

## Study on a Multilevel Integration Framework of Employees' Innovation Behavior under the View of Supply Chain

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**Abstract:** From the emergence background of the supply chain, the essence of its existence is to enhance the enterprise's core competitiveness, which is conducive to gaining competitive advantages in the fierce competitions under the environment of supply chain. Innovation is an important source of the core competitiveness, and employees are the center of enterprise innovation, so it's very necessary and important to study on employees' innovation behavior under the view of supply chain. On the basis of literature review of the past study, we analyze factors which affect employees' innovation behavior in the supply chain, with the application of theories in social psychology and management. Then we develop an integration framework from individual, organizational and social levels, and discuss the effective management practices to promote the innovation behavior and improve enterprise's capabilities of independent innovation under the environment of supply chain.

**Keywords:** multilevel integration framework; employees' innovation behavior; supply chain

### I. Introduction

In the context of globalization, enterprises are in the face of increasingly intense and dynamic competitions. Moreover, the form has developed into competition among supply chains. Enterprises have to take innovation into consideration [1]. They have to develop core competitiveness and gain competitive advantage through it. Employees are the center of enterprises' innovation, so it's necessary to analyze factors affecting their innovation behavior in the supply chain environment, which is good for enterprises to effectively promote employees' innovation behavior, and then improve the abilities to innovate independently and enhance the core competitiveness of enterprises.

Many foreign scholars defined the innovation in the workplace as the production of creative, useful ideas and solutions [2]. Employee innovation behavior refers to the use of an individual's knowledge and ability to put forward valuable new ideas or create valuable products with organization resources [3]. It is the research focus at home and abroad. A number of scholars currently study on the relationship of some factors and employees' innovation behavior from some aspect of an individual or organization

[4] [5] [6] [7]. To some extent, it alleviates the urgent need to promote the company's staff to implement innovative behavior, however, it's only temporary. The reasons are as follows: firstly, there are a variety of factors which affect it; secondly, the implementation of innovation has connection with the organization and society, such as other enterprises in the supply chain, so it needs consideration under these context; and lastly, every section is closely associated, such as knowledge management, authorization management and emotional management, moreover, they are all indispensable. Therefore, we have to expand the scope and test other functional modules' interaction mechanism with employees' innovation behavior, such as emotional management, goal orientation, social norms and some others, thus develop the organization's management system to promote innovation [8]. In this paper, we borrow ideas from related theories in social psychology and management, and develop a multilevel integration framework from a more comprehensive and systematic perspective for factors analysis, aiming at carrying out theoretical research and practical work more effectively in the future.

The remainder of the paper is organized as follows: Section 2 focuses on individual level. Section 3 focuses on organizational level. Section 4 focuses on the social level. Section 5 presents the integration framework. The paper ends with some concluding remarks.

### II. Individual's Impact on His Innovation Behavior

According to relevant theories in social psychology, individual knowledge and values have impacts on innovative behavior of employees, which are primarily through some intermediary variables, such as attitude, perceived behavior control and personal norms, just as Fig. 1 shows. We will

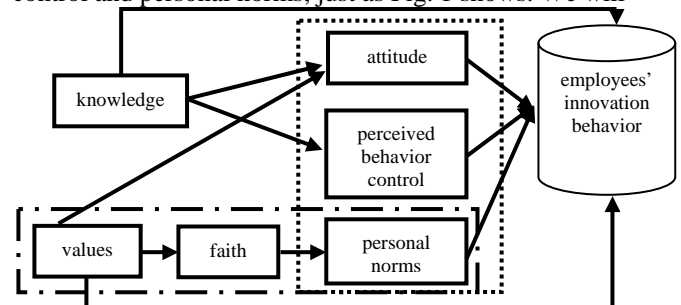


Fig. 1. Individual's impact on his innovation behavior

first analyze these three intermediate variables' impacts on innovation behavior of employees before the analysis of knowledge and values.

#### **Attitude's impact on his innovation behavior**

Attitude refers to an individual's affinity assessment on the implementation of a specific act. As for innovation behavior, it is the positive or negative evaluation towards the action. According to the Theory of Reasoned Action, attitude can affect behavior [9]. When the employee believes that innovative behavior is not only conducive to the survival and development of the enterprise, also to meeting his own needs, the attitude is positive, then he tends to engage in innovative behavior, and vice versa. In the environment of supply chain management, the material benefits and spiritual benefits come from innovation engagement have effects on the attitude.

