Introduction

MySpace is at home at News Corporation's place. YouTube broadcasts itself with Google. Flickr shares photos with Yahoo! These are three riveting illustrations where 'Web 2.0' is put to work. The users that is, rather than their hosts. The likes of MySpace, YouTube, and Flickr may bring particular technology and expertise to the tables of News Corp., Google, and Yahoo! but mostly they bring in a vast and rapidly growing community of users. All the 'yous' who, like me, maintain and become engaged with social network profiles, crazy-looking avatars, file-sharing, code-writing, and so forth.

‘You', and a huge collective of others, have become participants in digital development practices as many start-ups and established firms have embraced, in one way or another (such as through acquisitions like News Corp., Google, and Yahoo! have), some of the unique qualities of certain Internet applications and tools by actively articulating ‘your’ creative and interpretative endeavours. And, while some consider this a dreadful development that has a detrimental effect on our culture (Keen, 2007), others hail it as the way forward to sustain growth and innovation in society (Benkler, 2006; Jenkins, 2006).

Especially since the 1990s 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 (Jenkins, 1992;
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. 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 ‘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), engaging firms to look at the consequences for commercial interests. Such migrations between firms and users highlight the increasing complexity of the division of knowledge and labour in digital product development, drawing attention to the mechanisms of how work is accomplished and organized across firm boundaries.

This paper considers the trajectories of coordination and participation across firm boundaries in the context of the 3D software industry, thereby highlighting the interdependencies developing between the firm, users, and platform, and the implications
for the boundaries of participation and competition. For this purpose, this paper draws on 3D software developer firm, Linden Lab, that facilitates and invites users to participate in development practices of the virtual world platform, Second Life. The results of interviews conducted with employees of this firm, and an online survey with its respective user base are used as evidence to yield a more rounded understanding of software development and its constituents and maintenance affecting game design, possibly benefiting the firm’s ability to innovate and compete.

The structure of this paper is as follows: The first section yields a modular perspective on the facilitation and coordination of work practices within and across the boundaries of 3D software developer firms. This is followed by an overview of the methodology. The third section explores several organizational elements involved in the dynamics of platform development at the intersection of Linden Lab and its user base. The paper concludes with a discussion of the findings demonstrating how work is accomplished within the boundaries of a permanent firm demonstrating a co-evolution of participation and competition underpinning platform design across firm boundaries.

**Designing for mod development**

At the inception of computer gaming (Spacewar!, 1962), programming consisted of tens of lines of code that, roughly fifty years later, has evolved into a social significant and high risk, technologically advanced, capital intensive, proprietary practice and billion dollar industry. Millions of people worldwide regularly play games on various platforms, that is, consoles (e.g. Wii, PSP), PC games (installed and played on the computer), game portals (online game
platforms including social networks), massively multiplayer online games and virtual worlds (e.g. Word of Warcraft), and mobile (cf. Kerr, 2006). Many, if not all, of contemporary devices offer online services allowing customers to, for example, upgrade their products, play with others online, and download content such as game demos.

In this setting, the relationship between modular (technical) design and modular market structures has become apparent (cf. ‘mirroring hypothesis’; Langlois, 2003; Colfer and Baldwin, 2010). Game technology (hardware and software) is key to game design. One such important technology is the game engine, used for e.g. PC-based First Person Shooters (FPS). It consists of several components and includes a graphics rendering system, modules for artificial intelligence, physics, scripting, networking, and other features (Moore and Sward, 2007). The game engine is the developer firm’s intellectual property, or proprietary technology. Nowadays, game engines just like their products, i.e. games, have an ongoing development cycle that involves constant updating.

For developer firms the modular design is increasingly also a ‘canvas’ that enables and facilitates user contributions by opening up (parts of) their technology to customers. This can occur at different stages of product life. Generally speaking, this tends to occur after the original game has been released to the public. In many cases, ‘user developers’ tend to get access to (parts of the) code and a firm-designed toolkit such as graphics editors and 3D modeling software that allows them to customize and design essential parts of the (original) product world.

Such toolkits are specialized software applications that are necessary for particular parts of the game development process, such as level editing and script compilation. They tend to lower the threshold by enabling and facilitating user participation in product
development, supporting users to create products that correspond to their individual needs. Toolkits come in a variety of forms and allow users different modalities in design possibilities, ranging from having very simple scope ('low-end') such as having the choice to select between various options like size and color, to granting users the opportunity to come up with new products ('high-end') (Thomke and Von Hippel, 2002). The more basic type of toolkit is typically used to exploit mature markets, while the more advanced kind tends to be used in the exploration of new opportunities for products and services.

