Association for Information Systems
AIS Electronic Library (AISeL)

PACIS 2016 Proceedings

Pacific Asia Conference on Information Systems (PACIS)

Summer 6-27-2016

THE IMPACT OF POWER BOUNDARY MANAGEMENT ON THE DESIGN OF COMPANY-INITIATED OPEN INNOVATION PLATFORM

Yikai Liang
Shandong University, 328161891@qq.com

Rui Zhou
Shandong University & School of Business, 490372741@qq.com

Jiali Chen
Shandong University, 522534245@qq.com

Kangning Wei
Shandong University, kwei.sdu@gmail.com

THE IMPACT OF POWER BOUNDARY MANAGEMENT ON THE DESIGN OF COMPANY-INITIATED OPEN INNOVATION PLATFORM

Yikai Liang, School of Management, Shandong University, Jinan, China, 328161891@qq.com

Rui Zhou, School of Management, Shandong University & School of Business, Shandong Management University, Jinan, China, 490372741@qq.com

Jiali Chen, School of Management, Shandong University, Jinan, China, 522534245@qq.com

Kangning Wei, School of Management, Shandong University, Jinan, China, kwei.sdu@gmail.com

Abstract

Open innovation recognizes potential opportunities and advantages gained from leveraging knowledge and innovations found outside an organization's formal boundaries. With the intensive use of Internet-based tools, organizations are actively involved in using Open Innovation Platform (OIP) to attract external knowledge. However, developing a company-initiated OIP is a challenging task because usage of OIP depends on the voluntary participation of external users, which makes companies cannot follow the protocol of developing traditional IS. Furthermore, a company's institutional properties may also impact the design company-initiated OIP. In this research, we focus on one type of organizational property, namely power boundary, and explore its impact on the design of a company-initiated OIP over time. From qualitative analysis of two versions of OIP in a single company, we develop a theoretical model depicting how the changes of power boundary of a firm influence the design of a company-initiated OIP over time. This result generates theoretical and empirical insights into the OIP design and power boundary and thus has important implications for both scholars and practitioners.

Keywords: Open Innovation Platform, Power Boundary, Design, Company-Initiated.

1 INTRODUCTION

Open innovation recognizes potential opportunities and advantages gained from leveraging knowledge and innovations found outside an organization's formal boundaries (Chesbrough 2003; Chesbrough et al. 2008). With the intensive use of Internet-based tools such as innovation spaces, innovation communities, crowding and online innovation communities, organizations are actively searching for potential external knowledge and ideas from individuals outside (Di Gangi & Wasko 2009; Denyer et al. 2011). An important and popular way to do so is to use Open Innovation Platform (OIP) to attract individuals to participate and contribute to the open innovation processes. The OIP refers to the virtual environment of knowledge transfer and integration that is supported by collaborative innovation systems or communication tools (Hallerstede 2013; Bullinger & Moeslein 2011). Realizing the innovation potentials of these communities (e.g., attracting numerous innovators with low or even no costs), many firms begin to create their own OIP[1]. Famous examples include Dell's IdeaStorm community and Starbucks's My Starbucks idea.

OIP is essentially an IT tool used by organizations. However, the use of these company-initiated platforms differ from that of traditional large-scale information systems (IS) such as enterprise resource planning systems and customer relationship management systems. Usually, traditional IS are used within the organizations. However, for the OIP, its usage depends on voluntary participation of external users such as customers, suppliers and other interested individuals (Bateman et al. 2010). The different users and focuses of these two types of IT seem to suggest that it might not be proper to follow the protocol of developing traditional IS to develop the OIP. For example, compared to traditional IS, the design and management of the OIP cannot solely rely on traditional hierarchical structure.

Previous literature on IS development has predominantly focused on the design of traditional information system with institutional properties of organization such as culture and structure. Little research has been conducted on how to design company-initiated OIP to improve the open innovation capabilities of the companies. Researchers have argued that using the OIPs to integrate innovators without clear guidelines does not always lead to success (Cui et al. 2012). Therefore, in this research we attempt to examine how an OIP is initiated and developed by an organization.

Olikowski (1992) argued that dynamic interaction exists between technology design and organizational constraints. That is, technology is designed by human actors under certain organizational constraints, and also instructs the actions of human actors which is sequentially solidified as organizational properties over time (Orlikowski & Robey 1991). An important organizational constraint is power-related boundary, which concerns how many external resources (sphere of influence) should be mastered within the boundary in order to maximize its strategic control over crucial resources (Santos & Eisenhardt 2005). Power boundary is an instrumental force in the development of the OIP to ensure the useful outcomes of production (Van Osch & Avital 2009; Jarvenpaa & Lang 2011). Additionally, power boundary is dynamic. Although power boundary might hold stable temporarily, it may change over time in an evolutionary way (Barile et al. 2012), which continue to impact the development of the OIP. More specifically, we are interested in the following research question: how does power boundary of an organization influence the design of its OIP over time?

