# Research on Network Team Collaborative Innovation Product Iterative Development Model

ISSN: 1813-4890

Xirong Gao <sup>a</sup>, Xingrong Wang <sup>b</sup>

School of Economics and Management, Chongqing University of Posts and Telecommunications, Chongqing, China

<sup>a</sup>443885592@qq.com, <sup>b</sup>1450667472@qq.com

### **Abstract**

In the face of a highly competitive market, product operators are often struggling with limited human resources, high costs, and demanding, high-volume, iterative tasks. In order to maintain user satisfaction and reduce the iterative pressure of product operators, the article designed an iterative development model for network collaborative innovation products. Firstly, the block chain technology is used to build a network collaborative innovation cloud platform to realize information sharing and public participation in tasks. Then set up a network collaborative innovation team to achieve fast and high-quality innovation tasks through this model. Finally, the specific path of the network collaborative innovation iterative development mode is designed, including the implementation path of further fast response in this path. The iterative path established by the article can be used to help enterprises improve the iteration speed and iterative quality in iterative innovation.

## **Keywords**

Network collaborative innovation; block chain; iterative development model; rapid response.

#### 1. Introduction

In the production of digital products, iterative innovation ideas are included, that is, user feedback is obtained through user experience, and then the information fed back by the user is analyzed, thereby correcting product problems and adding new functions and product attributes. The continuous upgrading of products has led to an increase in user satisfaction, which in turn has increased demand and increased the market share of manufacturers. However, in the face of fierce competition and market giant control, in order to maintain the number of product users and user satisfaction, product operators often have limited human resources, limited R&D, production capacity, rising costs and high costs. The comparison and balance of the update tasks that require high and frequent times are exhausted.

In the production of digital products, iterative innovation ideas are included, that is, user feedback is obtained through user experience, and then the information fed back by the user is analyzed, thereby correcting product problems and adding new functions and product attributes. The continuous upgrading of products has led to an increase in user satisfaction, which in turn has increased demand and increased the market share of manufacturers. However, in the face of fierce competition and market giant control, in order to maintain the number of product users and user satisfaction, product operators often have limited human resources, limited R&D, production capacity, rising costs and high costs. The comparison and balance of the update tasks that require high and frequent times are exhausted.

At the same time, in terms of network technology, the development is leaps and bounds. Cloud computing, big data, Internet of Things, blockchain and many other new technologies can not only play a role in data computing and storage, rapid information transfer, real-time resource monitoring, automation, etc. It can make the whole society sublimate in resource planning, resource integration, new value creation and surplus retention.

Based on the above research background, this paper proposes to use network technology to enhance the teamwork of product production teams through the above-mentioned information transfer, and to assist product production and product innovation through distributed information transfer, resource integration and resource rational planning.

## 2. Literature Review

Iterative innovation is a new innovation model—iterative innovation—that combines iteration and innovation with a continuous approach to the optimal solution. Huang Yanhe and Tao Qiuyan proposed to accelerate the pace of innovation, with continuous innovation as the orientation, and through the construction of a fully authorized small innovation team, using multiple iterations to innovate innovative behavior patterns with minimum cost and minimum risk [1]. Sun Li and Yang Xiaoming believe that iterative innovation is due to the high uncertainty of the market. Before the demand is not fully confirmed, the first generation of imperfect products will be developed, and then the immature products will be handed over to the leading users to continuously obtain user demand, improve the product [2].

Regarding the characteristics of iterative innovation, Hui Huaihai, Liang Gongqian, and Ma Jiancheng believe that the characteristics of iterative innovation are open, continuous, accelerating, and dual [3]. Xi Tao and Zheng Xianqiang believe that micro-innovation and rapid change are the characteristics of iterative innovation [4]. . Zhang Teng and Zhang Yuli believe that the key dimension of iterative innovation is the advancement in the category of innovation source and the advancement in the category of innovation evolution process, and proposes that the key mechanisms of iterative innovation are user interaction, rapid response and cross-border fusion [5]. Lin Ting proposes software development with iterative innovation ideas with open computing, multi-regional software collaborative development, community-driven development, and modularity [6].

