

STUDY ON THE IMPROVEMENT METHOD OF ORGANIZATIONAL INNOVATION ABILITY BASED ON USER COLLABORATIVE INNOVATION FOR ELECTRICAL APPLIANCE

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Abstract

This study investigates the integration of the lead user method and collaborative innovation method to improve enterprise product innovation management, a research area that remains underexplored in academia. The research focuses on key challenges such as identifying lead users, extracting and managing their innovative ideas, and integrating these ideas with expert insights to develop innovative product concepts. A structured model is proposed to examine the impact of five critical factors Customer. Using a mixed-method approach, including quantitative surveys of 434 participants and qualitative interviews with 15 experts, the study validates the model and identifies significant relationships among these factors. The results indicate that Customer Competence of Lead User and User Insight significantly influence Conceptual Collaboration Innovation Competence, which in turn positively affects User Collaborative Innovation. Additionally, Conceptual Decision-Making Competence and Innovative Leadership play crucial roles in enhancing collaborative innovation outcomes. The findings highlight that effective management of lead user insights, collaborative innovation processes, and decision-making competencies, supported by innovative leadership, significantly improves product innovation performance.

Keywords: User Collaborative Innovation, Lead User, User Insight, Conceptual Decision-Making.

INTRODUCTION

Since the world economy entered 2022, more and more innovative ideas and innovative thinking have been widely mentioned, and a variety of innovative methods have been applied in the development of new products, which has brought a positive impact on the innovation of enterprises. According to the research of scholars, the higher the degree of product innovation of a company and the more it meets customer needs, the more it can lead the market, and the degree of innovation of a company is closely related to its development (Yu Dengke et al., 2018). More and more managers have realized the importance of innovation. Many managers try to mobilize the company's design resources and change management methods in the hope that the product can stand out from the competition and lead the market.

In the academic field, Demil B et al (2012) put forward the collaborative innovation method, which utilizes external resources including advanced knowledge and experience to participate in the process of product design development and improve the innovation power of enterprises (Saunière J C et al.,2013) (Toillier A et al.,2018) also mentioned how to use teams to achieve collaborative innovation. The essence of collaborative innovation is to integrate external resources with internal resources to achieve product innovation, among which external resources include university scientific research, industry experts, state agencies and leading users. Internal resources include the original company's user research team, project

development team, project research and development funds, etc. (Anzola-Roman P et al., 2019). Common integration methods of resource integration include digital platform integration, team cooperation development, project leading subject change, etc. Collaborative innovation emphasizes the integration of external resources and internal resources, and emphasizes the integration method, innovation driving mechanism, knowledge transfer mode, etc. However, in the process of collaborative innovation, the internal management mode of the company and how to allocate the supporting management resources can better assist innovation, this aspect still needs further management research. Among external resources, the lead user is one of the important resources. C. Luthje (2004) proposed the lead user method, which utilizes the advanced knowledge and experience of the lead user to participate in the process of product design development. Improving the innovation capacity of enterprises (A. Chatterji, and K. Fabrizio, 2014). (Glen L. Urban, 1988) pointed out that the use of advanced user perception to predict the future needs of ordinary users can help enterprises develop products faster. At the same time (Cornelius Herstatt,1992) proposed that developing products in collaboration with leading users could accelerate the process of new product development and greatly reduce the development cost of enterprises (Chang, W et al.,2016) proposed that using leading users to develop new products. Can improve the organization's financial returns.

Lead user method and user collaborative innovation method also face management difficulties when they are used together. How to set up supporting services to ensure that the ideas of leading users can be directly transmitted to product innovation? The management of the company has its own processes and decision-making methods. How to transfer the ideas of leading users to the decision-making level and how to ensure that the decision-making level can effectively retain the ideas of leading users? Many companies' new product development decisions are directly decided by company executives. How can the ideas of the leading users effectively influence the executives, and what are the key process nodes and key management elements? What is the impact weight? It has certain research value in the academic circle.