Furthermore, there are specific ‘within-firm toolsets.’ The firm equips its developers with tools they need in order to work. These tools may be internally designed but can also be third party developed like commercial-off-the-shelf graphics packages such as Maya, and Photoshop. ‘End user toolkits’ may be developed and provided by the developer firm. These toolkits appear to vary from being completely identical to the tools used internally, to specifically designed end user tools. They may also be third party tools that come with the product or, if allowed and compatible, used on the users’ own account. And, if allowed and possible, users may develop their own tools. Both first and third party toolkits may be located internal and external to the firm-hosted platform.

In this line of argument, successful development across firm boundaries deals effectively with information costs, where the firm is seen as being interested in economizing on the acquisition of reliable need information that assists in delivering a product (or service) tailored to users’ specific needs (while improving the knowledge base of the whole firm). Firm-provided toolkits are an essential means to this end. Firms and users tend to know different things, finding expression in the development of different
types of user contributions, thereby emphasizing that developer firms tend to focus on known needs and users seem to stress functionality (Von Hippel, 1994).

From such a modular perspective, software platforms associated, here, with the game engine and toolkits are considered to be structuring or central components for which other stakeholders develop complementary technologies and products (cf. ‘multi-sided market strategy’ and ‘platform leadership’; Evans et al. 2005; Gawer 2009). As a result, the platform tends to operate as gatekeeper of information and value flows between different stakeholders from which they, and especially the developer firm, can possibly benefit (Ballon and Van Heesvelde 2011). And increasingly, with multiple stakeholders involved in development practices across firm boundaries, the boundaries of platforms are in constant flux (Parker and Van Alstyne 2008). Ambiguity, therefore, may arise about the nature of the firm but also about the main interface and (the nature of) the platform underpinning various competitive efforts that may not necessarily benefit or support the developer firm, and an unbundled and open market more generally (Ballon 2009).

Not much attention in this context, however, has been given to the sources of organizing work which can be internal to the firm, acquired by firms in the market, or co-developed with developer communities and users (cf. Bakker, 2010; Barley and Kunda, 2001; Bechky, 2006; van der Graaf, 2012). And, while research has brought forward insight into different elements associated with the logic of modular (and migratory or cross-boundary) practices, there is little empirical evidence that links these aspects to the dynamics of how work that can be characterized by an ex ante defined period of time of interaction between workers, or developers (often with different agendas) – within and external-to the firm - underpinned by the
product life cycle, is actually facilitated, coordinated and achieved. While roles are important in the coordination of work systems, this paper illustrates how modular aspects, mainly associated with the nature of the product/technology, also, coordinate work practices within and across firm boundaries. The focal unit of interest in the present paper is, therefore, to unravel coordination mechanisms of firm-user dynamics embedded in and underpinned by the product context.

**Your World. Your Imagination.**

This paper draws on the 3D software developer firm Linden Lab. Founded in 1999, it is the developer of virtual world technology for Second Life. And, rather than forging an objective-driven and gaming orientation, Second Life (2003) is a collaborative, immersive, and open-ended empty 3D environment that is being inhabited, designed and developed, gratis or for a subscription fee, by its so-called ‘residents’ who own the intellectual property right over these contributions. Thus, without user-generated content there would not be much to do or see. And, it is also a highly sociable and communicative service platform. Linden Lab provides users with an Internet-based interface (or, viewer) with a built-in toolkit that can be used to build, script, and texture the content of the platform, and by accessing the source code the viewer can also be modified.

For this paper, a mixture of quantitative and qualitative data and methods were used to yield insight into the firm-user dynamics underlying product design. Semi-structured interviews were conducted with 13 Linden Lab employees in 2006 and 2007. The interviews highlighted aspects of, among others, the role of each employee in the software development process, how performance is measured, and their level of interaction with customers. The interview data were
used to ‘tell the story’ of game developers, highlighting the context of, and (latent) structures underlying, the explanations and interpretations of work involved in processes of game design within and across firm boundaries (Fereday and Muir-Cochrane, 2006). And thus, it sought to yield insight into how the developers “organize and forge connections between events and the sense they make of those connections” with other stakeholders (Bryman, 2004: 412).

An online survey was conducted among Second Life (N=434, 2007). The survey asked respondents about general characteristics such as length and type of membership and about particular features and uses of the platform, that is, motivations, design (tools, features, usage), information and communication behaviour (e.g. information provision/seeker). Demographics such as gender, income and employment status were also collected.

The respondent profile can be summarized by the following: More men than women seem to participate in Second Life (N = 434), 58.8% vs. 35.9%). The mean age of the respondents is 34.49 with a median age of 34 and a range from 13 to 68. By far the largest groups of respondents resided in North America (58%) and Europe (32%). Nearly half of the respondents report to work full-time and about one-third of the respondents earns an annual income less than US$ 30,000. The appeal of Second Life was also measured in terms of social, topical, and technical aspects which is presented in Table 1.

