

User-led Innovation and the video game industry •

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Abstract

In spite of the recent acknowledgements of “open source development” type of user-led innovation, our understanding is still limited as to its applicability and benefit. Particularly, from the viewpoint of firms making consumer goods, it remains unclear whether they can take advantage of peer-to-peer interaction and collaboration among consumers in the Internet era. Through an analysis of the video game industry, this article highlights its potential and limitations. The current hype of user-led innovation entails the risk of the concept’s being over-applied in terms of its applicability across industries and assumption of benefits. We argue that user-led innovation emerged out of not only technology-specific environment, but also culturally-specific context of industries. Our analysis shows that user-led innovation in its applications is likely to be constrained by the cultural context among other obstacles, thereby limiting its usefulness to a set of industries with particular characteristics.

Keywords: User-innovation, user communities, industry, video games.

1. Introduction

User-led innovation is arguably one of the notable outcomes among many innovations using the Internet. For some products, production process has become increasingly, and even at times, purely interactive. With the emergence of the Internet, a corporate entity is no longer necessary for product development but rather has become optional (von Hippel, 2001). Today, innovation, development, and consumption can be potentially organized entirely by the users. This caused some to argue that the barriers and the division of labor that existed between the producer and the consumer are breaking down (Hartley, 2004; Humphreys et al, 2005). Consumers are now the “last worker on the production line” (Leadbeater, 2000; Humphreys et al, 2005). Consumers can now escape its previous relative passivity, and instead can actively engage in customizing products to suit their demands.

Such user-led innovation increasingly involves peer-to-peer interactions and communal efforts among users. As exemplified by Linux, the Internet offers the unparalleled opportunity to connect previously disconnected individuals around the world to engage in a common project. In many cases, what used to be the “provision” of digital products and contents is shifting to peer-to-peer “sharing”, in which information, knowledge, and digital products are co-developed, shared, and distributed freely. The open-source project is essentially a creation of a “regulated commons” (de Laat, 2005), in which communal collaborative effort can take place with anyone from any part of the world who has access to the Internet.

While the literature on user-led innovation is relatively new, the role of the user involvement in product development has been explored in the pre-Internet age. In business innovation literature, the role of the user has long been understood as an essential source of information in product development, by such pioneers as Lundvall (1988, 1992) and von Hippel (1976, 1977, 1989, 2001, 2005). Most research on the role of the user in the pre-Internet era focused

on the coordination between R&D and marketing within a firm (Neale and Corkindale, 1998). They typically took the shape of case studies, and ranged from resin development at General Electric (Gross, 1989), document application systems by XEROX (Anderson and Crocca, 1993), to medical-surgical supplies at 3M (von Hippel, et al, 1999). Collaboration and participation of industrial users in the product/process development undertaken by producers of intermediate goods has been long recognized in the literature.

By contrast, the role of users of consumer goods in the process of innovation, commercialization and production has been traditionally viewed as largely “consultative” (Gardiner and Rothwell, 1985). Users of consumer goods have been acknowledged as playing a key role in shaping market demand and exerting some influence upon the direction of innovation, as exemplified by Porter’s (1990) diamond framework of national competitiveness (also Porter and Sakakibara, 2004). Manufacturers effectively engage in a risky guess-work every time new product introduction takes place because (1) they cannot know exactly what consumers want as they may not articulate their needs fully, (2) even if they do know what consumers want, manufacturers are unable to meet every detail of their demand, and (3) consumers may change their minds frequently (Jeppesen, 2005). Furthermore, whereas consumers prefer individual customization, manufacturers are interested in finding a standardized product with which they can achieve the maximum economies of scale. The end-result of these conditions makes it attractive for manufacturers to incorporate the view of consumers to reduce risks of product introduction. Thus, to researchers who advocate the importance of user-led innovation, consumer innovators play the role of “market initiators”, and fall into the category of “lead users,” who are typically early adopters of new products in the market.

In spite of the recent acknowledgements of “open source development” type of user-led innovation, our understanding is still limited as to its applicability and benefit. Particularly, from the viewpoint of firms making consumer goods, it remains unclear whether they can take advantage of peer-to-peer interaction and collaboration among consumers under the new technology-specific environment represented by ICTs. In this paper, we approach this issue by asking the following two questions: (1) Can such communal participation of consumers in innovation processes be universal across industries? and (2) From the viewpoint of firms, does such communal participation of consumers always produce beneficial effects? The mode of communication between the producer and the consumer has moved from business-to-consumer to increasingly adopting some aspects of peer-to-peer interactions. Individuals can interact through like-minded others in a production process, without relying on corporate entity. For example, Internet forums provide an arena for product development, product information and technical trouble-shooting. However, it remains unanswered to what extent this new model can be applied to a variety of industries, because of the issue of user-incentives. Lerner and Tirole (2005, p. 115) suggest that because many industries involve forms of cooperation between the producer and the user, and some with user-driven innovation or open science culture, “a number of ingredients of open source software are not specific to the software industry.” However, they also acknowledge that “no other industry has yet produced anything quite like open source development.” Issues range from the inability of breaking up large projects into manageable and independent modules, the availability of sophisticated users, high costs in making products available to users, and regulatory issues (for example, experimental drugs in biotechnology). They also suggest that some products require large-scale teamwork and capital costs, and others with too little “peer recognition and ego gratification.” Scores are hardly settled on the question of whether

technical advances in ICTs enable every industry to create and facilitate peer-to-peer interactions and communal efforts of consumers in the innovation process.

