This is a repository copy of *A distinct type of online group for customer knowledge innovation: The virtual product user community*.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/173550/

Version: Published Version

Xuguang Li and Andrew Cox*

A Distinct Type of Online Group for Customer Knowledge Innovation: The Virtual Product User Community

Abstract: Among online communities of customers there are a number of different types of group that need to be distinguished. One interesting type are virtual product user communities, i.e. company sponsored online forums where product users share usage experience and collaboratively construct new knowledge to solve technical problems. The purpose of this paper is to show that these "virtual product user communities" are a distinct type of customer group with knowledge innovation capability. The research adopts a method combining observation and content analysis of discussion threads where technical problems are solved, complemented by thematic analysis of interviews with forum members to explore its character, especially its knowledge related attributes. The paper confirms empirically that the virtual product user community is a distinct type of virtual community and can be differentiated from other virtual communities of consumers. In addition, an enhanced classification framework, extending Porter's (2004) classic 5Ps model, is proposed to highlight knowledge-related activities in virtual communities. Of particular interest is that the findings suggest that knowledge-related activities should be considered as an important attribute in defining and classifying virtual communities. In terms of practical implications, it is recommended that the virtual product user community should be given appropriate support from top management in order to fully exploit its knowledge innovation value. Moreover, tailored facilitation strategies to promote knowledge construction activities and community development can be developed in accordance with its unique attributes. The paper precisely distinguishes one specific type of innovative virtual community consisting of product users from other online customer communities. Moreover, it outlines a revised

virtual community classification framework, which can be widely applied in analysing features of online groups. Its key attribute of knowledge-related activity redirects attention to virtual communities' knowledge innovation capabilities.

1 Introduction

Since the first online community, "The Well" (http://www.well.com), was founded in 1985 (Ridings and Gefen 2004), hundreds of diverse types of virtual communities have emerged. Many specific types of communities have been identified. In response to the proliferation of online groups, there have been many attempts to build classifications of them, sometimes for a specific purpose, sometimes to determine exhaustive classification criteria (e.g. De Souza and Preece 2004; Dubé, Bourhis, and Jacob 2006; Hagel and Armstrong 1997; Hara, Shachaf, and Stoerger 2009; Henri and Pudelko 2003; Messinger, Stroulia, and Lyons 2008; Porter 2004; Ridings, Gefen, and Arinze 2002; Stanoevska-Slabeva and Schmid 2001). Porter's (2004) 5Ps model, which was created based on an extensive examination of existing work, is widely cited as a good starting point for such classification.

Because of the proliferation of online communities and increasing specialisation, there is a need for further work in classifying such groups. No classification system has been widely agreed by researchers due to the varying properties of virtual communities (Martínez-López et al. 2016). Classification is the foundation for explanation in social science (Bailey 1994). Without an adequate classification system as its basis, theory cannot provide explanation, and there can be no chance to form advanced conceptualizations, terminology, theorizing, or data analysis (Bailey 1994). Classification of online communities is theoretically important for reducing the complexity by condensing huge numbers of virtual communities into several salient types, to enable the analysis and obtain a better understanding of the proliferation of online social aggregations. In practical terms, it is the

---

*Corresponding author: Dr Andrew Cox, Information School, Regent Court (IS), 211 Portobello, Sheffield, S1 4DP, UK,
E-mail: a.m.cox@sheffield.ac.uk
Xuguang Li, Department of Information Resource Management, Business School, Nankai University, 94 Weijin Road, Tianjin, 300071, China, E-mail: xuguangli@nankai.edu.cn. https://orcid.org/0000-0002-7916-3851

basis for tailoring support strategies to ensure communities fully achieve their purposes. Verburg and Andriessen (2011) state that clear distinctions between different types of knowledge networks have not been made in many studies, and this causes organizing and facilitating strategies to be too general. Thus there is a value in trying to develop more finely grained ways of classifying online groups.

It is increasingly recognised that online consumer communities are of immense value to organisations but this can be in different ways, e.g. through celebrating the brand, promoting relationship marketing, providing product support, suggesting new product ideas or fixing problems and product testing (Nambisan and Nambisan 2008). As the purposes for which communities are established continue diversifying, there is a need for clarity in distinguishing between these types of groups.

The premise of this paper is that there potentially exists an important and distinct type of virtual community for customers where users themselves collaboratively solve technical problems with products and so create better usage experiences through peer support, usually on producer sponsored (/firm hosted) user support forums, with examples being Dell Support Forum, HP Discussion Board and Lenovo Forum. In prior studies conducted by Li and Cox (2016) and Li, Cox, and Ford (2017), these are designated "Virtual Product User Communities" (VPUC). Such forms of hosted support forum can be defined as "a producer-sponsored customer aggregation existing on the Internet to share usage experience and collaboratively to find technical solutions to problems within specific brand products" (Li, Cox, and Ford 2017, 284). Haavisto (2014) empirically demonstrates that this type of virtual community hosted on producer sponsored discussion forums consisting of consumers can serve for idea creation in product innovation. They are composed of users of a company's product, but seem to be distinct from other consumer online collectivities such as virtual brand communities or broader communities of consumption not tied to a specific brand. A few other authors have recognised them as distinct, but they have yet to be studied in depth and have not been empirically differentiated from other similar types of online consumer aggregations (Kim, Yong Park, and Jin 2008; Wiertz and de Ruyter 2007). Therefore, the aim of this paper is to investigate empirically whether virtual product user communities are a distinct type of community, and, if they are, to explore their key attributes, especially their innovative knowledge creation capability.

It is crucial for a successful classification scheme to identify the fundamental characteristics which serve as the basis for classification (Bailey 1994). Knowledge is one of fundamental features and purposes of virtual communities.

Koh and Kim (2004) point out that a virtual community can be considered as a knowledge community type via computer-mediated communications. Through the proposed analysis, the existing classification system proposed by Porter (2004), which does not involve any knowledge-related attributes, can be tested and further refined. By ascertaining the key knowledge-related characteristics in the novel classification framework, a more capable tool for describing and analysing virtual communities may be created. In addition, it can better meet the diverse needs of organizations, especially the need for user constructed innovative knowledge.

The paper is laid out as follows: the literature review identifies Porter's (2004) 5Ps typology as the best foundation for any classification of virtual communities while introducing other classification criteria and attributes. Then it briefly reviews the distinct nature of two types of online customer groups: virtual communities of consumption (VCC) and virtual brand communities (VBC). The methodology section explains how empirical data about VPUCs was collected and analysed. The findings then explain the distinct features of such communities, drawing a comparison with the other two types of virtual customer communities. The discussion section explores the significance of distinguishing the VPUC from other similar virtual communities and the distinct value of the VPUC. It also argues for the importance of knowledge activity as a key variable in defining virtual communities. The conclusion draws out the theoretical contribution and practical implications of the study.

2 The Classification of Virtual Community

2.1 Definition and Classification of Virtual Community

Based on the synthesis of existing definitions made by researchers from multiple disciplines, Porter (2004) proposes a comparatively comprehensive definition of virtual community as a collection of individuals or business partners interacting around a common interest, where the interaction is at least partially supported and/or mediated by IT technology and guided by certain norms or protocols. This definition contains most key elements proposed by other researchers, namely, interacting aggregations of people, shared interests, technology mediation and norms (Lee, Vogel, and Limayem 2003; Preece 2000).

There is no widely accepted typology of virtual communities (Porter 2004). On the basis of a brief literature

review, Franklin, Mainelli, and Pay (2014, 30) summarise four main bases for workable classification of virtual communities: "governance; technical operations; member behaviour; and strategy". However, most researchers have classified virtual communities according to a single variable which is important to their discipline (Porter 2004; Preece 2000; Stanoevska-Slabeva 2002). Therefore, there are many typologies of virtual communities based on different variables. For instance, basing a classification on the community's purpose in meeting consumer needs, Hagel and Armstrong (1997) propose that online communities can be grouped into four types: transaction community, relationship community, interest community and fantasy-based community. In contrast, Henri and Pudelko, from a learning perspective and based on the idea that "all virtual communities are learning communities" (2003, 476), suggest that online communities can be categorised into four different groups, namely community of interest, goal-oriented community of interest, learners' community and community of practice. Plant (2004) suggests that virtual communities can be classified into two types according to their hosting type and purpose, either that created by profit organisations (e.g. professional communities of practice) or member initiated for the non-commercial purposes (e.g. communities of interest emerged spontaneously). Thus attempts at classification are quite divergent because they often focus on a single variable, and usually reflect a specific point of view of a particular research discipline (Stanoevska-Slabeva and Schmid 2001). It is concluded by Lee, Vogel, and Limayem (2003) that the classifications of virtual community can neither cover every aspect nor fit under every circumstance and each classification scheme is more suitable in some cases than in others.

