SOCIAL EMBEDDEDNESS AND CUSTOMER-GENERATED CONTENT: THE MODERATION EFFECT OF EMPLOYEE PARTICIPATION

Guoxin Li
School of Management
Harbin Institute of Technology, Harbin, China
liguoxin@hit.edu.cn

Xue Yang*
School of Management
Harbin Institute of Technology, Harbin, China
yangxue198700@hit.edu.cn

Wei Xu
School of Information
Renmin University of China, Beijing, China
weixu@ruc.edu.cn

Yingqiu Zhu
School of Information
Renmin University of China, Beijing, China
inkZhu@ruc.edu.cn

ABSTRACT

Due to the rapid development of Web 2.0 technology, the Internet has changed how people communicate. Increasing numbers of customers generate content in online co-creation communities, and this co-creation between customers and companies has become a fashion trend. This study investigates the relationship between social embeddedness and the amount of customer-generated content and how employee participation moderates this relationship. We focus on structural embeddedness and relational embeddedness to measure social embeddedness. The amount of customer-generated content is assessed by the number of posts in a given community. The results indicate that both structural and relational embeddedness positively impact the amount of customer-generated content and that employee participation negatively moderates the relationship between structural embeddedness and the amount of customer-generated content. Theoretical and practical implications are discussed.

Keywords: Co-creation; Social embeddedness; Customer-generated content; Employee participation

1. Introduction

The continuous improvement of the Internet has appealed to the interest of companies that understand the potential to combine customers' ideas and needs [Martínez-Navarro & Bigné 2017; Nambisan 2013; Wang et al. 2017]. Companies may establish online co-creation communities, which provide customers the opportunity to participate in product development and product support [Luo et al. 2015]. Co-creation with customers is an effective method to improve customer relationships and enhance business process efficiency [Khodakarami & Chan 2014]. Recent studies have explored various aspects of co-creation, including customer co-creation activities [Nambisan 2002; Payne et al. 2008; Schau et al. 2009], customers' roles in co-creation activities [Healy & McDonagh 2013; Nambisan 2002], psychological drivers of consumer participation in co-creation [Nambisan & Baron 2009; Zhang et al. 2015], online community citizenship behaviour [Chou et al. 2016], and the business value of customer-generated content [Aggarwal & Singh 2013; Dahlander & Frederiksen 2012].

Undoubtedly, the sustainable development of an online co-creation community depends primarily on customers who voluntarily contribute customer-generated content, while content generation and content sharing are generally

* Corresponding Author

related to social relationships [Lee 2015; Zeng & Wei 2013]. Customers' experience and decision-making are generally influenced by interpersonal interactions [Dallas et al. 2012; Okazaki et al. 2015]. Without social interaction among customers, customer-generated content would have not reached its universal popularity [ShZhani et al. 2014; Wang 2015]. Studies regarding social networks have extended from sociology to other areas, such as marketing, information systems, and business management. Certain scholars have recently explored user-generated content from a social network perspective, for example, the popularity of videos on YouTube [Dallas et al. 2012], the broadcasting of information via Twitter [ShZhani et al. 2014], and the dissemination of content on Wiki [Ransbotham et al. 2012]. Social media allows new information and ideas to spread among users through networks facilitated by subscription and comment links [Chau & Xu 2012]. However, few studies focus on customer-generated content from a social network perspective in an online co-creation community.

This study aims to analyse the effect of social embeddedness on the amount of customer-generated content from a social network perspective. Specifically, we explore the relationship between social embeddedness (structural and relational embeddedness) and the amount of customer-generated content and how the participation of employees moderates this relationship. Our research context is the XIAOMI Company, which was ranked third among the world's 50 most innovative companies in 2014 by Fast Company (www.fastcompany.com). XIAOMI provides online discussion forums, design contests, and a prototyping centre in its online co-creation community, called MIUI. MIUI primarily aims to involve customers in the delivery of product support services, new design ideas, and product concept testing.