Furthermore, while discussions on benefits of user-led innovation abound, any negative impact of new communal consumer involvement has been largely left out by the user innovation literature. As von Hippel has argued elsewhere (von Hippel, 2001, 2005; Riggs and von Hippel, 1994), user-led innovation is particularly effective in reducing costs of gathering “sticky” information about user preferences, because some information is costly to acquire, transfer and use. This has led the user-led innovation literature to debate whether outcomes of user-involvement can be better characterized as product customization, adaptation/modification, and/or new product design. For instance, Franke and Piller (2004) are careful to avoid the term innovation and instead use mass customization as an objective. Piller et al (2004) prefer to use alternative terms such as “customer-integration” and “co-design.” On the other hand, von Hippel includes customization as one form of user-led innovation, interpreting the term innovation broadly, rather than narrowly that applies only to new breakthroughs. In spite of the debate, user participation and communal involvement is viewed as beneficial to the innovation process on the whole. We question this by drawing upon the literature on industry lifecycle. While the user-led innovation literature has implicitly shifted its focus from an early phase of industry lifecycle (where the acceptance of a really new product to lead users matters) to its middle phases (where customization and adaptation becomes more important as the demand for mass production and standardization grows on the part of manufacturers), it ignores the cycle’s last phase: discontinuities between different industry lifecycles. Particularly the impact of the recent growth of peer-to-peer communal collaboration, either positive or negative, has yet to be analyzed in relation to this particular phase.

In the following sections, we first examine the potential and limitations of user-involvement in production process based on existing literature. We argue that user-led innovation emerges out of not only technology-specific environment, but also culturally-specific context of industries. Industries and products that have a following, a group of hobbyists previously organized or disorganized, are the most likely sources of active user-led innovation today (section 2.1). Furthermore, we question the general assumption of benefits arising from user involvement. We contend that given a greater influence exerted by user communities as interest groups in the Internet era than before, the pursuit for user involvement on the part of firms can produce negative effects by locking them in to an industry’s evolutionary path (section 2.2). We then undertake an industry analysis for the video game industry as a case in which user-led innovation is currently observed. It is shown that fans and hobbyist groups had always been the foundations for the video game industry in the pre-Internet era (section 3.1). We also demonstrate that in their development of the groundbreaking Wii console, Nintendo were fully aware of the danger that staying close with communities of enthusiastic users would have locked the firm in to the trajectory that had dominated the industry (section 3.2). In concluding section 4, we suggest that the current hype of user-led innovation in the literature runs the risk of the concept’s being over-applied.

2. The user of consumer goods in innovation process: a re-examination

2.1 User incentives of sharing of innovations and knowledge

There is little doubt that the current degree of user involvement in production has become unprecedented, suggesting that users have moved into the realm of production in a new way.

There are three major implications for the operations of firms and the economy at large on the changing role of the user in the age of the Internet. First, the boundaries between producers and consumers are being radically redefined with the emergence of open-source development. Peer-to-peer interactions on the Internet, in some instances, began to rival products which have otherwise required a corporate entity for production (e.g., peer-to-peer created Mozilla Firefox web browser). Secondly, this means that the boundary between common property and private property regimes when it comes to knowledge is being seriously questioned. Perhaps the biggest impact the Internet has had on the market is its ability to dislodge the previously concrete boundaries between public good and private goods. The culture of the Internet converted certain private goods to be not only publicly shared, but also collectively innovated. As outlined by Bonaccorsi and Rossi (2003a, b), the economics of the Internet has brought about the possibilities for a new logic in the market system (e.g., “reputation”, “the gift economy”). In the new system, the realm of the public goods have expanded and in some cases, encroached upon those realms which have previously been exclusively on the private realm. The knowledge and its spillover therefore is no longer restricted to the producers (i.e., the firm and the industry) but is used by users and consumers in the peer-to-peer environment. Finally, what distinguishes innovation of the Internet era is the potential of *mass* involvement in all stages of innovation process *real time*. In that sense the Internet has allowed the emergence of *interactive* innovation in a true sense. These new characteristics, facilitated with the Internet, call into questions some of the preconceived notions of the role of the user. In Table 1 we have attempted to characterize the potential changes in the role of the user in the pre- and post-Internet eras.