2.2 Key Attributes of Virtual Community for Classification

The classification of virtual communities must be based on identifying their most important attributes. Based on a review of previous classifications, in order to build a common foundation by developing a generic typology of virtual community for all contexts, Porter (2004) suggests that the attributes of the virtual community can be based on 5Ps, namely purpose, place, platform, population interaction structure and profit model. The attribute of "Purpose" refers to what is the subject focus of content in the virtual community. "Place" defines where interaction takes place such as completely virtually or only partially virtually with a combination of face-to-face communication. "Platform" refers to the type of technologies in use, such as whether technical

design supports synchronous communication, asynchronous communication or a hybrid style of interaction. "Population interaction structure" encompasses group structure (e.g. small group, network, and public) and social ties (e.g. strong or weak). "Profit model" focuses on tangible economic value, so whether a virtual community is revenue-generating and non-revenue generating. These five elements focus on the critical questions that concern all stakeholders: "(1) For what purpose? (2) Where? (3) How? (4) Who? and (5) How much?" (Messinger, Stroulia, and Lyons 2008, 11). Based on an in-depth examination of Porter's (2004) typology, Messinger, Stroulia, and Lyons (2008) identify that this typology is useful for: (a) interpreting the historical development of virtual groups; (b) identifying their future applications for society, education and business; and (c) capturing future search topics regarding virtual communities. Thus, for a classification of virtual communities regarding customers and users, this generic typology provides an effective starting point.

Nevertheless, Messinger, Stroulia, and Lyons (2008) suggest that new features of virtual community need to be incorporated into the typology as the field evolves. Thus, although Porter's (2004) typology has been widely cited, it might need to be extended by including other classification variables in order to capture the fine differences between similar types of virtual communities in a particular research context. Other common classification criteria identified from the existing literature are:

– Degrees of formalisation, which refers to whether there are formal meetings and an officially appointed coordinator (Collison 1999), and formal establishment by management (Botkin 1999);
– Knowledge (/topics) (Collison 1999);
– Network structure (Collison 1999);
– Motivation for participation (Collison 1999);
– Contract value, which refers to the concrete results that the community produces (Collison 1999);
– Control (Collison 1999);
– Composition, which refers to the members of different participation levels making up the community, including only experts or both experts and novices (Collison 1999);
– Hosting type (Constance 2004; Plant 2004), which can be classified into member-initiated communities (similar to consumer initiated) and organisation-sponsored communities (parallel to corporation-initiated) (Constance 2004);
– Openness of networks (Brown and Duguid 2001), which is derived from the characteristic of "Intra-or inter-organizational" networks suggested by Brown and Duguid (2001), and so on.

Some variables are quite similar or parallel to each other, for instance, profit model and contract value; defined membership and composition. Many variables are strongly linked to each other. The attributes of hosting type, degree of formalisation, control and openness of network are highly related, for example. When one of these attributes is explored, the rest will be known. Given this, there is no need to explore all the listed variables.

One area where Porter's (2004) 5Ps typology may be underdeveloped is in the area of knowledge related activities, such as knowledge sharing and knowledge construction. Virtual communities are significant knowledge sharing channels for varying users (Chiu, Hsu, and Wang 2006; Hsu et al. 2007) and some well-known enterprises like Dell have incorporated users' contributed knowledge into the organisation (Di Gangi and Wasko 2009; Di Gangi, Wasko, and Hooker 2010). Verburg and Andriessen (2011) echo many authors in suggesting that knowledge is the foundation for innovation and improvement. They conclude that the main aims of communities involve knowledge processes including knowledge sharing, knowledge creation and learning.

Knowledge sharing is defined as "exchanging already existing knowledge through interactions between individuals" (Li, Cox, and Ford 2017, 286). Thus, knowledge exchange does not increase overall knowledge volume. However, knowledge sharing is considered as an essential successful factor of virtual communities (Shang, Chen, and Liao 2006). Zhang et al. (2010) suggest that knowledge sharing is vital in the proliferation of online communities. Whereas knowledge construction could be defined as creating novel knowledge through community members' interaction, complex cognitive and information processing are when requisite knowledge does not already exist (Li, Cox, and Ford 2017). Knowledge construction can cause knowledge augmentation due to newly created knowledge. Learning itself is also to be seen as about the social construction of knowledge (Verburg and Andriessen 2011). Online communities are increasingly seen as places for knowledge creation which can be utilised in innovation of product, service or process (Haefliger et al. 2011). Faraj, Jarvenpaa, and Majchrzak (2011) suggest that they are suitable for unconventional knowledge collaboration and innovation activities. From the perspective of virtual community service providers, a vital purpose of building virtual communities for users on their websites is for knowledge sharing, which can result in profitable business models (Koh and Kim 2004). Due to the great varieties of knowledge networks and communities, it is useful to explore the knowledge-related processes within such networks and communities. As a result, knowledge-related activities might also be considered as an important variable to consider in classifying knowledge-related virtual communities. This will help to develop tailored facilitation and management strategies.

More specifically, knowledge-related activity is also a salient feature of online communities consisting of customers. Increasingly, the customer is recognised to be a unique knowledge resource for the organisation to collect information on product usage patterns, product applications, design defects and product improvement insights (Anderson 2005; Bennett and Gabriel 1999; Piller and Walcher 2006). Customers' needs about the product and their knowledge obtained from the actual usage of products make them a potential external knowledge resource for new product development (Khodakarami and Chan 2014; Mahr, Lievens, and Blazevic 2014; Thomke and von Hippel 2002). Online customer communities represent knowledge reservoirs of product know-how, hence they are promising product innovation sources (Füller et al. 2006). To highlight their feature of enabling knowledge creation, Faraj et al. (2016) offer a new definition for online communities: they are collective spaces of knowledge flow featured by a constant morphing and composed of IT technologies and users. Therefore, the capability of constructing new knowledge within virtual communities can also be an important attribute to consider in their classification. This can also serve as an indicator of their innovation capacity. In this research, the proposed new attribute regarding knowledge construction will be explored through content analysis of discussion threads and thematic interview analysis.

3 Virtual Communities Consisting of Product Users and Customers

Due to the lack of a consistent scheme which is widely accepted, there are many terms proposed to describe similar customer aggregations on the Internet (i.e. virtual communities consisting of product users, consumers and brand fans). Verburg and Andriessen (2011) note that many new terms have been invented to describe communities, such as community of interest (Wenger, McDermott, and Snyder 2002), network of practice (Brown and Duguid 2001; Wasko and Faraj 2008) and so on. Verburg and Andriessen (2011, 36) also observe that various forms of terminologies of online communities have caused the current confusion in terms of naming the same phenomenon with different names and using the same label to refer to different phenomena: "The great variety in terminology has led to the current situation in which different names are applied to the same phenomenon or that the same label refers to different phenomena".

The virtual community investigated in this research (which consists of product users and exists on firm hosted discussion forums) has been noticed by a few researchers (e.g. Kim, Yong Park, and Jin 2008), but without clearly distinguishing it from other consumer online consumer communities and so far it has not been explored in-depth. In research exploring customers' willingness to contribute knowledge, Wiertz and de Ruyter (2007) identify such groups as firm-hosted commercial online communities with the definition of firm-hosted online customer collectives who collaboratively co-produce and consume content about a commercial activity which is central to their interest through exchanging intangible resources. This captures some of their most salient attributes: they are firm-hosted, focused on problem-solving by peer support and information exchange. They clearly distinguish them from open source communities on the basis of the type of sponsorship, membership and benefits. In addition, they also identify them as different from VBC in terms of purpose. However, much work is still needed to comprehensively explore their attributes and thus systematically distinguish them from other consumer online communities.