This study contributes to existing studies in two ways. First, it contributes to a better understanding of the role of social embeddedness regarding co-creation. Although prior research has explored various co-creation issues [Nambisan 2002; Payne et al. 2008; Schau et al. 2009], there has been little research examining the effect of social embeddedness on the amount of customer-generated content. Our study fills this research gap by focusing on the impact of social embeddedness (structural and relational embeddedness) on the amount of customer-generated content. Second, this study broadens the understanding of employee participation. We investigate the moderating effect of employee participation on social embeddedness and the amount of customer-generated content. This study clarifies how companies can influence the amount of customer-generated content through the participation of employees.

The remainder of the paper is organized as follows. The next section presents the theoretical background and proposes hypotheses. The third section describes the research setting and data, and the fourth section analyses the results. Finally, we conclude the paper by discussing the theoretical and managerial implications.

2. Theoretical Background and Hypotheses

2.1. Social Embeddedness Theory

Social networks represent social links and structural characteristics of social actors [Granovetter 1973]. Networks and relations among actors are the main research subject in social network theory [Borgatti & Everett 1999]. From the social network perspective, ties may be direct or indirect. Direct ties refer to direct connections between actors, and indirect ties refer to connections between two actors that require a third actor to facilitate the relationship [Faust 1997].

Scholars have presented varied conclusions in terms of the optimal network structure. Granovetter [1985] classified social embeddedness as structural embeddedness and relational embeddedness within a human social network. Burt [1992] proposed that the most efficient network structure is characterized by irredundant brokerage agents and contacts that are referred to as structural holes. Because redundant links provide identical and reduplicative information, actors in structural holes provide opportunities for information access and control. Coleman [1988] proposed that the network structure of an actor is associated with his/her social capital. A dense network structure is beneficial for forming social capital, which facilitates the functioning of coordination in a relationship. Nahapiet and Ghoshal [1998] classified social capital into three dimensions: structural, relational, and cognitive. The structural dimension refers to structural characteristics (e.g., network ties, density and network patterns) and are critical for forming actors' social capital [Gonzalez-Brambila et al. 2013]. The relational dimension refers to the level of obligation, trust, and expectation among actors engaged in a social network [Chang & Chuang 2011]. The cognitive dimension suggests that shared language and shared visions may help actors gain social capital within a social network [Chen 2007].

In this study, following the work of Granovetter [1985], we classify social embeddedness as structural embeddedness and relational embeddedness. Structural embeddedness is related to network structure, through which actors can efficiently exchange information and knowledge [Feld 1997; Gonzalez-Brambila et al. 2013]. Relational embeddedness is associated with relationship quality and tie strength among actors [Cheng 2014; Gilsing & Duysters 2008]. Tie strength can be strong or weak. Weak ties are loosely formed, and strong ties are formed through intensive and frequent interaction among actors [Granovetter 1973].

Two types of social networks exist in the context of an online co-creation community: a friendship-based network and a content-based network. A friendship-based network is initiated by an invitation from one focal customer to another customer, which requires confirmation from the invitee. Because a friendship-based network is the result of mutual agreement, we characterize such networks as undirected networks [Dallas et al. 2012]. A content-based network forms through commenting on certain customer-generated content. Customers' followers include individuals who reply to their posts, whereas customers' followings include individuals whose posts the customers reply to [ShZhani et al. 2014]. Content following is a one-way relationship, and we characterize it as a directional network. In this research, we focus in particular on the direct connection between a focal customer and followings.

2.2. Social Embeddedness and Customer-generated Content

2.2.1. Structural Embeddedness

According to the work of Granovetter [1985], structural embeddedness is related to network structure, through which customers can efficiently exchange information and knowledge. In this study, a high degree of structural embeddedness refers to a customer's maintenance of a large network size of friendship-based networks, which implies a large number of customer friends. Network size determines the direct ties a customer owns and reflects the position that a customer holds within a social network [Gonzalez-Brambila et al. 2013]. Customers with large networks may directly contact many friends through direct ties. Direct ties may assist in information exchange and provide complementary information [Feld 1997]. Information and resources can circulate through social ties, so consumers with a large number of direct ties can potentially access the special resources of other consumers through friendship [Tsai & Ghoshal 1998]. Since social ties can facilitate information and knowledge exchange, it is likely that direct ties among consumers improve the possibility for the consumer to absorb new resources. Moreover, homogeneous people are likely networked to each other [McPherson et al. 2001] such that connected friends generally have common characteristics and similarities. New ideas are more likely to be transferred between similar individuals [Reagans & McEvily 2003]; thus, direct ties in friend networks may facilitate information transmission. Diverse knowledge and perspectives increase the opportunity for generating novel ideas [Roberts & Candi 2014; Wang 2016]. When a customer possesses a high degree of structural embeddedness, that customer may conveniently access abundant information through direct ties, which may stimulate the customer to generate more content through integrating different perspectives.

