# Chapter 1   Introduction

Day, my, day, my, day, my, day, my

- Tomahawk[1]

## 1.1     Introduction

This chapter provides an introduction to the research which is concerned with a 'participatory turn' reflected in the claimed democratization of World Wide Web technologies. The availability of relatively cheap and easy-to-use tools and applications such as game developer toolkits and wikis encourages users to participate in Web-based development practices. This research is designed to enhance our understanding of user participation in the commercial setting of the three-dimensional (3D) software industry with the aim of highlighting the creative capacities of users and their contributions to product development on a Web-based firm-hosted platform. The study aims to yield insight into the development and organization of firm-user interactions where both commercial and non-commercial production modalities interact. It gives particular attention to the ways participation and practices are structured and organized across permeable firm boundaries.

The structure of this chapter is as follows. Section 1.2 introduces the study by describing my first encounters with, and interest in, the 3D software of Second Life. In Section 1.3 the objective of this study is outlined and contextualized in the main theoretical framework and supportive themes that underlie the present study. Section 1.4 draws out the scientific and managerial relevance of the research. In Section 1.5 the structure of the study is outlined, which is followed by a brief conclusion in Section 1.6.

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1    Tomahawk, God Hates a Coward, *Tomahawk* (Ipecac Recordings, 2001).

## 1.2    A playmate enters a playground

This thesis is about user participation in Web-based 3D development practices, known as mod development, in the commercial setting of the 3D software industry, and which is part of a larger, recent phenomenon of users who increasingly participate on firm-hosted Web sites. It is designed to improve our understanding of how these users collaborate and share knowledge and ideas relevant to their participatory experiences and usage of the firm-hosted 3D platform, and how they improve, develop, and maintain new 3D platform-related products and services that may benefit the developer firm.

Research into popular sites for user participation such as YouTube have shown that users form communities in the pursuit of a shared enterprise, captured by the conceptualizations of *participatory* and *convergence culture* (Jenkins, 1992, 2006). Yet, how the process of organizing practices of mod community members across firm boundaries is carried out, or how a framework can be developed for the investigation of interdependent relationships developing between multiple spheres of economic activity that underpin the firm-hosted 3D platform, have not been systematically investigated in the literature. By using a single-case study approach to examine Second Life (www.secondlife.com) this thesis sets out to illuminate the relationship between mod community membership and the developer firm, and offers an original account and conceptualization of user participation in the context of firm-hosted 3D platform development which involves a distinctive innovation and learning process.

The first time I heard about Second Life was at the 2003 State of Play conference in New York. The developer firm, Linden Lab, introduced Second Life as a 3D Web-based environment where users, rather than the developer firm, construct, deconstruct, and reconstruct digital objects such as the houses and clothes shaping and maintaining Second Life. Rather than offering a developer-imposed narrative, Second Life is mostly a product of user communities that are central to the design and maintenance of the platform. This draws attention to a type of user who not only consumes what Linden Lab has put in front of her/him, but who has an interest in participating in practices with others bringing their competencies as artists, coders, and businessmen, etc. into her/his Second Life experience. This has resulted in a thriving 3D environment that allows for vibrant social interactions, knowledge exchanges, and the

improvement and development of 3D products and services contributing new dimensions to the Second Life experience.

Moreover, Linden Lab generated quite a buzz in the room when it announced at the conference that the intellectual property rights of these user-made contributions rested in the hands of their respective creators. This was seen as a dramatic departure from what was common in the larger games industry. These strategic arrangements seemed to point to a dynamic relationship between the roles of the developer firm and the user base underpinning the development of the 3D platform which seemed to capitalize on the integration of within-firm and external labour processes. Consequently, users appeared to be more than mere end users. Instead, they are users from whom, arguably, the developer firm could learn in the further advancement of the Second Life product.