The sources of these changes are not solely technical – advances in ICTs – but often inter-related with and enhanced by other factors, institutional and cultural. This is particularly evident in the area of user incentives. von Hippel (2001; von Hippel and von Krogh, 2006) argues that users reveal and share innovations and knowledge, either one underpinning innovations or one leading to potential innovations, only when the benefits outweigh the costs. The costs here are the cost of distribution and the cost from the loss of intellectual property. The cost of distribution is essentially free for digital products, whereas it incurs costs to distribute non-digital products. This is the area where technical advances in ICTs contribute most for consumers who lack distribution and support capacities. The loss of intellectual property is low if there is no rivalry in the use of innovations between different market segments. Some information cannot be hidden (in such activities as sports), thus secrecy does not apply. The other side of the equation is benefits arising from sharing of innovations and knowledge. If there are significant benefits, users will voluntarily reveal and share innovations and knowledge. Aside from the creation of new knowledge through spillovers, benefits in this area are associated with the formation of a community. They include sharing of resources in production and distribution when users embark upon the release of products on their own. Benefits also include more powerful “voice” they express to firms with a view to altering the directions of the latter’s innovation activities, which we return to in section 2.2. Furthermore, the existence of a community provides its members with an opportunity to achieve improved reputation from their peers. For these users, the excitement is in the fact that innovation communities comprising of users exist, which should not exist according to traditional economic views. Such reputations are not necessarily a product of the technical advances represented by the Internet, since they had existed earlier in the pre-Internet era. These variations in the sources of user incentives suggest that whether users are driven to engage in communal efforts in innovation processes is not determined solely by technology but hinges upon the interplay of technical, institutional, and cultural factors.

Not surprisingly, the balance among technical, institutional, and cultural factors in the equation of user incentives varies across products and industries. When an impact of technical and institutional factors are held constant, some products and industries are more disposed to communal effort of consumers than others, due to a greater presence of cultural factors that encourage the shift. Table 2 below unpacks various characteristics that relate to user-incentives for product development. User-incentives are assumed to be higher in a market where it is characterized as demand-pull rather than supply-push (Neale and Corkindale, 1998), where demand is heterogeneous rather than homogeneous, where demand for customization is high, and where product life is short and there is a high level of product turn over. Information that can be easily shared or disseminated further facilitates the ease in user-involvement. Furthermore, the types of users who have high degree of user incentives are for those products with a high proportion of dedicated enthusiasts, with a user group or community, in which user-to-user reciprocity exists and/or building of reputation is possible. In general, products with a high cultural content, a high entertainment value, or a product that benefit from a high level of specialization/customization tend to have above-mentioned characteristics. Thus, products that involve user-led innovation so far being studied are hobby products for which user input is primarily design, such as windsurfing equipment (von Hippel, 2001), outdoor products (Lüthje, 2004), mountain bikes (Lüthje et al. 2005), watches (Franke and Piller, 2004), rodeo kayaks (Hienerth, 2006), and computer game *The Sims* (Prügl and Schreier, 2006), with a few exceptions including computerized information search systems used by libraries (Morrison et al, 2000) and car sharing (Truffer, 2003). These entertainment-oriented products typically have hobbyist groups associated with them. Video games are another case of such entertainment product. As we will see in section 3.1, communities of enthusiasts existed and were involved in innovation processes one way or another throughout the industry's history, both before and after the appearance of the Internet. The concentration of cases of user-led innovation in entertainment-oriented products suggests that the model of communal efforts of consumers in innovation processes is over-applied if its universal applicability is assumed.

2.2 *Toolkit approach and user communities*

In the user-led innovation literature, the participation of users in innovation processes is in general viewed as beneficial to firms. For firms engaging in innovations, the role of consumers in the process used to be primarily “consultative”, feeding their preferences as well as their ideas potentially leading to innovative products. This particular benefit was first identified with the involvement of “lead users” at the time of new product development, and then with the interaction with an early majority group of users when firms need to expand a market and “cross a chasm” (Moore, 1991). More recently, firms interested in exploiting user-led innovation are experimenting with the “tool-kit” approach, which provides a framework for product development that can be driven primarily by the user. A “tool-kit” is developed as a go-between for producers and consumers – users can conduct problem-solving themselves and thereby reduce (if not eliminate) the cost of product development for producers (Riggs and von Hippel, 1994; von Hippel and Katz, 2002). What distinguishes the tool-kit approach from the “consultative” approach is that producers abandon their efforts to understand users, and instead outsource innovation tasks to users themselves, and that location of problem-solving shifts from its conventional location at the firm to the location of the user (von Hippel and Katz, 2002; Jeppesen, 2005; also see Piller and Walcher, 2006 about the use of toolkits as a tool to fish ideas from users). From the manufacturers' standpoint, the benefit of the “tool-kit” approach is clear. As von Hippel (2005) argues, it reduces the cost of gathering “sticky” information on consumer preferences. Particularly this meets the need of

manufacturers to standardize the production process on their part and achieve scale economies while allowing consumers to flexibly adapt products to their specific needs.

Cautions are expressed against the reliance upon user feedback as a means of making successful transition through the discontinuities phase to a new industry cycle. To start with, “customers are notoriously lacking in foresight” (Hamel and Prahalad, 1994, p. 99). Very few consumers are able to describe a product that does not yet exist. The best that most consumers can do is to refer to what they are currently using to do the job. Henry Ford famously said that if he had listened to what his customers wanted he would have built a faster horse instead of an automobile (Nokes et al., 2003, p. 83). Consumers cannot be expected to be able to see how a new underlying technology will be useful to them, either. Because of this, it does not help to ask consumers if they want different technology inside the box. Examining the failure of companies to stay at the top of industries at the time of technological or market change, Bower and Christensen (1995) go one step further. They argue that “a more fundamental reason lies at the heart to the paradox: leading companies succumb to one of the most popular, and valuable, management dogmas. They stay close to their customers” (Bower and Christensen, 1995, p. 43). While trying to satisfy the needs of existing customers, incumbent firms on the trajectory of a currently successful technology tend to dismiss emerging technologies/opportunities which may initially appear less attractive.