Thus, the following hypothesis is proposed:

H1: Structural embeddedness positively influences the amount of customer-generated content.

2.2.2. Relational Embeddedness

Relational embeddedness is associated with relationship quality and tie strength among customers. In this study, a high degree of relational embeddedness refers to a customer's high degree of tie strength. Close relationships and interactions allow customers to meet each other, share private information, and create a common point of view [Zeng & Wei 2013]. Therefore, a customer who possesses strong relationships with others is more likely to form a recognition relationship with other customers in a network. Consumers give replies and comments to indicate the quality, usefulness, or emotional appeal of user-generated content. Knowledge that many others have common interests and similar tastes increases contribution. Frequent communication with various individuals can also form social identity, and a consumer is likely to generate more content. Moreover, close relationships and interactions play an important role in shaping shared goals and values among customers [Tsai & Ghoshal 1998]. Socialized customers may also generate additional new content based on their common interests and mutual understandings [Van den Hooff & Huysman 2009]. Thus, the following hypothesis is proposed:

H2: Relational embeddedness positively influences the amount of customer-generated content.

2.2.3. Employee Participation

Due to the real-time characteristics of virtual communities, companies need to encourage two types of social interaction – consumer-to-consumer and consumer-to-employee – in online co-creation communities [Kohler et al. 2011]. Employee participation refers to an employee's establishment of a friendship with customers. Company employees, particularly engineers and specialists, generally are aware of the latest information and new applications of a product [Poetz & Schreier 2012]. Therefore, customers who directly make friends with employees will have more opportunities to pool up-to-date professional information and knowledge [Singh et al. 2011]. This knowledge and experience may assist the consumer and generate more personalized and novel plugins with other customers [Wang 2016]. Customers who make friends with employees have an increased likelihood of combining the captured information and resources from employees with their own experience and creating new user-generated content [Ransbotham et al. 2012].

Becoming friends with employees may help customers form a social identity [Ray et al. 2014; Steven L. Johnson, Hani Safadi 2015]. Customers may recognize that they share the same critical and core attributes with employees and may come to see themselves as replaceable alternatives for them [Tsai & Bagozzi 2014]. Customers who engage with

employees have an increased likelihood of enhancing the intimate relationship formed through relational embeddedness. Consumers' voluntary contributions appear to be presentations of personal goals, unlike an obligated fulfilment of group norms [Ray et al. 2014]. Thus, the following hypothesis is proposed:

H3: Employee participation positively moderates the relationship between structural embeddedness and the amount of customer-generated content.

H4: Employee participation positively moderates the relationship between relational embeddedness and the amount of customer-generated content.

This study proposes a conceptual model to examine the relationship between social embeddedness and the amount of customer-generated content and to analyse how employee participation moderates this relationship. Figure 1 presents the full conceptual model.