I wanted to check it out but life took over until in 2006 Second Life gatecrashed worldwide, in the on- and offline headlines. With news headlines such as Second Life Will Save Copyright (Wired, 20/11/06), Get a (Second) Life (Financial Times, 17/11/06), Talent-Spotting in Virtual World's (BBC News, 21/6/06), and A Virtual World's Real Dollars (BusinessWeek, 28/3/06), Second Life was presented as a rather open and extensible platform for development (cf. Au, 2008; Ondrejka, 2007).[2] And so, on an early Saturday morning in London while I was still in my PJs, I installed Second Life on my Mac and created a female avatar by the name of Rocketgrrrl Tripp.[3]

The prefab avatar raised from the digital trenches was a rather average looking young woman dressed in jeans and a tee shirt, so I spent some time toying around with the appearance editor. After a while I had created Rocketgrrrl more to my liking by changing her into a raven-black longhaired, big blue eyed woman wearing black latex-like pants and a jacket, and knee-length black boots. Now ready to explore Second Life I tried to figure out how to walk the newcomer's route guided by instruction signposts in such a manner that I was actually able to read those signs. This was difficult. Impatiently I gave up trying to read them and checked out the interface menu instead. By clicking around I accidentally hit 'search' and somehow arrived in a nightclub. A very handsome punk rocker approached me and asked me whether I was interested in

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2 See http://secondlife.com/news/ for Second Life news archives and press releases between 2002 and 2008.
3 An *avatar* is usually a prefab or self-created digital persona controlled by the user. It enables users to participate and interact in games and other game-like environments.

making some Linden Dollars (L$) by 'camping' in the club. I had no idea what he meant. I tried to sit down on a bar stool next to him, but one of my legs was not bending and my arms stood up straight as if I wanted to reach for the disco ball on the ceiling. Time to log off. Nearly six hours had past. Still puzzled by what it was that I actually had been doing in Second Life I could not come up with anything other than 'not much'.

That same evening, however, I logged back on and found myself still in the same nightclub and I was relieved to notice that my posture had turned back to normal. Not knowing where to go, and knowing only that I did not feel like staying in the club, I stumbled outside and, like a drunk person, tried to walk without bumping too much into things over vast lands filled with avatars, shops, residential houses, parks, boats, and nothing but emptiness. What I encountered was mostly in a state of 'under construction'. Right there and then, I could see avatars on their land chatting using the lingo like 'rezzing' and suddenly new objects would appear from out of nowhere. I spent that evening just standing here and there to watch other avatars build. That experience would exemplify the way I was going to spend most of my Second Life. It is during those times that I encountered and talked to other Second Life users, in all shapes and sizes, building, texturing, and scripting a living and a social life in the various corners of the platform.

From early on it was quite clear that the creative capacity of Second Life could be evidenced in these practices of development, customization, and visual socialization that were made possible by purposively firm-designed systems, the so-called editor or toolkit, that put modification activities in the hands of users. However, what constitutes user participation in the firm-hosted 3D environment, and the relation between mod communities with the developer firm as co-participants in product development underpinned by structures for participation and organization of practices across firm boundaries, have not been systematically investigated. This study, therefore, is designed to learn more about the increasing importance attributed to user participation in mod development practices, and the growing significance of social software in the context of the firm-hosted 3D environment.

The next section introduces the theories and methodology that guide this study.

## 1.3 Approaching the playground

> Rap music, the Jubilee Debt Campaign, the Linux open source software movement and The Sims computer game have all left their mark on the world in the last decade. Rap infects all popular culture. The Jubilee campaign led to billions of dollars of developing world debt being written off. Linux is one of the biggest challengers to Microsoft. The Sims is one of the most popular computer games ever. These developments have one thing in common: they were all driven by Pro-Ams, innovative, committed and networked amateurs working to professional standards. This emerging group, the Pro-Ams, could have a huge influence on the shape of society in the next two decades. (Leadbeater and Miller, 2004: 9).

> Say good-bye to today's experts and cultural gatekeepers – our reporters, news anchors, editors, music companies, and Hollywood movie studios. In today's cult of the amateur, the monkeys are running the show. With their infinite typewriters, they are authoring the future. And we may not like how it reads (Keen, 2007: 9).

> A significant paradigm shift is now underway. The rise of what is now described as social software or Web 2.0 environments stands to have a profound impact on social practices, the media, economic and legal frameworks, and democratic society itself (Bruns, 2007: 1).

From these illustrations, the overarching idea announcing the decline of the marginal productivity of the user can be heard. Facilitated by user-friendly and attractively priced (or gratis) software technologies, emerging sites for user participation are "all forms of digital culture, networked in technology […] and collaborative in principle" (Uricchio, 2004: 86). Think Myspace profiles, YouTube videos, Wikipedia entries, and World of Warcraft avatars. In 2006 Time Magazine acknowledged this growing importance of user participation by naming 'you' Person of the Year.[4] This *participatory turn* (OECD, 2007) is viewed as a new or, alternative, logic that seems to favour new over old production-consumption configurations that, to some degree, assume that user participation with particular attention to creative and collaborative practices on open and transparent (and often, firm-hosted) platforms, are empowering and are the way of the future. And, while some consider this a dreadful development that has a detrimental effect on our culture, others hail it as the way forward to sustain growth and innovation in society.

