Beyond e-business models: the road to virtual worlds

Maria Rosita Cagnina · Michele Poian

Abstract Virtual Worlds (or, VWs) are an intriguing field of research. In particular, VWs appear to create new opportunities for integrating the business of the firm with Information Technology (or, IT). This article is a first attempt to address the topic of how owning and maintaining a VW can impact on the business models of firms and on the literature on business models, and VWs are examined in order to understand the relationship between them. A qualitative methodology is proposed to sketch a radar map framework, which is able to identify value drivers and the subsequent impact on elements of value proposition. Although they need to be tested and verified, the findings provided in this work might offer support for firms looking to VWs as a new way to implement a winning business model. Finally, suggestions for empowering future research are proposed and examined.

Keywords Business model · Virtual worlds · Drivers of value · Qualitative approach · Radar map

1 Introduction

In the last five-years, the Internet has radically changed. Such a pattern cannot pass unnoticed, since both academic and business worlds have shown great interest in such changes. Indeed, whilst the suppleness and ubiquity of interconnected computational networks have led the Internet to become the standard platform for communication [39], the constant improvement in ICT has shown the way forward to a "new

M.R. Cagnina (✉) · M. Poian
Department of Economics, University of Udine, Via Tomadini 30/a, 33100 Udine, Italy
e-mail: cagnina@uniud.it

M. Poian
e-mail: michele.poian@uniud.it

🖄 Springer

Web". Authors like Tapscott [77] and O'Reilly [57] describe such a shift in terms of "Web 2.0"; in particular, Tapscott and Williams [77] claim that:

> We're all participating in the rise of a global, ubiquitous platform for computation and collaboration that is reshaping nearly every aspect of human affairs. While the old Web was about Web sites, clicks, and "eyeballs," the new Web is about the communities, participation, and peering (p. 19).

Therefore, it makes sense to speak about forms of "Social Software", which put the power of creating, sharing and collaborating with "peers" [10] in the hands of everyone. A large number of platforms embodies these principles; Youtube, Wikipedia, Slideshare, Facebook, Linkedin and many others arose in a relatively short period of time, and each one filled a human need for sociality, which is shared by most Internet users.

The evolution of the Internet has also been characterised by the birth and development of so-called Virtual Worlds (henceforward, VWs). As a matter of fact, many of these digital environments appeared on the web, due to computational advances and growing interconnectedness. Digital environments offer a graphical, three-dimensional representation that simulates the real world, in which users are identified by a digital version of themselves: the avatar [18]. Initially discarded as a sort of ephemeral fashion, VWs have become very popular, attracting the attention of millions of users, who spend remarkable amounts of time and money on them. Pages are replaced by—digital—places.

It can be said that the Social Software/Virtual World combination changes behaviours, patterns of usage and perceptions of a large number of Internet users. Therefore, both Social Software and VWs represent how the Internet is evolving. Quite obviously, firms are worried about how to deal with the challenges posed by the digital environment but at the same time, they cannot ignore the business opportunities that are turning up.

In this article, attention is focused on the spread of VWs, the second thread of Internet evolution. In particular, this work can be seen as a preliminary step in a long-term research project aiming to explore the challenges connected with VWs and the way they are related to business models [2, 3, 6, 7, 14, 15]. Indeed, these relations might lead to a potential shakeout of existing forms of e-business, leading to new models. For instance, some authors [14, 15] have examined the approaches firms adopted to implement their business models within a specific VW, using the *Second Life* case study. Although such a choice might appear limiting, it was justified in view of the unique user-generated nature of *Second Life*, which permitted many companies to join the VW with a relatively small investment. However, these studies did not address the question of which features of VWs can be identified as relevant for business models. This open question is the starting point for our work. Specifically, the aim of the article is to try and understand under what conditions business models that hinge on VWs may find new sources of value. The work may be considered as part of an ongoing research project.

The paper is structured as follows. In the next section business models in the literature will be examined, focusing in particular on e-business. In the third section the objective is to determine the main features of VWs and introduce a brief classification

of them. In the fourth section a case-study methodology will be used to support the results of our study on VWs. We will also draw a graph radar framework to map the salient characteristics of various VW categories. In the last section, we will discuss the major findings of our work, defining the pros and cons of our approach. We will also try to suggest directions that VWs/business models might take in the future.