Thus, this paper seeks to define this type of community which is chiefly distinguished by its members and users contributing content, so it is relevant to consider similar types of consumer online groups. Virtual communities of consumption (VCC) are defined by Kozinets (1999) as attached customer groups whose online interactions are on the basis of a common interest or enthusiasm for, and knowledge of, a specific consumption activity or related group of activities. People participate in VCC to gather information, seek advice and review expert users' opinions when making a purchase decision, while communicating experiences of consumption activity to others post-purchase (De Valck, Van Bruggen, and Wierenga 2009). Such groups focus on consumption related interests (Kozinets 1999), and can be considered to be specialised consumer knowledge reservoirs (De Valck, Van Bruggen, and Wierenga 2009). A classic example would be coffee fans on the alt.-coffee newsgroup where community members share knowledge about different types of coffee beans, ways of preparing coffee and brands (Kozinets 1999). Another case is the research site of De Valck, Van Bruggen, and Wierenga (2009), a virtual community dedicated to culinary matters, such as restaurants, recipes etc. Other examples are the online communities focusing on the consumption experience of movies (Dellarocas, Awad, and Zhang 2004). This type of virtual community is closely related to purchasing behaviours, including information seeking before the purchase decision and communicating consumption experience after purchase (Evans et al. 2001).

Another relevant group are brand communities, defined by Amine and Sitz (2004) as a self-selected, geographically independent and hierarchical group of consumers who share common norms, values and social representations, and have a strong sense of membership with other members and with the whole community based on their common attachment to a specific brand. Traditionally, typical examples of virtual brand communities (VBC) are around cult or luxury brand products, like Harley Davidson and Mercedes (O'Guinn and Muniz 2005). However, Cova and Pace (2006) illustrate how this type of community can also gather around convenience products, such as "my Nutella The Community", a virtual community focusing on the hazelnut spread. A VBC can exist on social networking sites. The classic example would be the Apple group or the Starbuck fan page on Facebook (Zaglia 2013). The brand community consists of enthusiastic devotees and admirers of particular brand products (Algesheimer, Dholakia, and Herrmann 2005; McAlexander and Schouten 1998; Muniz and O'Guinn 2001). Thus, brand communities differ from traditional communities in members' common love for a brand (Albert, Merunka, and Valette-Florence 2008).

In terms of community members, these online customer and fan communities are similar to the VPUC concept because their members are all product users, customers or fans. It is the purpose of this paper to look more closely at the similarities and differences between them, and so contribute to a better understanding of classification of the online community for this specific context.

4 Methodology

In order to explore the idea that the VPUC is a distinct form of community, the research reported in this paper sought to analyse contents from some case examples of producers' user support forums which were introduced and analysed by Li and Cox (2016) and Li, Cox, and Ford (2017), and then, on this basis, undertake a systematic comparison with similar communities (i.e. VCC and VBC). The study draws on empirical data derived from a real life context of company sponsored peer support forums.

A purposive sampling strategy was chosen in selecting cases, i.e. multiple virtual communities consisting of product users hosted on producer websites, including Dell Support Forum in English, Dell Support Forum in Chinese, Lenovo Support Forum in English, Lenovo Discussion Board in Chinese, the HP Discussion Board in English and HP Technical Support Forum in Chinese. The sampling strategy was based on selecting information-rich cases, "those from which one can learn a great deal about issues of central importance

to the purpose of the research" (Patton 1990, 169). These selected forums, affiliated to the respective websites of IT producers, in both English and Chinese language versions, are the most popular of all language versions, attracting the most users in the world. Furthermore, they appeared to share some common attributes, such as that they were sponsored by the producers and hosted on the producers' websites, used a similar technical platform of an online forum, consisting of community members of product users, and discussed similar topics around solving products' technical problems. These forums are also quite active in terms of a large number of published posts, community members and a high percentage of successfully solved problems.

Website documentation including community mission statements provided an initial understanding of the nature of the groups. For more in-depth understanding, data was collected through thread analysis, interviews and observation.

As Section 2 above suggests, knowledge-related processes can potentially be a key element of virtual product user communities. In order to specifically explore knowledge construction, a judgement sampling strategy was used to select theoretically interesting and important discussion threads on the sub-forums discussing computer technical problems through peer support: laptops and notebooks are personal electronic products that have more technical questions and problems in their usage than other home electronic appliances. Thus, computer users usually prefer to find quick solutions by participating in the discussions on the Internet forums. Therefore, forums on these topics were considered highly relevant to the study. The discussion threads with accepted answers suggest a complete knowledge construction process with rich and theoretically interesting elements. Therefore, the threads which have accepted solutions (e.g. threads with a label "This question has suggested answer(s)" in Dell User Support Forum) and contain rich knowledge construction elements were selected from the above company sponsored forums. This sampling method adopted was to select four comparatively long discussion threads (with posts mainly from 30 to 80, depending on each forum's typical thread length) with rich knowledge construction elements (/rich data) in solving technical problems of computer products from these similar producer sponsored user support forums.

Qualitative content analysis was adopted to explore the knowledge construction embedded within the selected online discussions threads. Graneheim and Lundman (2003) suggest that this method can be used to deal with interpreting and analysing latent content rather than simply summarising surface meaning. A qualitative content analysis framework for analysing knowledge construction activities of low criticality embedded within online discussion contents in VPUCs (Li, Cox, and Ford 2017) was utilised to code selected threads. The main-level category of "knowledge construction episodes" included in this framework is about constructing new knowledge to solve technical problem. Thus, it can be used as a sign of knowledge innovation capacity of the discussed participants. The provision of clear definitions for categories and associated examples in this content analysis framework enables strong operationalisability. The full analysis details were published in the work of Li, Cox, and Ford 2017.

Haavisto's (2014) research empirically confirms that simply observing discussions in online consumer forums can be used as an effective way to explore consumers' collective online innovation behaviours in generating product innovation ideas. In this research, observations were made of community members' patterns of publishing and interaction, and moderators' moderation activities. Additionally, close observations were used to reveal attributes of VPUC, such as purpose, place, platform, moderation, openness of network and so on.

Additional insight was derived by thematic analysis of in-depth e-mail interviews, complementing the analysis of discussion threads by providing community members' opinions about knowledge construction, the way of collaboratively finding solutions, attitudes towards community moderation and moderators' roles and community culture. Twenty members of Dell Support Forum (English) with diverse levels of knowledge and experiences, many of whom were active community members, were selected with a purposive sampling strategy for online semi-structured interview via e-mail. Ratislavová and Ratislav (2014) empirically prove that email interviewing is a robust qualitative research method. Firstly, potential interviewees were contacted by sending a brief introduction of the research project and associated research ethics information via emails presented on the forum. Then a set of interview questions were sent to community members who had agreed to be interviewed. Later, follow-up questions which were proposed based on their initial answers were sent. The whole interview process usually underwent several rounds via e-mail. Braun and Clarke (2006, 79) suggest that, "thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data". The interview data was analysed manually by deductive thematic analysis: by a structured process of "careful reading and re-reading of the data" (Rice and Ezzy 1999, 258). This theoretically-driven coding uses prior theories as its departure point (Boyatzis 1998). After a familiarisation process of interview transcripts, the data was coded in light of prior relevant theories, then codes derived from the literature to describe data were

connected to each other to develop into themes through the constant comparison process. Braun and Clarke (2006, 82) propose that a theme "represents some levels of patterned response or meaning within the data set".

5 Findings

5.1 Comparison Summary of VPUC with Other Relevant Online Communities

This is based on relevant existing literature, results from analysis of discussion threads and interview transcripts and observations about attributes of explored communities, which are introduced in-depth in Sections 5.2 and 5.3. Table 1 presents a summary of a detailed comparison between the VPUC and two other types of groups formed by customers and fans, the VCC and VBC. The following sections discuss the different characteristics summarised in the table, including attributes derived from Porter's (2004) 5Ps typology and other extended attributes identified from existing literature.