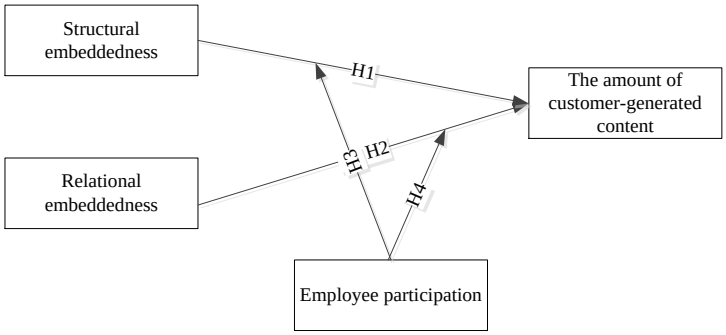

Figure 1: Conceptual Model

3. Research Method

3.1. Research Setting and Data Collection

Our research context is the XIAOMI Company, ranked third among the world's 50 most innovative companies in 2014 by Fast Company (www.fastcompany.com). MIUI.com is currently a popular mobile phone online community hosted by the XIAOMI Company. It provides a wide range of usability and functionality and facilitates customer-generated content regarding the XIAOMI mobile phone. MIUI members are primarily mobile phone enthusiasts, many of whom are devoted amateurs or professionals. In addition to customers, XIAOMI Company employees participate in the MIUI community and release the latest product software and applications, communicate with customers and help customers solve technical problems. MIUI allows its members (both customers and company engineers) to establish their own personal homepage (similar to Facebook.com). All members may interact with each other through making friends, joining interesting clubs, and sharing and commenting on valuable content. This information is exhibited on users' personal homepage.

We formed the panel dataset from the MIUI community using python scripts. Data collection lasted from 18 August to 8 September 2014. Data were collected every three days at seven time points, resulting in 1397 unique customers and 9779 observations.

3.2. Independent Variables

Interactions between customers in an online co-creation community form the networked structure. Friendships are initiated by an invitation from one customer to another customer, which requires confirmation from the invitee. Because the friend network is the result of mutual agreement, we characterize such networks as undirected networks [Dallas et al. 2012]. In accordance with the work of Wang [2016], we operationalize structural embeddedness as the network size it, which is the total number of friends possessed by customer i from registration to time period t.

A content-based network forms through commenting on certain customer-generated content. Customers' followers include individuals who reply to their posts, whereas customers' followings include individuals whose posts the customers reply to [ShZhani et al. 2014]. Value co-creation communities are a little different from social network sties (SNSs), a member may frequently communicate with the same member in SNSs, however, in value co-creation communities, there is little such back and forth communication. Our data includes the replier's ID of each customer-generated content and confirms that there is little such back and forth communication in MIUI community. So we assume that customers in value co-creation communities comment on various members' posts. Content following is a one-way relationship, and we characterize it as a directional network. We operationalize relational embeddedness as

tie strength it, which includes the number of comments posted by customer i divided by the total amount of online time (hours) of customer i from registration to time period t.

Employee participation refers to an employee's establishment of a friendship with customers. Making friends is a typical interpersonal interaction, reflecting the extent to which employees contact with consumers in the co-creation. Employee participation is operationalized as the total number of employees who make friends with consumer i from registration to time period t.

3.3. Dependent Variable

The sustainable development of an online co-creation community depends primarily on customers who voluntarily contribute customer-generated content. Attracting consumers to generate more content is the prime concerns of the co-creation community. So we focus on the amount of the customer-generated content. We operationalize the amount of customer-generated content as post it, that is, the total number of posts generated by customer i from registration to the time point t.

Table 1: Constructs and Measurements

Constructs	*Measurements*	*Description*
The amount of customer-generated content	Post $_{it}$	The total number of posts generated by customer i from registration to time period t.
Structural embeddedness	Network size $_{it}$	The total number of friends possessed by customer i from registration to time period t.
Relational embeddedness	Tie strength $_{it}$	The total number of comments posted by customer i divided by the total online time (hours) of customer i from registration to time point t.
Employee participation	Employee participation $_{it}$	The total number of employees who make friends with consumer i from registration to time period t.

4. Data Analysis

4.1. Descriptive Statistics

Descriptive statistics are provided in Table 2. The total amount of customer-generated content ranges from 0 to 496 posts. The average value of structural embeddedness is 1.323, ranging from 0 to 78. Relational embeddedness has a mean of 3.274 and a range of 0 to 24.377.