<table>
<thead>
<tr>
<th>Why does Second Life appeal to you?</th>
<th>Distribution in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships</td>
<td>I can enjoy social interactions with others</td>
</tr>
<tr>
<td>Motivation</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>Escapism</td>
<td>I can pretend to be someone else</td>
</tr>
<tr>
<td>Creativity</td>
<td>I like to build, script, and/or texture</td>
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<tr>
<td></td>
<td>I can modify Second Life Open Source</td>
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<tr>
<td>Peer recognition</td>
<td>I can build a reputation</td>
</tr>
<tr>
<td>Innovation potential</td>
<td>It’s innovative</td>
</tr>
<tr>
<td></td>
<td>I like that we can retain intellectual property rights</td>
</tr>
<tr>
<td></td>
<td>I can make money</td>
</tr>
</tbody>
</table>

Source: Survey on Second Life, N=434.

Next, the findings are presented that yield insight into the organizational dynamics of Linden Lab in relation to its user base in platform development.

**Designing Linden Lab**

Second Life (2003) is the result of a series of course changes. In 1999 Linden Lab began working on a hardware feedback device (‘haptics’) that would enable users to fully immerse in virtual reality. In order to demonstrate this device a virtual environment called ‘Linden World’, with task-based games was built. Linden Lab abandoned the device when it figured that Linden World had more potential. In retrospect, it can be said that Linden World was the first version of Second Life. The format of the 3D world-to-be was set during a board meeting in 2001, when a number of employees started building their own digital content such as snowmen. Those inputs marked what was going to be the most compelling aspect of Second Life: having people build and contribute their own creations in real time. So, rather than forging an objective-driven and
gaming orientation, Linden Lab shifted its goals towards an user-created and community-driven platform, encouraging ten Linden Lab employees or so to work on transforming the Linden product into an avatar-based platform that allowed users to engage in building, and eventually, scripting activities (van der Graaf, 2009).¹

“So from that point onwards, the whole of Linden Lab is very aware of the debt we owe to the people who are actually making stuff. I mean seriously, the platform is, you know, a fairly adequate piece of software that allows people to make all this cool stuff.” (Jim, 12/1/07, p. 2)

Linden Lab’s mission statement, referred to as ‘Tao of Linden’, describes the principles underlying the attitude and approach towards being employed at the developer firm. This goes back to the firm’s early days when it was still a small start-up. At that time, Linden Lab consisted of a handful developers and an office manager. Some had already worked at other companies and, based on those encounters with corporate culture, they sought to avoid particular negative experiences. One of the upsides of being a small-sized company was that the hierarchy could be (relatively) flat, allowing input and decision-making from all Lindens. Internally, discussions could be held about what kind of attributes of the ‘Linden culture to be’ would be desirable. At the same time, they had to take into account whether these ‘work ways’ could be sustained over time and, for example, could be applied to a firm that would increase in size. Linden Lab came up with four goals that were to seed Linden Lab’s culture: a flat hierarchy; a fun place to work; refrain from ideas of code ownership; and no (or only a few) meetings.
Since those early days, Linden Lab has prided itself in its effort to give all employees the chance to opt-in by their choice to commit to and execute outstanding job tasks. The practice of opting-in is based on volitional commitment. Linden Lab has developed a near hundred percent commitment to having employees (‘Lindens’) choose what to work on. This practice means that ‘Lindens’ are held responsible for carefully selecting work out of outstanding job tasks according to their own skills and task preferences, and they are held accountable for successfully accomplishing a chosen task.

The development tasks for the Second Life product are organized in studios. Each studio tends to have certain specialties. For example, Studio Blacklight concentrates on high priority bugs and issues that affect the service. In addition, in order to acclimatize and familiarize oneself with Second Life and the tasks ahead, a new worker generally spends her or his first few weeks in Studio Blacklight. Since this studio’s main focus is solving bugs rather than being project-oriented it tends to be, for newcomers, an insightful way to become accustomed to the inner workings of Linden Lab. After a while, some may become inspired by other parts of the Second Life product and move to another studio, and which is in line with the ‘Tao of Linden’.

How is work coordinated? The software-package JIRA supports and coordinates this practice allowing people everyday to submit and retrieve tasks, bugs, and so forth. It is also a mechanism to prioritize work as, once a week issues that are considered worth doing, are ranked by votes cast by other Lindens. Another practice is ‘Achievements and Objectives’ (As & Os). This is a weekly email sent to everybody in the company, containing what people are working on and what their goals are for that week. Lindens, however, have an opinion about what is ‘most important.’ In this light, a studio director may need to step in as s/he needs to manage multiple
tasks (and not people) for that particular studio. Thus, Lindens are not attached to a particular studio and, therefore, the director fulfils a kind of guidance and awareness role concerning task and resource management.

“I currently have three active projects in my studio, each with two to four developers and a few other resources shared among the projects (two program managers, a designer, and of course myself). I ensure that the projects have enough resources and approve which projects have resources available to be worked on within my studio. Then I help to make sure that those projects succeed. [...] So part of my job is to help make the “hard decisions” when deciding between projects” (Steve, 7/11/07, p. 2).