5.2 Attributes in Porter's (2004) 5Ps Typology

5.2.1 Purpose

From observation, website documentation and content analysis of selected forums, it is apparent that the VPUC's public discussion threads are mainly about solving technical problems through collaborative support. This is related to the purpose for which the groups were established and members' participation motives. Sometimes community members also share some best use experiences. In contrast, the main topics in the VCC centre on consumption-related interests, purchasing information and consumer experience. The topics in VBC focus on knowledge and interest about a specific brand.

Members of a VCC share a passion for a particular form of consumption, but not necessarily any particular brand. The VBC members are committed and enthusiastic devotees of a particular brand. The VPUC members are mainly users of the same brand products, but they are not necessarily enthusiasts for this brand.

Table 1: Comparison of VPUC with Virtual communities of consumption and brand communities.

Community type attributes	Virtual community of consumption	Virtual brand community	Virtual Product user community
Purpose	Discussing purchasing behaviours (before-purchase and post-purchase) and consumption-related interests in a particular product area, e.g. soft drinks	Sharing knowledge and interest in a particular brand (e.g. Coca-Cola)	Solving technical problems within the products of a particular company; sharing best usage experience after purchasing
Place	Completely virtual	Completely virtual	Completely virtual
Platform	Online discussion boards; mailing lists; social networking sites	Online discussion boards; social networking sites	Mainly based on online discussion boards
Population	Public; strong ties in online boards	Public; strong ties in online boards	Public; weak ties in online boards
Profit model	Non-revenue generating	Non-revenue generating	Non-revenue generating
Community members	Consumers with a shared enthusiasm for a particular consumption activity	Brand lovers	Users of a specific brand
Company benefit	Marketing through influencing purchase decisions; sharing knowledge about consumption related experience	Relationship marketing; promoting brand loyalty; mediating knowledge exchange of brand among users	Solving technical problems and sharing users' relevant skills; moderators communication with customers
Degree of formalization	Formal/informal	Formal/informal	Formal/informal
Openness of network	Open network (for the consumer initiated community); inter-organizational (for the company initiated community)	Open network (for the brand fans initiated community); inter-organizational (for the company initiated community)	Inter-organizational (for the organization initiated community)
Knowledge-related activities	Knowledge sharing (/information exchange) about purchasing or interest	Knowledge sharing (distributing news and promotional material)	Knowledge sharing; knowledge construction at a low level of critical thinking

5.2.2 Place

According to observation of selected forum users' online behaviours and interview data, the place where interaction between VPUC members occurs is completely virtual. In most cases, their interaction was conducted on the public forum, and occasionally via the private message function of the forum. This can be related to the large community size and the loose ties among community members. Therefore, there is no difference between these three types of virtual communities in terms of the variable "Place" in Porter's (2004) 5Ps typology. That is to say, they are all completely virtual.

5.2.3 Platform

The types of communication platform that VPUC relies on are different from VCC and VBC. From observations of sample communities it was clear that the main communication platform for discussions among VPUC members was the user support forum hosted on the producer's official website. This enables the community and its discussion content to have an open and public nature. According to interviewees, the forum users try to avoid using private messaging functions to discuss problems, in order to let others share their knowledge. Private messages through the forum's messaging function are occasionally used only for personal communication and to discuss non-technical issues, and all technical issues should be discussed in public, namely on the forum. They rely on the technical platform of online discussion boards hosted on producer's official website. The VPUC has hybrid elements of both asynchronous (forum) and synchronous (messaging) communication designs.

The VCC and VBC can exist on more various types of communication platforms. For example, Kozinets (1999) proposes that the e-mail mailing list can also serve as the platform to constitute a community of consumption as would the discussion forum (/bulletin board). De Valck, Van Bruggen, and Wierenga (2009) point out that the VCC expands to the social networking sites like MySpace and Facebook. VBC can also exist on social network sites (Sloan, Bodey, and Gyrd-Jones 2015; Zaglia 2013; Zheng et al. 2015). Thus, according to research so far, these two types of virtual communities can rely on more types of platforms than VPUC. However, whether VPUC exists on social network sites or not still needs further empirical exploration.

5.2.4 Population Interaction Structure

All of these three types of virtual communities are open and public on the Internet, but the nature of ties between their community members is different. According to observation,

there are thousands of registered community members participating in discussions in VPUCs. The community member profile information, observation of their discussions and interview data reveal that these participants have diverse backgrounds and weak ties between each other. The interviewees' jobs were quite diverse, for instances, musician, courier, private music teacher, students, electrical engineer and so on. Most of them join in the community for functional benefits of the community of acquiring information or knowledge to solve technical problems of their PC products. One interviewee thought most community members were new users seeking product information:

> Most of the people I've met on the forum were actually new users/buyers looking for more information on their products.

Most community members are less active community members and do not actively participate in the discussion, and this causes a lack of interaction within the community. Another interviewee pointed out that many of community members lack sufficient knowledge about computers – yet they did make a vital contribution through their questions. They occasionally use the forum unless they have some questions to ask, and also seldom participate in the discussion:

> The people who asked questions were mostly non-technical. Many of them were new to computers. Most questions that were asked could be answered trivially with a little online research, but most of the questioners were too unsophisticated to even do sensible Google searches. Most of them never used the forums unless they had a problem, and when the problem was solved, they were gone (at least until the next time their computer gave them an error message).

Moreover, there is not much long-term interaction communication privately between most of community members. Leonard and Onyx (2003) suggest that a long-term period of interaction is needed to build up strong ties and trust. Thus, it can be speculated that strong ties are not very common in the VPUC.

However, it should be noted that on the Dell User Support Forum (English) there is a hidden discussion board (/sub-community) which consists of active members with long membership and cannot be accessed by ordinary forum users (Li and Cox 2016). The discussion topics in this hidden discussion board do not focus on technical issues. In fact, its content is quite diverse and free in style, including jokes, gossips, interests and issues about the forum itself. A vibrant sub-culture not of a technical nature in this discussion board helps people to work closely together with strong ties and form a strong sense of community identity. Thus, the VPUC sponsored by organisation can be a large virtual community with weak ties where a small group with strong ties exists.

The VPUC is different from the VCC and VBC in the strength of social ties. The VCC and VBC have stronger ties between their community members. In the VCC, the community norms, cultures and language, as well as identities of other community members, can be learned while a member learns the online consumption knowledge (Kozinets 1999). At the same time, the community member can be transformed from peripheral status to a part of the community, and a sense of lasting identification can also be built in the consumption process. The sense of belonging and identity can reflect the strong ties between community members (Leonard and Onyx 2003). VBC members have common consciousness of a kind (i.e. sense of belonging to a group gathered around a brand) and have a common sense of obligations to the community and other members (Muniz and O'Guinn 2001). The sense of community among members can be produced through using brand community for self-promotion and altruistic online behaviours (Sloan, Bodey, and Gyrd-Jones 2015). VBC members have stronger connections towards each other (Muniz and O'Guinn 2001) and a strong sense of community membership and identification (Dholakia, Bagozzi, and Pearo 2004). Therefore, "virtual ties become real ties, and weak ties become stronger" (Chang, Hsieh, and Tseng 2013, 489).

5.2.5 Profit Model

According to website documentation, like VCC and VBC, the VPUC does not directly create tangible economic benefits, such as advertising fees or subscription revenue. Thus, according to Porter (2004) its profit attribute should belong to the level of non-profit generating. The revenue to support VPUC is usually part of the routine expenditures of the business organisation. However, solving technical problems through users' peer support in the VPUC can directly reduce customer support costs. Incorporating users' innovative insights and problem-solving skills into the organisational knowledge system can also improve products and services. The VCC and VBC reduce marketing costs in a different way, as marketing tools.

5.3 Other Attributes Extending the 5Ps

Therefore, from Porter's (2004) 5Ps typology, the VPUC can be distinguished from the VCC and VBC in the variables of purpose, varieties of communication platforms and population interaction structure (to be more specific, the strength of social ties between community members). As

shown in Table 1, in order to further explore their differences and capture fine differences, Porter's (2004) 5Ps typology was extended by adding a number of other variables that seemed to be required to capture the fundamental distinction between these types of community. The attribute of profit model is too general to differentiate the concrete values brought to the company, thus a new attribute of company benefit which can describe this in detail was added for comparison.