Table 2: Descriptive Statistics

Constructs	*Mean*	*Std. Dev.*	*Min*	*Max*
The amount of customer-generated content	14.242	29.120	0	496
Structural embeddedness	1.323	5.647	0	78
Relational embeddedness	3.274	2.760	0	24.377
Employee participation	0.061	0.307	0	3

Because the total number of customer-generated posts is a non-negative count variable, the Poisson regression and negative binomial regression can be adopted in alignment with previous studies [Wang 2016]. A negative binomial regression is conducted prior to a Poisson regression when the variance is considerably larger than the conditional mean. As demonstrated in Table 2, the mean and variance of the dependent variable are different. Therefore, we employ a negative binomial fixed effect regression to test our model. The negative binomial fixed effect model is explicitly expressed as follows:

$$\begin{aligned} Ln(\lambda_{it}) = {} & \beta_0 + \beta_1 Structuralembeddedness_{i\,t-1} + \beta_2 Rlationalembeddedness_{i\,t-1} \\ & + \beta_3 Employeesparticipation_{i\,t-1} \\ & + \beta_4 Structuralembeddedness_{i\,t-1} * Employeesparticipation_{i\,t-1} \\ & + \beta_5 Rlationalembeddedness_{i\,t-1} * Employeesparticipation_{i\,t-1} \\ & + \alpha_i + \delta_t + \varepsilon_{it} \end{aligned}$$

The contribution behaviour may also be affected by unobservable individual intrinsic characteristics; therefore, we include individual fixed effects (α_i) to account for all unobserved heterogeneity. Time fixed effects (δ_t) control for any time-specific influence shared by all individuals.

4.2. Results

Structural embeddedness (b=0.042, p<0.001) and relational embeddedness (b=0.145, p<0.001) are significant predictors of the amount of customer-generated content. Thus, H1 and H2 are supported. The interaction of structural embeddedness and employee participation is significant (b=-0.003, p<0.001). Employee participation negatively moderates the relationship between structural embeddedness and the amount of customer-generated content. This analytical result was not expected. Thus, H3 is not supported. The interaction of relational embeddedness and employee participation is not significant (b=-0.001, p>0.1). Employee participation does not moderate the relationship between relational embeddedness and the amount of customer-generated content. Thus, H4 is not supported.

Table 3: Regression Model

	Model 1	*Model 2*	*Model 3*
Constant	4.088***	4.099***	4.098***
	(0.079)	(0.080)	(0.080)
Structural embeddedness	0.041***	0.042***	0.042***
	(0.003)	(0.003)	(0.003)
Relational embeddedness	0.144***	0.146***	0.145***
	(0.007)	(0.007)	(0.007)
Employee participation		0.096***	0.100**
		(0.019)	(0.029)
Structural embeddedness * Employee participation		-0.003***	-0.003***
		(0.001)	(0.001)
Relational embeddedness * Employee participation			-0.001
			(0.005)
Observations	9779	9779	9779
Number of consumers	1397	1397	1397
Individual fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes

***P<0.001, **P<0.01.

5. Discussion

Based on social embeddedness theory, this study investigates the effect of structural and relational embeddedness on the amount of customer-generated content and how employee participation moderates this relationship. First, we demonstrate that both structural and relational embeddedness positively impact the amount of customer-generated content. It has been demonstrated that social embeddedness plays a very important role in terms of customer-generated content in an online co-creation community. Customers located in the centre of the content-based network maintain strong ties with other consumers and contribute more content to the online co-creation community. Strong ties can facilitate the diffusion information of high-quality and detailed information [Ibarra 1992], which is positively related to the development of individuals' creativity [Cheng 2014]. Consumers of high creativity are likely to generate more content.

Moreover, the empirical results indicate that employee participation does not significantly moderate the relationship between relational embeddedness and the amount of customer-generated content. That is, regardless of whether customers engage with employees, relational embeddedness positively affects customers' contribution. This may be because customers with a high degree of relational embeddedness possess strong ties with other consumers. Thus, employee participation does little to change the position of the customer in the content-based network. Consequently, regardless of whether there is employee participation, customers own a high-quality relationship with other consumers and are willing to generate their content.