With this proliferation of digital technologies firm production boundaries are said to become increasingly porous as a result of having a growing number of users participate in copying, cutting, pasting, and adding to existing media materials. Turning to the theoretical insights developing in work on participatory cultures in media sites (Bruns, 2007; Burgess and Green, 2009; Hartley, 2008; Jenkins, 1992, 2006) users are

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4 See http://www.time.com/time/magazine/article/0,9171,1569514,00.html (accessed 14/09/08).

well-known to engage in the production of meaning, whether of cultural texts, corporate intentions, or the technology itself. Especially since the 1990s media researchers have shown an increasing interest in this linkage between new technologies and users, looking in particular at the formation of new social collectivities and 'bottom-up' redefinitions of cultural practices[5] (Baym, 2000; Consalvo, 2007; Jenkins, 1992; Klein, 1999; Livingstone, 1991). These studies have aimed to examine online sites of user participation (and dissatisfaction) that relate firm-produced/provided media content to (often unexpected kinds of) official and unofficial 'grassroots' user practices such as fansubbing, machinima, and mash-ups.[6] More specifically, these studies have tended to yield insight into aesthetic status and social power by casting the work of participating users as 'transgressive' (against the perceived economic interests of the producing/providing media firm, such as file-sharing networks) or as at least, 'unintended' (not considered by the producing/providing media firm but also not perceived as harmful, such as fan fiction). Such actions were thus seen as users taking basic materials provided by commercial media firms and actively re-appropriating and redistributing those materials as cultural practices.

While this blurring of production and consumption practices is not a new phenomenon it has become more salient in the context of digital technologies facilitating those diverse practices on a wider scale, engaging firms to look at the consequences for commercial interests.[7] In many cases, participatory Web sites represent successful illustrations of a rapidly evolving (yet often subtle) relationship of collaboration with users across firm boundaries at a time where it has become "increasingly clear that the Internet is not only embedded in people's lives but that with the rise of a more "participative web" its impacts on all aspects of economic and social organization are expanding" (OECD, 2007: 15) coinciding with a strong interest and

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5 This is not new as generations of researchers have focused on the determining effects of technology, the producing corporations, and the public – the latter understood both as creators and audiences. However, the recent proliferation of digital technologies has particularly reactivated debates regarding the aesthetic status of new, technologically enabled expressive forms, and again challenges regarding the role of commerce in the production of culture have been mounted. Digital technologies have made questions regarding originality and reproducibility particularly difficult, and they have blurred the lines among producer, distributor, and consumer to a far greater extent than previous media forms (cf. Gasser and Ernst, 2006; Jenkins, 2004; Uricchio, 2004).

6 *Fansubbing* refers to fans that provide Japanese animation/manga with subtitles for the enjoyment of non-Japanese speakers. *Machinima* is a technique that typically makes use of games to create short films. *Mash-up* is the practice of laying the vocal/music from one song over another song.

7 See Jenkins (1992, 2006) for a brief historical context of user participation evidenced from folk culture where stories were told, retold, reworked and so on.

awareness of the importance of firm-engagement with those active users.

*With its focus on active media spectatorship, collaboration, and creativity, the user participation literature associated with the concepts of participatory and convergence culture developed in the media research literature guide the main theoretical framework of this study.* However, although this literature has made many valuable contributions relevant to the topics investigated in this thesis, insufficient attention has been given to the development and organization of firm-user relationships on firm-hosted 3D platforms where both commercial and non-commercial production modalities interact underpinning product development. This may be due to a rather functional understanding of user participation which cannot fully explain the growing significance of the role of mod communities in knowledge production and innovation in the context of the developer firm.