5.3.1 Community Members

There are major differences between members of these three types of virtual communities. The members of VCC are mainly consumers with a shared enthusiasm for a particular consumption activity rather than a specific brand product, and their active community members (i.e. devotees) are loyal to a particular form of consumption activity (Kozinets 1999). The VBC are enthusiasts for a particular brand. The members in VPUC form social aggregations around specific products which they use. Thus, their community members are mainly product users of the same brand. They are not necessarily assembled out of a common enthusiasm for a particular consumption activity, or a specific brand.

5.3.2 Company Benefit

Although all these types of community are built on a non-profit model, they all do directly benefit the sponsor, but the nature of the benefits is different. From the Introduction Page of the VPUCs investigated and observations of published discussions, the sponsors' main purpose is to provide a convenient communication platform for customers to solve technical problems through peer support, thus reducing company costs. In addition, the content analysis and the observation of labelling and processing the product user's innovative ideas in these user forums also reveal that, with proper facilitation and knowledge spanning through moderators, it is possible for the producers to incorporate users' innovative insights and problem-solving skills into the organisational knowledge repository.

The VPUC differs from a VCC where the purpose is to exchange information and share knowledge about consumption activities. The main aim of a VCC is to exchange information between members (De Valck, Van Bruggen, and Wierenga 2009). From the marketing perspective, information exchange and knowledge sharing activities can influence community members' purchasing decisions (De Valck, Van Bruggen, and Wierenga 2009). The consumers' loyalty as the basis of involvement in the consumption

activity also makes this type of virtual community a relationship marketing tool (Kozinets 1999).

The VPUC is also different from the VBC which has become an effective relationship marketing communication channel and relationship linkages between the devoted customers and firms (Anderson 2005). Anderson (2005) concludes that brand community can promote brand loyalty, mediate knowledge exchange among the product users and bring in extra brand involvement and brand value. More importantly, it is a relationship marketing tool for its connection among consumers through the benefit of community (Muniz and O'Guinn 2001). A successful brand community can create a socially embedded and strengthened brand loyalty and brand commitment (Algesheimer, Dholakia, and Herrmann 2005; Jang et al. 2008; Royo-Vela and Casamassima 2010; Zhou 2011) and ensure brand loyalty from negative events (Chang, Hsieh, and Tseng 2013).

The attribute of company benefit gives a more detailed description of the community establishment purpose, and captures the fine differences between them. This suggests that this new attribute can replace or complement the attribute of establishment purpose in Porter's (2004) 5Ps typology.

5.3.3 Degree of Formalisation

The VPUC can have both formal and informal characteristics. It is firm hosted and formally established by top management, and its leadership is achieved through officially appointed coordinators and community managers of different levels by the sponsor. According to the introduction webpage and observations of moderators' work in selected forums, the leadership structure is established to achieve the organisation's purposes. Formal moderators at different levels are appointed. However, the interview data also revealed that the formal appointed moderators in VPUCs mainly give generic knowledge (which is usually from pre-set scripts) and in fact lack specific knowledge to solve varying problems.

> However, Dell's tech support people who are now participating don't seem to have the depth of knowledge that the forum regulars historically had. They tend toward generic answer from their scripts and the information as provided in Dell's owner's manuals which is somewhat limited, particularly in the area of laptop audio. Their most obvious weakness is that they don't know the differences between the different models and the problems unique to each, and so tend to give "one answer fits all" replies.

Interviewees believed that the moderator should reduce their involvement in the knowledge construction (i.e. discussion) process as much as possible, and concentrate on

their roles in maintaining the social order and in bridging the virtual community and the organisation.

Furthermore, some forums had volunteer moderators (i.e. active forum users) to participate in moderation activities. The observation and the content analysis threads also suggest that a VPUC adopts collective moderation mechanisms in addition to formal moderation. Some active forum users can be invited to be informal moderators. For instance, forum members in Dell Support Forum with the badge of "Rockstar" are independent individuals with high-level expertise in computers and voluntarily contribute their knowledge to solve technical issues and ideation in the community. Dell Company allows them to participate into the forum management but with limited privileges. Active forum users defend each other when trolling or offensive behaviours occur (Li, Cox, and Ford 2017). Forum users themselves also mediate disputes and bring the discussion back on track. The observation data revealed that the technical moderation system is embedded in the architecture of the forums. Thus, according to Botkin's (1999) definition of formalisation, the VPUC has the elements of both formal and informal management.

Both the VCC and VBC have two types of hosting type, member initiated and organisation initiated. Meanwhile, both formal and volunteer moderators are appointed within these two types of community. Thus, all these three types of virtual communities are similar in terms of formalisation.

5.3.4 Openness of Network

The VPUC is different from the VCC and VBC in terms of openness of network. According to observation and introductions of the selected support forums hosted by sponsoring firms, VPUCs have an inter-organisational relationship with its sponsor. They are connected to the hosting organisation through network spanners, i.e. the formally appointed moderators in the community. However, the VCC and VBC can be either initiated by the organisations or members themselves. Thus, these two types of community can be of either inter-organisational or open-Internet nature.

5.3.5 Knowledge-Related Activities

It follows from their different purposes that these three types of community have different knowledge-related activities. The VPUC requires sharing knowledge when there is a ready answer for a technical problem or someone knows this, or the construction of new knowledge to solve unknown questions or problems. However, the purposes of the VCC and VBC mainly result in knowledge sharing or information exchange with the other community members (De Valck,

Van Bruggen, and Wierenga 2009; Dessart, Veloutsou, and Morgan-Thomas 2015; Sloan, Bodey, and Gyrd-Jones 2015).

In-depth analysis of content of discussion threads and interview analysis revealed a typical trial and error strategy was in use in VPUCs to construct knowledge, where no existing answer existed (Li, Cox, and Ford 2017). Participants (often new to the community) presented problems. Community members work to a) clarify the problem and b) propose solutions. Solutions are tried out and the results reported. Eventually a solution emerges, which is usually labelled by a moderator as a confirmed solution. One interviewee explained the knowledge construction strategy as follows:

> …A large number of solutions that are unknown to Dell come about by people experimenting with their computers. People do this all the time and occasionally they stumble upon something of value, and when they do they often disseminate it by posting on the forum.

The quote captures a trial and error approach to problem-solving: users keep on trying different ideas on their computers until they occasionally find some valuable knowledge about its solution. Then they will disseminate it in their discussion threads after experimenting with the idea.

According to Li, Cox, and Ford (2017), the knowledge construction in the discussion of solving technical problems in the VPUC is thus through trial and error and so requires a low level of critical thinking, because the purpose is purely pragmatic: to solve the problem that has been presented.

The process illustrates that knowledge construction can be achieved through users' collaborative efforts. In addition, user constructed knowledge in the VPUC is unique, experiential and contextual due to its basis in users' real experience in solving varying technical problems rather than from generic scripts (Li, Cox, and Ford 2017). It also confirms Brown and Duguid's (2001) statement that effective knowledge sharing and creation can also take place in large, loosely coupled groups. Thus, both knowledge sharing and knowledge construction are conducted in the VPUC. This not only confirms that innovative knowledge construction activities can exist in specific type of virtual communities consisting of users due to a multiple factors, but also differentiates the VPUC from the other two for this variable.

6 Discussion

This article confirms empirically that the VPUC is a distinct type of virtual community. By adding the attribute of knowledge-related activity, the definition of VPC proposed by Li, Cox, and Ford (2017) can be modified as follows: it is a firm-hosted customer aggregation attached to specific brand products to share usage experience and collaboratively solve technical solutions and a knowledge focused virtual community tightly bound to the sponsoring organisation. According to Porter's (2004) 5Ps Model (and somewhat expanded drawing on other classificatory literature), the findings reveal that the VPUC can be differentiated from similar virtual communities (i.e. VCC and VBC) in terms of the attributes of purpose, platform, members, company benefit and knowledge-related activities. More importantly, its salient attribute of knowledge innovation capacity, which has not been found from existing research on VCC and VBC, is empirically identified and is worth recognition by researchers and practitioners.