The presence of “communities of practice” (Wenger, 1998), which arise from shared obligations and commitments to a particular practice, is of equal significance to individuals and firms, linking individual careers and corporate developments with industry evolution (Arthur et al, 2001). Grabher (1993) suggests that success of such communities often produces complacency and over-confidence about the formula of their activities that has proved useful. Increased familiarity and trust between members of a community also discourages them to start networks with new partners from the scratch or experiment with different types of networks. The combination of complacency and familiarity thus locks individuals and firms in the existing networks of their communities. As this goes on, the networks start to show their age. Unable to bring together information from different sources and perceive new opportunities, the networks become less flexible and less innovative than they used to be (Grabher, 1993).

Thus, user communities can lock firms in to an existing evolutionary path of products and deter them from embarking on a new cycle. They act as a pressure group (Olson, 1965), exerting an influence upon the direction firms take in innovation strategy. With the aid of the Internet, the influence of their collective “voice” (Hirschman, 1970) becomes greater as their members grow in number and become more closely connected. Growing interests on the part of firms in interactions with users accelerate this further. As such user communities become mature, iterations of interaction and exchange of information between individuals within a community leads to a convergence of their norms, values, and behaviors through the creation of local languages (Rogers and Bhowmik, 1971). Just as firms in a mature industry show the same tendency, user communities tend to come to consist of individuals with more similar mindsets, dispelling outsiders with different ideas. When these factors are combined, user communities can produce negative impacts upon innovation processes from the mature phase to the discontinuities phase, and such impacts have become greater in the Internet era.

3. User-involvement in the video game industry

Aoyama and Izushi (2003) detailed how the video game industry comprises large console manufacturers, video game publishers, and video game development firms, large and small. Because of this complexity the industry demands a variety of skills, ranging from technically-oriented computer programming, scenario-writing to graphic artistry. As the industry's profitability shifted increasingly from hardware (i.e. console) manufacturing to software production, fan-based content development has arguably become central to the video game industry (Humphreys et al, 2005). In a relatively new market for mobile phone games, a "value web" between consumers and developers has grown in response to increasingly heterogeneous demand and the need for customization (Piller et al, 2004). By contrast, console-based games, a more mature segment of the industry, had until recently followed an evolutionary path catering to enthusiasts who demand more realistic graphics and faster response (Izushi and Aoyama, 2006).

In the following sections, we take a case of the video games industry and discuss user-involvement and user-incentives in product development. In our view, the video game industry is comprised of a unique set of requirements that make the industry particularly suitable for a greater user-involvement in production process, as exemplified by the emergence of fan-created contents (section 3.1). Furthermore, negative impacts exerted by the collective "voice" of user communities are well acknowledged in the more mature sector of console-based games. We show this through a case study of a breakthrough innovation – the development of Nintendo Wii (section 3.2).

3.1 *User communities in the video game industry*

Today, numerous player-created video games exist with various degrees of user-involvement. Hobbyist groups (known as "modders") may execute simple rearrangements to complete conversions, and may even post tutorials to share techniques among themselves (Postigo, 2003a). Some players create their own content, often using tools released by the game developer (Humphreys, 2003, p.88). Table 3 below provides some examples of video games that have successfully involved users in varying degrees.

The video game industry inherently possessed many of the characteristics that support the user-involvement in creative process before the widespread use of the Internet, while the Internet undoubtedly facilitated and made user-involvement much easier. In many ways, user-involvement in the video game industry's creative contents is nothing new. The video game industry has long been the archetypical demand-pull industry. In fact, fans and hobbyist groups have always been the foundations of video game production. This is particularly notable in the origin of video games in the United States, which emerged as a pastime among engineering students of a campus organization, named the Tech Model Railroad Club, at MIT, experimenting upon the first interactive computer PDP-1 manufactured by Digital Equipment Corporation in the early 1960s. The club's students "believed in a cooperative society and imagined themselves living in a utopian world in which people shared information – sometimes without regard to property rights." (Kent, 2001, p. 16). Steve Russell, a member of the club, made the first version of *Spacewar*, a simple duel between rocket ships. The game used toggle switchers built into the PDP-1 computer, allowing players to control the speed and direction of both ships and fire torpedoes at each other. In typical "hacker" fashion, TMRC members shared and revised the prototype, adding an accurate map of the stars in the background and a sun with an accurate gravitational field in the foreground (Kent, 2001). Subsequent development of the video game industry, largely initiated by Atari first with arcade games and later with home entertainment systems,

inherited the communal tradition of “hackers” nurtured through the interface between personal computing and arcade games. There was a degree of cultural coherence between Atari and Apple, both of which attracted highly qualified engineers in Silicon Valley who, unlike the computer hardware-oriented industry, were interested in associating themselves with neither large firms nor military contracts. The US video game industry offered creative yet alternative opportunities for engineers and programmers, many of whom had been trained in close association with the country’s defense interests under the cold-war regime. Bushnell was quoted as saying, “... we provided a place for creative people to be part of something completely new. These were people who wanted to create something intellectually stimulating and fun. They wanted to put their talent into making games, not bombs.” (Sheff, 1993, p. 140).