With regard to the process research of iterative innovation, Ma Lihui and Tan Runhua established the design goal of the whole product through product demand analysis and technological evolution analysis, determined the conflict of the ideal solution element IFRM through evolutionary obstacles, and selected the corresponding solution tool in TRIZ according to the conflict type. The analogy of the problem, the designer determined the domain solution based on experience and specific products, and established a reverse iterative design model driven by the conflict network [7]. Xu Wei constructed an iterative innovation mechanism model through code analysis, and made a reasonable establishment of the sub-categories in the main categories of iterative innovation, and analyzed the relationship between the main categories [8].

On the research of collaborative innovation, Liu Xiaoyun and Zhao Weifeng constructed the operational mechanism of China's manufacturing collaborative innovation system from four aspects: system dynamic mechanism, resource supply mechanism, cooperative trust mechanism and incentive guarantee mechanism [9]. Zhang Zhan and Zhang Hongjuan summed up the basic model of collaborative innovation into categories, and summarized the derivative models according to different classification principles to deepen the derivative models such as the strength of the relationship between participating subjects and the density of collaborative innovation networks [10]. Based on the analysis of the formation process of the virtual organization's continuous innovation capability, Zhang Baocang and Ren Hao proposed that collaborative innovation is a way to enhance the ability of virtual organizations to continuously innovate [11].

#### 3. Reeearch framework

In the process of developing new products, in the face of fierce competition and market dominated by market giants, in order to maintain the number of product users and user satisfaction, the new product development process with collaborative innovation as the core idea is to build a collaborative innovation cloud platform. Establish a collaborative innovation team to collaboratively innovate the cloud platform to carry out the iterative development process of new products. Therefore, the model of new product development can be summarized as the construction of collaborative innovation cloud

platform, collaborative innovation team formation and new product iterative development (as shown in Figure 1). Among them, the collaborative innovation cloud platform is the medium for iterative development of new products. The collaborative innovation team is the main force of iterative development. The iterative development of new products is the target process of formulating strategies and achieving further optimization and improvement. This paper aims to improve the quality and efficiency of product innovation, through the construction of collaborative innovation cloud platform, the formation of collaborative innovation team and the design of iterative process to achieve rapid and effective iteration and innovation of products.

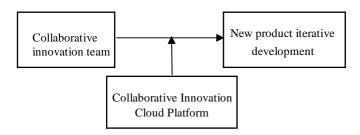


Figure 1 Network team collaborative innovation iterative development model

#### 3.1 Network Collaborative Innovation Cloud Platform Construction

The establishment of the network collaborative innovation cloud platform is the basis for designing the network team collaborative innovation and iterative development model. By building a network collaborative innovation cloud platform, the functions of network interconnection, information sharing, public task release and public participation task completion are realized. Refer to the design principles of the network collaborative innovation cloud platform, and learn from the existing advanced network technologies to complete the design of the platform technology architecture.

#### 3.2 Network collaborative innovation team building

The establishment of the network collaborative innovation team is based on the application of modern advanced network technology, based on its application and combined with a variety of related management theory to build a team formation model that can form collaborative innovation between networks. High quality innovative tasks.

#### 3.3 Product Iterative Development Model Design

Product iterative development mode design is to establish a network with collaborative innovation between teams to further explore the specific tasks, design a specific path of network collaborative innovation iterative development model, including the realization of a fast response implementation path.

## 4. Network Collaborative Innovation Cloud Platform To Build

The network collaborative innovation cloud platform is a network platform that can realize internetwork interconnection, information sharing, public task release and public participation tasks. The functions that can be realized include: information communication and information transmission between networks; information sharing and distribution within the platform. The design principles of the platform are advanced, scalable, open and compatible, reliable and secure. The technical architecture of the network collaborative innovation cloud platform is six levels from the bottom to the top: the physical layer, the data layer, the network layer, the consensus layer, the intelligent contract layer, and the application layer.

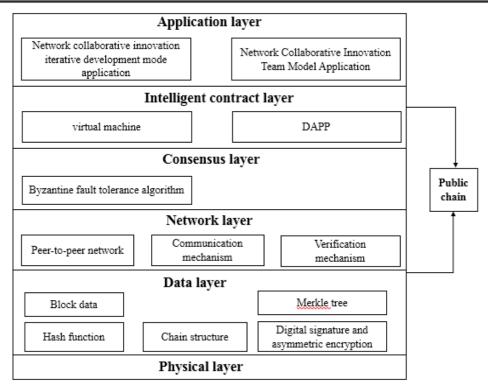


Figure 2 Support platform technical architecture design

## (1) Physical layer

The physical host and hardware environment of the platform is the most basic level of the entire platform construction.

