A Review of Research on the Relationship Between Pay for Performance and Employee Creativity

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Abstract. Innovation is the primary driving force for China's economic development and transformation. Innovation-driven strategy is the primary strategy for China's economic development. Enterprises are the main body of the market economy. Among them, employees are the source of enterprise development. How to promote employee creativity in enterprise management is also a key consideration for managers. Chinese enterprises are in an important period of compensation system reform. The innovation-driven development strategy urgently needs enterprises to reform the incentive system, and enterprises implement a pay for performance system to stimulate the creativity of employees. The academic research on pay for performance system and employee creativity is also relatively mature. This paper attempts to explore the research progress of pay for performance system on employee creativity from four perspectives: economics, cognitive psychology, behavioral psychology and cognitive neuroscience. And on the basis of comparative analysis, the nonlinear thinking of researchers in this field on the relationship between pay for performance and employee creativity is discussed.

Keywords: Pay for performance, employee creativity, business management.

1. Introduction

As China's economic development enters a new stage, innovation-driven development is the main tone for China to implement economic transformation and adapt to the new normal. Intellectual capital-driven innovation will gather new development momentum and help Chinese enterprises in the new round of global business intelligence revolution to seize the opportunity. Compensation management is the core of human resource management, an important economic link connecting employees and enterprises, and plays a key role in the selection and retention of talents in enterprises. Under this background, managers will face dual challenges: how to attract talents Creative employees and building organizational support systems suitable for employee creation.

At present, most companies adopt a pay for performance system that comprehensively reflects the value of their employees. Not only are Microsoft, Google and other world-leading companies using this system, but with the entry of globalization and the continuous acceleration of the internationalization of the Chinese market, there is an increasing trend among companies, competition continues to intensify. In order to motivate companies to improve their work efficiency, more and more Chinese companies have begun to implement pay for performance systems. However, in practice, enterprises are in full swing, while theoretical research in academia is unusually deserted. The reason for the backward development of practice and theory is the conflict of views and theoretical debates in the past half century. Professor Deci (1971), a representative of the cognitive psychology, proposed the effect through the "Desi experiment" that monetary incentives would have an eroding effect on intrinsic motivation, which triggered an unprecedented crisis of theoretical paradigms and shook the existence of neoclassical economics. The theoretical foundation of the "stimulus-response" paradigm has led scholars to focus on the psychological process between incentives and outcomes. However, the behavioral psychology represented by Professor Eisenberger questioned the theoretical premise and experimental manipulation methods of the cognitive psychology, believing that pay for performance provides a positive feedback and reinforcement mechanism for work, making individuals willing to put more effort into task-related skills In the learning process, and apply the new skills acquired to new tasks, so as to enhance the intrinsic
motivation of employees and improve their creativity. The sharp opposition of viewpoints and the cessation of theoretical development have caused business managers to be at a loss. This article explores the relationship between pay for performance and creativity from four perspectives, with a view to providing direction for both practical aspects.

2. Concept development

2.1. Pay for performance

Pay for performance (PFP) refers to the part of variable income that is closely related to employees' personal performance. It is performance-oriented and directly links employees' income to performance. The purpose is to give full play to the enthusiasm and initiative of employees. To achieve a win-win situation for the organization and employees. The earliest research on pay for performance began at the end of the nineteenth century, and it was gradually developed from the "differential piece-rate wage system" by American management guru Taylor. By binding employee income with personal or organizational performance, pay for performance not only effectively diversifies organizational management risks, but also reduces total compensation costs when the overall performance of the organization is poor (Gerhart & Milkovich, 1990), and through two ways, incentives and screening, to improve employee performance and optimize the human resource structure within the organization (Gerhart & Milkovich, 1992) have become the most common compensation system in business management practice (Gerhart, Rynes, & Fulmer, 2009). According to the theory of cognitive evaluation, pay for performance is informative and controlling. Among them, information refers to that pay for performance can provide employees with the opportunity to obtain work performance evaluation and measure their own ability level and value compared with others and specific goals through relevant performance feedback provided by the organization and performance bonus amount received by employees after execution and task completion. Controlling means that pay for performance conveys a kind of external social control, which makes employees feel that their thoughts or behaviors are required and constrained by policies, and they cannot freely choose, otherwise they will not be paid. The core of pay for performance affecting employees' attitudes and behaviors is the difference between the objective risk level of the plan itself and the subjective perceived risk level of employees (Wiseman, Gomez-Mejia, & Fugate, 2000). According to prospect theory, individuals are prone to cognitive biases in risky situations and exhibit certain laws, such as the reference point effect, loss aversion, the law of diminishing sensitivity and the extended framing effect (Kahneman & Tversky, 1981).