In the case of the UK, the video game industry emerged out of “bedroom coders” (Izushi and Aoyama, 2006). The UK video game industry originated through involvement of amateur hobbyists who accumulated of sector-specific skills. Known as the “bedroom coders”, they refer to a whole generation of self-trained programmers, mostly teenagers still in school, programming and running businesses out of their bedrooms. Most contemporary UK video game firms emerged out of this cadre of freethinking, independent programmers who subsequently helped the emergence of professional programmers. Bedroom coders were loosely connected by networks of various channels. Video game enthusiasts developed informal social networks through chance encounters at local software stores and exchanged information on how to win games and sharing programming codes. Computer magazines, such as *C&VG* (f. 1981), *Sinclair User* (f. 1982), *Your Spectrum* (f. 1983), *Computer Gamer* (f. 1984), and *Input* (f. 1984), also facilitated bedroom coders to develop contacts, advertise games, and exchange machine codes. Trade shows and conventions provided another venue of information exchange between amateur programmers and professional developers. Many “bedroom coders”, nurtured through communities of game enthusiasts and amateur programmers, went on to become professional programmers while some even established start-up firms (the most famous of which is Codemasters founded by brothers Richard and David Darling).

In Japan, the sharing of artistic talent between cartoon/animation films and video games was in large part supported by the hobbyist groups. Typically known as “otaku,” the hobbyist consumers have been known to be the cluster of lead users of many hobby products. For example, the cartoon producers and fans interact through a bi-annual convention in Tokyo known as *komike* (i.e. shortened form of the Japanese words for “comic market”: *komikku maaketto*). *Komike* attracts a large number of attendants and primarily focused on comic books, although recently it increasingly includes video games, novels, and other genre of art. Japan’s video game industry is related to a historically embedded foundation of creative skills based on vibrant cartoons and animation films in various ways (Aoyama and Izushi, 2003). The sharing of creative resources in Japan was in part possible due to the contemporaneous and overlapping development of *manga*, animation films, and video game industries. *Komike* is an important arena for artists to exercise their creativity without constrained by the criteria of commercial magazine publishers. Japan’s reputable Nomura Research Institute (NRI) estimated that in 2004, 1.72 million hobbyist consumers exist in Japan with an estimated economic impacts of Y410 billion (US\$3.57 billion calculated with the exchange rate of Y115/dollar) (Nomura Research Institute, 2005).¹

Thus the video game industry has always been founded upon the blurring boundaries between work and play, or the application of cutting edge multi-media technology on entertainment

products. In addition, “To keep the game fresh and exciting and to encourage repeat play, the game is adapted as it is played in direct response to player actions... game designers must engage in an ongoing dialogue with players ...” (Pearce, 2002, p.26 as quoted in Humphreys, 2003). The video game industry emerged out of a community of fans and hobbyists, who are now connected through the Internet and are provided with tools to engage in product development, modification, and adaptation individually or collaboratively across distance. While the level of user involvement *en masse* may be unprecedented in the era of Internet, the evolution of the video game industry suggests that user incentives had existed much in the same way as a key driver of user involvement and communal effort in innovation processes.

In today’s video game industry, MMOG (Massively Multiplayer Online Games) help form and grow user communities by facilitating interactions among game players. Users of MMOG are game enthusiasts by any measure. In terms of hours of game play, players surveyed in their study spend an average of 22.85 hours per week (Cole and Griffiths, 2007). Yee (2006) analyses online survey data collected from 30,000 users of Massively Multiplayer Online Role-Playing Games (MMORPGs) and reaches a five factor model of user motivations which includes relationship along with other four factors (i.e. achievement, immersion, escapism, and manipulation). He also finds that users derive meaningful relationships, as well as salient emotional experience and real-life leadership skills, from these virtual environments. Cole and Griffiths (2007) examine the social interactions that occur both within and outside of MMORPGs through an analysis of survey data consisting of 912 self-selected MMORPG players from 45 countries. They find that MMORPGs are “highly socially interactive environments providing the opportunity to create strong friendships and emotional relationships.” Their study demonstrates that “the social interactions in online gaming form a considerable element in the enjoyment of playing” and “high percentages of gamers making life-long friends and partners.” Thus, the enthusiasm of online game players results in a strong demand for advanced online game functions and quality online games.

3.2 *Choosing not to listen to users– the case of Nintendo Wii console development*

There is little doubt that one of the most important breakthroughs, if not the most important, in the videogame industry in a recent period is Nintendo’s new console Wii. Since its release in late 2006, the console has been hugely successful and outselling its rival systems Sony PlayStation 3 (PS3) and Microsoft Xbox 360. According to NPD Group, a market research firm, Nintendo sold 6.29 million units of the Wii in the US market in 2007, as compared with 4.62 million units of the Xbox 360 and 2.56 million units of the PS3 (CMP Game Group, 2008). Similarly, the Wii outsold the PS3 and the Xbox 360 in Japan with their shipments in 2007 amounting to 3.20 million, 1.10 million, and 0.24 million units respectively (*Mainichi jp*, 2007).