2 The concept of Business model: a literature review

In recent years, e-business models have been one of the strong points in business and computer science literature [27, 64]. Nevertheless, a standardized and accepted definition of the concept has not yet been given. From time to time, both practitioners and academics have examined the topic of business models from many different perspectives. Gordijn, Osterwalder and Pigneur [32] argue that the notion of "business model" in the literature may refer to:

- *Taxonomies* [70, 79], which distinguish among e-shops, malls, auctions, virtual marketplaces, pay-per-click and so on. Such an approach was used as a launching pad for a thread of research which tried to reconstruct a taxonomy of the main e-business models [47, 68, 69, 83]. This notion led to the identification of a *finite* number of business models;
- *Conceptual models* of the way we do business, in which business models describe a *meta-model* [28, 59] or *a reference model* [35, 47] for a specific industry [41, 44, 53, 69, 73, 87]. This notion resulted in the identification of a potentially *infinite* number of business models [1, 4, 5, 22, 49, 59, 65, 74, 82].

Diversity in the definitions available [47, 50, 83] poses substantial challenges to itemizing the nature and components of a model, as well as to establishing a criterion for distinguishing good models from bad ones. It also leads to confusion in terminology, in so much as business model, strategy, business concept, revenue model, and economic model are used interchangeably. In order to avoid this "melting pot" of definitions, a basic principle can be stated: the business model describes the value creation logic that permeates a company's processes. Osterwalder, Pigneur and Tucci [61] claim that a business model offers a cross-section of a certain number of elements, which are:

- The value that a company offers one or more segments of the market;
- The structure of the company and the partner network that allows a firm to generate and monetize value;
- The relationship with capital, in order to generate profits and sustainable revenue streams.

Therefore, it appears consistent to consider a business model as a tool that arranges components and dynamic relations which create both value for the customer and profit for the company [1].

Moreover, the Internet's rapid growth has led to an increase in the complexity of the business landscape, forcing companies to conceive forms of e-business. As a

general rule, the e-business model that appears in the literature describes organisa-
tions and how they have changed through Internet innovation. Stähler [74] identi-
fies the ways in which Internet business models can support innovation, including:
value innovation (anti-virus software—e.g. Norton); architecture innovation (build-
to-order—e.g. Dell); innovation through coordination (auctions or brokerage—e.g.
eBay); revenue model innovation (targeted advertising—e.g. Google); and revolu-
tionary business model innovation (open source—e.g. Wikipedia). Simply put, the
Internet has compelled firms to integrate off-line and on-line policies. As a result,
new business models have stemmed from dismantling and reformulating companies'
value chains. For instance, it is worth remembering the separation between physical
flows and information flows of products, the birth of new players of intermediation—
infomediaries and metamediaries—and the separation of physical networks from cog-
nitive networks of relationships.

The main result has been that the Internet has enriched the options and the channels
by which companies could access the market. This has led to rethinking traditional
business models, so that they would be able to fit with the specificities of online,
digital space. In addition to pure play business models [68], the competitive arena
saw the birth of hybrid business models, also known as "multi-channel commerce",
"bricks-and-clicks" or "clicks-and-mortar" [85]. Moreover, this process matched the
transformation of the traditional consumer into a hybrid consumer, who was able to
bridge offline and online spaces [12, 80, 83]. Whilst, during the dot.com bubble, many
firms were persuaded that moving all activities online would result in the maximiza-
tion of their competitive advantage, nowadays the same goal is obtained by means
of a combination of web and physical channels. Germane to this trend appears to be
the emergence of the "virtual community" model. Broadly speaking, virtual commu-
nities started out as a spontaneous social phenomenon, but they soon awakened the
interest of businesses. For example, early in 1999 Hagel [34] stated that the virtual
community business model would prevail on the Web. Meanwhile, the diffusion of
Web 2.0 social software [57] and VWs reinforced the strengths of the community-
based model. In fact, interaction, collaboration and knowledge sharing among com-
munity participants became easier and more widespread. Therefore, this evolution of
the Internet suggests that it is reasonable to hypothesize both the hybridization of ex-
isting business models and the development of new models specifically linked to the
characteristics of VWs [3, 6, 7, 54, 84].

The large number of approaches and the differences in methodologies [42] yielded
a patchy framework in the business model literature. Indeed, almost every author de-
velops a different proposal that adheres to a different ontology [2]. Hence, analysing
and understanding what a business model properly represents should require clear and
unambiguous statements. Pateli and Giaglis [64] reviewed the contributions of the
scholars by means of a framework based on six analytical features: definitions, com-
ponents, taxonomies, representations, change methodologies and evaluation models.
The strength of this model lies in the fact that it allows for the comparison of different
approaches and theories. As a result, it has been possible to underline the lack of con-
sensus on a shared definition of business model, due to the fact that the perspectives
embraced by scholars stemmed from heterogeneous, disconnected theoretical fields.
In the same way, Shafer et al. [72] reassembled the components of business models
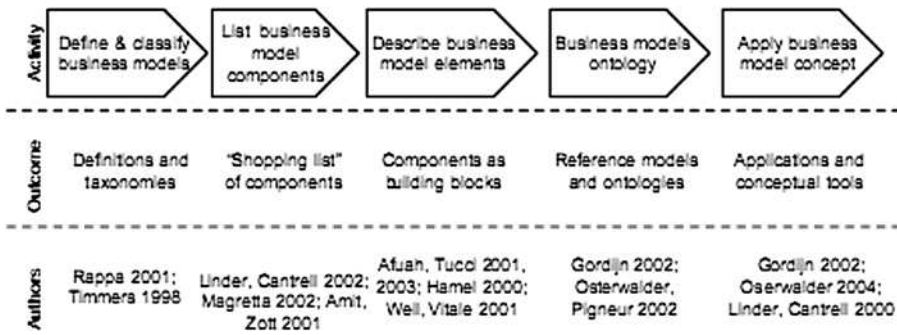
Fig. 1 Evolution of the business model concept towards ontologies and applications [Gordijn, Oster-walder, Pigneur, 2005]