Given the exploratory nature of this research, we adopt a longitudinal case study approach. In the next section, we briefly review prior research on the OIPs and power-related boundary.

[1] Many organizations also sponsor or just participate in OIPs built by a third-party. In this research, we focus on company-initiated OIP.

2 LITERATURE REVIEW

2.1 Boundary Management

Santos and Eisenhardt (2005) expand the view of boundaries from traditional exchange-efficiency perspective to include four different perspectives--efficiency, power, competence, and identity, which provide researchers a deeper and dynamic understanding of organizational boundaries. Boundaries of efficiency view the organization as governance mechanisms distinct from markets, focusing on minimizing governance costs. It demarcates whether a transaction should be made by a market or organization. Boundaries of power views the organization as institutions that attempt to reduce uncertainty and exercise power in order to improve performance, focusing on maximizing strategic control over crucial strategic relationships. It demarcates the sphere of the organizational influence, through ownership mechanisms or exercising power to external forces. Boundaries of competence views the organization as a unique bundle of resources, focusing on maximizes the value of organization's resources for competitive advantage. It demarcates the bundles of resources possessed by the organization. Boundaries of identity views the organization as social contexts for sense making (Weick 1995), focusing on the set of achieving coherence between the identity of the organization and its activities. It demarcates the dominant mind-set of "who we are". These four views of boundary are coevolutionary and synergistic with each other. Additionally, organizational boundary is dynamic. Though organizational boundaries hold temporary stability in one moment, they may change over time in an evolutionary way (Kodama 2010; Barile et al. 2012).

As to the company-initiated open innovation platform, on one hand, from the perspective of technology design and development (Orlikowski 1992; DeSanctis & Poole 1994), the organization holds complete autonomy on open innovation platform and owns the technology of open innovation platform as internal resource. On the other hand, from the perspective of interaction in the OIP (Sibai 2015), the organization couldn't exercise complete autonomy on the interaction when the organization inspires and collects innovations of platform users (innovation contributors) through the OIP, and the organization owns the platform users (innovation contributors) as external resource. Thus, the organization needs the boundary logic of power to exercise governance on the OIP.

2.2 Power Boundary of OI and OIP

Power means one's ability to influence the others' behavior in ways that produce outcomes favored by the focal one (Pfeffer & Salancik 1978). Power-related boundary management refers to ownership mechanisms (e.g., acquisitions, hiring) and non-ownership mechanisms (e.g., collusion, lobbying, consortia, alliance, friendship ties, board relationships) (Santos & Eisenhardt 2005) in open innovation context. Santos and Eisenhardt (2009) point out that power is the unifying boundary logic in the high-ambiguity environment (e.g., nascent or destabilized market). They study the process that entrepreneurs construct new markets by co-constructing organizational boundaries, and recognize that entrepreneurs use power logic throughout the whole process, especial the soft-power based on persuasion (e.g., illusion, exploiting others' natural tendencies, preemptive or delaying) that *reduce market ambiguity and influence the actions of others* (Santos & Eisenhardt 2009).

As to the power-related boundaries of online creative community, Demil and Lecocq (2006) present "bazaar governance" describing the power-related boundaries of open source software. Bazaar governance is characterized as low levels of control, weak incentives intensity. It increases the uncertainty to governance, meanwhile promotes the openness of communities. Power is instrumental to the functioning of communities and is largely managed through rules and regulations that govern members' interactions (Markus 2007). Governance in online creative communities refers to the mechanisms or processes that adjust individual's behaviors to adhere to certain rules (Markus 2007; O'Mahony & Ferraro 2007). With the regulations, the members' behaviors are coordinated to fulfill the shared community goal and spirit (Sibai et al. 2015).

There are many researchers studying the governance mechanisms of online creative community. O'Mahony (2007) identifies a variety of governance mechanisms: decision-making structure and decentralized degree, diversity of contributors, management of conflict, leadership constructing and

turnover, membership structures and rights, and autonomous participation. De Laat (2007) recognizes six governance tools of OSS projects: modularization of software (task segment), division of roles (human arrangements to various tasks), delegation of decision making (centralized or decentralized/shared), training and indoctrination (formulation of entry requirements), formalization (rules and regulations to coordinate member activities), and leadership (autocracy or democracy). Markus (2007) categories OSS governance into six dimensions: ownership of assets, chartering the project (project goals), community management (rules about members' entry requirements, roles and limitations), software development processes (structures and rules about requirements elicitation, human deployment, processes for managing software changes, release control), conflict resolution and rule changing, and use of information and tools (information inflows and the using way of tools and repositories).

Recently, Jarvenpaa and Lang (2011) examines the power-related boundaries of online communities about music remix as the governance on decision-making about resource inflows, production processes and outcomes, which is associated with the control of key resources, determining authority domain in activities and managing relationships with external domains. After comparing the two communities--NIN (firm-sponsored) and CCM (autonomous), they identify two essential differences between firm-sponsored community and autonomous community. One is the level of control of key resources. NIN refers to hierarchical control, while CCM refers to peer relationships. The other is the dynamicity of control. The rules of NIN mostly are unchanged since they are launched. The rules of CCM are dynamic, various in different projects.

