A System Dynamics Model for Open Innovation Community

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ABSTRACT

In order to promote the development speed of the open innovation community, a dynamical system model of it is constructed, and the simulation is carried out to find out the rules of the running rules for the open innovation community. First, the basic characteristics of open innovation community are summarized. Second, the system dynamics model of open innovation community is constructed. Finally, the simulation analysis based on dynamic system model of the open innovation community is carried out, and the effect of different factors on the variables of the open innovation community is obtained. Results show that system dynamics is an effective tool for analyzing the open innovation community.

KEYWORDS
Model, Open Innovation Community, Simulation, System Dynamics

1. INTRODUCTION

With the economic globalization, “Closed innovation” has been out of date compared to “open innovation”, more and more enterprises have implemented the “open innovation”. The “open innovation” refers that the enterprises carry out innovation by using the internal and external sources at the same time. Under “open innovation” mode, the innovation process of the enterprise is nonlinear and open, the innovation main body of the enterprise no longer relies on its own strength, and interacts effectively with external sources of innovation, and then enterprise efficiency can be maximized. In the internet age the open innovation requires the innovation subject be good at network management, and can coordinate the cross organizational, cross cultural knowledge transfer and flow. Knowledge sharing, and innovative behavior have been no longer restricted to communication between internal employees, the virtual community based on social media has become the new platform that publishes the innovative ideas. The enterprise can establish the open innovation community to connect the external users and enterprises, and the users are encouraged to express the ideas and opinions in community (Lee et al., 2018).

The increase of the knowledge transfer speed, the acceleration of human capital flow and more and more wide of venture capital range require enterprises to accelerate the development and promotion of new technology and new products and actively search, identify, and obtain all the resources inside and outside the enterprises (Pirkkalainen et al., 2018; Martinez-Torres & Olmedilla, 2016; Hannigan, 2018), and seek innovative cooperation Initiatively, and achieve technological innovation through sharing resources and complementary advantages. Therefore, it is necessary to carry out operation mechanism and system analysis for open innovation community network, and analyze the cause and
effect relationship of each node in community, and integration mechanism of innovation resources (Cui et al., 2018; Jason et al., 2018; Angela et al., 2018). The system dynamics is an important method for studying complex problem, absorbs the essence of cybernetics and information theory (Sam & Petros, 2017; Mila, 2017), and integrates the computer technology into the system modeling and simulation based on system, explores the problems existing in the system by analyzing the mechanism of information feedback (Jan et al., 2017; Mari, 2017; Birgit et al., 2018), and solve the system problem based on structure method, function method and historical method, therefore the system dynamics can deal with the system problems with complex, nonlinear and delay phenomena.

The system dynamics has been applied in natural and society fields (Wondowossen et al., 2018; Khanmohammadi et al., 2018; Albert et al., 2018), which belongs to a cross disciplinary discipline. The system dynamics can effectively cope with the complex problem, and correctly evaluate the nonlinear problem (Michael et al., 2017; Zhang et al., 2018; Juan et al., 2017). A dynamic simulation model is established based on the observed information of the system, and the future behavior of the system is described by computer experiments (Mohammed et al., 2018; Alberto et al., 2018). Therefore, it is feasible to apply the system dynamics to this research.

2. BASIC CHARACTERISTICS OF OPEN INNOVATION COMMUNITY

Firstly, members of the open innovation community include different groups of people, consumers, designers, researchers and collaborators. These groups have different fields of expertise, skills and experience. All the knowledge and information in the community, such as programs, needs, technology and creativity, comes from the community members, and along with the community members. Flow and flow. Therefore, increasing or maintaining a stable number of community members is an important part of open innovation community management. The greater the number of community members, the greater the breadth and depth of community knowledge transfer and sharing. Enterprises will get more opportunities to identify new ideas, new technologies and new needs. According to the development strategy and market trends, innovative resources will be rapidly transformed into new products and services, and innovative income will be increased. The change of the number of community members is mainly affected by such factors as community popularity, community attraction, member satisfaction, loss rate of members, community culture, community coverage, member incentives and so on. The satisfaction of community members is an important factor affecting the loss of community members. With the decrease of the satisfaction of community members, the loss rate of community members increases, and the increase of the loss rate will further reduce the community coverage rate. A good open innovation culture is conducive to creating an open innovation atmosphere that is inclusive and shared, enhancing the sense of identity, trust and belonging of community members, so that open communities have a strong attraction to community members, enhance the visibility of open innovation communities, and the visibility of open innovation communities will follow the community. The number of district members has increased steadily. Membership incentive is the key link of open innovation community member management, which directly affects the activity and attractiveness of community members (Hussan et al., 2018).

Secondly, the open innovation community has a lot of knowledge. The enterprise can obtain the knowledge through perception, exploration, diffusion and absorption of knowledge. In open innovation mode, enterprises can develop the innovation potential through searching, obtaining and integrating external knowledge or technology. The enterprise can collect the existing knowledge again, and then the innovation capability or performance of the enterprise can be enhanced. The open innovation community should constantly pursue new knowledge resources and create new knowledge to keep competitive power. The knowledge creation involves the interaction between tacit knowledge and explicit knowledge, the explicit knowledge is easy to be captured and formalized, and spread within the organization, while the tacit knowledge is highly personal and difficult to capture, encode and accept. The ability to create knowledge of the open innovation community is decided by ability to
Managing the Implementation of Business Intelligence Systems: A Critical Success Factors Framework
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