A first supporting theme in the main theoretical framework is offered by the *communities of practice perspective* which assists us in the investigation of learning relationships between the developer firm and users underpinning product development across firm boundaries (Lave and Wenger, 1991). Participation in mod communities can be approached in terms of enculturation practices such as apprenticeship and mastery. On the basis of shared beliefs and common interests communities are formed, and work towards enculturating newcomers into communal belief systems, skills, and practices from those who have already mastered the group's social and material practices. In addition, such Web-based communities have been found to be effective in enabling and facilitating (voluntary) knowledge sharing (Scarbrough and Swan, 2001). Through these networked communities of practice people are said to develop and share the capacity to create and employ knowledge which can assist in advancing user creativity that underlies the organization of product development (Brown and Duguid, 1991; Nonaka, Toyama, and Nagata, 2000). More specifically, through participation and practices, users can exchange information and are regarded as being part of the firm's dynamic knowledge base, arguably providing the firm with opportunities to learn (Grant, 1996; Wenger, 1998). This information- and practice-based perspective is therefore expected to yield insight into the underlying dimensions of the growth of knowledge and sharing practices across firm boundaries with the aim of highlighting knowledge contributions as a potential source of competitive advantage (Benkler, 2006; Foray, 2004; Freeman, 1991; Lundvall, 1996).

The literature concerning *user-centred innovation* provides a second supporting theme (von Hippel, 2005). In a more traditional view of innovation, firms take on most, if not all, product development, while, in the users-as-innovators model, users are viewed as valuable innovators in the stages of idea generation and the process of product development (Jeppesen, 2004; Lüthje, 2004). Following the line of argument associated with rapidly expanding user participation and enhanced networked connectivity, consulting with users has become an important focal point for firms. Consequently, firms appear to be actively encouraging and facilitating user participation in the innovation process which may be evidenced in purposively designed and provided toolkits. Providing toolkits for innovation and (co-)design is a means of systematically outsourcing certain design and innovation tasks from the firm to the user, assisting users in improving and developing new products and services (von Hippel, 2005). In this way, users are presented with a broader palette to participate, better equipping them to advance and develop products according to their own interests and needs, while contributing to product development (Thomke and von Hippel, 2002). From this theoretical lens, the developer firm may be seen to benefit from a relatively low cost approach to acquiring user-provided information such as user-contributed ideas, improvements and developments of products and services underpinning the overall knowledge base of the firm (Allen, 1977; Foray, 2004).

Thus, whereas the development and organization of firm-user relationships in the context of 3D platform development is underplayed in the user participation literature, the communities of practice literature and user-centred innovation field can support this investigation by illuminating aspects of knowledge production and firm-provided toolkits which underpin learning relationships, allowing a more comprehensive understanding of product development across firm boundaries. However, with many accounts in the user-centred innovation literature having developed an individualistic approach to users-as-innovators such as in the investigation of motivations for innovating, types of innovations, and ways of contributing, and with a somewhat narrow understanding of communities of practice involving ideas of community membership, user and firm 'cultures' have been rather simplistic addressed in these literatures. As a result, these lines of research play a subsidiary role in this thesis, providing the contextual themes in support of the main theoretical framework of this study.

In the light of this discussion and my primary interest in the *dynamics* or the iterative firm-user interactions underpinning Second Life, this thesis aims to investigate:

Q    How is user participation constituted and maintained on the firm-hosted 3D platform, and with what implications for product development across firm boundaries?

The research design for this study involves using a mixture of quantitative and qualitative data and methods. An online survey was conducted among Second Life users, resulting in 434 responses. The survey asked respondents about general Second Life characteristics such as length and type of membership and about particular features and uses of the platform such as motivations, design, information and communication behaviour. First life demographics of users such as gender, income, and employment status were also collected. Semi-structured interviews were conducted with eight Linden Lab employees and thirteen Second Life users. The interviews with Linden Lab employees highlighted aspects of their roles within Linden Lab, their interactions with users, and their perceptions of learning opportunities. The interviews with Second Life users addressed their interests, usage patterns, contributions to the platform, and their interactions with other users and Linden Lab employees. In addition, online documents were collected and examined thematically drawing from the Second Life blog, forums, mailing lists, and public bug tracker (JIRA). The documents were used to examine the ways in which the developer firm and users interact in ways which are shown to further product development. The analysis of the data pointed to interesting relationships between the distinctive creative capacities of users and the range of capabilities afforded by the firm-provided 3D platform which underpin the advancement of Second Life.