into an affinity diagram which depicted four categories: strategic choices, creating value, capturing value, and the value network. Finally, according to Chesbrough [20], there are six parameters that depict the business model function: value proposition, target market, value chain, revenue mechanism, value network or ecosystem and competitive strategy.

The ways in which business models are represented are also varied. This is due to the fact that business models are usually described by means of a mixture of informal textual, verbal, and ad hoc illustrations. Tapscott et al. [76] used the term "Value Map", which depicted all key classes of participants (partners, customers, suppliers) and value exchanges (tangible and intangible benefits, knowledge); in the same vein, Alves and Roque [2] integrated the concept of business model with the concept of value net, as defined by Parolini [63]—a set of networked groups of activities that can be carried out by different actors; Gordijn and Akkermans [29–31] adopted an e-value ontology that included: actor, value object, value port, value interface, value exchange, value offering, market segment, composite actor, and value activity; Osterwalder and Pigneur [60] conceptualized an "e-Business Model Ontology", which was the formalization of relationships, vocabulary, and semantics of the fundamental elements in the e-business model domain. Finally, Methlie and Pedersen [53] drew a model where revenue system, governance form and strategy interact with the service features.

However, research into the business model is still an ongoing process. The historical changes in approaches and key concepts are described in a recent article by Gordijn, Osterwalder and Pigneur [32]. The authors have suggested a scheme to analyse the evolution of business model research in the literature. The five phases defined below (Fig. 1) show how the focus of authors has shifted from taxonomies to conceptual tools as well as specific business applications.

Although the phases are not in chronological order, the frame is consistent with the way the business model research evolved. Gordijn, Osterwalder and Pigneur [32] affirm:

> During the first phase, when the term business model started to become prominent, a number of authors suggested business model definitions and classifications [77, 79]. In the second phase authors started to complete the definitions

by proposing what elements belong into a [*sic*] business models. At first, these propositions were simple shopping lists, just mentioning the components of a business model [22, 47, 50, 65]. Only in a third phase followed detailed descriptions of these components [1, 35, 82]. In a fourth phase researchers started to model the components conceptually culminating in business model ontologies [28, 59]. In this phase models also started to be more rigorously evaluated or tested. Finally, in the ongoing fifth phase, the reference models are being applied in management and IS applications (p. 2).

Nowadays, the fifth phase has recently taken on greater importance, since the merging between technology and business affects how innovation is implemented in companies [21] and their capacity to gain competitive advantages.

In their work, Pateli and Giaglis [64] highlighted two relevant insights into the ways business model research should look in the future. First, they emphasized the necessity of examining new frameworks and applying fresh methods, in order to avoid an excessive immobility. Academics and managers are progressively recognizing that surviving and flourishing in a high-tech market depends on the capabilities of the firm to modify their business and change the way of creating value. For instance, Afuah and Tucci [1] and Hamel [35] turned their attention to previously unknown factors to measure the potential or the performance of the business model. And secondly, Pateli and Giaglis [64] found that the evaluation criterion domain is perhaps the less mature business model research area:

> The majority of the criteria proposed in the literature are derived from generic theory and are mostly driven by financial indicators (for example, profitability and margins) that are very difficult, if possible at all, to measure ex ante (pp. 343).

On the other hand, we are concerned that finding "better" value indicators will not resolve the problem. The critical point is that taxonomies focus on revenues and not on other sources of value, such as reputation or knowledge. It seems that the definition of what value is perceived to be should receive more attention. In short, does it make sense to speak about value generated for the customer when this is limited to what may be expressed with money? The question is anything but trivial. Since in online contexts people can be both consumers and producers of content [77], the way they assess the value of products might change. Therefore, the business model should evolve in order to explain:

- How companies can access immaterial value, which is difficult to assess;
- How it is possible to involve proactive users in production processes.

New markets in which these questions may find answers are emerging, and we find VWs may be the most fruitful among them.