Third, the empirical results demonstrate that employee participation negatively moderates the relationship between structural embeddedness and the amount of customer-generated content. Under low structural embeddedness, customers with more employee participation have a higher quantity of customer-generated content than customers with less employee participation. Customers with a low degree of structural embeddedness possess fewer direct ties with other consumers. Under this condition, customers maintaining friendships with employees may receive additional information from employees. Under high structural embeddedness, customers with less employee participation have a larger amount of customer-generated content than customers with more employee participation. Under this condition, customers with a very high degree of structural embeddedness and more employee participation may reduce the quantity of content and concentrate on generating high-quality content. First, consumers can probably take

advantage of the large amount of information facilitated by high structural embeddedness, however they may face the problem of cognitive overload. Employee participation can help consumers to better understanding various information and overcome cognitive overload. Moreover, consumers can also benefit from more employee participation to acquire expertise. With a large amount of information, especially professional and specialized knowledge, consumers are likely to generate higher-quality content than to generate more content. Thirdly, employees can also provide professional advice to consumers' new ideas, thus enhancing the quality of the consumer-generated content. Similarly, Cheng [2014] showed that among highly motivated bloggers, structural embeddedness led to a lower quantity but a higher quality of creative content than among less motivated bloggers.

5.1. Theoretical Implications

This study makes the following theoretical contributions. First, it verifies the effects of structural embeddedness and relational embeddedness on customer-generated content in an online co-creation community. These results contribute to our understanding of social network theory and co-creation practice. This study identifies two network characteristics from a social network analysis perspective and links them to customer-generated content. The analysis indicates that these two network characteristics features – network size and tie strength – are directly positive predictors of customer-generated content. The social embeddedness factors we identify in this study are not detailed, but they clarify the new phenomenon of co-creation. This study, as a forerunner, plays an important role in recognizing other social network characteristics, which are necessary to understand co-creation contribution.

Furthermore, the appearance of co-creation increases information availability regarding new product development and product support. To the best of our knowledge, this study is the first to investigate the moderating effect of employee participation on social embeddedness and customer-generated content. Our results offer new information regarding the validity of employee participation on social embeddedness and customer-generated content. Specifically, the results reveal the importance of employee participation as a moderator of structural embeddedness and customer-generated content. This new discovery augments previous studies by providing an improved understanding of how employees may encourage customer-generated content in an online co-creation community.

5.2. Practical Implications

This study has implications for managers and employees of online co-creation communities. First, managers and employees should optimize and improve the functions of friend features in their communities. The design should make it easy to locate new friends and arrange friendships. In this way, the network size of customers may increase, thereby stimulating the contribution of customer-generated content.

Moreover, managers and employees should encourage intimate and frequent contact among customers. To enhance the tie strength and relationship quality of customers, managers and employees should offer convenient and comfortable communication patterns for customers to develop and enhance their relationships. They can also issue a series of regulations and rules to manage customer interactions. For example, employees may publish a specific topic and then reward customers for participation. Employees may also organize team competitions, which may facilitate communication and interaction among customers and thus enhance the tie strength through social interaction.

5.3. Limitations

This study includes several limitations. First, exploring the relationship between social embeddedness and the amount of consumer-generated content is subject to endogeneity. Employee participation is also an endogenous variable. Though we adopt a lagged panel structure of the data and conduct a fixed effects analysis, we cannot completely rule out all the endogeneity challenges. This study can be considered a preliminary investigation of the link between network characteristics and content generation.

Secondly, we carry out the panel data to achieve empirical results; however, the research data were gathered within a one-month time period. In the future, more research data may be collected to verify the stability of the results. Further research may also investigate the dynamics of network characteristics in both friendship-based networks and content-based networks over a longer time period. A longitudinal design should contribute additional insights in terms of co-creation activities.

Third, this study includes only one specific platform, the MIUI community of the XIAOMI Company in China. Because the MIUI community does not provide rating/voting information, we cannot examine these data. Further research may extend our study to additional social media platforms and validate our analysis by collecting much richer data from a wider range of co-creation participants. Based on Chinese co-creation customers, this study provides additional information on the largest Internet market in the world. However, given the popularity of co-creation globally, future studies may also be conducted in other countries and include comparison studies in other cultures.

Finally, we utilize a social network analysis to study the process of co-creation; however, content analysis is not conducted in our research. Thus, in the future, qualitative analyses may be carried out regarding customer-generated content. Future research may adopt the model in this study as a foundation to conduct content analyses and to advance our understanding of co-creation.

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