The attributes explored in this research are interrelated to each other, and all centred around the attribute of knowledge-related activities, which is directly related to the purpose for which the group was established. The main purpose for which the groups were established directly decides what the benefits are (/company benefit); who wants to join the community (i.e. community members); the places where people gather; the platform; the population interaction structure; how the community is managed (/degree of formalisation); and what knowledge activities in the community meet the purpose. That is to say, attributes in Porter's (2004) 5Ps typology and other added attributes stress the premises in achieving the community's purpose, and the variable of knowledge-related activity focuses on the result of collective influences of these attributes. For instance, the VPUC's purpose, community members, place, platform and so on are all around solving technical problems and sharing best usage experience. The attribute of knowledge-related activity also directly determines the achievement of the community purpose.

- Platform: the open and public nature of platform allows product users to share knowledge to the greatest extent. Knowledge sharing is an essential part of knowledge creation.
- People (i.e. community members) and population interaction structure: diverse backgrounds and expertise of VPUC's members lead to various forms of participation, which is valuable for knowledge construction (Li, Cox, and Ford 2017). Loose ties on the main forum of VPUC have the capacity to bring in more novel knowledge (Burt 1992; Granovetter 1973). Moreover, the existence and nature of the sub-community consisting of active members with high-level knowledge not only enable sponsors to retain valuable knowledge contributors, but also create a strong sense of belonging. Chai

and Kim (2012) point out that a strong sense of belong can facilitate knowledge creation.

- Degree of formalisation: the leadership consisting of the formal moderators and informal volunteer moderators is implanted into the VPUC. It can ensure the social order of community and flexibility through this type of combination of formal moderator and collective moderation. This provides the community a certain level of freedom and less heavy control from sponsors, which are important for collaborative knowledge construction according to Li, Cox, and Ford (2017).
- Openness of Network: VPUC's inter-organisational relationship with its sponsor creates an orientation of knowledge related activities.

Thus, these attributes together shape how members' participation concentrates on knowledge sharing and knowledge construction of requisite knowledge. Faraj et al. (2016, 668) point out that the virtual communities are "novel forms of organizing for innovation and knowledge creation, leading to increased scrutiny and participation by organizations of all types, including firms, non-profits, governments, and spontaneously formed groups". Thus, the knowledge-related attribute regarding knowledge construction, included in this new framework, can work as the index of the capacity of such communities in generating innovative knowledge, which is directly related to their ability in promoting innovations of producers and sponsoring organisations. More importantly, through exploring the attributes of virtual community and their interrelations, it offers a holistic approach to design a knowledge-innovative virtual community by organically incorporating these attributes.

As for the content in knowledge-related activity, the existing literature reveals that the VCC focuses on sharing "consumption" related knowledge, and the VBC sharing "brand"-related knowledge (i.e. knowledge and interests about brands). According to the findings, the VPUC is centred on both sharing and constructing knowledge about "usage", especially in solving the technical problems in using the products. This feature is highlighted by the names of these three distinct types of virtual communities consisting of customers.

The revised categorisation scheme developed here based on Porter's (2004) 5Ps typology and other extended variables in this research is shown to fit well in such situations. Porter's (2004) 5Ps typology only contains two general dimensions of establishment and relationship orientation (Kordzadeh and Warren 2013). By extending the 5Ps typology with a few new attributes, the new classification framework successfully identifies more fundamental characteristics, and effectively captures the fine differences to distinguish these three

similar types of virtual communities consisting of consumers. Bailey (1994) points out that a good typology should also allow researchers to compare types easily and quickly. This advantage enables the separating of dissimilar cases of virtual communities for analysis rather than remaining mixed together in the research and management. Therefore, this proves that it is more capable than Porter's (2004) 5Ps typology of coping with the challenge of classifying rapidly expanding and diversifying virtual communities.

More importantly, by including the core attribute of knowledge-related activity, this new classification scheme clearly identifies the VPUC's innovative nature and its unique benefit to the organisation: constructing new knowledge, which is specific and experiential, to solve technical problems which cannot be tackled by general technical scripts. Thus, the new classification framework extends Porter's (2004) typology into a new dimension: the knowledge dimension. It meets the measurement criterion that "a good typology not only shows an exhaustive set of types, it also shows the exhaustive set of dimensions on which the types are based" (Bailey 1994, 13). Consequently, this new multi-dimensional classification framework allows incorporating users' innovative insights and problem-solving skills in producers' new product development and user support services. By adding the attribute of degree of formalisation, this scheme shows the virtual community's hosting type and its boundedness to the producer, which are related to the ease of implementing leadership of moderators, transferring and utilising user generated ideas. In practice, Dell has already succeeded in utilising users' innovative ideas through one of its online product user communities, i.e. Dell IdeaStorm community launched in February 2007 and hosting on its website for a long period (Bayus 2013; Di Gangi and Wasko 2009; Di Gangi, Wasko, and Hooker 2010; Hossain and Islam 2015). The attributes of VPUC illustrated in this research and the successful examples suggests that VPUC based innovation can be an effective way to cope with the challenge of "integration of external ideas from customer involvement and open innovation practices into already existing systems and structures" (Elmquist, Fredberg, and Ollila 2009, 337).

As stated above, in the light of Bailey (1994)'s evaluation of typologies, the advantages of this new classification framework can be concluded as follows: (1) having more description capability by identifying the fundamental attribute related to knowledge activity; (2) reducing the complexity of diverse and numerous online social aggregations into systematic sets of a number of homogeneous types, situated in a few key dimensions; (3) identifying the fine differences of similar types of virtual communities, enabling a quick and easy comparison of types. By providing a useful heuristics and a multidimensional classification scheme, this new

classification can be widely applied in describing, analysing and comparing online groups and communities, as shown in the case of identifying the distinct type of VPUC in this research.

7 Conclusions

In terms of theoretical contribution, this research defines and describes in a precise way one specific type of virtual community consisting of product users on the Internet. It also locates its position among various types of other virtual communities by discussing their classification and comparing them with other relevant kinds of consumer online communities. Its attributes are defined and differentiated from other similar virtual communities. Thus, through the above work, it clarifies the blurred existing concepts about various types of online communities consisting of consumers and product users, which usually remain mixed together. The detailed descriptions of their attributes pave a solid basis for more focused scrutiny of these online consumer collectivities. Moreover, by clarifying the attributes of VPUC, it empirically supports and highlights the statement of Li, Cox, and Ford (2017) about the enormous potential value of VPUC in producing innovative knowledge to solve technical problems with products.

Furthermore, by extending Porter (2004)'s 5Ps typology including only two overly general dimensions of establishment and relationship orientation into the knowledge dimension, this research builds a more effective classification framework for virtual communities that fits better for exploring online customer and product user aggregations. According to its capability in differentiating the above quite similar online consumer aggregations, it can be speculated that the new framework can serve as a powerful tool to effectively classify the online communities of a great variety and number at a very finely grained level. It can function as an effective inventory tool to help researchers quickly locate any needed types of virtual community, and easily know what types of virtual communities are available for analysis. Furthermore, including a key attribute in this novel classification framework about knowledge innovation can help redirect theoretical attention to virtual communities' knowledge innovation capability.

This is a set of useful theoretical clarifications, with practical implications. It is helpful to managers in a sponsoring company to realise the importance and the value of VPUC in knowledge innovation. Moreover, the clarification of the nature of the VPUC and its attributes in this research build a solid basis for future researchers to explore knowledge activities and other issues related to management in this specific type of virtual community.

In addition, this paper proposes that knowledge-related activities such as knowledge construction and sharing can be considered as a key attribute in classifying virtual communities. This attribute serves as an important index of the virtual community's knowledge innovative capacity for the sponsor. Consequently, it can help direct management's attention towards the knowledge assets contributed by the virtual product user communities and help develop more tailored facilitation strategies to foster community members' knowledge construction activities.

This research contributes a more capable classification framework than Porter (2004)'s 5Ps typology, and thus enables the potentiality of making clear distinctions between varying types of online communities (especially the knowledge communities) and providing more tailored organising and facilitating strategies to fully achieve their purposes. Thus, this more systematic typology provides a solid basis for both researchers and practitioners.