In order to providing a more comprehensive understanding of governance, Sibai et al. (2015) categories the multiplex governance mechanisms into three governance structures. From the perspective of types of interactions, three main governance structures are identified—market, hierarchy, and clan. Within the same online community, different governance structures coexist. Following the logic of exchange, market governance controls transactional interaction though exchange rules (e.g., legal constraints). Following the logic of authority, hierarchy governance controls the hierarchical interactions within the community through authoritarian standards (e.g., conventions defined unilaterally by the more powerful party determining what constitutes good or bad behavior). It's manifested in the practices of community management. Authoritarian standards rely on a norm of legitimate authority that prescribes attributes entitling members to greater power party. There are two types of legitimacy that may coexistence in one online community. One is despotism, the authority is legitimated by "natural" access (e.g., the funding firm of the community), the rules implied in community designing that constraint members' behaviors in significant ways (Humphreys 2008); the other one is meritocracy, the authority is legitimated from members' talent and achievements. Following the logic of sharing identity, clan governance, also viewed as self-governance (Forteet et al. 2009, p. 49) or democratic mode of governance (O'Mahony & Ferraro 2007, p. 1082), controls communal interaction (e.g., interactions between members in a group) through traditions. Traditions refer to the repetitive behaviors among members, which coordinate the actions of multiple individuals adhering to certain standards. The enforcement of rules relies on peer pressure on *collective identity, a lasting, shared sense of belonging to a community are the enforcement* (Sibai et al. 2015).

To sum up, the governance of the company-initiated OIP follows the logic of power-related boundary as non-owership boundary choice. The power-related boundary management of company-initiated OIP involves trade-offs between openness (attracting external participation, stimulating innovations) and control (over platform activities, standardization of producing innovations, usefulness of innovation production), aiming to balance tensions related to these key trade-offs with respect to the particular organization strategy (Jarvenpaa & Lang 2011). Additionally, as the bridge connecting organization and platform users (innovation contributors), the boundary management of the OIP also should be considered to improve virtual collaboration between organization and users (De Laat 2007).

3 RESEARCH METHOD

Given the current state of the research on this topic, we adopted an exploratory single case study method that allows the study of the phenomenon in a natural setting over time and answers the "how" aspect of the phenomenon (Yin 2009) identified in our research question. The following sections describe our case, data collection and analysis methods.

3.1 Case Description

To identify how power boundary influences the design of the OIP over time, we investigated an appliance manufacturer's online open innovation platform. H Group, which was headquartered in Qingdao China, was selected as the research site. By studying the OIP based in a single company, we controlled unwanted variance brought by different structural characteristics of companies and its strategies. H group was only a small-scale refrigerator manufacturer in 1984. However, it has been the world's No. 1 brand of household appliances since 2009. In 2012, it was ranked as one of the 50 most innovative companies in the world.

In September 2012, H group launched its first OIP, Idea v1.0 (OIPv1), which was developed and operated by its open innovation center. The purpose of this platform was to collect creative suggestions and comments which help H group to improve its products, services and sales. During its operation, the center received over 2,930 creative ideas, 12,647 votes and 9,335 comments.

In March 2014, Idea v1.0 was upgraded to Idea v2.0 (OIPv2). This new platform follows the idea of openness, cooperation, innovation and sharing. It integrates various excellent solutions, wisdom and innovations and cooperates with global research institutes and researchers, therefore provides platform users with current technical news and innovative solutions. The Idea appeals to global designers, innovators and users to create products and service guiding customer demands together in the Internet era. This platform has received 6,120 creative ideas and 819 creative design solutions as to December 2015.

3.2 Data Collection

We studied the two versions of H Group's open innovation platforms, collecting data over a period of three years (2012.12-2015.12). Data were collected from multiple resources, including group interviews, secondary data, and participant observation. During this period, we registered in H Group's OIP and were involved in the online activities. We also collected data related to users' activities and creative items separately in two time points (in 2014.1 and 2015.12). We conducted semi-structured interviews with the general managers and general staffs of H Group's Innovation department in charge. Table 1 summarizes our data collection methods.

Data Types	Data Source	Critical Information Collected
Interview Data	Semi-structured interviews	The main drivers and development barriers of enterprise-initiated OIP, methods adopted to resolve these barriers, the difference of open innovation strategies in the two versions of the OIP
Secondary Data	Internet news	Open innovation related information such as enterprise honor and performance, leaders' speech, innovation activities, other large events
	Enterprise website	CEO presentation, group brand, the Group's strategy, corporate culture, model innovation, development process, honor of H Group, H Group in the world, News and so on
Participant Observation	Archive data on the two OIPs	The number of users, idea types, intellectual property items, growth rate of idea, committee note, adoption rate, and the process of idea submitted

Table 1. Data collection details

3.2.1 Interview

We conducted two rounds of semi-structured group interviews with H Group's relevant staff in January 2014 and January 2015 respectively. The purpose of these interviews was to ask the

performances of the OIPs and identify any power boundary changes and their impact on the design of the OIP. The details of interviews are shown in Table 2.