Objective

- 1) To create the factor model of Customer Competence of Lead User, User insight, Conceptual Collaboration innovation competence, Conceptual Decision-making competence, Innovative Leadership and user collaborative innovation.
- 2) To test the model of User collaborative innovation with factors.
- 3) To explain the relationship between User collaborative innovation and Customer Competence of Lead User, User insight, Conceptual Collaboration innovation competence, Conceptual Decision-making competence, Innovative Leadership

LITERATURE REVIEW

The core theories included in this paper are: Collaborative innovation theory, Lead User Theory, the theory of decision making, Concept of User interview method. Relevant theoretical introduction.

Theory introduction:

Collaborative innovation theory: Collaborative innovation can be defined as the use of external resources (Li Zu Chao et al, 2012), through the ideas, knowledge and experience of external resources to cooperate with internal personnel to achieve joint development and innovation (Demil B et al, 2012; V Anzola-Román P et al, 2019). This innovation model breaks the traditional knowledge boundary problem within the organization, and realizes the integration of external ideas and technologies with internal ideas and technologies by introducing external resources (A. Chatterji, and K. Fabrizio, 2014).

Lead User Theory

The Lead User method is proposed by Eric von Hippel, an American professor, who advocates using the advanced knowledge and experience of users to innovate products or services. (Eric von Hippel,2009). Also lead users define as the one who own rich knowledge and experience regarding product use, user needs, and demand trends constitute one of the most important sources for product innovation (A. Chatterji, and K. Fabrizio,2014). Lead users are found to come up with commercially attractive user innovations and have been shown to be a highly promising source of innovation for new product development tasks. According to lead-user theory, these users are defined as being ahead of an important market trend and experiencing high benefits from innovating (Schreier M et al,2008). Allowing leader users to participate in the product development process, interact with product developers, and gain insight into the ideas of leading users can greatly improve the innovation of products (Franke et al. 2006). lead user innovation is the creation of the Open Innovation theory, which has is actively discovered and used by firms, what awoke the companies and show them how they can benefit from Lead User Innovation. (Chen Rongqiu.2005)

The theory of decision making

Decision-making theory is a theory developed by the economist Hislop D et al(2000). Decision-making theory consists of decision concept, principle and theory. According to Simon's theory, decision theory takes the rationality pursuit of decision-makers as the main research direction. Decision makers pursue finite rational solutions, and they pursue satisfactory solutions rather than optimal solutions (Herbert Simon et al.,2013). Decision-making theory mainly states that the decision-making process is divided into four stages, the first stage is the stage of intelligence activities. Its main purpose is to find the data and information needed to make decisions, and to understand the problems that need to be made. The second stage is the design activity stage, the main purpose is to develop alternative plans; The third stage is the decision-making activity stage, the main purpose is to evaluate the various schemes based on the past experience (Schultz C et al, 2013), the current situation and the future forecast, and select the best scheme from the alternatives; The fourth stage is the review stage, which is the process of information feedback and revision in the decision-making process. Generally, only the first three stages are used in the product concept design process. When the product concept is determined, it enters the development stage. The development process is the business of other departments, and the secondary concept modification is rarely carried out.

The application environment of decision theory in the concept screening stage is as follows: 1) The product completes the summary of the initial concept. 2) There are multiple departments to negotiate and confirm the final selection concept. 4) The planning department takes the lead and finalizes the concept for product adoption (Peterkova J et al.,2018).

Concept of User interview method

The interview method is a way to obtain information by talking with the survey object directly and purposefully (Ren Zhixiang et al.,2010). Household-entry interview is an investigation method in which interviewers collect information through interviews at the interviewees' homes or units in accordance with the procedures and requirements stipulated in the survey program (Ren Zhixiang, 2010). The primary purpose of user research is to help enterprises define the target user group of the product and clarify and refine the product concept (TAN Run-hua,2022). Through the research of the user's task operation characteristics, perceptual characteristics, cognitive psychological characteristics, the actual needs of users become the guidance of product design, so that the product is more in line with the user's habits, experience and expectations. Its approach draws on the various methods of the humanities and social sciences, with the aim of bringing the best experience to users, including designers and product users. Research on user research methods can help researchers and designers quickly find the needed methods, so that enterprises can determine the target user group faster and more effectively, and improve the efficiency of user research (StevePortigal et al.,2015).