The clarification of the attributes of the VPUC may be of practical importance in better managing such communities. Moderation techniques and management strategy should be developed around the attributes of the community illustrated in this paper. For example, the active community members with high-level expertise, accounting for a very small percentage of participants, are proved to be a valuable and irreplaceable knowledge resource. A strategy of promoting multiple motivations including materialistic and spiritual rewards should be adopted to retain them. Offline activities can also be organised to enhance the social ties between the community members, and with the sponsors. To encourage knowledge construction via various contributions in the discussion, the community should be given more freedom and less heavy moderation, and supporting cultures of trial and error should also be fostered in the community.

More work can be conducted to verify this new classification framework by applying it in differentiating similar online communities in other contexts. Moreover, the extension of VPUC on other technical platforms, such as social networking sites, can be further explored based on this research. Research into the influence of new technology on other attributes, such as degree of formalisation, openness of network and the knowledge activities would also be of interest. Exploration of creating innovative virtual communities by incorporating these attributes into designing is also recommended as the future research.

References

Albert, N., D. Merunka, and P. Valette-Florence. 2008. "When Consumers Love Their Brands: Exploring the Concept and its Dimensions." *Journal of Business Research* 61 (10): 1062–75.

Algesheimer, R., U. M. Dholakia, and A. Herrmann. 2005. "The Social Influence of Brand Community: Evidence from European Car Clubs." *Journal of Marketing* 69 (3): 19–34.

Amine, A., and L. Sitz. 2004. *How Does a Virtual Brand Community Emerge? Some Implications for Marketing Research*, Vol. XII, 1–16. Paris: Cahier de Recherche de l'IRG-Paris.

Anderson, P. H. 2005. "Relationship Marketing and Brand Involvement of Professionals through Web-Enhanced Brand Communities: The Case of Coloplast." *Industrial Marketing Management* 34 (3): 285–97.

Bailey, K. D. 1994. *Typologies and Taxonomies: An Introduction to Classification Techniques*. In *Sage University Paper Series on Quantitative Applications in the Social Science*, 07–102. Beverly Hills: Sage.

Bayus, B. L. 2013. "Crowdsourcing New Product Ideas over Time: An Analysis of the Dell IdeaStorm Community." *Management Science* 59 (1): 226–44.

Bennett, R., and H. I. Gabriel. 1999. "Organizational Factors and Knowledge Management within Large Marketing Departments: an Empirical Study." *Journal of Knowledge Management* 3 (3): 212–25.

Botkin, J. W. 1999. *Smart Business: How Knowledge Communities Can Revolutionize Your Company*. New York: The Free Press.

Boyatzis, R. E. 1998. *Transforming Qualitative Information: Thematic Analysis and Code Development*. Thousand Oaks: SAGE Publications.

Braun, V., and V. Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2): 77–101.

Brown, J. S., and P. Duguid. 2001. "Knowledge and Organization: a Social Practice Perspective." *Organization Science* 12 (2): 198–213.

Burt, R. 1992. "The Social Structure of Competition." In *Networks and Organizations: Structure, Form, and Action*, edited by N. Nohria and R. Eccles, 57–91. London.

Chai, S., and M. Kim. 2012. "A Socio-Technical Approach to Knowledge Contribution Behavior: An Empirical Investigation of Social Networking Sites Users." *International Journal of Information Management* 32 (2): 118–26.

Chang, A., S. H. Hsieh, and T. H. Tseng. 2013. "Online Brand Community Response to Negative Brand Events: the Role of Group eWOM." *Internet Research* 23 (4): 486–506.

Chiu, C. M., M. H. Hsu, and E. T. G. Wang. 2006. "Understanding Knowledge Sharing in Virtual Communities: an Integration of Social Capital and Social Cognitive Theories." *Decision Support Systems* 42 (3): 1872–88.

Collison, C. 1999. "Connecting the New Organization: How BP Amoco Encourages Post-merger Collaboration." *Knowledge Management Review* 7 (2): 12–5.

Constance, E. P. 2004. "A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research." *Journal of Computer-Mediated Communication* 10 (1): 25–37.

Cova, B., and S. Pace. 2006. "Brand Community of Convenience Products: New Forms of Customer Empowerment – the Case "my Nutella the Community"." *European Journal of Marketing* 40 (9): 1087–105.

De Souza, C. S., and J. Preece. 2004. "A Framework for Analyzing and Understanding Online Communities." *Interacting with Computers* 16 (3): 579–610.

De Valck, K., G. H. Van Bruggen, and B. Wierenga. 2009. "Virtual Communities: A Marketing Perspective." *Decision Support Systems* 47 (3): 185–203.

Dellarocas, C., N. F. Awad, and X. Zhang. 2004. "Exploring the Value of Online Reviews to Organizations: Implications for Revenue Forecasting and Planning." In: *Conference Proceedings 25th International Conference on Information Systems*. Washington, DC.

Dessart, L., C. Veloutsou, and A. Morgan-Thomas. 2015. "Consumer Engagement in Online Brand Communities: a Social Media Perspective." *The Journal of Product and Brand Management* 24 (1): 28–42.

Dholakia, U. M., R. P. Bagozzi, and L. K. Pearo. 2004. "A Social Influence Model of Consumer Participation in Network- and Small-Group-Based Virtual Communities." *International Journal of Research in Marketing* 21 (1): 241–63.

Di Gangi, P. M., and M. Wasko. 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): 303–12.

Di Gangi, P., M. Wasko, and R. Hooker. 2010. "Getting Customers' Ideas to Work for You: Learning from Dell How to Succeed with Online User Innovation Communities." *MIS Quarterly Executive* 9 (4): 213–28.

Dubé, L., A. Bourhis, and R. Jacob. 2006. "Towards a Typology of Virtual Communities of Practice." *Interdisciplinary Journal of Information, Knowledge, and Management* 1 (1): 69–93.

Elmquist, M., T. Fredberg, and S. Ollila. 2009. "Exploring the Field of Open Innovation." *European Journal of Innovation Management* 12 (3): 326–45.

Evans, M., G. Wedande, L. Ralston, and S. van't Hul. 2001. "Consumer Interaction in the Virtual Era: Some Qualitative Insights." *Qualitative Market Research: An International Journal* 4 (3): 150–9.

Faraj, S., S. L. Jarvenpaa, and A. Majchrzak. 2011. "Knowledge Collaboration in Online Communities." *Organization Science* 22 (5): 1224–39.

Faraj, S., G. V. Krogh, E. Monteiro, and K. R. Lakhani. 2016. "Online Community as Space for Knowledge Flows." *Information Systems Research* 27 (4): 668–84.

Franklin, J. C., M. Mainelli, and R. Pay. 2014. "Measuring the Value of Online Communities." *Journal of Business Strategy* 35 (1): 29–42.

Füller, J., M. Bartl, H. Ernst, and H. Mühlbacher. 2006. "Community Based Innovation: How to Integrate Members of Virtual Communities into New Product Development." *Electronic Commerce Research* 6 (1): 57–73.

Graneheim, U. H., and B. Lundman. 2003. "Qualitative Content Analysis in Nursing Research: Concepts, Procedures and Measures to Achieve Trustworthiness." *Nurse Education Today* 24 (2): 105–12.

Granovetter, M. S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78 (6): 1360–80.

Haavisto, P. 2014. "Observing Discussion Forums and Product Innovation – A Way to Create Consumer Value? Case Heart-Rate Monitors." *Technovation* 34 (4): 215–22.

Haefliger, S., E. Monteiro, D. Foray, and G. Von Krogh. 2011. "Social Software and Strategy." *Long Range Planning* 44 (5–6): 297–316.

Hagel, J., and A. G. Armstrong. 1997. *Net Gain: Expanding Markets through Virtual Communities*. Boston, MA: Harvard Business School Press.

Hara, N., P. Shachaf, and S. Stoerger. 2009. "Online Communities of Practice Typology Revisited." *Journal of Information Science* 35 (6): 740–57.

Henri, F., and B. Pudelko. 2003. "Understanding and Analyzing Activity and Learning in Virtual Communities." *Journal of Computer Assisted Learning* 19 (4): 474–87.

Hossain, M., and K. Z. Islam. 2015. "Ideation through Online Open Innovation Platform: Dell IdeaStorm." *Journal of the Knowledge Economy* 6 (3): 611–24.