2.2. Employee creativity

Creativity refers to the generation of novel and useful ideas or viewpoints related to products, services, and processes (Amabile, 1996). In the field of creativity research, a group of cognitive psychologists represented by Amabile and Deci and behavioral psychologists led by Eisenberger have debated the relationship between external economic rewards and individual creativity for three decades. Amabile and Deci inherited the ideas of freedom and individualism of the French romantic philosopher Rousseau, and believed that the nature of human beings lies in the pursuit of freedom, self-expression and self-realization. Based on this, they argue that reward systems for performance improvement are inherently destructive to the creative activities of individuals seeking new discoveries on their own. The main reasons include: (1) Reward destroys the individual's interest in the creative activity itself (Lepper, Greene, & Nisbett, 1973; Deci et al., 1999); (2) Makes the individual lose the sense of self-determination for his behavior (Deci et al., 1999) & Ryan, 1985); (3) Anticipated rewards lead individuals to focus on short-term outcomes and rewards themselves, and no longer try more effective problem-solving methods (Amabile, 1996). Different from Amabile et al., behavior-oriented researchers such as Eisenberger agree with the British utilitarian philosopher Bentham's utilitarian view of human nature, believing that human behavior will be reinforced by positive results, and they believe that through the rational application of rewards, individuals can be
effectively increased. self-determination and performance pressure, which in turn increase their intrinsic interest and creativity (Eisenberger & Rhoades, 2001; Eisenberger & Aselage, 2009).

3. The relationship between pay for performance and employee creativity

3.1. Economic Perspective

Economic theory assumes that individuals respond rationally and selfishly to external financial rewards, and they argue that cash compensation should be structured as a high reward for outstanding performance and a severe punishment for low performance. Many historical achievements of the Manhattan Project show that providing economic incentives can greatly promote the generation of creative solutions. Similarly, the patent system guarantees the economic benefits of innovative ideas and products, which also reflects the promotion effect of strong economic incentives on creativity.

At the same time, the important role of pay for performance on individual behavior and organizational performance has also been widely recognized (BELOGOLOVSKY, 2014). Ma (2015) pointed out that pay for performance can transfer corporate business risks to employees, and can select the most suitable employees and express their recognition and ability trust in the form of currency. Performance goals guide employees' work direction. The high-value compensation feature of pay for performance has also made many companies regard it as an important incentive to encourage employees to work hard, increase working time allocation, and improve work efficiency and creativity. The Economist's study of 500 companies found that compared with companies that did not actively adopt pay for performance, companies that actively adopted pay for performance achieved twice the shareholder return.

In addition, many scholars have proposed through agency theory that agency costs will cause problems such as information asymmetry and inconsistency between the principal and the agent, which makes pay for performance an incentive contract model with high returns and high risks. However, Eisenhardt pointed out through positive agency theory that proper incentive contracts can alleviate the possible negative consequences of agency costs, which can be explained from two aspects: one is the result-based contract form between the principal and the agent, which can make the agent shows work behaviors that are more favorable to the principal; secondly, when the principal has enough information to prove the agent's work behavior, the agent is more likely to show work behavior that is favorable to the principal.

3.2. Cognitive Psychology Perspective

In 1983, Amabile put forward the composition theory of creativity based on the perspective of cognitive evaluation. Amabile pointed out that creativity not only requires individuals to possess professional knowledge and various skills related to creation, but more importantly, individuals need to have a high level of intrinsic motivation to work tasks. Amabile and Pillemer believe that intrinsic motivation comes from employees' perceptions of work value (that is, whether the work is fun, enjoyable, satisfying, and positively challenging for employees), external constraints and extrinsic incentives in the social environment will change the psychological state of employees from the inside to the outside, and cooperate with the intrinsic motivation to affect the creativity of employees. With intrinsic motivation as the pivot, the component theory of creativity has officially opened the research on the relationship between reward and individual creativity in the fields of psychology, education and management.