The success of the Wii, along with the bestseller dual-screen handheld machine DS (which was released in 2004 and recorded the shipments of 8.5 million units in the US in 2007), saved Nintendo which had been struggling in the console market. In fact, with the Wii’s predecessor GameCube, Nintendo had dropped to a distant third position in the console market facing fierce competition from Sony PlayStation 2 and Microsoft Xbox. Before the release of the Wii, industry insiders had forecasted that there would be little prospect for Nintendo in the long run due to the firm’s much smaller size and development resources relative to Sony and Microsoft (*International Herald Tribune*, 2007b).

Nintendo broke away from the previously defined trajectory in the design of the Wii. The firm set its design goal at a console that could be placed and left switched-on all day at any place, even at a kitchen. The machine had to be small and fan-less in its design, unobtrusive both in terms of size and noise. This in turn required the use of processors consuming low power, which was in stark contrast to the industry's trend of seeking for a greater processing capacity at the cost of noise and heat resulting from high power consumption. An impact of this decision is evident in the Wii's graphics. While sacrificing photorealistic graphics, Nintendo focused its efforts upon innovation in other features including a wireless, motion-controlled wand that players move to direct action on the screen, and games that make use of the innovative controller. The Wii's compact, unobtrusive design and controller, as well as the preceding success of the DS and its innovative, genre-creating games (e.g. *Nintendogs*, *Brain Training* games), helped the console to make inroads on the hitherto unexplored segment of the household – females and the middle-aged.

This decision and the ensuing process of product development were undertaken without any significant involvement of users and user communities. There is little evidence in interviews with the Wii's project team members that points to any form of user involvement until September 2006, just two months prior to the release in the US market, when the Wii was shown to external game creators for close viewing at Tokyo Game Show (Nintendo, 2007). Rather, by deliberately not listening to user communities, Nintendo prevented the strategy from being swayed by them and particularly hardcore gaming communities. CEO was quoted by saying:

“Nintendo has grasped two important notions that have eluded its competitors. The first is, Don't listen to your customers. The hardcore gaming community is extremely vocal -- they blog a lot -- but if Nintendo kept listening to them, hard-core gamers would be the only audience it ever had.”(*Time*, 2006)

Nintendo were fully aware that if they had kept listening to users, hardcore gamers would have been the only audience it ever had (*Gametactics*, 2006; Grossman, 2006). Courted by firms through various means such as game play contests and the provision of toolkits for content modifications, hardcore gamers have gained an undeniable presence in the industry (*International Herald Tribune*, 2003). Their communities are extremely vocal, expressing their “voice” through blogs and online forums on the Internet. A number of gamer communities exist, such as GameSpy's Fileplanet (www.fileplanet.com) and Planet Unreal (www.planetunreal.com), which include ‘mod’ news, message boards and free downloads of homemade games like *Infection* and *Red Orchestra*. (*International Herald Tribune*, 2003). Their “voice” has a strong influence upon the industry. For instance, if game developers switch from games aimed at hard-core gamers to games aimed at casual players, they risk a backlash from hardcore gamers protesting through postings on the Internet (*International Herald Tribune*, 2007c).

Thus, the concept of the Wii was unimaginable to hardcore gamers: if they had been approached, they could not have said that they wanted it. The conventional approach to product development, which is deeply ingrained in the minds of modern management, is to listen to customers and explore their hidden needs. However, in the market for technologically advanced, innovative products and particularly at the time when the discontinuities phase is imminent, user involvement does not always provide a solution but rather constrains the imagination of producers. When Sony and Microsoft listened to the needs of the customers and tried to comply with their requests, Nintendo showed their vision

of the future that was radically different from what hardcore gamers wanted. CEO Iwata said:

“We thought that we needed to show the future by ourselves. We needed to go forward step by step and show our vision, telling what we were going to do, so that our customers could understand it.” (*PC Watch*, 2006b)

Shigeru Miyamoto, Director of Information & Development and the creator of such classic games as Donkey Kong and Mario Brothers, summarized the challenges as follows.

“The difficulty we were faced with at the development of Wii’s interface was how to convince those users and game designers who were accustomed with traditional interfaces. This was a big hurdle. Teamed up with industrial designers, we felt as if we were challenging their conventional wisdom, if not we were waging a war against those users and game designers. Of course, we did not see them as our enemy. However, we had to challenge them as they were conservative, being used with the status quo in the industry.”¹

One of the reasons why the Wii console is viewed by industry insiders as a breakthrough is its appeal to those who have never played video games or play games only casually. It is widely acknowledged that Nintendo’s Wii and DS, coupled with games taking advantage of their functions, have widened the industry’s market base to non-gamers and casual gamers, rejecting “the conventional wisdom that video games are the domain of testosterone-driven gadget freaks who zone out for hours while conquering computer-generated foes” (*International Herald Tribune*, 2007a). The expansion of the market to non-gamers and casual gamers had a significant impact in Japan. The Japanese market for home video games, which had continued to decline since 1997, reversed the trend in 2005 thanks to the release of the DS and recorded an all-time high of shipments for two years in row in 2006 and 2007 due to the continued success of the DS and the release of the Wii (*Mainichi jp*, 2007).

