relationship between the degree of professionalization and market orientation of private enterprise R&D personnel at different levels. Therefore, private enterprises should implement different incentive strategies for different independent innovation situations of R&D personnel.

4. Analysis of the Independent Innovation Incentive Strategy of Private Enterprise R&D Personnel

In the era of "Internet +", the development space and prospects of a private enterprise depend on whether the core links of the enterprise are online. The incentive and investment of R&D personnel is the top priority of enterprise management. Whether it is offline or online directly determines the survival of private enterprises. Efficiently promote the independent innovation ability of private enterprise R&D personnel. In addition to correctly understanding the different ability and work characteristics of private enterprise R&D personnel, to identify different independent innovation scenarios, it is necessary to select an appropriate incentive strategy or a combination of incentive strategies based on the above content.

Based on the research of previous scholars and the characteristics of R&D personnel, this article summarizes short-term basic salary and benefits, bonuses, and long-term stock options as salary incentives; summarizes R&D personnel's vision for job promotion, achievement development, and cultivation and learning as growth and development needs; summarizing factors such as corporate culture, entrepreneurship, and company prospects as corporate environmental incentives. According to the ERG theory proposed by Clayton Alderfer, it is believed that existence (Existence), correlation (Relatedness), and growth and development (Growth) are the three core needs of human beings. Different from Maslow's characteristic of leveling from low to high and gradually satisfying, the three needs in ERG theory can play a role at the same time and are not limited to a certain level. Based on this, the incentives of private enterprises for R&D personnel should also be based on these three needs, mainly considering the three incentive strategies of salary incentives, growth and development incentives and corporate environmental incentives. Salary incentives can meet people's basic living needs such as food, clothing, housing and transportation; the role of the corporate environment is to meet the needs of people's mutual relations and social communication, emphasizing the impact of the environment and the social relationships formed by the environment; growth and development incentives meet people's personal realization and self-realization perfect the needs of higher levels. Moreover, according to the different independent innovation scenarios of the independent innovation of R&D personnel mentioned above, companies should adopt different incentive strategies or use a certain incentive as the key incentive, and the rest of the incentives are auxiliary incentives. The specific embodiments are as follows:

4.1. Salary Incentive Strategy

Salary incentive strategy refers to a combination of various ways that private companies give R&D personnel based on the performance results of R&D personnel, including short-term compensation such as basic salary, bonuses and benefits, as well as profit sharing, stock options, etc. In the era of "remuneration is king", high salary and high efficiency are still the last word, and it is also the most important and important talent incentive method for private enterprises. Affected by the scale of funds, many private enterprises simply treat salary as human capital expenditure, ignoring the role of good salary incentives in maintaining and increasing the value of corporate talents. Private enterprises should regard salary incentives as a kind of human capital investment, and turn salary incentives into the driving force of employees' professional behavior and an important means to attract high-end talents.

4.2. Growth and Development Incentive Strategy

Growth and development incentive strategy refers to a series of measures taken by private enterprises to provide their employees with systematic training and learning according to their own needs, to help employees achieve professional development and even meet personal achievement needs, such as employees training and learning, personal promotion, participation in corporate management, etc. For high-tech talents engaged in research and development,

training and learning opportunities are more worthy of attention. Under the vision of many private enterprises with complex internal relationships, random training and chaotic management, a good training system and career planning mechanism are important measures for companies to recruit high-end talents and stimulate their willingness to work.

4.3. Enterprise Environmental Incentive Strategy

Enterprise environmental incentive strategy refers to a series of measures adopted by private enterprises to absorb and maintain stability by improving the internal state of the company, creating a good atmosphere and correct orientation. Mainly reflected in the quality and spirit of entrepreneurs, simple and harmonious interpersonal relationships, positive and good corporate culture, pioneering and innovative atmosphere and so on. A good corporate environment can enable employees to focus more on their own work, enhance their sense of belonging and improve the quality and efficiency of their work.