On the basis of cognitive evaluation theory, Deci and Ryan integrated organic adjustment theory and basic psychological needs theory, and proposed a broader work motivation theory—self-determination theory. Self-determination theory further points out that intrinsic motivation is an internalized autonomous motivation driven by employees' basic needs for self-determination, which can guide employees to appreciate interest and enjoyment in the process of work tasks. The existence of the three psychological needs of competence, autonomy and belonging makes employees rely on the external environment value and the adjustment process, thereby initiating the self-regulation
process of internalization of extrinsic motivation. Human beings will satisfy these three basic psychological needs in order to obtain happiness, and constantly pursue self-esteem and self-realization in the process. Based on self-determination theory, many researchers think that certain conditions for performance of the low level of internalization, performance rewards of controlling and cognitive effect will weaken the staff independent sense and become its external attribution of work activities, the staff will own goals and work activities within separation, affect the enthusiasm of staff to express themselves and to explore the unknown and self-confidence. Therefore, performance rewards can weaken or even kill employees' intrinsic motivation and creativity.

Frey and Oberholzer-Gee put forward the theory of motivation crowding through economic methods on the basis of cognitive evaluation theory. They believe that individual behavior depends on preferences, intrinsic motivation, constraints or related prices, and whether external intervention has a positive or negative effect on individual work effort, related to the predominance of preferences or constraints. Frey further pointed out that performance-related contingency rewards can "crowd out" an individual's intrinsic motivation by hurting two psychological processes, self-determination and self-esteem.

### 3.3. Behavioral Psychology Perspective

Starting from pragmatism, behavioral psychology pays more attention to the external behavioral process and growth environment of individuals. It believes that external rewards that can bring positive outcome expectations or behavioral expectations can drive, strengthen and change the behavioral process of individuals.

Eisenberger’s research confirms that payment to meet performance standards has a positive effect on individuals’ perceived self-determination, competence, task interest, and free time spent on work tasks. In addition, this type of payment positively affects task interest and free time through the mediating effects of perceived self-determination and competence. In addition to the mediating role of perceived self-determination, some scholars have further confirmed that expected performance rewards can promote individuals' intrinsic work interest and creativity through a positive effect on performance pressure. General interest theory was proposed by Eisenberger et al., which criticized the limitations of cognitive appraisal theory. According to general interest theory, when the task content and task environment present the situation that the task performance helps to satisfy the individual's needs, desires and wishes, it will enhance the individual's intrinsic motivation; on the contrary, when the task content and the task environment convey the task's demand for the individual intrinsic motivation is weakened when desires and wishes are unimportant, irrelevant or contradictory. If the reward is only provided for completing the task without caring about the quality of the task, the intrinsic motivation of the individual will be weakened. But if the reward is provided for a specific high task performance, the personal significance of the task will be conveyed, as well as the social significance. Thereby enhancing the intrinsic motivation, which is, specific performance standards are more conducive to promoting the intrinsic motivation of individuals than vague performance standards.

Guo et al. (2015) pointed out that external rewards based on performance conditions can not only be regarded by employees as a fair exchange of their own knowledge and promote knowledge sharing at work, but also give employees warning pressure, thereby promoting organizational information flow and individual creativity. Jiang confirmed incentive rewards associated with innovation help foster creativity. Sousa’s research finds that rewarding practices are associated with components of creativity (skills and processes), human resource management (including program training, transformational leaders, strong information sharing, structured teams, selection based on candidates’ graduation schools, and Formal performance evaluation) can positively moderate the positive relationship between reward practice and innovation performance.
3.4. Neuroscience Perspective

The neuroscientific perspective started very late. It mainly examines the brain mechanism of the effect of monetary rewards on creativity. Through scientific and technological means such as functional magnetic resonance imaging and event-related potentials, it explores the individual's cognitive processing of monetary rewards, physiological changes such as brain magnetic fields and neural potentials, thereby characterizing the neural activity mechanism of monetary reward driving individual behavior.