## (2) Data layer

Above the reliable hardware infrastructure provided by the physical layer is the foundation of everything in the software. It mainly implements two functions: storing related data and the realization and security of accounts and transactions. The data storage is mainly based on the Merkle tree, implemented by means of blocks and chain structure. The implementation of accounts and transactions is based on a variety of cryptographic algorithms and techniques, such as digital signatures, hash functions, and asymmetric encryption techniques, to ensure that transactions are safely performed in the context of decentralization.

#### (3) Network layer

The network layer mainly implements the connection and communication of network nodes. Different from the central network system with a central server, each client of the peer-to-peer network is both a node and a server function, which has the characteristics of decentralization and robustness. The existence of the network layer enables information to be interconnected on the platform; and because of the construction of the network layer, it is possible to generate an internal knowledge integration platform. Two points form the characteristics of network collaboration and improve the efficiency of network collaborative innovation.

#### (4) Consensus layer

The consensus layer mainly realizes that all nodes of the whole network agree on transactions and data, and prevent consensus attacks such as Byzantine attacks and witch attacks. In the technical architecture design of the network collaborative innovation platform, this paper adopts the most typical Byzantine fault-tolerant algorithm in the block chain technology in the consensus layer, so that the consensus can be achieved on the whole platform to achieve data security and not to be tampered with. The application of the standard and reward distribution methods described later.

## (5) Intelligent contract layer

The smart contract gives the book a programmable feature, and the block chain 2.0 runs the code in a virtual machine to implement the smart contract function. This layer forms a decentralized application (DAPP) by adding a front-end interface that interacts with the user on the smart contract. The intelligent contract layer is an important function in the platform that enables users to directly realize the transactions of digital assets and reward distribution according to the results of their work when participating in innovation.

## (6) Application layer

The application layer is similar to various software programs in computers, and is a product that ordinary people can use directly. The application of this level is almost blank. The market is in urgent need of such an application, detonating the market, forming an expansion trend, and allowing block chain technology to quickly serve the public. The application of the network collaborative innovation iterative development model and the application of the network collaborative innovation team model are the specific content of the network collaborative innovation platform at the application layer and the key functions of the entire platform.

## (7) Public chain

The network collaborative innovation platform is an open combination of block chain and an application for network collaborative innovation. The public chain refers to the block chain that is open to everyone and can be participated by anyone. In order to meet the requirements of openness of the platform and public participation in public innovation, the use of the public chain is an inevitable choice.

## 5. Network Collaborative Innovation Team Building

### 5.1 Organizational structure

The organizational structure of crowdsourcing is a multi-tasking or mixed-action organizational structure with a mission-oriented structure, which is characterized by public participation, responsibility only for the task's demand goals, and huge participant node size. However, in the situation of crowdsourcing structure organization, there is a lack of links between nodes.

In order to inspire more and better ideas for task participants and to exert greater efficiency through learning, we should strengthen communication between nodes, build knowledge sharing mechanisms within the structure, and transfer information and share mechanisms. This paper proposes the organizational structure of the network collaborative innovation team. The structure diagram should be a three-dimensional shape of the cone, the round surface of the bottom surrounds a myriad of nodes, and the node and any other node can be connected. At the same time, due to the credit mechanism brought by the work of the block chain, the nodes can trust each other and be closely linked.