Variable introduction:

Organizational Innovation Ability: Innovation Ability of a company is linked to the internal efforts of human, technological and organizational resources, combined with the ability to interact with the external environment to pursue resources, knowledge and skills to be incorporated into the organization to create new products that are perceived and valued by stakeholders.

User Collaborative Innovation: It is the use of lead users' innovative ideas, knowledge, and technology combined with the development process of the enterprise, so that the internal resources of the enterprise and the external resources of the enterprise are combined to form cooperative innovation. CUI A S et al (2017) mentioned that user participation plays an active role in promoting product innovation, from user participation, product team absorb leader user's knowledge, skill and Experience to get good ideas to create innovative product. User collaborative innovation is dimensions by: 1) Collaboration (Collaboration saves time, combines resources and can help teams gain a fresh approach to existing problems. Collaboration is more than people simply working together), 2) Ideation (Innovation starts as an idea. Your ideation process is critical for generating concepts, hypotheses and projects, as well as for refining those ideas), 3/) Implementation (concepts or ideas can translate to new product; Product design can be realized. And consumers' pain points can be effectively solved), 4) Value Creation (One of the essential elements of innovation is the value it creates. Value can mean solving a new problem, incremental improvements to existing products or reducing the time, cost or labor associated with something).

Customer Competence of Lead User: Leading users can gain insight into the future consumption trends of general users, leading users have enough knowledge to solve pain points, and leading users are willing to actively share their knowledge and skills. It has a high resolution of the products of interest and a wealth of product-related knowledge. He G et al (2010) point out Customer Competence of Lead User which include 4 dimensions: A1/ Knowledge Competence, A2/ Innovation Competence, A3/Communication Competence, A4/Cooperation Competence

User Insight: Summary of interviewing skills and conceptual insight of the interviewer on the leading users. This insight focuses on the interviewing ability of the interviewer during the one-to-one interview, which is closely related to the interviewer's knowledge background, empathy ability, and structural composition of the interviewer.

The interview process uses the user interview. user insight in this article mainly refers to the user experience (UX). Based on Hole L et al (2007) published, Gaining insight into the User eXperience . For the dimensions of UX, Zarour M et al(2017) give the dimensions of UX: B1) 1 product experience , B2) User Needs Experience, B3) Technology Experience.

Conceptual collaboration innovation competence: It is the competence of the planning department or user research department to investigate innovative concepts. Large consumer electronics companies include the unit responsible for user research, which will conduct concept interviews in the early stage of new product development. After discussion by several departments, the pain points and needs obtained by users are transformed into internal development language, which is called concept, and the concept set is finally formed. The concept set is the basis for later product development. The innovation of the concept set, the satisfaction degree of users' needs, and the acceptance degree of leading users' ideas are all the keys to the success of collaborative innovation. Peterkova J et al (2018) mentioned that innovation concept is divided into 11 dimensions, this paper use four dimensions to Description:C1) the identification of new consumer needs, C2) the development of new technological solutions, C3) the creativity of employees, C4) the inclusion of external partners in innovation projects.

Conceptual Decision-making Competence: it is the communication efficiency of multiple departments to jointly determine the final concept of the product through negotiation. This ability is reflected in the ability to retain innovative concepts, the user attraction ability of the concept combination of the decision, and the premium ability of the product. This concept decision-making process is the process of selecting multiple concepts and finally clarifying the product concept combination. The selection process needs to consider the innovation of the concept, the reliability of the concept, the cost of the concept, the premium of the concept, and the attractiveness of the concept. Therefore, it is necessary for team members to participate in the discussion to have certain technical capabilities, innovative willing, cost recognition, and understanding of lead users' needs, so as to ensure that external resources can be integrated into the enterprise and maximize the use of internal resources. Welie J V M et al (2001) define dimension of Conceptual Decision-making competence, they are: D1) absorbing (The ability to understand, absorb and retain external knowledge), D2) Manipulation of knowledge (the

ability to manipulate cognitive content critically), D3) freedom of will (The ability to think freely), D4) means of expression (the ability to express oneself).