Knutson et al. (2001) used an event-related functional magnetic resonance imaging method to examine whether individuals' expectations of increasing monetary incentives could increase the dependence of blood oxygen levels in the nucleus accumbens. The study found that individuals' expectations of raising monetary incentives can significantly improve individual well-being and nucleus accumbens activity; at the highest level of reward, individual nucleus accumbens activity is related to individual differences in reward cue-induced well-being. The higher the value of the reward, the stronger the activity of the nucleus accumbens, and the higher the induction ratio of the subjects' happiness. Further research has found that the active state of the nucleus accumbens can stimulate the release of dopamine in the human brain, making individuals feel happy. The track of dopamine release can be called a reward circuit. However, due to the dopamine release track varies with regions, the individual's reward expectations separated from reward results. If individuals perceive performance to determine their reward results, the emotional and motivational effects of rewards will be amplified; if individuals perceive opportunities to determine their reward results, individuals will be more aware and cautious of rewards. Furthermore, if the individual is unable to obtain the desired reward, the reward circuit is blunted.

Through experimental neuroimaging results, Murayama et al. (2010) found that performance-based monetary rewards do erode individual intrinsic motivation, and the activity of the anterior striatum and medial brain regions will be weakened according to the enhancement of behavioral erosion effects. Research evidence suggests that the evaluation system of the basal ganglia of the human cerebral cortex plays a central role in this erosion effect, and that the evaluation system of the basal ganglia of the human cerebral cortex underlies the erosion effect by integrating the value of extrinsic reward with the value of intrinsic work.

Chinese scholars Tan (2013) believes that the medial prefrontal cortex can allow individuals to construct expectations of rewards based on performance tasks, and then flexibly arrange cognitive resource input and work methods. This also means that rewards can promote the individual's mental resource investment in creative work and flexible choices of work styles by activating the activity of the medial prefrontal cortex. Psychological experimental research by Fan (2014) also confirmed that rewards can affect individuals' attention choices in the process of information processing. Zhu (2013) pointed out that material rewards can activate the parasympathetic nerves inhibited by individual mental fatigue, thereby improving individual work performance.

3.5. Development direction

The above four perspectives all believe that the relationship between pay for performance and intrinsic motivation and creativity is a simple linear relationship. However, many scholars believe that reward and creativity are not purely linear, but also related to reward structure and creative task types of interventions, related. Ariely et al. (2009) believed that the effect of monetary reward on performance and intrinsic motivation depends on task characteristics and reward size. Rewards play a positive role in simple repetitive tasks (key-pressing tasks), while complex tasks (addition tasks) that deplete cognitive resources will play a positive role; low and medium rewards lack the promotion effect on intrinsic motivation and performance, high rewards will weaken the intrinsic motivation and performance of the subjects, but high rewards will stimulate the intrinsic motivation of employees who do not receive monetary rewards in the organization. Ederer et al. (2013) believe that only a pay for performance plan that can tolerate early failure of employees and reward long-term success can effectively stimulate higher employee creativity. However, these studies have not yet pointed to the
core of the underlying mechanism of the nonlinear relationship between pay for performance and intrinsic motivation and creativity.

Amabile proposed that the synergy theory of motivation attempts to bridge the theoretical conflict between the cognitive psychology and the behavioral psychology. She believes that external incentives mainly include two types of external incentives: synergistic external incentives and non-synergistic external incentives. Among them, the synergistic external motivation factors have information attributes, which can provide positive information for employees to better achieve performance tasks, thereby activating synergistic extrinsic motivation that can promote intrinsic motivation. External incentives have control properties, which can make individuals perceive their own behavioral process to be constrained, thus forming a non-cooperative extrinsic motivation that cannot be tolerated or even inhibited by intrinsic motivation. At this time, extrinsic motivation will weaken the positive effect of intrinsic motivation on individual behavior.

Analyzing the cognitive psychology and the behavioral psychology, we can find that the cognitive psychology focuses on the controllability of pay for performance, and the behavioral psychology focuses on the informational nature of pay for performance. In the crowding-in effect, who is in a strong position will affect the overall net effect of pay for performance on intrinsic motivation. Based on this understanding and the theory of motivational synergy, many researchers have proposed that pay for performance has an "inverted U-shaped" relationship with individuals' intrinsic motivation, innovative behavior or creativity.