Interview	Date	Duration	Participants	Topic items
1st interview	2014/1/18	120 mins	Supervisor and director of OIPv1, three employees of design department	The reasons of construct the OIP, OIPv1 design elements, user characteristic, outcomes and the boundary strategy
2nd interview	2015/1/9	150 mins	Director of innovation center, president of H University	The reasons of OIP change, OIPv2 design elements, user characteristic and outcomes the boundary strategy

Table 2. Interview details

3.2.2 Secondary Data

Secondary data include any data collected from Internet and the Group's official website regarding H Group's organizational environment, open innovation strategy as well as the latest OIP-related news. Secondary data provide background information which helped us to analyze power boundary changes, the reasons for building the company-initiated OIP and for changing of the OIP version.

3.2.3 Participant Observation

Two of the authors participated in two versions of H Group's OIP as users over three years. They submitted ideas and interacted with administrators of the OIP and other users on the platform to capture the contribution process of different OIP versions. They also downloaded ideas or design solutions represented on the platforms to analyze the degree of innovation.

3.3 Data Analysis Method

In this study, data analysis was performed concurrently with data collection, which followed empirical contextualization and inference to best explanation (Ketokivi & Mantere 2010). We used an iterative process of cycling between our data, emerging concepts and relevant literature (Strauss & Corbin 2010). We initially related our findings to organizational power boundary within each OIP (Phase1 and Phase1 2), identifying how the power boundary influenced the characteristics of the OIP. After conceptual insights emerged about the interrelations between organizational power boundary and design characteristics of each OIP, we turned to cross-case analysis to compare the differences (outcomes) on OIPv1 and OIPv2. Being leaded by the explorations of how the power boundary impacted the changes of the design of company-initiated OIP, We then revisited the data and began to compile pertinent evidences from the two versions of the OIP. Finally, based on our interpretation of the data, we offered an explanation regarding the power boundary (openness and control) and the design of OIP in terms of a structurational model, weaving together theories, additional evidence, and citations to the relevant literature. The validity and reliability of our research method is highlighted in Table 3 (Yin 2009).

Construct validity	Insight into the interview protocols by the interviewees
Internal validity	Selection of different stakeholders (Supervisor and director of OIP, employees of design department, director of innovation center, president of H University) as interviewees Comparison of the interviewees' statements
External validity	Analytic generalization of results in regard to boundary theory and structurational theory
Reliability	Recording, transcription and coding of the interviews

Table 3. Validity and reliability of the research method

4 RESULT

4.1 Phase 1: The Initial Design and Use of the OIP

4.1.1 The initial design of the OIP

In order to maintain profitability and keep advantages in market competition, H Group needs to increase innovation capability, decrease the cost of new product development (NPD), and improve customer satisfaction by integrating customers into the product development. In 2012, H Group started its network strategy and began the process to transform from a traditional home appliances manufacturing enterprise to an Internet-based one. An interviewee made the following comment regarding the purpose of initiating the first OIP:

> *In fact, the idea of building the OIP is an alignment with group strategy, which is from closed to open, and not only out-inbound but also in-outbound. H Group will become a platformization enterprise in this way.*

The network and platform strategies indicate that H Group not only wanted to rely on its own R&D resources but also invite external innovation resources to participate in its product development and improvement to better respond to consumers' demands. In other words, H Group attempted to exercise power in order to improve performance, focusing on maximizing strategic control over external resources (openness), which demarcated the sphere of the organizational influence, through open to external forces. Another interviewee commented:

> *Accordance with the H Group strategy evolution, we also have a slogan called 'fro endogeny to crowdsourcing'. Everyone will work together to participate in the idea produce.*

To integrate more users to participate in the process of innovation, the task of developing OIPv1 was delegated to H Group's after-sale department in September 2012, which was responsible for collecting creative suggestions and complaints from customers. Consequently, H Group's after-sale department focused on openness in developing the OIP, in order to attract external participation, and stimulate innovation ideas.

The purpose of OIPv1 was to facilitate interaction and collaboration among innovation contributors to stimulate creativity and to collect creative suggestions and comments to improve products, services and sales. One interviewee mentioned that the target group of the OIPv1 was unspecified. In other words, OIPv1 was open to anybody with different backgrounds and knowledge. There were no limits on the topics that users could participate. The contributors could submit any suggestions, complaint and creative concepts concerning the existing products of the Group (such as refrigerator, air conditioner, washing machine, etc) or the platform itself. Therefore, the content input to the platform was also open.

An analysis of the archived data on the platform revealed that the contents of contribution from the users were mainly simple ideas or concepts regarding the existing products, even complaints and suggestions. The above design characteristics of the platform showed openness towards the platform users. In terms of intellectual property venture, there was no formal contract about the submitted ideas. Other people could browse and download the contents, without registering.