Innovative Leadership: Innovative Leadership is the leader's influence in the process of conceptual decision-making. If the leader's thought is conservative and competitive, the more he interferes in conceptual decision-making, the worse the innovation of the concept. On the contrary, if the leader is an enthusiast, the leader's intervention will greatly affect the product innovation. At the same time, if leaders actively participate in the interview process and have insight into the ideas of some leading users, the decision-making process may be more innovative. Finally, whether leaders are inclusive to different ideas has a decisive impact on innovation. If leaders are not inclusive, the role of user insight in the early door-to-door research may become negligible, because no matter what good concepts are found, they will eventually be screened out in the process of concept selecting communication. It is the responsibility of innovative leaders to construct innovative management mechanism. Zhu W et al (2016) Summarize innovative leadership's dimension: E1) Thinking creatively, E2) Holding the willpower to be Innovative, E3) tolerating different perspectives and various risks, E4) establishing mechanisms for innovative ideas, Implementing innovative ideas.

Model building and research hypotheses

This research examines six factors: Customer Competence of Lead User, User insight, Conceptual Collaboration innovation competence, Conceptual Decision-making competence, Innovative Leadership, User collaborative innovation, based on the literature, the model framework between variables is studied, and hypothesis testing is performed between input variables and output responses.

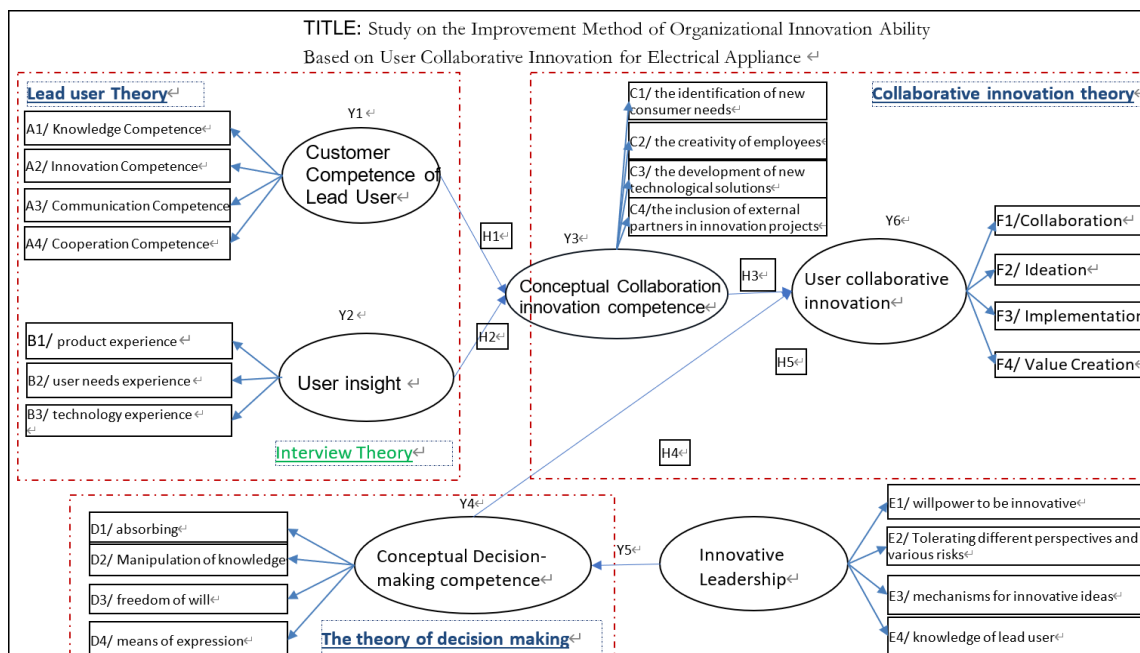


Figure 1: Conceptual Framework.

Research hypotheses

- H1: Customer Competence of Lead User affects Conceptual Collaboration innovation competence.
- H2: User insight affects Conceptual Collaboration innovation competence.
- H3: Conceptual Collaboration innovation competence affects User Collaborative Innovation.
- H4: Conceptual Decision-making competence affects User Collaborative Innovation.
- H5: Innovative Leadership affects Conceptual Decision-Making Competence

METHODOLOGY

Participants and sample design

Population is the project planning and project leaders who participate in the project process, including planners (user research), project manager and director, etc. a modeling survey is carried out, the second research was conducted by the engineers of small appliances related to cooking. As the total number of engineers was unknown, the statistical research method of John T. Rosco was adopted for the research. $Z_c=1.96$, $e_m=\sigma/10$, $\sigma/e_m=10$, $N=19.6^2=384$, $N=(Z_c\sigma/e_m)^2=384$, Invalid questionnaires will be generated in the interview process. The sample size should be increased by 20%, 434 samples were actually collected.