4. Comparative analysis from different perspectives

The above has sorted out the disputes on the relationship between performance compensation and employee creativity from the perspectives of economics, cognitive psychology, behavioral psychology and cognitive neuroscience, and found the development direction from linear research to nonlinear research. The reason for the development of research is that the existing research is insufficient. The nonlinear thinking on the relationship between pay for performance and creativity is based on the analysis of the comparisons and deficiencies of research from different perspectives.

The utilitarian philosophical basis of standard economic theory is the starting point of the study of economic perspective, which holds that the actor is rational supreme; the focus of the economic perspective is that the individual's response to external economic rewards is rational and selfish. Therefore, economics perspective research follows the research paradigm of "stimulus-response", and abstracts individual intrinsic motivation and creativity as a "mirror mapping" of performance-based compensation incentive results, which is, pay for performance helps promote individual intrinsic motivation and creativity. However, individuals in real situations are bounded rationality, and their cognition and judgment of pay for performance do not depend on rational thinking and reasoning, but make choices based on their own intuition, habits, experience or personality traits. Therefore, the limitation of research from the perspective of economics is that it ignores the irrational dynamic psychometric process of individuals.

Self-determination theory is an important theoretical basis for putting forward and studying the negative effects of pay for performance. Self-determination theory believes that free nature makes individuals have an endogenous demand for self-determination, while external economic rewards will give individuals excessive reasons and control hints. Therefore, research from the perspective of cognitive psychology follows the research paradigm of "stimulus-intrinsic motivation-behavioral results", and regards creative work as something with unique value and significance independent of the organizational incentive mechanism. The perception of value and meaning has a negative effect on intrinsic motivation, which is called the "crowding out effect" in the theory of motivation crowding. This negative effect can lead individuals to focus on reward value and tend toward routine tasks that are more rewarding. However, most of the research from the perspective of cognitive psychology is based on experimental research. The discontinuous material reward experimental situation design cannot effectively connect the reward and the individual's value experience in creative work, nor can
it reflect the continuity of the individual's pay for performance in the real organizational situation. This limitation interferes with the general applicability of the findings.

Behavioral psychology research points out through learned diligence theory and general interest theory that pay for performance will give individuals positive feedback, and this positive feedback makes individuals more willing to work hard to achieve their goals through a reinforcement mechanism; if the payment is paid for low levels of effort or performance, and individual feedback can be very negative, making it difficult to work hard or explore the unknown. The research from the perspective of behavioral psychology still follows the research paradigm of "stimulus-intrinsic motivation-behavioral outcomes", believes that the effect of reward on creativity depends on the type of reward. And believes that effective pay for performance can provide reasonable performance standards, clear task goals, scientific task structure. It emphasizes the symbolic significance and emotional attributes of pay for performance, and regards the informational nature of pay for performance as the promoter of individual intrinsic motivation, so as to enhance individual intrinsic interest in work and vigilance against low performance, awaken and enhance individual creativity, and promote individual creative thinking and work. Although the behavioral psychology perspective conducts empirical research through interviews and questionnaires in organizational contexts, the behavioral psychology perspective research overemphasizes individuals’ positive expectations of rewards when designing measurement tools, amplifies the informative cues of material rewards, and ignores cognitive processes and behavioral responses of individuals to reward attributes under different reward intensity expectations. In fact, individuals tend to choose more convenient and low-risk behaviors when faced with high-intensity reward expectations, thereby avoiding the uncertainty caused by high-risk creative activities.