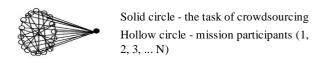


Figure 3 Network collaborative innovation team organization chart

## 5.2 Organizational pattern design

The organizational form of the network collaborative innovation team is built on a network with a fast and diverse information transfer. In order to enable the organization to fully handle the innovative tasks, Ms. Wu Yuhong's requirements for the innovative communities of the four typical alien tribes in the "Creating Times" and the organizational characteristics of iterative innovation [12]. The design of the organizational form of the network collaborative innovation team should follow the following principles: cross-border integration, mixed functions/blurred; complete information, collective

collaboration; free choice of paths, focus on objectives; flexible organization, flexible modules; open boundaries, public participation; The relationship is equal and trust, and self-extension is maximized. The organizational component of the network collaborative innovation team is determined by the ecosystem model in which it exists. Such an ecosystem is the integration of professional knowledge and the remaining diverse knowledge as well as the entire chain of task delegation to task solving. By thinking about the positioning of the ecosystem, this paper gives the eco-pattern as shown below:

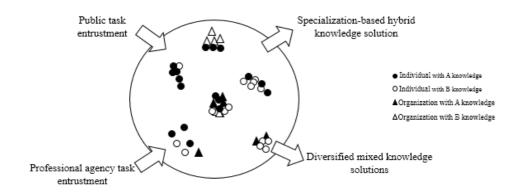


Figure 4 Network collaborative innovation ecosystem model

The network collaborative innovation ecosystem model is mainly divided into two parts, internal and external. The first is that external professional organizations and the public input their delegated tasks internally; these delegated tasks are processed internally, and the solutions are output to the outside for feedback. In the interior, there are countless free combinations of nodes, which are composed of individuals with different expertise, organizations, and individuals with diverse knowledge, according to different kinds of ratios and different degrees of aggregation. Each of these combinations has its own comparative advantages. According to the theory of comparative advantage and the theory of long tails [13], when the external input tasks are commissioned internally, the competition between the organizations and the selection of the best and self-advantage Behavior, which can handle task delegation in an efficient manner, and ultimately includes a hybrid knowledge solution based on specialized knowledge or a solution containing diverse mixed knowledge for external output to meet external needs.

#### 5.3 Incentive mechanism

Participants' motivation is divided into two aspects: intrinsic motivation and extrinsic motivation. Understanding the participants' motivation to participate can correctly establish incentive strategies and stimulate participants' desire to participate in the task. In addition, the innovation task should adopt intrinsic motivation, and the external motivation effect is not significant. This paper designs incentives from the following five aspects.

- (1) Relevant research indicates that the main motives of task participants in crowdsourcing are: money, satisfying their curiosity, learning new knowledge and improving their self-ability, and designing incentives from these aspects.
- (2) As a network collaborative innovation team existing in the virtual community, the many social characteristics of the virtual community can also promote the active participation of members of the network collaborative innovation team. Xu Guang and other four people think that structural dimension social capital, relationship dimension social capital, cognitive dimension social capital with virtual community perception as an intermediary can effectively have a significant positive impact on organizational citizenship behavior [14]. It can be seen that helping the team to improve

cohesion, trust mechanism and communication platform, as well as the setting of work processes and the shaping of team spirit, is an important way to motivate team members to participate.

- (3) According to the hierarchy theory of management needs [15], as the needs of three people who are going up: social, respectful, self-fulfilling, these needs are all stimulating people to work actively, and These needs are better met in a network of information-filled spaces.
- (4) Social circles are open, based on hobbies and topics, and have high interactivity among members. According to the characteristics of the network—Mekoff's Law [16], the growth of the number of nodes leads to the growth of network value. For social networks with explosive growth like the community, the increase in value will give participants greater incentives.
- (5) Block chain technology is distributed, non-destructible, and programmable economy brought by smart contracts and trust between nodes. This kind of trust comes from the fair proof of the results of the work, the evaluation of the true reputation and the corresponding distribution system. Because of the trust between the nodes, the upper and lower links of the production chain can trust each other. Only the upstream and downstream full trust allows the producers to realize that the rewards they may get from their work will not be deprived and will be fully attributed to themselves. Its efforts to produce.

## 5.4 Distribution System Design

For the design of the distribution system of the network collaborative innovation team, these principles should be possessed: diversified rewards; job performance through competitive bidding; multi-path coexistence, optimal supremacy; talented people have everything. According to the design principles, the design of the distribution system is as follows:

## (1) Bargaining system

Due to the application of the consensus mechanism of blockchain technology, digital assets can be traded, that is, the ownership of work results is proved, and because of the large number of working members in the project, this paper uses the scores to calculate the value of the results. Therefore, it is possible to make the work results public, wait for other workers to negotiate and give scores to their workload, and allow other workers to carry out the next step, and give a round of reports in this period. After multiple rounds of reporting changes and generations following the participation of many participants in the project work, all the workers finally submit the final report after completing the entire project, rewarding them according to the score.