Nintendo has made an explicit strategic decision to shift their market focus away from game enthusiasts, but instead offer services that appeal more to casual gamers. They made a conscious decision to keep hardcore gamers at arm’s length. Iwata was fully aware of the risk of maintaining close relationships with hardcore gamers. He was quoted by saying “Online gaming normally belongs to the most aggressive players, and they can be a very vocal group. For the casual player, this kind of interaction can be very intimidating. I believed if we catered to only this very vocal group of hard-core players, we could never truly expand the audience.”²

As a reflection of this strategic orientation, Wii’s online functions (although the Wii is the first among Nintendo consoles with full online capabilities) emphasize the use of a variety of services that are peripheral to online gaming. For instance, WiiConnect24 service allows users to send and receive SMS messages and exchange pictures even while the console is in the stand-by mode. It also includes an Opera browser, so that the users can surf the Internet even in the middle of gaming sessions by putting the Wii on stand-by mode. The console in the stand-by mode also downloads promotional demos from the Nintendo site automatically. In contrast, its online game services are more limited. Although Nintendo offers online-

¹Shigeru Miyamoto, Director of Information & Development Interview published in Nintendo website (<http://www.nintendo.co.jp/wii/topics/interview/vol2/index.html>). Translated by authors into English.

²Satoru Iwata at Game Developers Conference’s keynote speech on 23 March 2006 (<http://www.gametactics.com/?view=article&article=202>)

enabled games free of subscription fees, which users can play right out of the box, they are less complex and less challenging than titles offered for the Xbox platform. With the function called Nintendo Wi-Fi Connection (first launched in November 2005 for DS), users can play games with other players over the Internet when they are in proximity to a WiFi access point. However, WiFi is more limited in data transfer than cable at the moment, thus denying hard-core games to access fast-changing, photorealistic graphics. Wii's hardware specification, particularly the use of a slower CPU and GPU also serves as constraints.

The grip by the hardcore gamers does not necessarily the bottom line of business, either. This is illustrated by Sega's earlier exit from the console market. Sega had support of hard-core game enthusiasts for several reasons. First, hard-core gamers favored Sega over other consoles for its technological superiority. Second, Sega had rights to a number of traditional arcade game titles, also favored by hard-core gamers. Sega first developed a large user-base of hard-core gamers who are known as the Sega fans with the launch of Sega Genesis in Japan in 1988 which was technologically more advanced than the Nintendo's system at the time, and also targeted for an older audience than Nintendo's. Sega was also the first in developing a 32-bit system, Sega Genesis, released in 1994. Subsequently, Sega upgraded their console's technical capacity in rapid fire in order to retain its technological superiority and cover for the declining sales, with Sega Saturn in 1995, and Sega Dreamcast released in 1998/99. However, Sega made two mistakes by assuming first that technological superiority is the surest way to retain the hard-core enthusiasts, and second that the market will follow the cues from the hard-core enthusiasts. With these assumptions, Sega neglected the issues of game availability by resolving production issues and attracting developers to program games for Sega consoles. Production problems made Sega to miss the first post-release Christmas gift-giving season in the Japanese market, and yet they refused to offer price-breaks for their software titles (Morioka, 2000). Finally, Sega neglected nurturing third party developers to develop new hit titles (Aida and Ohgaki, 1997). It did not take long for a vicious cycle to set in. Customers held off purchase until the new platform becomes available. The fact that there was no compatibility between the Dreamcast and older Sega titles exacerbated the vicious cycle. This meant that even Sega enthusiasts could not play their library of software designed for older consoles. Although there were estimated 3 million Sega fans in Japan alone (Morioka, 2000) at the time of Dreamcast's release, Sega sold a little over 1 million units. Sega's financial position declined to a third of its revenue between fiscal years 1995 and 1999 (Annual reports). Sega ended its production of Dreamcast in 2001, and left the console market all together. Sega was caught in a double-bind. On the one hand, to expand market share, it needed to break out of its own image which it successfully established – a high quality console for serious gamers. On the other hand, in attempting to attract a broader audience including catering more to women and children made hard-core Sega fans that the company is changing away from their interests. Casual gamers did not flock to Sega due to its high price and the limited software availability. In the end, Sega chose to leave the brutally competitive game console market and focus on software development.

4. Conclusion

The current hype of user-led innovation in the literature entails the risk of the concept's being over-applied in terms of its applicability across industries and assumption of benefits to innovation processes. The case of the video game industry offers insights into certain characteristics of industries for which partnership between the user and the producer with a greater user-involvement may be effective. The video game industry has its origin in a hobbyist/nerd culture, on which the open source development is based. In fact, the video

game industry is a branch of the same culture that became commercially viable and successful all the while retaining the counter-culture tendencies through artists involvement. The case suggests that user-innovation emerged out of not only technology-specific environment (such as recent advances in ICTs) but also culturally-specific context of industries. Industries and products that have a following, a group of hobbyists previously organized or disorganized, are the most likely sources of active user-led innovation today. This in turn leads to a strong possibility that user-innovation in its applications is constrained in those industries that do not have such a cultural base among users. Furthermore, the case of Nintendo's Wii console gives a warning to blind faith in the involvement of users and user communities in innovation processes. Innovation management faces different challenges by phases of industry lifecycle. From the mature phase to the discontinuities phase, it becomes more important to question the status quo and keep an eye on opportunities outside the existing trajectory. While ideas of such breakthroughs may arise from some users, they do not necessarily reach firms. Armed with the Internet, communities of most enthusiastic users are now able to exert a greater influence than before. Given their enthusiasm, they are the most vocal group and have vested interest in the existing trajectory through their purchase of peripherals/software. Easy, and often anonymous, peer-to-peer sharing of information through the Internet also tends to dispel out of such user communities those individuals who have different ideas. Under the circumstances, efforts on the part of firms to involve users may produce negative effects by locking them in to an industry's existing trajectory.

