



Research on Continuous Knowledge Sharing Behavior of Users Participating in Crowdsourcing Innovation

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Abstract. Crowdsourcing innovation is a process in which an enterprise obtains external knowledge by allowing external users to brainstorm. The continuous knowledge sharing behavior of users on the crowdsourcing innovation platform is one of the key factors determining the success of the crowdsourcing innovation community. Therefore, this paper builds a research model based on social cognitive theory and takes Lego Creative Crowdsourcing Community as an example, using least square method to analyze the influencing factors of users' continuous knowledge sharing behavior. The results show that the knowledge self-efficacy of users has a significant positive impact on the persistence and persistence of the continuous behavior factors, but has no significant impact on the activity; Results Expectation has a significant positive impact on users' continuous knowledge sharing behavior; Among the environmental factors, interaction has a partial positive impact on users' continuous knowledge sharing behavior, peer recognition has no positive impact on sustainability, and has a partial positive impact on activity and persistence.

Keywords: crowdsourcing innovation · continuous knowledge sharing · social cognitive theory · least squares regression

1 Introduction

Crowdsourcing innovation refers to the practice of enterprises to solve problems by soliciting public opinions on tasks traditionally solved by the organization. Since 2005, Howe and Robinson put forward the concept of crowdsourcing [1], which has been widely used in innovation within the organization. However, due to the complexity and diversity of the innovation tasks of crowdsourcing innovation, the free and voluntary participation of participants, strong uncertainty and difficult to control, users often cannot achieve continuous and effective knowledge sharing [2].

Based on the above analysis, this paper, from the perspective of knowledge sharing, selects the competition column in Lego. Idea, a relatively active open crowdsourcing community, as the research object, and obtains the behavioral data of users' continuous knowledge sharing in the crowdsourcing community. Through empirical analysis, this

paper studies the influencing factors of users' continuous knowledge sharing behavior in the open crowdsourcing community, which is helpful for enterprises to take corresponding measures to improve community activity, promoting user knowledge sharing behavior, so as to obtain more ideas that can help improve enterprise performance and ensure the sustainable development of the community.

2 Research Hypothesis and Model Construction

2.1 Research Hypothesis

2.1.1 Personal and Behavioral Factors

Knowledge Self-efficacy and Continuous Knowledge Sharing Behavior. Knowledge self-efficacy is an individual's judgment on whether self-mastered knowledge can help solve relevant problems [3]. People with a strong sense of knowledge self-efficacy often have more confidence in themselves and are willing to make more efforts. This is because sharing knowledge helps to form users' sense of self-worth, thus improving their willingness to contribute knowledge [4]. Therefore, this paper believes:

H1a: User's knowledge self-efficacy has a positive impact on the sustainability of continuous knowledge sharing behavior in crowdsourcing innovation.

H1b: User's knowledge self-efficacy has a positive impact on the activity of continuous knowledge sharing behavior in crowdsourcing innovation.

H1c: The user's knowledge self-efficacy has a positive impact on the persistence of knowledge sharing behavior in crowdsourcing innovation.

Expected Results and Continuous Knowledge Sharing Behavior. According to the social expectation theory, users will have an expectation of the results before taking action. As a transactional community, crowdsourcing platform users will follow rational and self-interested behavior, and the expected return is the main determinant of personal attitude [5]. Therefore, this paper puts forward the following assumptions:

H2a: Result expectation has a positive impact on the sustainability of continuous knowledge sharing behavior in user crowdsourcing innovation.

H2b: Result expectation has a positive impact on the activity of continuous knowledge sharing behavior in user crowdsourcing innovation.

H2c: Result expectation has a positive impact on the persistence of continuous knowledge sharing behavior in user crowdsourcing innovation.

2.1.2 Environmental and Behavioral Factors

Peer Recognition and Continuous Knowledge Sharing. According to the social exchange theory, users exchange ideas and attention in the process of crowdsourcing innovation. When users get attention as an internal reward while sharing ideas, this internal reward will encourage them to share more ideas. Previous studies have shown that the feedback received by users when they publish their ideas, especially positive feedback, can promote users' satisfaction in the competition process, and they are more willing to continue to generate new creative content [6]. Therefore, we propose that:

H3a: Peer recognition has a positive impact on the sustainability of continuous knowledge sharing behavior in user crowdsourcing innovation.

H3b: Peer recognition has a positive impact on the activity of continuous knowledge sharing in user crowdsourcing innovation.