## (2) Application of bifurcation chain

The bifurcation chain transfers and preserves the work and evidence before the fork and gathers a new group of people through the fork to generate a new work report based on the fork before and independent of the report of the main chain. For example, after A's work, both B and C are willing to follow up on A's work and are willing to accept the quotation set by A. Therefore, after B and C complete their respective work, this round will be established separately. The report, in order to record the scores of their own work results, so that participants participate in the task, the task completion plan is divided and a number of new paths are born to make the final reward distribution with results statistics.

#### (3) Multiple selection and reward mechanisms

In order to mobilize the enthusiasm of the participants and the hard work of the participants, a variety of selections and rewards should be adopted. For the selection method, the double evaluation mechanism is adopted. One is that the task publishers themselves select themselves according to their own needs; the other is that many third parties join the popular democratic selection.

In the design of the reward mechanism, on the one hand, it is rewarded according to the rewards that should be obtained by the scheme selected by the task publisher, and the rewards are distributed according to the individual scores of the participants/the total scores of the selected schemes. It is often based on money and material rewards. On the other hand, the realization of personal values, the

display of personal abilities, the realization and protection of personal intellectual property, and further appreciation.

## 6. Network Collaborative Innovation Iterative Development Model Design

## 6.1 Network Collaborative Innovation Iterative Development Model Design Principles

The iterative development model based on collaborative innovation of network teams should be a model that relies on the Internet and blockchain technology, is task-oriented, starts from the least feasible product test, and is online with fragmented modular work. Iterative development work. In addition, the network collaborative innovation and iterative development should complete the link and link of the whole product development work, the fragmentation module and the fragmentation module in the online market-oriented transaction mode. Principles of network collaborative innovation iterative development model:

## (1) Public participation, mass innovation

The network collaborative innovation model must have the characteristics of complete openness, high participation and high interactivity. The solution to this problem is to open up, introduce different levels and breadth of the masses, achieve large-scale collaboration and cross-border integration, and achieve product innovation.

## (2) Working with fragmented modular Solitaire

Modularity is one of the trends in product innovation. Independent modules enable workers to quickly modify, adjust product shortcomings and quickly add new product fairness and attributes in product iterations. Volkswagen participates in the product innovation and development work in a fragmented module as a unit, and finally connects a large number of fragment modules according to a unified standard to complete the entire product.

## (3) Custom design and consensus on standards

In the product innovation under large-scale collaborative work and public participation, in order to facilitate management and enhance self-operation to improve work efficiency, each piece and module should be based on the participants' own ideas and practices while using fragmented modularity. Willingness to make a custom design. At the same time, the task participants and their respective modules developed by the company can form a Solitaire-style product innovation with each other in the combination of whether to follow the standards and build standards.

#### (4) Iterative product innovation

In the public participation and mass innovation, the public can not only promote the product's attributes more in line with the public's welcome, but also make the product innovation user feedback more real and fast, countless innovative solutions and a large number of fragmented modules. The combination makes the iteration speed and response speed in innovation faster and the quality of innovation is improved.

#### (5) Task-oriented, with the product function specified by the task as the function of MVP.

Taking tasks as the center, carrying out work and achieving the required functional goals can not only enhance the autonomy of the participants, but also form self-management to reduce the difficulty of centralized management in the development work, improve the level of cooperation and eliminate the hierarchy after the relationship is more harmonious. And finally complete the task to achieve the goal.

## 6.2 Network team collaborative innovation iterative development model process design

6.2.1 Network team collaborative innovation and iterative development overall process design The first is to build a business model. In the process of building a business model, it is mainly to determine the market demand, value embodiment and product function, product basic attributes, and how to pass the product.

The second step is to minimize the viable product development and minimize the viable product—MVP requires it to be completed: minimize costs, complete the core functions of the product, and make the product structure simple and easy to update and modify.

The third step is to conduct user testing, with the user's real user experience of the product as its evaluation of the product, based on the two basic usefulness and ease of use of the five principles of user experience, and openly allow It presents personal insights and complaints about the problem.