#### **Perceived behavior control's impact on his innovation behavior**

Perceived behavior control refers to individual perception to the difficulty level of carrying out some act. As for innovation behavior, it is the perception of ease on implementing innovation. According to the Theory of Planned Behavior, perceived behavior control can affect behavior [10]. When the employee believes he is capable of innovating, and has some past successful experience and resources, the intention to engage in innovation will be stronger. If he thinks that innovation can benefit the organization, and that others want him to do so, but he is subject to resource constraints, his intention is low. Internal control factors (individual's technology base, innovative capacity) and external control factors (dependence on others, opportunities) have impacts on perceived behavior control under the supply chain management environment. Enterprises in the supply chain should enhance staff's ability to innovate through training and organizational learning, at the same time, weaken the barriers to resources access, thus reduce the difficulty to do it.

#### **Personal norms' impact on his innovation behavior**

Personal norms refer to an individual's perception of stress on deciding whether to implement a specific act. As for staff innovation behavior, it is the perception of his own pressure. According to the "Value-Belief-Norm" Theory, personal norms can affect behavior [11]. The employee with innovative values often has innovative belief, that is a highly respected profession of faith and innovation spirit, the desire for self-realization, sensitive sense of innovation, as well as a strong self-confidence and rational expectations [12]. This belief forces the person to have a strong sense of responsibility to implement innovative behavior. Enterprises in the supply chain should emphasize the importance of innovation through training and communication, which enables staff to feel the urgency of innovation, and

constantly internalize innovation culture, thus advance innovation implementation.

#### **Knowledge's impact on his innovation behavior**

Knowledge impacts mainly through two ways: one is direct, namely, staff with high level of expertise, reasonable knowledge structure are more likely to be triggered to innovate [3]; the other is indirect, which has to go through attitude and perceived behavior control to exert the effect.

According to the "Knowledge-Attitude-Practice" Theory, staff knowledge can affect attitude [13]. In LAN Ying's study on factors which could affect users' disposal of old appliances, the relationship between knowledge and behavior was verified through empirical studies [14]. This theory suggests that knowledge could influence attitude, and that these two are prerequisites for behavior. Individuals with knowledge base, together with active thinking are more likely to take a positive attitude to change behavior, such as the promotion of innovative behavior. When employees have the necessary knowledge base of innovation and clearly know how to innovate and the purpose of innovation, after the turning into faith, they will be active in innovation.

In addition to attitude, knowledge could also have an influence on perceived behavior control. Staff knowledge is not only just the knowledge, skills and past experience are also included, which are the foundation of innovation capability enhancement and innovation implementation. As the internal control factors, innovation capability could affect behavior control ability. An increase in staff knowledge will bring capability improvement, thus lead to high ability in behavior controlling. If so, they are more willing to innovate. Knowledge increase can be achieved through learning, which needs a study-promotion environment in the enterprise, while strengthening knowledge sharing among enterprises in the entire supply chain.

#### **Values' impact on his innovation behavior**

Values impact mainly through two ways: one is through attitude towards the specific behavior, the other is through faith and personal norms.

Based on the Social Adaptation Theory, value is the most abstract part in social cognition, serving as a prototype for attitude and behavior, thus guiding people's attitude and behavioral expression towards certain acts. The theory from value to attitude, and then behavior is known as the "Value-Attitude-Behavior" Theory. Beckmann et al. studied about the values' affect process on behavior through attitude, with a multinational comparison [15]. Employee's own values will affect their attitude towards innovative behavior. Values determine staff awareness of innovation importance, affect the attitude, and then play a further role in innovation behavior and its performance.

In addition to attitude, values could also have an influence on faith and personal norms. Innovative value is people's awareness about the faith, intention and the path to realize

the innovation value in the long term practice, it is the core of enterprise culture on innovation. When it comes to personal norms, innovative values will stimulate their internal motives to innovate, then lead to initiative and continuous innovation. Meanwhile, corporate values on innovation will cause the integration into employees' own values mechanism and system, which aims at stimulating creative spirit. If so, their perceived pressure to engage in innovative behavior will become smaller, resulting in promoting the smooth implementation of employee innovation. Pressures from the higher and material gains due to innovation are not so long lasting, while employees will have a strong sense of mission and sustainable driving force to innovate with values internalization. Enterprises in the supply chain should focus on the cultivation of sense of dedication, responsibility and tolerance on innovation, thus shape the innovative values and create a well atmosphere for innovation in the whole supply chain.