H3c: Peer recognition has a positive impact on the persistence of continuous knowledge sharing behavior in user crowdsourcing innovation.

Interactive and Continuous Knowledge Sharing Behavior. In the crowdsourcing platform, the stronger the interaction between users, the more active the platform users are, the higher the participation in the crowdsourcing innovation task. Guo [7] and others confirmed that the bilateral participation and interaction between users and users and between users and enterprises have a significant positive impact on user loyalty. When users' efforts are responded to, they will continue to make contributions to crowdsourcing innovation more actively:

H4a: Interaction has a positive impact on the continuity of users' continuous knowledge sharing behavior.

H4b: Interaction has a positive impact on the activity of users' continuous knowledge sharing behavior.

H4c: Interaction has a positive impact on the persistence of users' continuous knowledge sharing behavior.

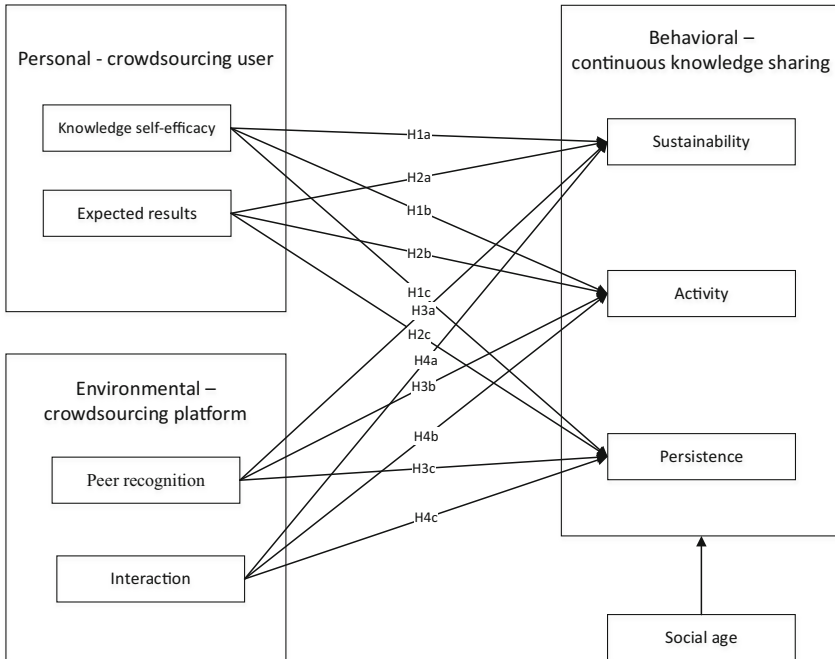


Fig. 1. Research model

2.2 Model Building

Based on the above analysis, based on social cognitive theory, this paper constructs a model of users' continuous knowledge sharing behavior in crowdsourcing innovation from the perspectives of crowdsourcing users and crowdsourcing environment. Among them, crowdsourcing users include knowledge self-efficacy and result expectation, the crowdsourcing environment includes peer recognition and interaction, the continuous knowledge sharing behavior includes the persistence, activity and persistence of the competition, and the control variable is user social age, as shown in Fig. 1.

3 Research Method

3.1 Data Acquisition

This paper selects Lego Creative Platform (ideas. Lego. Com) as the empirical object. The data is mainly collected from the competition section of the Lego creative platform, and the 38 competition project data and 8180 user data released on the Lego platform from November 2017 to March 2022 are captured by the web crawler software: the post-game collector 3.5.4.

3.2 Research Variable Design

The selection of variables in this paper is shown in the following Table 1.

In this paper, multiple regression model is used to verify the research hypothesis, and the least squares method (OLS) is used to estimate the model. Considering the effect of independent variables (social age, result expectation, knowledge self-efficacy, interaction and peer recognition) on dependent variables (users' continuous knowledge sharing behavior), the following regression model is established.