After quantitative research, 15 experts were interviewed for qualitative research, use word clouds to explain the relationships between variables

This paper studies the engineers' management of lead user mining, interview management, communication methods in concept screening and evaluation of leadership support during the development of several new products. Through a closed questionnaire survey of engineers, the average of the engineers' scores of the project is taken as the management level of each variable dimension of the project. In order to ensure that engineers have sufficient understanding of the whole process of product project development, engineers are limited to product planning and product managers or director.

Measurement method

The dimensions of variables refer to those of the Literature review A1, A2, A3, A4, B1, B2, B3, D1, D2, D3, D4, E1, E2, E3, E4, F1, F2, F3, F4. This questionnaire uses a Likert five-point scale, with "1" to "5" representing "Per niente", "a bit", "Abbastanza", "Molto", "Moltissimo".

RESULTS

Pls-SEM algorithm was used to detect model fit. VIF was used to analyze the collinearity of the model. According to the general standard, if $VIF < 5$, the collinearity is very good, if $5 < VIF < 10$, the collinearity can accept, if $VIF > 10$, it has multicollinearity.

Table 1: Collinearity Testing (VIF)

Dimensions	VIF	Dimensions	VIF	Dimensions	VIF
A1/Knowledge Competence	2.277	C1/the identification of new consumer needs	2.235	E1/willpower to be innovative	1.939
A2/Innovation Competence	3.495	C2/the creativity of employees	2.544	E2/Tolerating different perspectives and various risks	3.202
A3/Communication Competence	3.299	C3/the development of new technological solutions	2.526	E3/mechanisms for innovative ideas	2.477
A4/Cooperation Competence	2.448	C4/the inclusion of external partners in innovation projects	2.166	E4/knowledge of lead user	2.429
B1/product experience	2.212	D1/absorbing	3.564	F1/Collaboration	2.391
B2/user needs experience	2.47	D2/Manipulation of knowledge	3.838	F2/ Ideation	3.552
B3/technology experience	2.175	D3/freedom of will	4.488	F3/ Implementation	3.711
		D4/means of expression	3.949	F4/ Value Creation	2.549

According to Table 1, each VIF of the analysis results is less than 5, no collinearity and multicollinearity. This model can be used.

Calculation for AVE, Outer loadings, Cronbach's alpha value

For Cronbach's alpha value's standard, according to the criteria provided by Bland J, Altman D, (1997), DeVellis R, (2003). Garson G D, (2016), Put forward that greater or equal to 0.80 for a good scale, 0.70 for an acceptable scale.

For AVE value's standard, Fornell and Larcker (1981) put forward that AVE value need more than 0.5, if AVE value more than 0.5, it means variable be clearly explained.

For outer loadings standard, outer loading value need more than 0.7, if value is more than 0.7, it means factor is important. As shown in Figure 2, the AVE, Cronbach's alpha, outer loadings were detected, the results generated by software. And showed below:

Table 2: Cronbach's alpha and AVE value calculation

Factors	Cronbach's alpha	Average variance extracted)AVE(
Conceptual Collaboration innovation competence	0.887	0.747
Conceptual Decision-making competence	0.942	0.853
Customer Competence of Lead User	0.904	0.778
Innovative Leadership	0.884	0.743
User collaborative innovation	0.911	0.79
User insight	0.868	0.791

Through detection, the AVE value of all variables is greater than 0.5, the outer loadings value is greater than 0.7 (From figure-2, reflective line's value), and Cronbach's alpha is greater than 0.7. The model is accurate and effective.