Second Life itself is also regarded as an important tool that effectively deals with geographical and organizational constraints allowing (dispersed) Lindens to collaborate and communicate. More specifically, Linden Lab employs its own product platform to build and maintain its culture among its various (and dispersed) teams. The central role of within-firm deployment of Second Life, however, may not be obvious to a new Linden. It would not be the first time that a new hire mistakenly assumes that sharing the same office equals a physical meeting rather then logging onto Second Life. The platform provides open and certain closed areas for Lindens which are frequently used for, among other things, meetings, presentations, and job interviews.

So Linden Lab not only develops Second Life but also inhabits its product or design space for various firm-related tasks. In this view, Lindens often (albeit, at times, in different vicinities) rub shoulders with its user base.
Mastering Linden Lab

Working at Linden Lab is not for just anybody. It is hard to attract people with exceptional skills and/or a really good resume and who fits the firm’s social profile. Linden Lab is looking for smart, creative, energetic, and passionate people. It is not unheard of that applicants are interviewed eight to ten times. And, similar to other developer firms, applicants have to undergo a ‘programming test’ focusing on algorithmically complex problems as part of the hiring process. The point of these tests is not so much about having applicants come up with the right solutions, but rather a means to detect people that find such complexities ‘irresistible’ and are capable to justify choices made and program languages chosen.

Furthermore, for a newcomer in any company it may be unclear what the preferred means of work are, yet starting in a company where the choice of work is yours, it seems even more difficult. At Linden Lab, therefore, everyone is expected to choose a mentor and to have regular meetings. Even seniors because “everyone needs to hear about how they’re doing, managing their work, their social interactions, etc. Also, we’re encouraged to find someone who wants to teach us if we don’t know how to do something” (Q, 7/11/07, p. 3).

How is performance measured in these organizations? Linden Lab organizes each quarter a review day for which JIRA-based accomplishments are collected from previous set ‘As & Os’ and the ‘Love Machine.’ JIRA provides general metrics such as what tasks have been accomplished and yields a post-analysis of how things were executed, while the Love Machine is a more qualitative means of assessment; on a daily basis Lindens give and receive ‘love’ from their colleagues such as getting help writing code which at the end of each quarter, results in a pink envelope with money in it, as every ‘love note’ received
Modding Inc.

translates into US$ 1. Lindens also get peer reviewed by a number of co-workers. Reviews and 'love' scores are published internally on a wiki for everyone to read.

The Many Lives of Second Life

It takes about four hours to familiarize oneself with the basic controls of one’s Second Life avatar such as walking and flying, and much more for an advanced participatory experience as Warkirby, a user interviewed for this study shared, ‘I had a little experience with game mods before Second Life. [...] I spent five months studying scripting on and off here’ (3/12/07). With an user retention of roughly 10% the majority of users does not get through this learning curve, but the ones that do tend to stay (cf. Yung 2011). In this context, the Second Life survey asked respondents about its attractiveness based on the main functionalities of the Viewer’s built-in toolkit, enabling and guiding users to engage in building, scripting, and texturing practices in-world. The findings indicated that more than half of the respondents found the toolkit an appealing factor to participate in Second Life (M = 1.74, SD = .994, N = 434). Moreover, about half of the user base has been reported to experiment with the built-in tools and to invest time to learn how to work with the toolkit.

Let’s take a closer look at how the Second Life platform offers a space for development, or design, to occur. A built-in toolkit can be accessed in-world (on the Viewer task bar under ‘Tools’) and assists users to further develop the Second Life platform. This toolkit enables users to build, texture, and script for which its distribution is depicted in Table 2.

Table 2
The survey found that 56% of users frequently participate in building activities \((M = 1.82, \ SD\ = \ 1.126, \ N = 434)\). In-world generated builds can also be textured. Roughly one-third of the respondents were found to create and import textures \((M = 2.43, \ SD\ = \ 1.244, \ N = 434)\). Fewer than 20% of the respondents reported to actively participate in scripting activities which is indicative of scripting being a more advanced practice, requiring different skills than for building and/or texturing practices \((M = 2.91, \ SD\ = \ 1.325, \ N = 434)\). The Viewer itself can also be modified when Linden Lab released the source code to the public in January 2007; “doing it this way means that everybody can potentially benefit from it” (Babbage Linden, 12/01/07, p. 5). The findings suggest, however, that only a very small percentage of Second Life respondents modify the Viewer (on a need-base), while a large portion has no interest at all in those kinds of practices \((M = 1.88, \ SD\ = \ 1.071, \ N = 434)\).