Note

¹ These hobbyist consumers are identified in twelve sectors (by the order of estimated size of market: comic books, animation films, celebrity gossips, video games, PC assembly, audio-visual equipment, handheld IT tools, automobiles, travel, fashion, camera, and railroads). To better engage in this and other markets in general, NRI proposes new marketing strategies that emphasize collectable value of the product, promote creativity among users and provide products that allow product modification and customization, and create a community where creative activities of the users can be presented, exchanged, and collected.

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Table 1 User-led innovation in the pre- and post-Internet era

	Pre-Internet	Post-Internet
Venues of information exchange	Internal to the firm; feedback to R&D, product development teams for customization.	Can be external to the firm Online (websites)
Types of users	Industrial users (b-to-b) Consumers (b-to-c)	“Hackers” “Programmers” “Hobbyists”
Types of information exchanged	Technical solutions Market trends	“Codes” “Programs”
Modes of communication	Customer feedback (b-to-b, b-to-c) Focus groups (b-to-c)	“Peer-to-peer” “Forums” “User-innovation tool-kit”
Types of outcomes	New products Adaptation/customization for existing products	Software Digital contents Customer service Technical support
User incentives	Desire to expand product offerings/variety in the market; desire to increase consumption options/effectiveness of products purchased	Desire to engage in a collective efforts for commercial/non-commercial outcomes; reputation

Table 2 Unpacking user-incentives in product development

Types of characteristics	Description
Market characteristics	<ul style="list-style-type: none">- Demand-pull rather than supply-push market- A high level of heterogeneity in demand- A high level of demand for customization- A high level of product turn-over- A high level of uncertainty in demand
User characteristics	<ul style="list-style-type: none">- A high proportion of aficionados/fans/hobbyists among users- Identifiable user-community where reputational capital is built and recognized- Where user-to-user reciprocity exists
Information characteristics	<ul style="list-style-type: none">- Easily shared/disseminated
Benefit characteristics	<ul style="list-style-type: none">- Direct benefit to the user- Indirect benefit to the community- Benefits to public good above and beyond private good
Product characteristics	<ul style="list-style-type: none">- Product with a high cultural content- Product with a high entertainment value- Product with a high level of specialization/customization

Table 3 Examples of games that allow user-involvement in product development.

Games	Genre	Description
<i>Shadowbane</i>	Multiplayer Online Role Playing Game (MMORPG)	Players create characters and worlds. Shadowbane Vault (interest group) instructs players on how to create cities in game.
<i>Neverwinter Nights</i>	Role Playing Game (RPG).	Players create “worlds,” monsters, characters, etc. Fan-created contents can be downloaded online. Fan-created tools such as <i>DM’s Helper</i> also available for download.
<i>Furcadia</i>	Role Playing Game.	Customizable, player-driven contents. Offers “intuitive building tool” to build player’s own world. Online community called Beekin Program directly assists in game design/development.
<i>Second Life</i>	“3D online digital world imagined, created, and owned by its residents...”	Incorporates simulation software with ability to design and resell 3D contents. <i>Tringo</i> , created and distributed on <i>Second Life</i> , has recently become a highly successful user-created game to be distributed through Game Boy.
<i>Spore</i>	Players use software tools to “grow” a city from a single-cell organism.	Players can change the look and behavior of creatures and customize the city’s objects, buildings and vehicles.

Table 4 Binary logistic regression results about user characteristics of the preference of Wii to PS3 and Xbox 360

Dependant variable: "Do you prefer Wii to PS3 and Xbox 360?" (No: 0; Yes: 1)					
	coefficient estimate	standard error	Wald chi-square	sig.	odds ratio
Intercept	0.90	0.86	1.09	0.30	
Gender (Male: 0; Female: 1)	2.12	0.63	11.36	0.00	8.36
Hours of play per day	-1.15	0.46	6.26	0.01	0.32
Do you like action/shooting games? (No: 0; Yes: 1)	-1.19	0.61	3.74	0.05	0.31

Note: The variable "hours of play per day" takes the following values: less than 2 hours: 1; 2-5 hours: 2; 5-8 hours: 3; over 8 hours: 4. Backward stepwise selection is employed. Variables removed in the selection are: "Age"; "Years of game play experience"; "Do you like fighting games?"; "Do you like role playing games?"; "Do you like real time strategy games?"; and "Do you like simulation games?." Interpretation of odds ratio is as follows: for example, the odds ratio for gender (8.36) means that the values of the other variables in the model being equal, a female user is 8.36 times more likely to prefer Wii to PS3 and Xbox 360 than a male user. To take another example, the odds ratio for hours of play per day (0.32) in the model means that the values of the other variables in the model being equal, the odds of the preference of Wii to PS3 and Xbox 360 decrease by 68% with each additional value of the variable "hours of play per day." The results are obtained by analyzing survey data collected by Ya (2007).