## 1.4    Reverse engineering the thesis

The impetus for this study was evidence of this participatory turn in user participation in digital development practices (OECD, 2007). Arguably spearheaded by the open source model of software development associated with the bazaar and gift-giving models (Benkler, 2006; Raymond, 1999), this emergent and rapidly evolving user-generated development of intangible goods or products is reflected in the claimed

democratization of Web technologies. With the availability of affordable and accessible tools for content production and distribution, user participation is emerging as a creative infrastructure that is associated with pervasive knowledge-intensive and information-rich user-created content activities. An important thread in discussions concern the dynamics of user participation as a significant aspect of the knowledge-based economy (OECD, 2005; United Nations, 2008) or of ambiguous terms such as network society (Castells, 2001), learning economy (Lundvall and Johnson, 1994), or the information society (cf. Crawford, 1983; Foray, 2004; Fuchs, 2007; Robins and Webster, 1999). All these concepts emphasize the prominent role of information/knowledge and the use of digital information and communication technologies associated with new opportunities for user participation in digital content development.

How is user participation conceptualized in the scholarly literature? Perhaps the most dominant discourse concerning user participation is associated with the notion of Web 2.0. O'Reilly (2005) has coined this term to refer to businesses that seek ways to understand and make use of new technologies such as the Internet to capture 'the wisdom of crowds' (Surowiecki, 2004), or 'collective intelligence' (Lévy, 1999) of users. Many, fully-fledged and not so fully-fledged, terms, concepts, and models have been coined to capture this 'participatory turn' associated with Web 2.0, among which the most prominent are convergence culture (Jenkins, 2006; cf. 'participatory culture', Jenkins, 1992), democratizing innovation (von Hippel, 2005), produsage (Bruns, 2007), wealth of networks (Benkler, 2006), and wikinomics (Tapscott and Williams, 2006).

More specifically, the overarching idea points to a shift from a static perspective on Web content delivery towards a more dynamic perspective where Web tools and applications such as file-sharing networks, social software, wikis, really simple syndication feeds (RSS) and application programming interfaces (API) are put into the hands of users who are regarded as participants rather than end users. User participation from a Web 2.0 perspective tends to be associated with a convergence of production, distribution, and consumption practices and a blending of user-creativity, collaboration, and sharing enabled and assisted by, for example, social software using wikis and networking sites (Aufderheide and Jaszi, 2008; Green, 2008; Jenkins, 2006). These are said to be shaping new hybrid spaces where user involvement involves the generation of user experiences and "the collaborative and continuous building and extending of existing content in pursuit of further improvement" (Bruns, 2007: 3).

User participation in creative (or, creation) practices appears to be an increasingly large-scale phenomenon at least in the Western world where user creativity is largely informal, occurring in contexts where there appears to be no (apparent) authoritative entity and users voluntarily perform unassigned 'work tasks' (cf. Van Wendel de Joode, 2005; Raymond, 1999). These users that make, often voluntary, contributions may well be experts in certain areas yet they tend to be approached as 'amateurs', 'hobbyists', and 'fans' as user participation tends to occur outside the professional realm (Jeppesen, 2004; Keen, 2007; Postigo, 2008). Within this context, user participation has evoked debates in the social, economic, and policy domains which may be associated with increased user autonomy and diversity, new forms of media, different ways of doing business, and the need to address policy issues such as broadband access, privacy protection, and intellectual property protection (Benkler, 2006; Green, 2008; Leadbeater and Miller, 2004; OECD, 2007).

In addition, some studies suggest the ubiquity of opportunities for user participation that are accessible to 'all' and which empower the users (Burgess, 2007). While others see the linkage of Web tools and applications to user positions as "a brave new world where the spirits of commonality are finally merged with the interests of capitalism" (van Dijck and Nieborg, forthcoming: 12). The idea of a participatory Web seems to have become attached to a certain 'magic' or 'hype' and concrete claims and instances of such empowerment are implied rather than manifest in the empirical evidence (cf. Woolgar, 2002). Little attention has been given, for example, to the factors and distinctive relationships involved in different participatory modalities. Differences between more active and passive users are often assumed away, and the adoption of various technical and social designs is claimed to lead 'magically' to building a critical mass of participation (Burgess, 2007; Li and Bernoff, 2008; Tapscott and Williams, 2006).

In the context of the rapidly evolving computer/video games and 3D software industries supported by online network technologies, this study seeks to contribute to our understanding of user participation in an online firm-hosted 3D environment. It seeks to remedy gaps and weaknesses in the existing user participation literature about these firm-user interactions which are frequently based on intuitive claims about user participation. Moreover, in the user participation literature there is so far only an incomplete picture of the role of user participation in these commercial environments.