### III. Organization's Impact on Employees' Innovation Behavior

Organization impacts mainly through two ways: one is through goal orientation, intrinsic and extrinsic incentives, authorization management and some other behaviors, which is named organizational level 1; the other is through organizational learning, knowledge management, innovation atmosphere and so on, which is named organizational level 2.

#### Leader's behaviors' impact on employees' innovation behavior

The development of the goal orientation in staff led by R&D manager had a significantly positive effect on their innovative behavior [8] [16]. Goal orientation refers to concerning about the staff development. They are motivated by achieving learning goals, and encouraged to try new methods and learn from failures. Leaders who are developing the goal orientation, care about the career development of subordinates and encourage them to express the doubt and new ideas in the work, so as to provide a good environment for innovation, ultimately promote innovation behavior.

Incentive is divided into the extrinsic and the intrinsic, the former refers primarily to the external monetary remuneration, the latter refers primarily to no monetary rewards. According to the Motivation Theory, the external one meets employees' material needs, aiming at enabling them to implement innovative acts with no worries, the intrinsic one is primarily through setting innovation goals, assessing and recognizing the innovation, performance communication, guidance to improve, providing learning resources, job rotation, work flexibility, creating growing space, maintaining harmonious interpersonal relationships and so on to stimulate staff innovation enthusiasm, and thus implement innovation. Among all these, creating growing space is an important motivation factor. Enterprises in the

supply chain should provide good space for employees growth, have good supply chain management capabilities, while eliminating business processes, information sharing and technology transfer barriers among enterprises in the supply chain [17].

Authorization's promotion function is showed mainly in three aspects: the first is it not only allows employees to use existing resources, but also can take advantage of the resources have not been used; the second is it facilitates the development of new knowledge; the last is it strengthens employees' initiative [3]. Sole authorization provides staff innovation with support and basic security, by giving them a degree of autonomy decision-making rights and resources to promote learning. At present, the psychological empowerment mainly includes self-decision making, work values, self-efficacy, performance goals, objectives internalization and other aspects [18], which are designed to advance the initiative, realize the value of innovation, enhance self-confidence, as well as set innovation targets and internalize it as incentives, which could finally promote the innovation. The operating environment and future environment change will affect the implementation of the supply chain. Reasonable authority enables employees to innovate with freedom, and improve the ability to innovate independently. Meanwhile, the improvement of enterprise flexibility advances the health development of the supply chain.

There are other factors which could affect the innovation behavior, such as leadership styles and LMX(Leader Member Exchange). Leadership styles mainly refer to transactional leadership and transformational leadership, which could both affect innovative behavior of employees in certain scenarios. WU Wenhua noted that the transactional leadership could promote staff innovation, with combination of goal directed behavior; transformational leadership style could also do it through affecting the organic whole which includes organizational commitment, innovative culture and employee satisfaction [19]. LMX reflects leaders' concern about staff development and close communication with them. They adopt different management methods for different employees, which creates harmony in the organization.

#### Organizational learning and other factors' impact on employees' innovation behavior

Organizational learning is considered as an effective way to capture knowledge and adapt to environmental change with knowledge use. Organizational learning consists of three levels: individuals, groups and organizations. From these, there are two ways to increase individual knowledge, one is through organization's knowledge increase, which could further expand the organization's knowledge stock; the other is that the group or organizational learning can motivate individuals to learn, and thus internalize this into personal behavior. Therefore, the organizational learning capacity, particularly learning among the different levels can contribute to an individual's knowledge accumulation and

updating, so as to set the stage for innovation with knowledge stock.

Knowledge management generally consists of four stages: the creation or obtaining of new knowledge; knowledge retention; knowledge sharing within the organization; learning and using shared knowledge [20]. There are individual knowledge management and organizational knowledge management. The organization integrates staff skills, experience and qualities to create an environment which could facilitate the ideas creation effectively. Enterprise's attitude towards knowledge management can directly affect the employee's innovative behavior [21], such as whether to establish a knowledge sharing platform. Enterprise in the supply chain need to establish an effective knowledge management system with active support from senior leaders, so staff could be provided with more learning opportunities through knowledge documentation, datamation and systemization, which is conducive to employee knowledge accumulation and innovative capability improvement. With cooperation of upstream and downstream enterprises, knowledge sharing and integration can be strengthened, leading the company to develop product effectively through innovation, so as to meet different market needs in the rapidly changing environment [22].