Based on the previous research, this article puts forward the independent innovation incentive strategy of private enterprise R&D personnel based on the ERG theory, which is mainly divided into three methods: salary incentive strategy, growth and development incentive strategy, and corporate environmental incentive strategy. Individuals' different independent innovation incentive scenarios are specifically used to construct an independent innovation incentive model.

5. Independent Innovation Incentive Model for Private Enterprise R&D Personnel

Taking corresponding management measures flexibly according to changes in the environment is the basic idea of the contingency theory mentioned above. Similarly, private enterprises should choose and use the three incentive strategies of salary incentives, growth and development incentives, and corporate environment incentives according to the independent innovation situation of R&D personnel themselves. In view of this, this paper takes the independent innovation situation of R&D personnel as an independent variable, and the incentive strategy for R&D personnel as a dependent variable, and attempts to construct an independent innovation incentive model for R&D personnel in private enterprises (Figure 2).

Enterprise environmental incentive strategy	△	△		
Growth and development incentive strategy	▲		▲	
Salary incentive strategy		▲		▲
	Scenario I	Scenario II	Scenario III	Scenario IV

Figure 2: Independent innovation incentive model for R&D personnel in private enterprises
 Note: "▲" in the figure represents a key incentive strategy, and "△" represents a secondary incentive strategy.

5.1. Incentive Strategy for Independent Innovation Scenario I

R&D personnel have low level of professionalism in scientific research skills. In this case, the internal R&D personnel of private enterprises are not highly professional and are doing auxiliary work (such as simple data processing and technical assistance). The proportion of R&D personnel is relatively high. At this time, in order to stimulate the willingness of R&D personnel and improve their independent innovation ability, the key to improving the

professional skills of R&D personnel is to allow R&D personnel to see their own growth space, rather than just doing some basic auxiliary work. Therefore, in this context of independent innovation, private enterprises should first give R&D personnel incentives for growth and development, and attach importance to their training and development, that is, growth and development incentives are key incentive measures. In addition, the market orientation of R&D personnel is also low. This means that R&D personnel do not pay much attention to market demand or market demand is insufficient. At this time, private enterprises need to cultivate a good organizational environment and corporate atmosphere internally, and guide R&D personnel from the corporate level to not only focus on R&D products, but also pay attention to R&D. In order to make real-time improvements and improve R&D efficiency. However, this improvement in R&D efficiency should also be based on the strong professional and technical capabilities of R&D personnel. Therefore, corporate environmental incentives are a secondary incentive method, and growth and development incentives still dominate.

5.2. Incentive Strategy of Independent Innovation Scenario II

Independent innovation scenario II can be regarded as an ideal state of R&D personnel independent innovation scenario I. It improves the professionalization of R&D personnel's scientific research business, that is, private enterprises strengthen the professional skills of R&D personnel through reasonable training and development, reduce the proportion of auxiliary work in research and development work, and improve the overall company the level of research and development. At this time, retaining talent has become a key issue. In the era when salary is king, giving necessary high salaries and stock options have become key incentives. Therefore, in this case, the key incentive method that private enterprises should adopt is salary incentives. The main problem currently facing is that the degree of market orientation is still at a low level, and less attention to user needs and market trends is likely to lead to poor pertinence and reduced effectiveness of R&D work. Therefore, it is still necessary to continue to use corporate environmental incentives to stimulate R&D personnel to pay attention to user needs and improve market orientation.

5.3. Incentive Strategy for Independent Innovation Scenario III

R&D personnel are highly market-oriented. R&D personnel no longer only pay attention to R&D itself but pay more attention to user needs and market development trends during the R&D process, and the R&D work is highly targeted. The research and development update efficiency is also relatively high. However, at this time, the R&D personnel are not highly specialized in the scientific research business, and the insufficient skill level may cause the product to be updated in time. Even if the enterprise R&D personnel pay attention to the changes in user needs, they cannot meet the new user needs. Therefore, for private enterprises, the most urgent thing is to improve the professional skills of R&D personnel and provide them with adequate training and development so that they can respond to changes in market demand and play a key role in growth and development incentives.