Consequently, this study aims to yield insight into the dynamics between the developer firm and users with particular attention to the ways the developer firm develops user participation into a market and the ways in which that market enables and facilitates particular modes of mod development that are shown to shape and maintain a firm-hosted platform as a site at which the developer firm can be seen to learn.

In addressing some of the aspects that have remained largely unexplored in the user participation literature, the main theoretical framework is supported by several insights developed in work on communities of practice and user-centred innovation. However, this study's focus is not about the aesthetic and social qualities of user participation or the technological characteristics of software modularity, interoperability or the wider innovation system that underpins such developments. Rather, it is about specific aspects of product development across firm boundaries illuminating the growing significance of mod communities in knowledge production and innovation which are associated with the emerging knowledge-based economy.

From the perspective of the firm, the study contributes insight into the challenges faced by a developer firm that seeks to structure and organize user participation. The study highlights specific ways in which the developer firm may benefit or learn from user creativity through motivating, integrating, and coordinating particular tasks of employees and users which are shown to foster a particular firm-user dynamic in the labour market. In particular, the study yields insight into the ways a firm can learn from user participation in development practices across its boundaries, guided by firm-designed toolkits as a potential learning resource. As a result of this focus, this study offers some rich insights for practitioners who are involved in the phenomenon of user participation on firm-hosted 3D platforms.

## 1.5    Playlist

The 'playlist' supporting this study is organized into nine chapters.

*Chapter 2* introduces the study by providing a basic background about contemporary game/3D culture on the Internet. Against the increasing popularity of participatory Web applications associated with user-generated content attention is drawn to the modification practices of computer-based First Person Shooters games, virtual

worlds, and 3D collaborative platforms.

*Chapter 3* presents the theoretical background and conceptual framework for this study. Theories focusing on user participation, user-driven innovation, and networked communities of practice are discussed and applied to modification practices in the setting of a firm-hosted 3D platform. The conceptual framework for the study is developed to explicate the underlying dynamics of firms that encourage and facilitate user contributions guided by an understanding of user outputs as external resources on the 'demand side' of innovation.

*Chapter 4* presents the research methodology. The firm-hosted 3D platform Second Life is introduced as the research site for data collection. The chapter sets out the research methods used to collect the quantitative and qualitative data that are the basis for the analysis in this study, i.e. an online survey, semi-structured interviews, and online documents. The data collection procedure and methods of data analysis are outlined and the strengths and drawbacks of the approach are discussed.

*Chapter 5* presents the empirical findings concerning the design capabilities of Second Life users. The results focus on the analysis of disparities between the capabilities of Second Life users. Attention is drawn to the different participation patterns and communication behaviours associated with Second Life membership. Different modes of user participation are related to the organizational characteristics and culture of the developer firm.

*Chapter 6* presents the empirical findings with respect to the design space. The design space is the area for user participation in mod development practices. The analysis examines the characteristics of the Second Life platform yielding insight into the functionalities of the design space associated with the firm-provided toolkit that enables and facilitates user participation.

*Chapter 7* presents the empirical analysis of knowledge contributions made by users and employees of Linden Lab. The analysis yields insight into user participation on the firm-hosted platform by linking the design capabilities and design space to various communication practices. The findings demonstrate that Second Life is a site where various contributions by both users and the developer firm generate ideas about discovering, developing, and refining creative practices associated with firm learning that contribute to ongoing product development.

*Chapter 8* provides an analytical synthesis of the results concerning production

modalities underlying the firm-user interactions on the firm-hosted platform and considers this in the light of the conceptual framework for this study and the broader theoretical implications.

*Chapter 9* concludes this study with a contemplation of the main research findings about user participation on firm-hosted 3D platforms summarizing the principal theoretical, methodological, and empirical contributions of this study. The chapter discusses some of the limitations of the study and outlines opportunities for future research.

## 1.6 Conclusion

This chapter has set out the design of this study which contributes to the understanding of the roles of users in a firm-hosted 3D platform. Overall, the analysis draws attention to: the motivational, participatory, and behavioural patterns of user design capabilities; the functionalities of the firm-provided toolkit in relation to multiple modalities of mod development; and the role of knowledge contributions in cultivating and maintaining learning relationships. The findings suggest that firm-hosted mod development is a complex configuration of overlapping commercial and non-commercial production modalities, linking the developer firm and mod developers in product development of the 3D platform which influence the firm's learning opportunities. This complex configuration yields several terms such as 'modification effect market' that enable an improved understanding of user participation in the context of commerce.