There are also several other open source initiatives such as the Linden Lab-initiated Architecture Working Group (AWG) to work with users on defining an open protocol that can be standardized, and a user-initiated project OpenSimulator (or, ‘OpenSim’) focusing on developing a ‘Virtual Worlds Server’ to connect to any Viewer (and vice versa). Second
Life was its first compatibility project. Survey findings indicate that the open source element of Second Life is not the most important draw for engagement. Furthermore, only 2% of the respondents said to contribute to open source activities involving the platform on a repeat basis ($M = 4.04$, $SD = .982$, $N = 434$). Considering the advanced skills and know-how level needed to contribute, this small percentage of respondents is consistent with previous research in this domain.

Second Life can be said to offer a plethora of creation opportunities where users with different levels of skills and know-how can participate. Regardless of incentive and skill to participate in mod development, users (as individuals and as collectives) can make their developments and/or skills available (for free or a fee) for others to copy, rework, use in Second Life. Such practices suggest opportunities for entrepreneurship and highlight the ways employment can be organized among user developers on the firm-hosted platform.

Second Life, in many cases, offers a site where users rez, or show each other objects and development. This act of showcasing can be understood as a communicative (and aesthetic) experience and is pivotal for in-world interactions. Rezzing is akin to a handshake in the first world. Showing work to others means sharing an understanding of the roads that were travelled to arrive at the current path. Mike (Teen Grid) recalled a situation where he was on some land watching newcomers at work. Soon he learned that they were trying out for ‘Skoolaborate’ which was an Australian initiative that used Second Life as a means to engage students in collaborative learning experiences. Mike sent in his buildings and got the job.
"He almost thought I was an adult. He didn't understand. Yah. Pretty nice. [...] I am getting paid like two grand. [...] They really want me to help them out, get started off in Second Life because I am like the little guru kid. They kind of want to help me out getting a business started" (Mike, Teen Grid, 14/11/07, p. 4-5).

Mike hopes to establish a limited liability company that works with first life companies interested in moving their business to Second Life. One example of an already established company is The Electric Sheep Company (TESC). Its founder, Sibley who was interviewed for this study, had an interest in building a communication platform where social interactions could blend with ecommerce. Second Life seemed a good match. He hired someone in 2005 to set up the company and in 2006 committed himself full-time. Within one year TESC had twenty-five employees who were mainly preoccupied with offering in-world professional services for clients such as advertising and public relations agencies. The company's relationship with Linden Lab is highly regarded, not so much in terms of supporting what companies TESC launches in Second Life may so benefiting Linden Lab, but rather in terms of pushing the boundaries of the platform.

"We talk to [Linden Lab] several times a week. [...] How much work would it be to do this? When is this feature coming out? And then just generally being in touch with what is going on. We try to steer away from this but there occasionally are projects where we go and are jointly with the client in some cases, specifically asking Linden Lab to roll out a particular feature a little bit sooner so we can use it if it is really
critical for a particular project. [...] If it is a feature that is not at all on their road map, then they in theory might do it for pay but in practice they won’t because they are totally busy. But usually it is something they wanted to do. It is a matter of just moving it up to be done sooner” (Sibley, 13/10/06, p. 12).

Other interviewees reported not to have benefited from such a form of ‘favouritism’. An explanation may be related to the size of the project (that is, money), or, more likely, to the tremendous growth the platform experienced alongside the recognition of professional standards of running a business like Linden Lab. In particular, when technical aspects fail and Linden Lab does not prioritize the issue, this dependency of mod developers on the developer firm becomes very apparent. For example, Garrett explained that his client-facing and paid-for project ‘Swissopolis’ was extremely delayed because he found no immediate response and/or action by Linden Lab regarding several technical issues such as developing the largest terra form ever attempted in-world, namely the Matterhorn at Second Life scale. It was built as part of a highly trafficked set of islands with embedded premium first life brands rather than concentrating on a single brand. It would have been a first if the project had received a more adequate response from Linden Lab which would have prevented rising costs (and delay in income) that directly impacted the labour process. For example, there was no longer enough money to hire skilled builders and scripters for an extensive period of time which would have promised a quicker turn-around in delivering the project. In the mean time, Linden Lab launched Bay City which was built with the same strategy in mind, and now has become a rather strong competitor.
Employers that wish to attract hires for various paid and unpaid jobs, varying from employment arrangements of a more temporary nature to full-time positions, also tend to fish in the Second Life user pond. In so doing, they compete with Linden Lab and many small and large-sized, first and Second Life-based entrepreneurs in search of talented mod developers. Generally, job openings and service offerings tend to be announced in a dedicated section on the Second Life forum, in paid-for advertisements in-world, or by referral such as via in-world groups and friends. Tedd, an open source developer from Norway, joined Second Life to check out its technology and dabble in some business opportunities. He was not interested, however, in learning yet another programming language instead he was interested in the idea of building a Second Life server and via an email list came across a group of like-minded individuals.