Zuma believed that innovation was formed in the organizational climate [23], because members could recognize the innovation demand, innovation opportunities, as well as support for innovation in the atmosphere. Distinctive organizational culture bears the idea of innovation encouragement, which has a great role in promoting innovation. Innovative culture is conducive to encouraging their employees to imagine, putting forward their own ideas, while taking advantage of resources in the whole supply chain to conduct open tests, and breaking the inertia and rigid organizational thinking, which lead to innovation values shaping and innovative spirit stimulation. Organizations should advocate work freedom and challenge, provide support to teamwork, remove barriers not conducive to innovation. Besides, harmony and equality among employees need advocating. Moreover, organizations must create equal and harmonious organizational atmosphere, so employees could speak freely, express their opinions, try new experiments, and carry forward the innovative behavior [24].

Other factors include organizational commitment, team trust and so on. The impacts are mainly embodied in the mutual trust between organization and individual, individual and others. Organizational commitment is a psychological phenomenon that the employee has to remain in the organization as the input into it increases. No matter whether it is a sense of identity and participation in the organization, individual's recognition that he will lose the additional benefits once he leaves the organization, or the values consistency between the individual and organization, responsibility for the organization, all these will reinforce

the sense of organizational commitment of employees, thereby stimulating innovation behavior. In the environment of supply chain management, enterprises have broken the traditional organizational model to begin "no boundaries" development. Moreover, they could make use of external knowledge resources effectively through establishing project management team among others in the supply chain [25]. Moreover, trust in the team could advance the mutual trust among enterprises in the supply chain. Members from different organizations have more opportunities to pool ideas together and generate more innovative inspiration with communication, which ultimately contribute to the implementation of innovation.

#### **IV. Society's Impact on Employees' Innovation Behavior**

The innovative behavior of employees could be affected by the society. But in terms of degree, the influence of pressures come under social norms is greater than that from politics, economy, technology and other macro-factors.

##### **Social norms' impact on employees' innovation behavior**

Social norms refer to pressures come from social comparison, that is an individual's perceived social pressures when deciding whether to implement a particular behavior. As for employee innovation behavior, it is his perceived pressures from organizations or significant others when he engages in innovative acts. According to the Theory of Reasoned Action, social norms can affect behavior [9]. The impact of organization, leadership and other personnel has been explained in the previous analysis. In addition, perceived stress from family members, friends and others still belong to social norms. The proper pressure can precipitate innovative behavior of employees, so enterprises should keep abreast of the psychological state of employees, appropriate staff perception of the pressure, also conduct stress management in connection with different groups. Special attention should be paid to families in social norms. Except for working hours, employees stay at home most of the time, then their mood and behavior in the enterprise could be seriously influenced by family members. Therefore, enterprises need to care about staff's families, the health of family members and strengthen the emotional management.

##### **Other factors' impact on employees' innovation behavior**

Other social factors include politics, economy, technology and so on. Enterprises' overall innovation environment is related to politics, the level of resources to innovate is related to economy, technology determines the level of innovation. These factors affect staff innovative behavior more or less. But as to the extent of the impact to different types of employees in the supply chain, further analysis is wanted.

## V. The Integration Framework of Employees' Innovation Behavior

Enterprises in the supply chain could promote employees innovation behavior from individual level, organizational level and the social level. Summing up the above point of view, we present an integration framework, just as Fig. 2 shows.

On individual level, knowledge and values are important fundamental factors that affect employees' innovation behavior. They affect the innovative behavior through attitude, perceived behavior control, personal norms and other intermediary variables. Enterprises in the supply chain should increase the knowledge stock and shape staff values on innovation through the impact path, make them hold positive attitude towards innovative behavior, reduce the difficulty to engage in innovative acts, and finally advance the abilities to innovate independently.