Calculation for R-square and F-square value

R-square is used to check Accuracy of model estimates, R-square need more than 0.7, so the model fits well

F-squared value is used to test the goodness of fit of the model. The larger the value, the better the model fits the data, based on (Cohen, 1988) standard (≥ 0.02 is small, ≥ 0.15 is medium, ≥ 0.35 is large)

Table 3: R-square values

Factors	R-square	R-square adjusted
Conceptual Collaboration innovation competence	0.912	0.911
Conceptual Decision-making competence	0.605	0.604
User collaborative innovation	0.715	0.714

Table 4: F-square values

Factor -factor	f-square
Conceptual Collaboration innovation competence -> User collaborative innovation	0.754
Conceptual Decision-making competence -> User collaborative innovation	0.65
Customer Competence of Lead User -> Conceptual Collaboration innovation competence	2.674
Innovative Leadership -> Conceptual Decision-making competence	1.53
User insight -> Conceptual Collaboration innovation competence	0.812

R-squares are bigger than 0.7 or Close to 0.7, F-square bigger than 0.35. so, the model does not need to be deleted.

Use SEM-bootstrapping to draw roadmap for AVE, Outer loadings, path-coefficient and p-value

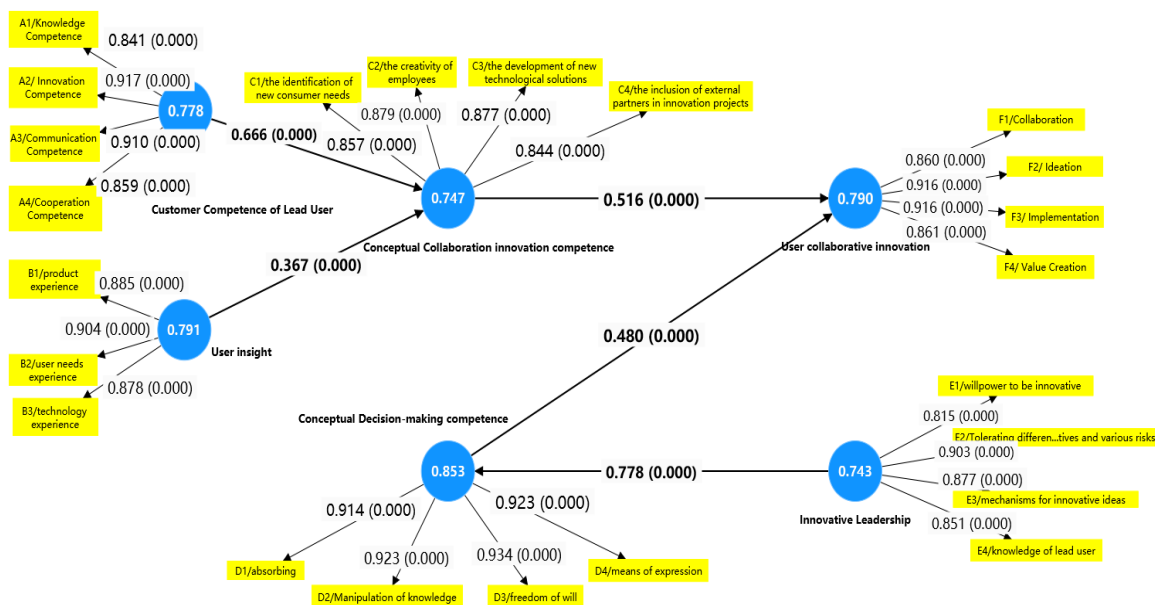


Figure 2: Roadmap with AVE, Outer loadings, path-coefficient and p-value

Table 5: P-value test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ((O/STD EV))	P values
Conceptual Collaboration innovation competence -> User collaborative innovation	0.516	0.517	0.036	14.42	0
Conceptual Decision-making competence -> User collaborative innovation	0.48	0.479	0.04	11.869	0
Customer Competence of Lead User -> Conceptual Collaboration innovation competence	0.666	0.665	0.032	20.964	0
Innovative Leadership -> Conceptual Decision-making competence	0.778	0.778	0.025	31.288	0
User insight -> Conceptual Collaboration innovation competence	0.367	0.368	0.033	11.052	0

According to the analysis conclusion, the p values of the main variables and each dimension are less than 0.05, so they are all key factors.