“I really started to feel the need of programming again because two weeks without programming must be a record or something [...] So I joined them basically just on the IRC channel asking what they needed help with. [...] And they said that they needed scripting. I had some experience with writing some script engines before so I started on that. [...] And I think within a week or something then they had given me membership in the core group or something because the amount of code that I was delivering was too much to put into the project, so that is the acceptance limit or threshold to accept new members [...]. “ (Tedd, 12/02/08, p. 10-11).
This open source initiative became known as OpenSimulator Project (or, ‘OpenSim’), operating on the Second Life server-side with the aim to make Second Life interoperable with other 3D environments. OpenSim does not accept financial donations (nor pay its contributors), rather it serves as an entity where people can donate, for example, licensing rights so that developers have extended licensing rights for using some tools, making it commercially friendly underlying entrepreneurship.

Similar to Linden Lab’s interest in potential hires, mod employers seek to select the right person for the job not purely based on skills and experience, but also on her/his personality. As employers tend to deal with remote workers they have never met and who, in many cases, are only known by their Second Life name, personality is an important attribute. Garrett explains:

“What I have come the conclusion of, with all these people, the same conclusion they all come to is that what we’re really looking for now is the temperament, the personality. That we can build on. Because if you don’t got that, it doesn’t matter if you have the skills. You can’t be trusted, or you’re not disciplined, you’re not responsible” (Garrett, 5/12/07, p. 91).

Furthermore, user developers do not only use Second Life as their object of work and/or the environment they work in, but the platform also serves as their preferred means of communication with their peers; especially, chat, instant message, and more recently, voice assist them in the organization of work. Second Life also supports the infrastructure of
commercial endeavours allowing users to transfer money via the internal micro payment system. Because of its speed and low cost it is often preferred over Paypal or international bank wire transfers. Another tool provided and employed by Linden Lab is JIRA. The mod developers community uses the client-side of JIRA as a means to report bugs and, to a lesser extent, request features. While it notifies Linden Lab of submitted issues, JIRA also helps the wider mod developers community in communicating other contributors’ interests and issues which may inform mod developers to support entered issues by casting their vote. The type of call and eloquence of discussions may not only make a stronger case to Linden Lab indicating what actions to prioritize but may also lead to opportunities for mod developers to collaborate.

In sum, Linden Lab’s internal organization can be said to reflect the firm’s dedication to user participation in product development. Both Lindens and Second Life users operate ‘entrepreneur-like’, work the same space, use, in many cases, similar tools, and in their activities are part of a collaborative effort to make the firm-hosted 3D platform a better and more enticing place that is adjustable to each person’s liking.

_Mastering Second Life_

First time users of Second Life are introduced and mentored by a built-in functionality that automatically directs newcomers to Orientation Island. It is here where they are introduced and guided through the basic controls and functions of, especially, the avatar. From Orientation Island the newcomer is transferred to a Welcome Area and left to her or his own devices. There are, however, many resources available that can be tapped into that can
assist and enhance the experiences of new Second Life users. Examples of such firm-provided resources include in-world workshops and courses, libraries, knowledge base, wiki portals, videos, blog, and forums. There are also user contributions that mix with Linden-produced ones. For example, one interviewee volunteered to write most of the LSL content for the Second Life wiki and also moderated several of the Second Life forums. In addition, there are various support channels that correspond to specific account types associated with Second Life membership. For example, a premium account holder can access live chat, while fee-based enterprise level support is serviced 24/7 by a so-called concierge team. There are also many user- and third party-provided means of support similar to the firm-hosted ones including blogs, forums, wikis, newspapers, instruction guides, videos and podcasts, books, and sandboxes.

Not only can resources be consulted; generally other users are friendly and are likely to help out. An adult user describes how he sees his mentoring role: “I do scripting mentoring which means I may tell you how to solve your problem, but I won’t solve it for you” (Strife, 4/12/07, p. 9). Consulting with fellow Second Life users seems often to be preferred over Linden Lab’s, to various extents, poorly designed documents and support channels, indicating a situation of interdependence between Linden Lab and its user base. In this context, the survey developed for this study asked respondents to rank their preferred means of communication to find out how to do particular things in Second Life. The results are presented in Table 3. A Kendall’s W Test showed that there was moderate agreement among respondents ranking the items (X2 (4) = 482.435, W = .306, p< .001).
Table 3
Information quest 2: Rank

<table>
<thead>
<tr>
<th>Rank in order of importance</th>
<th>Mean (N= 394)(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask someone you know in-world via IM</td>
<td>1.68</td>
</tr>
<tr>
<td>Ask group in-world</td>
<td>2.84</td>
</tr>
<tr>
<td>Visit an in-world library</td>
<td>2.99</td>
</tr>
<tr>
<td>Ask anyone in-world within visual range via chat</td>
<td>3.45</td>
</tr>
<tr>
<td>Ask a Linden in-world</td>
<td>4.04</td>
</tr>
</tbody>
</table>

Source: Survey on Second Life, N=394.
\(^a\)Values range from 1-5 (Statements, 1=highest; 5=lowest).

