Research on the Relationship between Motivation and Innovation Performance of Knowledge Workers Based on Computer Algorithms

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Abstract. For many enterprises, knowledge workers have become an important human resource. As the human capital that can add value, the management of knowledge employees has become an important issue of concern for enterprises. At present, there are still some problems in the incentive research of knowledge workers in China, such as the incomplete research object, the relatively single industry, the lack of pertinence and operability of the research content, the lack of tools and methods to measure the incentive effect of knowledge workers. In the management practice, the incentive of knowledge employees is mainly based on salary, with little attention paid to other incentive measures, the enterprise's understanding of it is not deep enough, the incentive mechanism is not sound, the incentive effect is not significant and other problems need to be solved.

1. Introduction
With the rapid development and extensive application of science and technology, today's society has entered a new economic form - the era of knowledge economy. With the advent of the era of knowledge economy, knowledge becomes the primary productive force, and those individuals and organizations that can take full advantage of knowledge will come to the fore. At the same time, knowledge employees are the owners and bearers of knowledge. They master and create knowledge and can make better use of knowledge to create value. Undoubtedly, they have become the core force for enterprises to gain competitive advantages. However, knowledge workers are a special group. They are different from ordinary employees in their own characteristics, demand structure and other aspects[1-3]. Therefore, how to grasp the characteristics of knowledge workers' demands and adopt various incentive measures to retain knowledge workers and arouse their enthusiasm has become an important issue for enterprises to maintain their own development and strive to be innovative enterprises.

2. The characteristics of knowledge workers
2.1. High autonomy and high independence
Knowledge employees are the owners of enterprise intelligence and knowledge capital. Different from general operating employees who passively obey the arrangement and are subject to the constraints of material equipment, knowledge employees have a strong sense of autonomy and are more inclined to have an independent working environment. They are good at self-guidance, self-control and self-development in work.
2.2. Strong desire for achievement
Knowledge workers are not engaged in simple and repetitive work. Most of them have received systematic higher education and possess certain professional knowledge and skills. As a result, they are more focused on realizing their own value, prefer challenging and creative tasks, and want to show their talents in their work[4-6].

2.3. Strong willingness to flow
Knowledge workers are different from ordinary employees in enterprises. They only pursue a stable job. They master a lot of core knowledge and are the main creators of enterprise value. They are willing to accept the new job and can quickly adapt to the new environment, so they don't have to worry about finding a job. Therefore, if they feel that the enterprise is not attractive to them or there are few development opportunities and space, they will quickly turn to a better company to pursue more development opportunities.

2.4. The working process is difficult to monitor and control
General labor has its fixed process and steps, while most of the work of knowledge workers is uncertain, with great randomness and flexibility, mainly relying on mental work, most of the work is intangible and creative, therefore, it is difficult to implement the monitoring of the work process of knowledge workers.

2.5. The fruits of Labour are hard to measure
The fruits of knowledge workers' labor are often in the form of certain ideas, ideas and technological inventions, which are hard to quantify and whose benefits are hard to estimate due to the influence of many factors. Moreover, knowledge innovation is of high complexity and difficulty, which determines that knowledge workers generally do not work independently, but form a work team and use collective wisdom to complete work tasks. Therefore, individual work performance is often difficult to measure.

3. Use utility function models to motivate employees
The utility function is basically a way of describing the behavior of choice: if we choose bundle X when we can obtain bundle Y, then x must have a higher utility than Y. By studying the choices made by consumers, we can estimate the utility function that describes the behavior of consumers. Similarly, in the management process of knowledge-based enterprises, the utility function of knowledge-based employees' motivation can be described by studying their choices of various incentive methods.

3.1. Eigenvalue of the excitation utility function
Determine in the study of knowledge staff incentive factors, many scholars through the empirical study influence various kinds of knowledge staff incentive factors, comprehensive study of the incentive factors, knowledge staff motivation can be mainly divided into several aspects, the model mainly includes the growth factors, work motivation, external motivation factors and incentive factors from four aspects.

Growth factor refers to the process of managing knowledge workers so that they can gain knowledge, skills and career growth. Work motivation factor refers to the work itself can bring knowledge workers motivation. External incentive factors are the external environmental factors that can motivate knowledge workers beyond the work they are engaged in, including the good operation and development of enterprises with broad development prospects and convenient working conditions. Relationship motivation factors are related to the interpersonal relationship of knowledge workers and can affect their work efficiency, including smooth communication and harmonious relationship between knowledge workers and their superiors and subordinates as well as their peers.
3.2. Establishment of excitation utility function