Table 6: Hypothetical statement

Hypothetical statement	Hypothetical content	P-value	Conclusion
H1	Customer Competence of Lead User affects Conceptual Collaboration innovation competence.	0.00	significantly affect
H2	User insight affects Conceptual Collaboration innovation competence.	0.00	significantly affect
H3	Conceptual Collaboration innovation competence affects User Collaborative Innovation	0.00	significantly affect
H4	Conceptual Decision-making competence affects User Collaborative Innovation.	0.00	significantly affect
H5	Innovative Leadership affects Conceptual Decision-making competence	0.00	significantly affect

H1, H2, H3, H4, H5 are significantly, Customer Competence of Lead User affects Conceptual Collaboration innovation competence, User insight affects Conceptual Collaboration innovation competence, Conceptual Collaboration innovation competence affects User Collaborative Innovation, Conceptual Decision-making competence affects User Collaborative Innovation, Innovative Leadership affects Conceptual Decision-making competence.

Explanation the relationship between factors

Using word clouds to investigate correlations between variables:



Figure 3: word clouds for relationship between factors

As figure 3 showed, the Enthusiasts means lead users. The company actuate lead users to find trend needs and pain points. The ability to find the lead users and the interviewing ability of the company are the core keys for the company to find good initial concepts. The better the concept of screening, the better the final product. At the same time, enterprises need to have high conceptual decision-making power to select appropriate concepts in the concept library to form products. In this process, top managers also play a supporting role in team decision-making. When top managers do not support team innovation, the team loses its role, which makes the team's decision-making power poor. Leadership support for innovation is achieved through teamwork. In summary, these variables together determine the performance of user collaborative innovation products' performance.

CONCLUSION AND FUTURE WORK

Conclusion:

The output of User collaborative innovation, such as product premium power, product User experience, product innovation, product resource saving degree, these characteristics are affected by Customer Competence of Lead User, User insight, Conceptual collaboration innovation competence, Conceptual Decision-making competence, Innovative Leadership. Influence of these five variables. Through management means, the output performance of User collaborative innovation can be improved. Of course, specific management strategies should be properly adjusted according to the characteristics of their own enterprises, so as to ensure that the five management variables can be controlled and constrained to improve the success of enterprise product innovation. In the process of product development, small household

appliances tend to pursue rapid development and low cost, which is a kind of fast-moving consumer goods. The development and design of other industries are different in terms of product management. Therefore, when studying the methods of innovation management, other industries should study the differences in management, and according to the differences of enterprises, when referring to the research content of this article, it should not be exactly the same, and it should be flexibly adjusted and changed

Future work:

The article studies how to combine external ideas and internal ideas, without specific management implementation methods, and more in-depth research is needed here.

In the study of Innovative Leadership, the paper did not give specific management of innovative mechanism, which requires further research

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References

- 1) Yu Dengke., &Yan Ying. (2018). The Interaction Between Technology Innovation and Business Model Innovation and Their Interaction effects on Enterprise Competitive Advantage.DOI : 10.6049/kjbydc.2018050261.2018
- 2) Demil B., &Lecocq X. (2012). Innovation collaborative et propriété intellectuelle : Quelques bonnes pratiques, Annexe, INPI.
- 3) Saunière J C, &Leroyer S, Boudin S, et al. (2013). Collaborative innovation and intellectual property[J]. Best practices. French Institute of Industrial Property. Paris.
- 4) Toillier A., &Faure G., &Chia E. (2018). Designing and organizing support for collective innovation in agriculture. In: Innovation and development in agricultural and food systems (Faure et al., eds), forthcoming.
- 5) Anzola-Román P, Bayona-Sáez C, García-Marco T. (2019). Profiting from collaborative innovation practices: Identifying organizational success factors along the process[J]. Journal of Management & Organization,25(2): 239-262.
- 6) C. Luthje. (2004). Characteristics of innovating users in a consumer goods field: An empirical study of sport-related product consumers,Technovation, vol. 24, pp. 683-695
- 7) A.Chatterji, and K. Fabrizio. (2014). Using users: when does external knowledge enhance corporate product innovation, Strategic Management Journal, vol. 35, pp. 1427-1445.
- 8) Fabrizio, and K. Fabrizio. (2014). Using users: when does external knowledge enhance corporate product innovation, Strategic Management Journal, vol. 35, pp. 1427-1445.
- 9) Glen L. Urban and Eric von Hippel. (1988). "Lead User Analysesfor the Development of New Industrial Products," Management Science, Vol. 34. No. 5, pp. 569-582.
- 10) Cornelius Herstatt and Eric von Hippel. (1992). "Developing NewProduct Concepts Via the Lead User Method: A Case Study in a "Low Tech" Field," Journal of Product Innovation Management, Vol. 9, No. 3, pp. 213-221, Sep.
- 11) Chang, W., & Taylor, S. A. (2016). The effectiveness of customer participation in new product development: A meta-analysis. Journal of Marketing, 80(1), 47-64.