5.4. Incentive Strategy of Independent Innovation Scenario IV

R&D personnel independent innovation situation IV can be regarded as the ideal state of independent innovation situation III of R&D personnel. At this time, the R&D personnel's scientific research business degree and market orientation are relatively high. R&D personnel have excellent professional skills, and at the same time have a high sensitivity to market trends and user needs. They can better adapt to market changes and carry out appropriate innovations to meet consumer needs. What private enterprises should consider at this time is how to retain talents and reduce the loss of talents. Undoubtedly, in this case, more attention should be paid to the key role of salary incentives. Private enterprises can increase short-term salaries, increase basic salaries and subsidies, and appropriately give R&D personnel long-term salary

incentives represented by equity, so as to stabilize talents and promote the healthy development of the enterprise.

6. Conclusions and Management Enlightenment

6.1. Conclusions

At present, our private enterprises are at the transition point from the early stage of development to the mid-term transition. Under the broad vision of "Internet +", private enterprises can only continuously improve their own autonomy only innovation ability can win long-term survival and development. As the core team of the enterprise, R&D personnel can only achieve real effective incentives and improve the willingness and independent innovation level of R&D personnel in private enterprises by implementing different incentives according to their different independent innovation situations. This paper establishes four different independent innovation scenarios for R&D personnel based on the degree of market orientation of R&D personnel and the degree of professionalization of scientific research business, and analyzes the incentive modes and combinations that private enterprises should choose in each context. The specifics are as follows four aspects. First, under the situation where the R&D personnel's scientific research business specialization and market orientation are relatively low, companies should focus on giving R&D personnel growth and development incentives, supplemented by corporate environmental incentives. While attaching importance to employee training to improve their abilities, they also create a good innovation environment to encourage employees. Second, under the situation where R&D personnel are highly specialized in scientific research and less market-oriented, companies first consider salary incentives to retain outstanding talents, and secondly use corporate environmental incentives to create a good R&D atmosphere to motivate R&D personnel. Third, under the situation where the R&D personnel's scientific research business is less specialized and highly market-oriented, the company has a good internal atmosphere at this time, and the company should focus on the growth and development incentives for R&D personnel, and improve R&D personnel's scientific research through training the level of business specialization. Fourth, in the context of the high degree of professionalism and market orientation of R&D personnel, R&D personnel have strong professional skills and pay attention to user needs, which greatly improves work efficiency. The company should provide sufficient salary incentives to meet the needs of employees to prevent brain drain.

6.2. Management Enlightenment

Through the study of incentive models, the following management enlightenment is obtained: first, In "Internet +" situation, private enterprises should not only face up to their own basic situation, combine Internet technology to timely pay attention to user needs and provide real-time feedback on the R&D part of the company, guide R&D personnel to pay attention to customer needs, and improve R&D technology and efficiency.

Second, after complying with the law of "Internet +", private enterprises should also realize that R&D personnel are the core human capital of the enterprise. Enterprises should accurately and effectively locate R&D personnel according to their work and ability characteristics. Context to choose the appropriate incentive strategy and its combination. Only by contingent analysis and selection of reasonable incentive strategies and methods can we truly and effectively improve the willingness and independent innovation level of R&D personnel, realize the rational development of human resources, and promote the sound and rapid development of private enterprises.

Third, people are children of the environment. Private enterprises should persist in improving their own corporate environment, create a good atmosphere, and use the environment to shape

and motivate their R&D personnel, thereby improving the quality of R&D personnel in all aspects.

Fourth, when private enterprise R&D personnel are highly specialized in scientific research business, companies should adopt more salary incentives. This incentive strategy is highly attractive for both internal full-time R&D personnel and external virtual R&D teams. .

Fifth, under the situation that R&D personnel are more market-oriented and their scientific research capabilities are generally low, private enterprises should first consider growth and development incentives, and attach importance to employee training and development, so as to improve their scientific research capabilities.

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