The organizational level contains two parts. On organizational level 1, the goal orientation, intrinsic and extrinsic incentives, authorization management and other behaviors could impact on employees' creative behavior. Leaders need to establish goal orientation to implement innovative behavior, improve internal and external incentives and authorize reasonably, so as to meet needs to innovate and grow, aiming at inspiring self realization and raising initiative maximally. On organizational level 2, organizational learning, knowledge management, innovation atmosphere could impact on employee innovation behavior

by influencing knowledge and values in the individual level. Enterprises should take measures, such as strengthening the organizational learning, establishing the knowledge management system, creating innovative atmosphere and removing barriers to knowledge sharing among enterprises to consolidate the individual's knowledge stock and shape innovation values, which are conducive to the implementation of innovative behavior. In the era of supply chain management, knowledge is good for innovating smoothly and meeting customers' needs effectively, finally enhancing the core competitiveness.

On the social level, social norms directly affect the innovative behavior of employees. Family members' impacts are controllable, so enterprises in the supply chain need to care about their life, keep abreast of the psychological state of employees timely, and conduct emotional management well. Politics, economy and other social factors also affect the innovative behavior of employees, but the impact extent and details need further analysis.

## VI. Concluding Remarks

The enterprise must have core competencies to gain competitive advantages in the fierce competitions under the environment of supply chain. Innovation is an important source of core competitiveness, and the employees are the center of enterprise innovation, so study employees' innovation behavior under the view of supply chain is

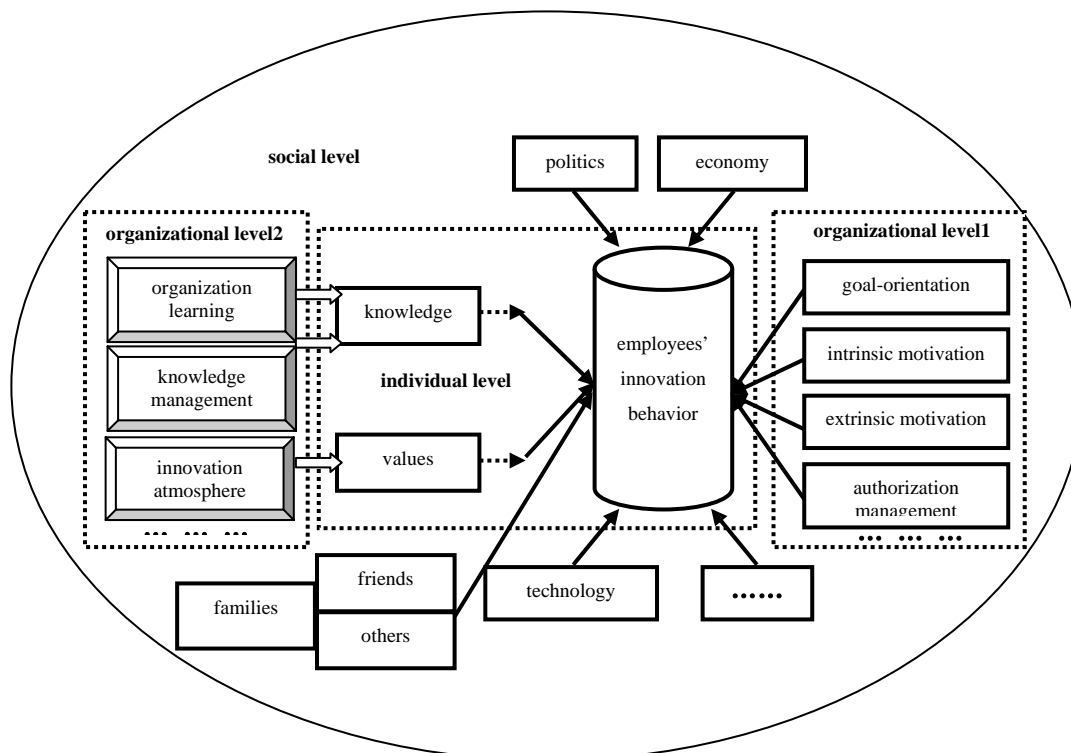


Fig. 2. The integration framework of employees' innovation behavior

crucial. In this paper, we analyzed the factors affecting employees' innovation behavior with theories of social psychology and management, elaborated the individual, organizational and social impacts in detail, proposed an integration framework, and discussed the effective management practices to promote the innovation behavior and improve enterprise's capabilities of independent innovation. Employees' innovation behavior is the result of factors interaction. Enterprises in the supply chain should use systematic management perspective to consider all the factors comprehensively, promote the smooth implementation of employees' innovation and enhance the innovative capability, ultimately strengthen the core competitiveness.

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