Hsu, M. H., T. L. Ju, C. H. Yen, and C. M. Chang. 2007. "Knowledge Sharing Behavior in Virtual Communities: the Relationship between Trust, Self-Efficacy, and Outcome Expectations." *International Journal of Human-Computer Studies* 65 (2): 153–69.

Jang, H., L. Olfman, I. Ko, J. Koh, and K. Kim. 2008. "The Influence of On-Line Brand Community Characteristics on Community Commitment and Brand Loyalty." *International Journal of Electronic Commerce* 12 (3): 57–80.

Khodakarami, F., and Y. E. Chan. 2014. "Exploring the Role of Customer Relationship Management (CRM) Systems in Customer Knowledge Creation." *Information & Management* 51 (1): 27–42.

Kim, H. S., J. Yong Park, and B. Jin. 2008. "Dimensions of Online Community Attributes: Examination of Online Communities Hosted by Companies in Korea." *International Journal of Retail & Distribution Management* 36 (10): 812–30.

Koh, J., and Y. G. Kim. 2004. "Knowledge Sharing in Virtual Communities: an E-Business Perspective." *Expert Systems with Applications* 26 (2): 155–66.

Kordzadeh, N., and J. Warren. 2013. "Toward a Typology of Health 2.0 Collaboration Platforms and Websites." *Health Technology* 3 (1): 37–50.

Kozinets, R. V. 1999. "E-tribalized Marketing? the Strategic Implications of Virtual Communities of Consumption." *European Management Journal* 17 (3): 252–64.

Lee, F. S. L., D. Vogel, and M. Limayem. 2003. "Virtual Community Informatics: A Review and Research Agenda." *Journal of Information Technology Theory and Application* 5 (1): 47–61.

Leonard, R., and J. Onyx. 2003. "Networking through Loose and Strong Ties: an Australian Qualitative Study." *Voluntas: International Journal of Voluntary and Nonprofit Organizations* 14 (2): 189–203.

Li, X., and A. M. Cox. 2016. "A Comparative Study of Knowledge Construction within Online User Support Discussion Forums in Chinese and English-Language Cultural Contexts." *Telematics and Informatics* 33: 1048–56.

Li, X., A. Cox, and N. Ford. 2017. "Knowledge Construction by Users: A Content Analysis Framework and a Knowledge Construction Process Model for Virtual Product User Communities." *Journal of Documentation* 73 (2): 284–304.

Mahr, D., A. Lievens, and V. Blazevic. 2014. "The Value of Customer Cocreated Knowledge during the Innovation Process." *Journal of Product Innovation Management* 31 (3): 599–615.

Martínez-López, F. J., R. Anaya-Sánchez, R. Aguilar-Illescas, and S. Molinillo. 2016. "Types of Virtual Communities and Virtual Brand Communities." In *Online Brand Communities*, 125–40. Cham: Springer.

McAlexander, J. H., and J. W. Schouten. 1998. "Brandfests: Servicescapes for the Cultivation of Brand Equity." In *Servicescapes: The Concept of Place in Contemporary Markets*, edited by J.F. Sherry, 377–402. Chicago: American Marketing Association.

Messinger, P. R., E. Stroulia, and K. Lyons. 2008. "A Typology of Virtual Worlds: Historical Overview and Future Directions." *Journal for Virtual Worlds Research* 1 (1): 1–18.

Muniz, A. T., Jr., and T. C. O'Guinn. 2001. "Brand Community." *Journal of Consumer Research* 27 (4): 412–32.

Nambisan, S., and P. Nambisan. 2008. "How to Profit from a Better 'virtual Customer Environment'." *MIT Sloan Management Review* 49 (3): 53–61.

O'Guinn, T. C., and A. M. Muniz Jr. 2005. "Communal Consumption and the Brand." In *Consumption: Frontiers of Research on Consumer Motives*, edited by D. G. Mick, and S.Ratneshwar, 252–72. London: Routledge.

Patton, M. Q. 1990. *Qualitative Evaluation and Research Methods*. London: Sage.

Piller, F. T., and D. Walcher. 2006. "Toolkits for Idea Competitions: a Novel Method to Integrate Users in New Product Development." *R & D Management* 36 (3): 307–18.

Plant, R. 2004. "Online Communities." *Technology in Society* 26 (1): 51–65.

Porter, C. E. 2004. "A Typology of Virtual Communities: A Multi-Disciplinary Foundation for Future Research." *Journal of Computer-Mediated Communication* 10 (1).

Preece, J. 2000. *Online Communities: Designing Usability, Supporting Sociability*. Chichester, UK: John Wiley & Sons.

Ratislavová, K., and J. Ratislav. 2014. "Asynchronous Email Interview as a Qualitative Research Method in the Humanities." *Human Affairs* 24 (4): 452–60.

Rice, P., and D. Ezzy. 1999. *Qualitative Research Methods: A Health Focus*. Melbourne: Oxford University Press.

Ridings, C. M., D. Gefen, and B. Arinze. 2002. "Some Antecedents and Effects of Trust in Virtual Communities." *Journal of Strategic Information Systems* 11 (3–4): 271–95.

Ridings, C., and D. Gefen. 2004. "Virtual Community Attraction: Why People Hang Out Online." *Journal of Computer-Mediated Communication* 10 (1).

Royo-Vela, M., and P. Casamassima. 2010. "The Influence of Belonging to Virtual Brand Communities on Consumers' Affective Commitment, Satisfaction and Word-Of-Mouth Advertising." *Online Information Review* 35 (4): 517–42.

Shang, R. A., Y. C. Chen, and H. J. Liao. 2006. "The Value of Participation in Virtual Consumer Communities on Brand Loyalty." *Internet Research* 16 (4): 398–418.

Sloan, S., K. Bodey, and R. Gyrd-Jones. 2015. "Knowledge Sharing in Online Brand Communities." *Qualitative Market Research: An International Journal* 18 (3): 320–45.

Stanoevska-Slabeva, K. 2002. "Toward a Community-Oriented Design of Internet Platforms." *International Journal of Electronic Commerce* 6 (3): 71–95.

Stanoevska-Slabeva, K., and B. F. Schmid. 2001. "A Typology of Online Communities and Community Supporting Platforms." In

Proceedings of the 34th Annual Hawaii International Conference on Systems Sciences, edited by R. H. Sprague, 7010–19, Maui, HI: IEEE Computer Society Press.

Thomke, S., and E. von Hippel. 2002. "Customers as Innovators." *Harvard Business Review* 80 (4): 74–81.

Verburg, R. M., and E. J. Andriessen. 2011. "A Typology of Knowledge Sharing Networks in Practice." *Knowledge and Process Management* 18 (1): 34–44.

Wasko, M., and S. Faraj. 2008. "Knowledge Exchange in Electronic Networks of Practice: An Examination of Knowledge Types and Knowledge Flows." In *Building the Knowledge Society on the Internet: Sharing and Exchanging Knowledge in Networked Environments*, 172–94. London, UK: IGI Global.

Wenger, E., R. McDermott, and W. M. Snyder. 2002. *Cultivating Communities of Practice*. Boston: Harvard Business School Press.

Wiertz, C., and K. de Ruyter. 2007. "Beyond the Call of Duty: Why Customers Contribute to Firm-Hosted Commercial Online Communities." *Organization Studies* 28 (3): 347–76.

Zaglia, M. E. 2013. "Brand Communities Embedded in Social Networks." *Journal of Business Research* 66 (2): 216–23.

Zhang, Y., Y. Fang, K. K. Wei, and H. Chen. 2010. "Exploring the Role of Psychological Safety in Promoting the Intention to Continue Sharing Knowledge in Virtual Communities." *International Journal of Information Management* 30 (5): 425–36.

Zheng, X., C. M. Cheung, M. K. Lee, and L. Liang. 2015. "Building Brand Loyalty through User Engagement in Online Brand Communities in Social Networking Sites." *Information Technology & People* 28 (1): 90–106.

Zhou, T. 2011. "Understanding Online Community User Participation: a Social Influence Perspective." *Internet Research* 21 (1): 67–81.