If \((x_1, x_2, \ldots, x_n)\) represents the values of \(n\) different characteristics of the utility function, thus leading to a model in which the enterprise and knowledge workers choose which or which kinds of incentives, depending on which combination they prefer. Generally, we can express incentive characteristic preference as the following form of utility function:

\[
U(x_1, x_2, \ldots, x_n) = \alpha_1 x_1 + \alpha_2 x_2 + \ldots + \alpha_n x_n
\]  

Due to facilitate statistical linear forms, and estimate the linear form of incentive utility function has a greater practical value, used in the management of knowledge staff motivation will be more convenient, and the utility function no matter in what form the monotonic transformation is to describe a kind of choice, in essence has not changed in this article to study the knowledge staff for incentive mode choice behavior, so this article will take the form of linear utility function. At the same time, since the monotone transformation of a utility function cannot change its fundamental properties, the preferences represented by the two are not different. Therefore, the linear form is convenient for statistics and accurate description of preference.

In order to make the utility function more intuitive, the eigenvalues of the utility function are transformed. The incentive model adopted in this paper includes four incentive factors, each of which includes many specific incentive factors. These incentive factors can be intuitively described as follows: Growth factor \(G\) (ability to exert \(A\), promoted the \(P\), \(S\)) work achievement, work motivation factor \(J\) (interest in work, work responsibility \(R\), I work independently, work up to \(A\) challenge work \(Q\), \(C\), \(D\)), external motivating factors \(E\) (company prospects for study, training, c&b W T P, safety, working conditions of the management system of \(M\), \(C\) and \(S\), participate in the management of \(J\) around motivating factors \(S\) (\(R\) \(C\), fire cooperation interpersonal relationship and personal life \(L\)). Then the utility function of the excitation can be described as:

\[
U(G,J,E,S) = \alpha_1 G + \alpha_2 J + \alpha_3 E + \alpha_4 S + \varepsilon
\]

The utility functions of the four motivators can also be specifically described as follows:

\[
U(G,A,P,S) = \beta_1 A + \beta_2 P + \beta_3 S + \varepsilon_1
\]

\[
U(I,R,A,Q,C,D) = \gamma_1 I + \gamma_2 R + \gamma_3 Q + \gamma_4 C + \gamma_5 D + \varepsilon_2
\]

\[
U(E,P,W,T,S,M,C,I) = \eta_1 P + \eta_2 W + \eta_3 T + \eta_4 S + \eta_5 M + \eta_6 C + \eta_7 I + \varepsilon_3
\]

\[
U(S(R, C, L)) = \phi_1 R + \phi_2 C + \phi_3 L + \varepsilon_4
\]

4. Build incentive compensation system

The amount of salary itself can only guarantee whether a person leaves his job, while the scientific and reasonable salary structure is the guarantee that can really motivate employees to work hard. For knowledge workers, getting a reward equal to their contribution can greatly increase their satisfaction. For knowledge workers, salary is not only the reward for their labor, but also a measure of self-worth, which can show their status in the enterprise or the society.

4.1. Conduct salary survey to ensure the fairness and rationality of enterprise salary

Enterprises should obtain the relevant enterprise's salary level and some information related to its salary incentive mechanism, so as to determine the market positioning of their own salary level. For knowledge employees, the salary is more important to realize their self-value and reflect their social status. If the salary level of knowledge employees who have made important contributions to the enterprise is lower than that of the same industry, employees will surely have a sense of low sense of achievement and fail to realize their self-value, and their willingness to flow will be stronger. Therefore, pay must be fair and reasonable.

4.2. Establish a broadband compensation system

Broadband compensation is a kind of compensation structure with relatively few salary grades and relatively wide salary range by recombining multiple salary grades and range of variation. Broadband
pay is market-oriented, which can guide employees to pay attention to personal development and their own value in the market, rather than simply pay attention to internal fairness.

4.3. Set up the incentive system of project bonus and stock option
At present, knowledge innovation is complex, knowledge employees are usually carried out in the form of project teams, and the salary of team members is directly linked to the quality of project completion. Project bonus, as a kind of extra salary, is conducive to motivating knowledge workers to work efficiently, maintain quality or overfulfill their tasks. Stock option is a kind of incentive for senior executives or key personnel, and also a symbol of power and status. The stock value is positively correlated with the business performance of the enterprise. Only when the enterprise maintains long-term profitability, the stock will continue to appreciate and the earnings of knowledge workers will continue to increase, thus forming a long-term incentive for knowledge workers.

The following figure shows the incentive model of knowledge workers:

![Employee motivation model](image)

Figure 1. Employee motivation model.

5. Conclusion
This paper establishes the incentive model of knowledge-based employees and puts forward the incentive countermeasures based on different needs, which enriches the previous incentive theory system of knowledge-based employees and has important reference significance for the practice of stimulating knowledge-based employees in enterprises.

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