The fourth and fifth steps are to analyze and organize the user feedback, and then select the optimal iteration improvement point.

The sixth step is to judge whether the product can continue to be further improved. If there is, then propose the design of the improvement plan, and then quickly give the product an incremental correction in the form of quick response and immediately put it on the market and return to the third collection user. Feedback information; if it is not possible to improve the product, choose transformation - redesign the function, attributes, and methods of the product, re-transfer back to the first step for the business model, and re-create the MVP in a new business model. The market is iterative.

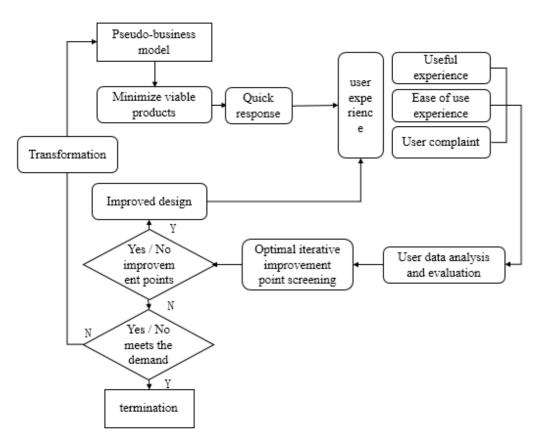


Figure 5 Iterative Innovation Process Design

#### 6.2.2 Network team collaborative innovation rapid response process design

Quick response is an important part of iterative innovation. The significance of this is that products can quickly and iteratively and quickly develop and implement products to quickly generate updated versions of products.

The mechanisms for rapid response through network collaborative innovation are: highly interactive information to achieve dynamic operations, fragmented modular operations, large-scale collaboration, follow-up or custom engineering standards for Solitaire operations. Considering these mechanisms, this paper designs a rapid response process under the network collaborative innovation as shown in the following figure.

The design of the quick response process is divided into three sections: one is module and fragmented work, the other is the construction of internal knowledge platform, the third is the interconnection between the first two points, and the final product is completed in the way of Solitaire.

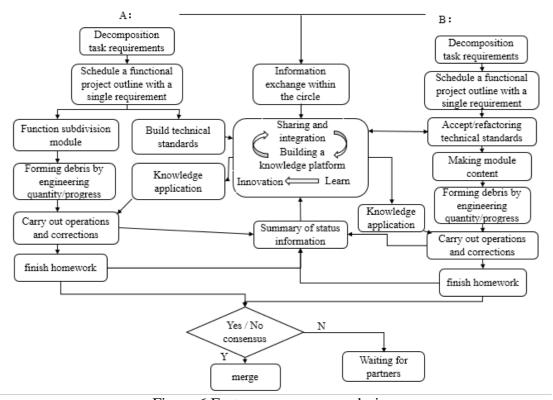


Figure 6 Fast response process design

#### (1) Module and fragmented work—the form of network collaborative work

The first is the fragmented modular work. From the flow in the figure, A and B often start from the decomposition of the task requirements, and then gradually subdivide, set up the functional project by solving the individual requirements, and then formulate the module by implementing the function. Finally, by definition, it is going to complete the fragmentation. Upload the work results to the network after completing their respective work. Eventually, a large number of pieces are spliced together to form the final product.

- (2) Construction of internal knowledge platform the key mechanism of network collaboration Building an internal knowledge platform is very important for network collaborative innovation. Collaboration can only be achieved by building an internal knowledge platform that allows information to flow through internal knowledge platforms. In the figure, the internal knowledge platform is the information exchange of the communication circle and communication group in the network, the technical standard formed by A in creating their own fragments, the technical standard of B reconstruction, and the instant summary and reporting of the status of the operation status. Aspect composition. A large amount of information converges on the internal knowledge platform, in which knowledge forms a cycle from integration to learning to innovation, integration, learning and innovation. Ultimately, the internal knowledge platform will continuously export new knowledge and form a driving and influencing role through the application of knowledge to the improvement and development of each of A and B's operations. It ensures that the fragments and fragments, modules and modules can work together, and finally guarantees the innovation of the products through the connection under certain efficiency.
- (3) Mutual connection and Solitaire the way the public participates in network collaborative innovation

The inter-joining function refers to the interaction between the internal knowledge platform and the fragmented modular operation in the figure, and the collaborative innovation is completed in the network. Solitaire refers to the completion of the final product by joining and supplementing the work of the former through the latter. At the end of the figure is the process, where the market-based upstream and downstream forms are used to determine whether two pieces of debris are merged by consensus.