The cognitive neuroscience perspective is based on the theory of brain science and brain neuroimaging theory, through simple natural science research, and follows the research paradigm of "stimulus-brain domain activity-behavioral results" to examine the relationship between reward and intrinsic motivation. The cognitive psychology perspective holds that rewards weaken intrinsic motivation, and there are research results that support the behavioral psychology perspective that rewards help enhance intrinsic motivation. In fact, a review of the last 15 years of research based on cognitive neuroscience shows that the finding that rewards weaken intrinsic motivation is not irreconcilable with the finding that rewards help enhance intrinsic motivation. Both Murayama et al. (2010) and Ma (2014) et al.'s studies have confirmed that when monetary rewards are provided for interesting work without canceling the performance reward commitment to the reward group, the intrinsic motivation or brain activity of the reward group is stronger than that of the non-reward control group. The studies by Knutson (2001) et al. and Kouneiher (2009) et al. also confirmed that when the researchers canceled the rewards for the subjects in the next stage of the task, the brain activity of the subjects would decrease. Therefore, this paper believes that according to the relevant research of cognitive neuroscience, pay for performance itself has the effect of improving the intrinsic motivation of individuals. However, when the organization no longer promises to provide employees with pay for performance, employees’ subjective evaluation of pay for performance will decrease, thus eroding its intrinsic motivation.

To sum up, the research based on the four perspectives of economics, cognitive psychology, behavioral psychology and cognitive neuroscience is based on different theoretical foundations, and puts forward different viewpoints from different perspectives. It is worth noting that the four research perspectives have very serious limitations: one-sided emphasis on the informative or controlling nature of rewards, ignoring the duality of rewards, and arguing that there is a simple linear relationship between pay for performance and intrinsic motivation and creativity. This linear view has been opposed by some scholars in recent years. These scholars comprehensively use the theory of self-determination and the theory of learned diligence to explain the changes of individual behavior under different incentive intensities, and thus come up with nonlinear conclusions that are different from traditional linear conclusions.
5. Limitations and future research

As mentioned above, although scholars have discovered the defects of linear research in recent years and gradually turned to non-linear research, there are still shortcomings. The "inverted U-shaped" research is only a simple interpretation of the binary attributes of pay for performance, and does not dig deeply into the individual's psychometric process of pay for performance. Creation is a high-risk activity of constant "trial and error", and individuals are bound to make a psychological trade-off between effort and risk. According to the perspective of prospect theory, as the incentive intensity of pay for performance increases, the reference point that affects individual behavioral decision-making is bound to be dynamically adjusted. As the conclusion of research from the perspective of cognitive neuroscience: pay for performance itself may be beneficial to promote human brain activity and intrinsic motivation, but pay for performance is also a carrier of uncertainty and risk. If employees are difficult to complete performance tasks, the organization will be difficult to continue to promise to pay for performance. At this time, the individual's brain activity and intrinsic motivation will show a downward trend to a certain extent. Pepper and Gore's (2015) "S-shaped" research further promotes the development of theoretical research on the relationship between pay for performance and creativity, but this research has two shortcomings. First, the theoretical basis for their inference that payment will weaken intrinsic motivation is only cognitive evaluation theory, ignores the systematic integration of the disputes between pay for performance and intrinsic motivation theory. Second, their research mistakenly believes that intrinsic motivation plus extrinsic motivation is the total work motivation.

In the future, we should deeply understand the impact of the information, control, and value compensation of pay for performance on the individual's intrinsic motivation and behavioral process, and explore the internal psychology of how extrinsic incentives guide individual behavioral processes to transform into intrinsic motivation-driven individual behavioral processes mechanism. Individuals have both the independent needs of pursuing self-determination and the ethical demands of professional dedication, as well as the competency needs of pursuing recognition and the natural attribute of disliking effort. The emergence of pay for performance will certainly destroy the individual’s independent needs and ethical demands, but it also helps to overcome individual effort aversion and satisfy individual competency needs. Secondly, pay for performance can stimulate human brain activity and the release of dopamine, which can promote individual behavioral processes. However, pay for performance releases dopamine through the same neural circuits as high attractiveness, good music and drugs. In order for employees to continue to work hard and creatively, it is necessary to continuously increase the level of motivation to repeatedly stimulate the release of dopamine, which can form a "reward addiction" similar to drug addiction. It not only makes employees focus on the reward value of performance pay, but also urges enterprises to construct a steep pay for performance model and weaken the incentive effect of pay for performance. Thirdly, pay for performance contains high risks. Organizations do not promise to pay employees who cannot complete specific performance indicators. When employees cannot complete performance indicators, it will reduce brain activity and intrinsic motivation. Finally, it is the key to solve the problem to explore the boundary conditions of performance-based compensation affecting creativity and the internal mechanism of the synergistic effect of internal and external motivation on creativity.

References