Most users work in-world, inside their own project. As a result, most of the development, at least in this sample of users, takes place real-time in-world and, subsequently, it is not unheard of that developers can count on working in front of an audience; hence, a kind of ‘performative mod development’. Skilled developers can rapidly make shapes appear in space, turn, twist, and join them, and change their colour and textures, while moving from abstract to concrete objects and structures. Such performances are, in many cases, sites for apprenticeship.

Sandboxes can fulfil a similar role as they are public spaces where users can indulge in creative endeavours, discuss their work, and meet new people. However, sandboxes are of a temporal character as they are cleared out daily. So if users are interested in pursuing work in-world, buying or renting land becomes necessary. Acquiring land involves familiarizing oneself with various aspects of this mechanism such as tier, number of prims needed, and location. It is not uncommon for users to ‘learn by doing’ and sell off their first land quite rapidly for a more suitable piece that fits their needs better.
Some users are more interested in the technology and the way these applications are used and move towards a 3D Web environment, such as user developers who participate in Viewer mods. Many developers make their code freely available for others to use and mod. In addition, progress and findings are often written down in blog format. Although others can contribute and provide feedback, Viewer modifications tend to be an individual effort (unlike Viewers that are commercially licensed). Open source development such as OpenSim, however, is very much a collaborative practice.

In practice, these developers do not spend much time using the Second Life platform. Rather they collaborate using IRC, mailing lists, and software repositories, thereby differentiating among channels for helping others, for development, and for the core group. Logs and word searches assist in keeping track of certain interests. The software repository functions as the repository for the source code and as a bug tracker where bugs or feature requests can be entered and which, in turn, are assigned to someone (or can be chosen to be worked on). When developers add something new or make changes, they add some comments and an overview of what has been done. This is distributed via IRC and the mailing lists so as to ensure all participants are up to date.

Yet, not all mod developers are granted access to write code to the repository. Newcomers may be granted those privileges when they have proven themselves over time in terms of reliability, technology usage (such as IRC) and delivering good work. Holding the position of core developer for that matter is not guaranteed either. When a core member starts investing less time and energy in contributing work, s/he will be replaced:
“There is a person right now who’s probably more in touch with what’s going on in physics than I am because I’ve been gone for 3 weeks, pretty much. And if I want to come back in, now I have to come back in, to some degree I have to prove myself again. Come back in, fix some of his bugs, and help put some features in that weren’t there. And then they’ll be, “OK, he hasn’t lost it,” you know, “He still knows what he’s talking about” (Dan, 26/11/07, p. 42).

Authority appears to be determined substantially by meritocracy. Some developers are likely to be more specialist, while others are more generalist. In addition, there are also tasks that are more of a supportive nature than writing the actual code such as cleaning up the library repository and maintaining the Web site. These may be executed by the developers but are more likely to be performed by non-programmers as part of the development group (cf. Berdou, 2007). Overall, the mastering of open source development of Second Life appears to involve a rather stringent and distributed review process where skills and contributions are constantly confirmed and reconfirmed so as not to compromise the overall project.

Participation and competition in contention

In contemporary society user participation in development practices seems to point to a kind of ‘talent-led economy’ where ‘work’ and ‘play’ appear to become increasingly blurred suggesting that the organization of work cannot be understood separately from the domestic sphere concerning personal (and social) interests (cf. Küchlich 2005; Postigo 2007; Terranova 2000).
For example, Lee (2007) has shown that ‘creative workers’ in London increasingly have a ‘portfolio career’ stressing a work-leisure flexibility underlying a perpetual entrepreneurial outlook to work where they ‘commodify’ themselves. Deuze, Martin, and Allen (2007: 350) have studied the working lives of ‘gameworkers’ and found that many make substantial sacrifices (particularly concerning working hours and copyright issues) to ‘call themselves game developers.’

User development practices can be attractive sources for the developer firm to benefit from such as in terms of brand creation (e.g. purchasing and incorporating mods) and extension of shelf-life, increased loyalty, innovation, and recruitment. Speaking from a knowledge-based view of the firm, the developer firm can be said to learn by expanding its overall knowledge base guided by a modular design within and across firm boundaries enabling and facilitating different contributions to platform development. Such developments are not only relevant in terms of the actual solution or development, but they also inform Linden Lab about what, for example, really frustrates users about scripting, what can be improved and so forth. Linden interviewees regarded learning about what users are working on as a means to assist Linden Lab to strategize and prioritize work internally. Also, by tapping into the heart of the community Linden Lab has sought to strengthen its firm base by incorporating those users/developers with the passion, skills and drive to make only the best.

Good intentions and mechanisms aside, working with (and learning from a diverse) the user base is not an easy task. Linden Lab has, at times, been incapable to effectively deal with user contributions especially due to a lack of internal human resources resulting in the company
to be a ‘bottleneck’ and which may result in stagnating development and user dissatisfaction and, arguably, increasingly motivate users to ‘do it themselves’ (van der Graaf 2009).