4.1.2 The use of the OIP and its performance

Once developed, the OIP was deployed in H Group, connecting its external customers and R&D department through the after-sale department. When consumers or innovation contributors submitted creative ideas, the contents were automatically generated on the platform and sent to the administrators of OIPv1, who were responsible for acknowledging and summarizing them. Then the ideas were sent to and evaluated by the R&D department.

The diffusion of the OIP was incremental at first, and the growth of the numbers of registrants and the ideas was incremental too. From September to October 2012, the number of the submitted ideas was increased from 19 to 627, and the number of ideas maintained 300 during the next five months. However, the number of the submitted ideas was decreased to 100 in April 2013. Totally, there were

more than 2, 930 ideas, 12,647 votes and 9,335 comments by December 2013. The majority of the ideas and suggestions were submitted by platform users who did not possess special knowledge related to the product. Therefore, the quality (the feasibility) of the ideas was very low. In the submitted ideas, there were lots of homogenization ideas (369, 12.67%) and fantasy ideas (834, 28.63%), which suggested that the platform did not exert any control or pre-screening methods on idea submission. The data from the platform also indicated that the number of the ideas that were implemented and partially implemented were only 15 (0.51%) and 56 (1.92%) respectively, which suggested a very low adoption rate of submitted ideas. One interviewee provided a possible reason for the low percentage of high-quality idea:

> *When we designed this platform, we didn't consider any protects to intellectual property. Anyone could browse the ideas submitted to the platform and download them if they want. I think maybe this had prevented some otherwise good ideas from submitting.*

Although we were not able to measure the performance of the OIP quantitatively in this research, we managed to ask the interviewees how they felt about the performance of the OIP. In general, they felt that the OIP did not perform well over time. One interviewee thought the after-sale department had worked as a barrier to the direct interaction between the customers and the R&D department, since the after-sale department was responsible for summarizing and transmitting the ideas to the R&D department:

> *The platform (OIPv1) is operated by the after-sale department, so any ideas need to go to this department first. But its main job is not R&D, but customer service. So there might be different understandings about innovative ideas between after-sale department and the R&D department. Without connecting the external platform users and the internal R&D staff directly, sometimes it is not easy to truly understand the ideas.*

4.2 Phase 2: The Redesign and Use of the OIP

4.2.1 The redesign of the OIP

Acknowledging the fact that OIPv1 did not satisfy H Group's purpose of utilizing external resources to innovate, H Group began to redesign and upgrade its OIP in 2014. They had clearer thoughts about what they wanted the OIP to be. That is, they wanted the OIP to provide more valuable ideas and design solutions, to protect intellectual property and privacy of the ideas submitted by external individuals, and they wanted to reduce possible misunderstandings between external contributors and internal R&D designers. To do so, the task of redesigning and managing the OIP was directly delegated to H Group's innovation center, which was responsible for new product (e.g., refrigerator, air-condition, washing machine and TV) development. An interviewee made the following comment regarding the purpose of redesigning the OIP:

> *The prior one (OIPv1) enlarged the distance between the users and designers. That is, the designers did not directly interact with the platform users. But now with the innovation center in charge of the platform, we were able to face the users directly and recognize valuable and interesting ideas more quickly.*

Different from the after-sale department, the innovation center focuses on design-related ideas. To make the platform more valuable to the Group, the center exerted more powers on the platform. For examples, in OIPv1, the users of the platform were not specified. Anyone could join the platform, which brought many low-quality ideas with trivial values. But in OIPv2, the users were specified, as one interviewee mentioned:

> *We have targeted users for this version (OIPv2). In other words, this platform is mainly open to the ones with specified knowledge and experiences such as students of industrial design major and people who are interested in design and are able to deliver feasible ideas.*

The topics discussed in the platform were also specified, which were classified into three categories based on design types: user interface, registered design and color, material & finishing of industrial design, and four groups based on product types: air-related (e.g., air cleaners and air conditioners),

food-related (e.g., refrigerators and microwave ovens), water-related (e.g., washing machines and humidifiers) and other categories.

Another difference between these two versions of the OIP is the content input control mechanism, which refers to how the ideas are submitted to and published on the platform. In OIPv1, nobody checked and prescreened the ideas submitted. That is, all submitted ideas could be published. But in OIPv2, the submission process was semi-open. Any submitted ideas need to be approved by an administrator before they can be published. Ideas that with little value or with just some general concepts will not get approved. The contents of the submitted ideas must be illustrated in detail with design notes (e.g., source, target custom and function). Another interviewee made the following comments regarding the categories of the submitted ideas:

> *The contents of the submitted ideas are divided into two categories. One category is called creative ideas, which refer to the ideas that only provide simple or moderate descriptions or some sketches on a design. Another one is called design solution, which has very detailed description on the design such as the product definition, size, standard, functional descriptions, and even some of the structural design. It is close to commercialization or production of the proposed design. In addition, there is a kind of ideas which is called 'fantasy'. It is just a "thinking". "Idea" does not mean "creative idea", and "creative idea" is not equal to "design solution". This kind of ideas will not pass the content screening. Therefore, the submitted ideas are divided into several categories based the degree of the content details.*

In terms of intellectual property, there are formal copyright notices about the published contents in OIPv2. The platform was redesigned to respect users' privacy and rights, and to protect personal information and idea contents provided by users. When a user submits an idea to H Group through the platform, it is seen as that the user authorizes H Group to use the submitted idea. Once the idea is approved and rewarded, the copyright and related property are owned by H Group, and no other organizations or individuals could use it for any commercial purpose without authorization.

In summary, while both versions of the OIP were designed to align with the Group's open innovation strategy, they are obviously differently designed in terms of organizer, targets, topic specificity, degree of elaboration, content input control, targeted users and intellectual property control. Table 4 summarizes the findings.

Characteristics	OIPv1	OIPv2
Organizer	After-sale department	Innovation center
Targets	Collect creative suggestions and comments to improve products, services and sales.	Collect original creative design work
Topic specificity	General (open topic)	Specific (specified topic)
Degree of elaboration	Idea/Sketch/Concept Homogenous (similar to original idea)	Concept/Prototype/Design Solution/Evolving Heterogeneous (innovative combinations)
Content input control	Open (any content was accepted and published in the platform)	Semi-open (H Group decides whether to accept or decline a submitted idea)
Targeted users	Unspecified: Internet user	Specified: Students, enthusiasts, designers, creators of industrial design
Intellectual Property Control	No Protection Mechanism	Protection announcement, off-line evaluation

Table 4. Differences in the open innovation platform designs

4.2.2 The use of the OIP and its evaluation

In March 2014, the OIPv2 was deployed in H Group. With the management of OIPv2, the innovation center directly interacts with innovation contributors, collects and pre-reviews creative ideas and design solutions submitted to the platform. Experts and engineers are selected and organized to evaluate the quality of the submitted ideas. Once approved, the submitted creative ideas or design solutions will be published in the platform. The diffusion of the OIP was slowly incremental during the transition period (March 2014 to July 2014), and the OIPv2 has attracted more than 12,000 active users. From March 2014 to December 2015, the numbers of published creative ideas and design solutions were 6,120 and 819 respectively. Many creative ideas or design solutions have detailed descriptions or even are illustrated with model figures. One interviewee commented that the outcomes and performance of OIPv2 were praised by the internal design team.

5 DISCUSSION AND CONCLUSION

To generate theoretical insights from the analysis, we focus on similarities and differences between the design of OIPv1 and OIPv2, and analyze the impact of different power boundaries on the design and outcomes of the two visions.

5.1 Power boundary and the design of the OIP

In this research, we use organizational power boundary to provide the rationale and guide for organizing and constructing an OIP. In outside-in open innovation model (Spithoven et al. 2011), power boundary refers to a set of activities involved in defining and protecting inner resources, as well as interacting relationships with external resources, to improve organizational innovation capabilities (Burger-Helmchen & Cohendet 2011). When an organization constructs an OIP as a part of its open innovation strategy, the developed platform is expected to be aligned with the power strategy of the organization (West & O'Mahony 2008).

Although the strategy of open to external resources is agreed in both stages of H Group's OIP development, the two versions of OIPv1 and OIPv2 differ in their organizational power boundary management in terms of the degree of openness. Openness means H Group expands the sphere of its organizational influence, which attracts more and more innovation contributors to the new product development process to improve its innovation capability. With the openness of power, OIPv1 was designed as an intermediary connecting external customers and internal R&D designers. In this stage, the platform exerted loose or no control on either platform users or the topics users can submit.

However in 2014, H Group claimed that open innovation should improve its design performance and protect the intellectual property. Consequently, H Group realized it should have a tighter power boundary management on attracting external innovation contributions. To align with this strategy, H Group exerted a number of controls on the platform design. For examples, OIPv2 restricts topics discussed in the platform and the idea submission process.

5.2 The outcomes and design of the OIP

Technology is designed by human actors under some organizational constraints, and also instructs the actions of human actors which is sequentially solidified as organizational properties over time (Orlikowski & Robey 1991). In our case, the redesign of OIPv2 was also influenced by experience and outcomes of OIPv1. The OIPv1 had not achieved the expected performance (e.g., few creative ideas about new product development, loose control of the external resources). The poor performance made H Group to realize that its power boundary regarding open innovation should change from more openness to more control, which led to the redesign of the characteristics of the OIP. From the interview we can see that OIPv2 is seen as more effective than OIPv1. OIPv2 focuses on creative ideas about new product design and takes action to develop the new product well. Most members who register in the platform are active.