- 12) Li Zu Chao Huang Manhui, & Xie Kang. (2017). User Innovation and IS Performance: Cross-layer Interaction Model based on Department Level [J]. *Management Review*,29(6):165-176.
- 13) Demil B, &Lecocq X. (2012). Innovation collaborative et propriété intellectuelle : Quelques bonnes pratiques, Annexe, INPI.
- 14) Anzola-Román P, &Bayona-Sáez C, &García-Marco T. (2019). Profiting from collaborative innovation practices: Identifying organizational success factors along the process[J]. *Journal of Management & Organization*,25(2): 239-262.
- 15) A.Chatterji, and K. Fabrizio, (2014). Using users: when does external knowledge enhance corporate product innovation, *Strategic Management Journal*, vol. 35, pp. 1427-1445.
- 16) Schreier M, &Prügl R. (2008). Extending lead - user theory: Antecedents and consequences of consumers' lead useress[J]. *Journal of Product Innovation Management*,25(4): 331-346.
- 17) Chen Rongqiu, (2005). "Customer-Centered Management," *Chinese Journal of Management*, Vol. 2 No. 2, pp. 133-140, Feb.
- 18) Hislop D, Newell S, Scarbrough H (2000). Networks, Knowledge and Power: Decision Making, Politics and the Process of Innovation[J]. *Technology Analysis & Strategic Management*, 12(3): 399-411.DOI:10.1080/713698478.
- 19) Simon, Herbert A. *Management Behavior* [M]. China Machine Press,2013.
- 20) Schultz C, &Salomo S, &De Brentani U, et al. (2013). How formal control influences decision - making clarity and innovation performance[J]. *Journal of Product Innovation Management*,30(3): 430-447.
- 21) Peterková J, Franek J. (2018). Decision making support for managers in innovation management: A PROMETHEE approach[J]. *International Journal of Innovation*,6(3): 256-274.
- 22) Ren Zhixiang, &Yu Wanhua. (2010). Application skills of household-entry interview method.
- 23) Ren Zhixiang, &Yu Wanhua. (2010). Application skills of household interview method [J]. *Shandong Statistics*, (6):2
- 24) StevePortigal, Portigal, Jiang Xiao. (2015). *Insight: The Secret of User Interview success*.
- 25) CUI A S, WU F. (2017) The impact of customer involvement on new product development: contingent and substitutive effects[J]. *Journal of product innovation management*, 34(1): 60-80.
- 26) He G, Yu J. (2010). Identify Lead Users by customer competence[C]//2010 IEEE International Conference on Industrial Engineering and Engineering Management. IEEE, 1305-1308.
- 27) Hole, L., & Williams, O. (2007). *Gaining insight into the User eXperience*.
- 28) Zarour, M., & Alharbi, M. (2017). User experience framework that combines aspects, dimensions, and measurement methods. *Cogent Engineering*, 4(1), 1421006.
- 29) Peterková J, Franek J. (2018). Decision making support for managers in innovation management: A PROMETHEE approach[J]. *International Journal of Innovation*,6(3): 256-274.
- 30) Welie J V M, Welie S P K. (2001). Patient decision making competence: Outlines of a conceptual analysis[J]. *Medicine, Health Care and Philosophy*,4: 127-138.
- 31) Zhu W, Yang H, Yang B. (2016). Innovative leadership in organizations: Dimensions, measurement, and validation[C]//Academy of Management Proceedings. Briarcliff Manor, NY 10510: Academy of Management, (1): 14534.