$$\begin{aligned} & \text{Competition continuity} \\ = & \beta_0 + \beta_1 \text{Social age} + \beta_2 \text{Expected results} + \beta_3 \text{Knowledge self - efficacy} + \beta_4 \text{ Interaction} + \beta_5 \text{Peer recognition} + \varepsilon \end{aligned} \quad (1)$$

$$\begin{aligned} & \text{Competition activity} \\ = & \beta_0 + \beta_1 \text{Social age} + \beta_2 \text{Expected results} + \beta_3 \text{Knowledge self - efficacy} + \beta_4 \text{ Interaction} + \beta_5 \text{Peer recognition} + \varepsilon \end{aligned} \quad (2)$$

$$\begin{aligned} & \text{Competition durability} \\ = & \beta_0 + \beta_1 \text{Social age} + \beta_2 \text{Expected results} + \beta_3 \text{Knowledge self - efficacy} + \beta_4 \text{ Interaction} + \beta_5 \text{Peer recognition} + \varepsilon \end{aligned} \quad (3)$$

In these equations, β_0 is the intercept item, ε is the error item, β_j ($j = 1, \dots, 5$) is the coefficient of each independent variable.

Table 1. Variable name and measurement index

Variable type	Measured item	Variable symbol	Variable interpretation
Dependent variable	Competition continuity	contribution	Number of all works submitted by users [8]
	Competition activity	per_contirbution	Average number of works submitted by users each year
	Competition durability	long_date	The days between the first work submitted by the user and the last work days [8]
Independent variable	knowledge self-efficacy	winner	Users win the championship and runner-up in the competition [8]
	Expected results	medal	Number of medals received by users [6]
	Interaction	following follower	Number of users following Number of fans owned by users
	Peer recognition	Avg_vote Avg_comment	Average number of votes received by users [8, 9] Average number of comments received by users [8, 9]
Control variable	Social age	Join_date	The number of years since users registered on the Lego platform [9]

4 Conclusions

In this paper, SPSS Statistics 26 is used for data analysis and hypothesis testing. Table 2 shows the results of hypothesis testing.

Based on social cognitive theory, this paper explores the factors that affect users' continuous knowledge sharing behavior in crowdsourcing innovation by constructing the relationship between crowdsourcing users, crowdsourcing environment and crowdsourcing user behavior. The research results show that users' knowledge self-efficacy has a significant positive impact on the persistence and persistence of the continuous behavior factors, but has no significant impact on the activity, H1a, H1c are supported, while H1b is not. Manchanda [10] believes that when users have won the first prize in the competition, they will be more careful in the selection of the competition. This kind of psychology will make them submit their works less frequently. Results Expectation has a significant positive impact on users' continuous knowledge sharing behavior, H2a, H2b,

Table 2. Regression analysis results

Variable	Dependent variable		
	contribution	per_contribution	long_date
	Model 1	Model 2	Model 3
Constant term	***	***	***
winner	0.093 ^{***}	0.021	0.057 ^{***}
medal	0.249 ^{***}	0.138 ^{***}	0.034 [*]
following	-0.091 ^{***}	-0.062 ^{***}	-0.041 ^{***}
follower	0.334 ^{***}	0.259 ^{***}	0.156 ^{***}
avg_vote	-0.001	0.049 ^{**}	-0.015
avg_comment	-0.133 ^{***}	-0.051 ^{**}	0.041 ^{**}
join_date	0.081 ^{***}	-0.427 ^{***}	0.561 ^{***}
R^2	0.246	0.247	0.405
F	230.199 ^{***}	231.618 ^{***}	479.333 ^{***}
DW	1.770	1.784	1.949
N	4919	4919	4919

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

H2c are all supported. Among the environmental factors, peer recognition has no positive impact on persistence, but has a partial positive impact on activity and persistence, H3a is not verified, and H3b and H3c are partially verified. The analysis may be caused by the unique attributes of the Lego platform. The user group of Lego. Idea is mainly Lego enthusiasts. Users who can publish ideas have a relatively professional knowledge base. They are more willing to obtain others' views on the works through comments and exchanges. Therefore, in the process of commenting, non-positive comments will make crowdsourcing users have self-doubt, and carefully examine their works in the next time, and strive to play better in the next competition through repeated deliberation. Such prudent behavior may have a negative effect on the publishing speed of works. Interaction has a partial positive impact on users' continuous knowledge sharing behavior, H4a, H4b and H4c are partially verified.

This paper divides the user's continuous knowledge sharing behavior into three variables: persistence, activity and persistence to measure it, and explores the user's continuous behavior more comprehensively from multiple perspectives; Moreover, unlike the questionnaire data, using the least squares regression model to analyze the real user data of the website not only reduces the subjectivity of the data source, but also makes the research on user behavior more convincing. In the follow-up study, interactive data can be collected to further investigate the influencing factors of user behavior.

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