The analysis of the two versions of the OIP suggests that organizational power boundary managed by H Group guides the design of the OIP, and outcomes of the OIP appear to be synergistic effects with the power boundary on the design of the OIP. The entire design and use process of the OIP can be

described in terms of a structurational model as shown in Figure 1, which illustrates the dynamic interaction between power boundary of an organization and the design characteristics of the OIP.

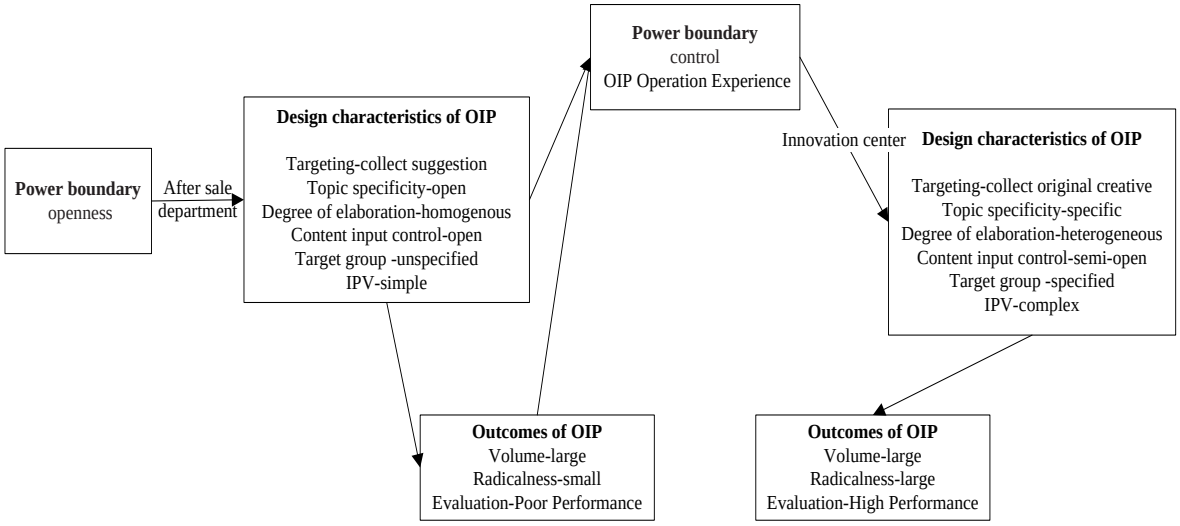

Figure 1. The entire design and use process of the OIP

5.3 Limitations

It is important to acknowledge major limitations of this research before discuss the implications. First, this research only studies 2 versions of a company-initiated OIP in a single company, which might restrict the generalizability of the findings. It is believed that different enterprises may have different concerns about the role of OIP in these enterprises, which lead to different decisions on how to design the OIP. In this sense, it is worthwhile to perform multiple-case studies in order to discover new factors. Second, the interviews were conducted in a group interview form, which so the researchers may ignore other hidden factors of the process of the OIP change. Third, we also ignore the influence of other factors on the power boundary change, e.g. the external environment, further study should explore the influence on the power change boundary.

5.4 Implications

From a theoretical point of view, power boundary is an important concept in traditional organization management and existing literature on open innovation recognizes the role of power boundary is both enabling and constraining platform design or open community development (Jarvenpaa & Lang 2011; Murray & O'Mahony 2007; O'Mahony & Bechky 2008). However, most research focuses on the power boundary of the platform or community itself. What is largely missing in the literature is a study on how organizational power boundary influences the design of its OIP with particular strategies over time. Using a longitudinal case study approach, this research provides a first step towards understanding this important question.

A practical insight is that it is important for practitioners to understand their organization's power boundaries in open innovation before designing their OIP. It is not helpful to just imitate others' design of an OIP without considering its own organizational strategies. We found salient differences in power boundaries in terms of openness and control in the design of the two platforms. Moreover, the interactions and fit between the power boundary of the organization and the OIP can improve OIP's performance. Thus, platform providers need to make a reasonable power boundary decision, such as considering levels of openness and control to design OIP.

References

Bateman, P. J., Gray, P. H. and Butler, B. S. (2010). Research note--the impact of community commitment on participation in online communities. Information Systems Research, 21(2), 841-854.

Barile, S., Saviano, M.and Polese, F. et al. (2012). Reflections on service systems boundaries: A viable systems perspective: The case of the London Borough of Sutton. European Management Journal, 30(5), 451-465.

Bullinger, A. C. and Mösslein, K. (2011). Innovation contests: systematization of the field and future research. International Journal of Virtual Communities & Social Networking, 3(1), 1-12.

Burger-Helmchen, T. and Cohendet, P. (2011). User communities and social software in the video game industry. Long Range Planning, 44(5), 317-343.

Chesbrough, H. W. (2003). The era of open innovation. MIT Sloan Management Review, 44(3), 35-41.

Chesbrough, H., Vanhaverbeke, W. and West, J. (2008). Open innovation : researching a new paradigm. Oxford University Press.