#### 7. Conclusion

This paper is based on the idea of collaborative innovation of network teams to help enterprises improve the iterative speed and iterative quality in iterative innovation. As a goal, an iterative development model under the collaborative innovation of network teams is proposed.

- (1) Combine blockchain technology to build a network collaborative innovation cloud platform for information sharing, public task release, and public participation task completion.
- (2) Drawing on the crowdsourcing model, the organizational structure of the network collaborative innovation team is proposed, so that the public in the network can participate in the innovation task, saving the enterprise's own human and material resources and making up for its shortage.
- (3) Propose the rapid response process under the collaborative innovation of the network team to help enterprises propose iterative solutions as soon as possible within the limited internal human resources and limited knowledge reserves to improve the quality and efficiency of product innovation.

## Acknowledgements

This paper was supported by National Social Science Fund Project "Study on the Stimulating Mechanism and Cutting Path of Chinese Enterprises to Independent Innovation Transition" (Approval No. 12BGL017); Chongqing University of Posts and Telecommunications University Student Research Training Program (2016).

## References

- [1] Huang Yan, Tao Qiuyan. Iterative Innovation: Concepts, Features and Key Success Factors [J]. Technology and Economy, 2015, 34(10): 24-28.
- [2] Sun Li, Yang Xiaoming. Iterative Innovation: A Shortcut to Innovation in the Network Age[J]. Tsinghua Management Review, 2014(06): 30-37.
- [3] Hui Huaihai, Liang Gongqian, Ma Jiancheng. Research on iterative innovation model and process[J].Soft Science, 2008(01): 117-121
- [4] Xi Tao, Zheng Xianqiang. Research on iterative innovative design method of Internet products in the era of big data[J]. Packaging Engineering, 2016, 37(08): 1-5.
- [5] Zhang Teng, Zhang Yuli. The key dimension mechanism and theoretical model of iterative innovation based on Haier entrepreneurial "small micro" case study[J]. Journal of Henan University, 2017, 5(3): 48-55.
- [6] Lin Ting. Improvement of agile development method based on teamwork [D]. Ocean University of China, 2009.
- [7] Ma Lihui, Tan Runhua. Reverse Iterative Innovation Design Process Driven by Conflict Network[J]. Model Mechanical Design and Research, 2007,25(5): 69-86.
- [8] Xu Wei. Research on product iterative innovation mechanism based on knowledge integration [D]. Harbin Institute of Technology, 2017.
- [9] Liu Xiaoyun, Zhao Weifeng. Research on Operation Mechanism of Collaborative Innovation System in China's Manufacturing Industry[J]. China Soft Science, 2015, (12): 63-76.
- [10] Zhang Zhan, Zhang Hongjuan. A Review of Collaborative Innovation Models[J]. Journal of Shenyang University, 2015, 12(6): 45-52.
- [11] Zhang Baocang, Ren Hao. Research on the Mechanism and Path of Sustainable Innovation Capability Improvement of Virtual Organizations[J]. Science and Technology Progress and Policy, 2017, 7(13): 23-36.

- [12] Wu Hongxuan. Zhongchuang Times [M]. CITIC Publishing House, 2015.
- [13] David Ricardo. Political Economy and Taxation Principles [M]. Beijing: Guangming Daily Press, 2009.
- [14] Xu Guang, Zhang Xue, Li Zhigang, Tian Youzhuang. Research on the Relationship between Social Capital and Organizational Citizenship Behavior Based on Virtual Community Perception and Community Participation Motivation[J]. Management Review, 2016, 7(7): 213-226.
- [15] Maslow. Human Motivation Theory [M]. Huaxia Publishing House, 1987.
- [16] Zhang Xiaoti, Ni Yunhu. Network Economy [M]. Beijing: Higher Education Press, 2002.8.