Also, the product character underpinned by the platform can be appreciated for its modular character. Here, within-firm, means that people can work on all the various tasks, upgrade per module or throughout the product life cycle involved in the design process. Across firm boundaries, it can mean that different stakeholders such as licensees and users, can develop content, updates, variants, or completely new product versions to the original product and possibly, the hard/software, rising questions about issues such as the conditions of value alternation and amplification. In fact, valuable ideas and skills can stem from changing firm (or, studio) and platform boundaries, and inflows and outflows of knowledge and development can find their way to the marketplace from either side of these (cf. ‘platform ambiguity’ in Ballon and Van Heesvelde, 2011; ‘proprietary extension’ in Nieborg and van der Graaf, 2008).

In this context, longitudinal research could further examine the conditions under which such organization designs associated with embeddedness are better suited to perform, innovate and compete. Perhaps it can also assist in fixing a reoccurring bug in the business model of ‘one price fits all’ to an optimal pricing service consistent with its modular (and transient) character. Moreover, the investigation of the dynamics of latent power structures and the workings of meritocracy in these organization designs would benefit from further research. Moreover, the organization of work seems to be constantly negotiated and renegotiated as people need to balance their skills and interests with studio-related tasks and needs which draws attention to their operation as gatekeepers of information and value flows between the different stakeholders, and which possibly limits the extent of self-direction.
Conclusion

The 3D software industry has often been considered as exemplar for the organization of a modular design and market highlighting the firm’s overarching business model that can be characterized by a particular kind of outsourcing. In other words, there is a seeming interest in multi-sided platform business models that include also end users that develop for the platform offering a greater potential for (market) growth by harnessing the (entrepreneurial) drive of mod developers to develop for existing or new product and platform (models) underpinning the enabler platform (a so-called ‘modification effect market’). And, contributing developers have this constellation space at their disposal to work in, negotiate with, and reconfigure drawing attention to the generative aspect of the platform.

The developer firm can thus (strategically) access the knowledge outside firm boundaries. Such a multi-sided platform approach highlights a more collaborative set-up on the one hand, while a more competitive one, on the other hand. The relationship between the organization of within-firm resources and external resources suggests the likelihood for multiple centers of development-related activity, competition, and compensation to occur, where the developer firm and mod developers, throughout the course of development life, rub shoulders in different formations moving attention away from the fluidity of firm boundaries to that of platform boundaries. Thus, such ambiguous boundaries (associated with e.g. the reduction of (production) costs and non-linear expansion) seem to indicate a strong entrepreneurial approach towards the organization of work processes that may not only benefit the firm but also contributing users.

It draws attention to the co-evolution of participation and competition to occur. More specifically, it highlights opportunities for competition (and compensation) with the developer
firm, in particular, and the community at large. This may indicate a so-called ‘participation tipping point’ where the developer firm increasingly becomes a client of mod development (van der Graaf 2009). In this view, multiple formations constituted by commercial and non-commercial developers are role-based and temporary because of the perpetual state of development characterizing the 3D platform. As a result, a dynamic relationship between designed and emergent practices is continuously shaped, negotiated, confirmed, and reconfirmed among commercial and non-commercial contributing developers.

The issues described here require a deeper understanding of the multifaceted interplay between platform competition, interoperability and the law as current multi-sided market business models seem to indicate that the converged modalities do not necessarily support to open and competitive markets. By yielding insight into the ways user participation is structured and organized across firm boundaries, however, these findings have, at minimum, provided a deeper understanding of the blending together of social dynamics and commerce as a significant aspect of the emerging knowledge-based economy.

References


1 Overtime, important means to draw users in included granting them intellectual property rights over the things they created; introduction of the Linden Dollar that can be exchanged for US Dollars; and, open sourcing the Second Life Viewer.

2 Studios have a long-term outlook, though the number can fluctuate (such as at the time of planning to open source the Viewer); there tend to be about five such on infrastructure, resident experience.

3 Note that in principle, every user that joins Second Life has the capacity to participate in building, texturing, and scripting the 3D environment, as it is not a prerequisite to own or rent land. In practice however, having access to land is preferred for more dedicated (and permanent) development plans as land ownership permits all sorts of enhancements of the space and, if desired, other users can be invited to participate in modifying land.

4 The 3D modeling tool allows users to build houses, mountains, and so forth that can be shared, moved, copied, and sold. The texture function permits users to generate and apply textures to created objects and the Linden Scripting Language (LSL) can be used to manage and control behavior of in-world objects. For example, if you were to build an ipod you could do the following: first, select the box prim (other prims include cylinder, tube) from the built-in toolkit which can be modified in scale, color, and texture, etc. A sample of Internet radio can be added. And, with the right script, you could make your ipod fly through space. In addition, you can make copies of the ipod freely available or for purchase, and also it can be stored in your inventory or removed from the platform.