Cui, T., Ye, H., Teo, H. H. and Li, J. (2014). Information technology and open innovation: a strategic alignment perspective. Information & Management, 52(3), 348–358.

De Laat, P. B. (2007). Governance of open source software: state of the art. Journal of Management & Governance, 11(2), 165-177.

Demil, B. and Lecocq, X. (2006). Neither market nor hierarchy nor network: The emergence of bazaar governance. Organization studies, 27(10), 1447-1466.

Denyer, D., Parry, E. and Flowers, P. (2011). 'social', 'open' and 'participative'? exploring personal experiences and organisational effects of enterprise2.0 use. Long Range Planning, 44(s 5–6), 375-396.

DeSanctis, G. and Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. Organization science, 5(2), 121-147.

Di Gangi, P. M. and Wasko, M. (2009). Steal my idea! Organizational adoption of user innovations from a user innovation community: a case study of Dell Ideastorm. Decision Support Systems, 48(1), 303-312.

Frey, K., Lüthje, C. and Haag, S. (2011). Whom should firms attract to open innovation platforms? the role of knowledge diversity and motivation. Long Range Planning, 44(5), 397-420.

Forte, A., Larco, V. and Bruckman, A. (2009). Decentralization in Wikipedia governance. Journal of Management Information Systems, 26(1), 49-72.

Hallerstede, S. H. (2013). Managing the lifecycle of open innovation platforms. Springer Science & Business Media.

Humphreys, S. (2008). Ruling the virtual world: Governance in massively multiplayer online games. European Journal of Cultural Studies, 11(2), 149-171.

Jarvenpaa, S. L. and Lang, K. R. (2011). Boundary management in online communities: case studies of the nine inch nails and ccMixter music remix sites. Long Range Planning, 44(5), 440-457.

Ketokivi, M. and Mantere, S. (2010). Two strategies for inductive reasoning in organizational research. Academy of Management Review, 35(1), 315-333.

Kodama, M. (2010). Boundary management: Developing business architectures for innovation. Springer, Berlin.

Krippendorff, K. (2004). Measuring the reliability of qualitative text analysis data. Quality & Quantity, 38(6), 787-800.

Landis, J. R. and Koch, G. G. (1977). An application of hierarchical kappa-type statistics in the assessment of majority agreement among multiple observers. Biometrics, 33(2), 363-437.

Markus, M. L. (2007). The governance of free/open source software projects: monolithic, multidimensional, or configurational?. Journal of Management & Governance, 11(2), 151-163.

O'Mahony, S. and Bechky, B. A. (2008). Boundary organizations: Enabling collaboration among unexpected allies. Administrative Science Quarterly, 53(3), 422–459.

O'Mahony, S. and Ferraro, F. (2007) The emergence of governance in an open source community. Academy of Management Journal, 50(5), 1079-1106.

O'Mahony, S. (2007). The governance of open source initiatives: what does it mean to be community managed?. Journal of Management & Governance, 11(2), 139-150.
Orlikowski, W. J.and Robey, D. (1991). Information technology and the structuring of organizations. Information Systems Research, 2(2), 143-169.
Orlikowski, W. J. (1992). The duality of technology: rethinking the concept of technology in organizations. Organization Science, 3(3), 398-427.
Pfeffer, J. and Salancik, G. (1978). The external control of organizations: A resource dependence perspective. Harper & Row, New York.
Prahalad, C. K. and Ramaswamy, V. (2004). Co-creation experiences: the next practice in value creation. Journal of Interactive Marketing, 18(18), 5-14.
Santos, F. M. and Eisenhardt, K. M. (2005). Organizational boundaries and theories of organization. Organization Science, 16(5), 491-508.
Santos, F. M. and Eisenhardt K. M. (2009). Constructing markets and shaping boundaries: Entrepreneurial power in nascent fields. Academy of Management Journal, 52(4), 643–671.
Sibai, O., de Valck, K., Farrell, A. M. and Rudd, J. M. (2015). Social Control in Online Communities of Consumption: A Framework for Community Management. Psychology & Marketing, 32(3), 250-264.
Spithoven, A., Clarysse, B. and Knockaert, M. (2011). Building absorptive capacity to organise inbound open innovation in traditional industries ☆. Technovation, 31(1), 10-21.
Strauss, B. A. and Corbin, J. (2010). Open Coding Definition of Terms, Basics of qualitative research: Grounded theory procedures and techniques. Thousand Oaks, CA: Sage Publication, inc.
Osch, v. W. and Avital, M. (2009). Collective generative capacity: The seed of IT-induced collective action and mass innovation. Proceedings of the 8th JAIS Theory Development Workshop, Phoenix, AZ . Sprouts Alliance.
Weick, K. (1995). Sensemaking in Organizations. Sage Publications, London.
West, J. and O'Mahony, S. (2008). The role of participation architecture in growing sponsored open source communities. Industry and Innovation, 15(2), 145–168.
Yin, R. K. (2009). Case Study Research. Design and Methods (5 ed.). Thousands Oaks: Sage.