3 Virtual worlds: towards new e-business forms?

In the 21st century, firms have been forced to find a way to renew their activities, laying the foundation for the rise of *e-commerce, e-business, e-learning* and similar

formulas. In the online competitive landscape the birth of VWs is the new challenge for firms. A large and growing number of Internet users is willing to invest time and money in these online platforms. The intensity of the phenomenon has caught the attention of scholars, practitioners and companies. Many authors [36, 48, 62] have hypothesized that the rise and growth of VWs resembled the Internet in the nineties, from a sophisticated application for computer fanatics to a vital instrument of everyday life. At the same time, it is evident that VWs posed different challenges compared to any other IT application. Indeed, VWs are a special form of media. Since the medium is the message [52], VWs create value by means of an appropriate "language". Therefore, VWs cannot be conceived as traditional e-business platforms [10, 14, 56, 71]. When VWs are platforms able to favour the creation of new forms of business model, the VW features and specifications should be carefully examined.

The clear identification of what VWs actually are is linked to the evolution of computer and web-based applications. Indeed, the forerunners of VWs were the MUDs—Multi-User Dungeon, or Domain—which were created in 1978 by Richard Bartle and Roy Trubshaw [43].

The crossover between original MUDs and computer games allowed a different kind of human-machine interaction, as digital images have progressively replaced words and led to a visual-based dimension of digital space [23]. The dramatic evolution of computer capabilities has reinforced the shift from words to images and it has also promoted the change in interfaces. As a result, digital environments have become increasingly detailed and realistic, and the patterns of interaction resulted in being more complex. The result was the birth of the so-called MMOGs in the nineties—Massive Multiplayer Online Games [26, 51, 88]—namely computer games which exported the playability through the software over the net, changing the meaning of playing [8, 78].

Although the link between VWs and MMOGs is extremely close, the former is not a simple replica of the latter. Distinguishing one from the other is important, because of the way their structures affect the users' perception. In this sense, videogames have no-neutral structures, since software developers control almost every feature of the platform. To some degree, it might be reasonable to consider MMOGs as a subset of VWs. In order to define areas of overlap, as well as characteristics of differentiation between VWs and MMOGs, the contribution of a certain number of authors has been examined. Manninen and Kujanpää [51] outlined the founding characteristics of MMOGs as:

- The world has underlying, automated rules that enable players to carry out changes to it.
- Players represent individuals in the VW. This is their character and all interaction with the world and other players is channelled through characters.
- Interaction with the world takes place in real time. When you do something in the world, you can expect feedback almost immediately.
- The world is shared, so there are other participants that act and play in the virtual world.

As a result, MMOGs are at least to some degree persistent, constantly up and running. On the other hand, these principles are not in contrast with those defined by Edward

Castronova, the so-called father of the virtual economy. Indeed, Castronova stated [17–19] that VWs are three-dimensional, digital environments in which a great number of people interact with each other by means of an avatar—a digital representation of the self. The founding features of VWs are:

- *Interactivity*: it exists on one computer but can be accessed remotely (i.e. by an Internet connection) and simultaneously by a large number of people, with the command inputs of one person affecting the command results of other people.
- *Physicality*: people access the program through an interface that simulates a first-person physical environment on their computer screen; the environment is generally ruled by the natural laws of Earth and is characterized by scarcity of resources.
- *Persistence*: the program continues to run whether anyone is using it or not; it memorizes the location of people and items, as well as the ownership of objects.

These areas of overlap emphasize the difficulty in setting a clear boundary between MMOGs and VWs. Such a situation is a consequence of the merging of technological and social features that can hardly be separated [14, 40, 75]. A useful, though partial, classification is based on different degrees of how player experience is structured. MMOGs are sold as packaged goods bundled with a gaming service platform: digital content is pre-developed by a professional team, which also determines the system of rewards and, thus, the achievements the player can have access to [26, 33, 51]. In contrast, VWs are loosely defined: the developer deals mainly with assuring the optimization, fixing software bugs, creating a digital space for the needs of the community of users and the maintenance of the service. Furthermore, the in-world system of rewards is usually determined by VW users and not by developers. Dougherty and Lastowka [25] built their classification on a similar theoretical background, as they distinguish between **Game Worlds**, like *World of Warcraft, Everquest, City of Heroes, Pirates of the Burning Sea*—gameplay based on achievement, predetermined player's task, traditional revenue models, content creation processes performed only by developers—**Social Worlds**, like *There.com, Habbo Hotel, Whyville*—gameplay based on socializing, player's task partially pre-determined, revenue model based on advertising and/or sales of virtual properties, customization of content (and not creation) performed by users—and **User-Generated Worlds**, like *Second Life, Multiverse, Active Worlds*—mixed gameplay, player's task self-determined, content creation processes activated by the users. However, it should be pointed out that this is a flexible classification, as even in this case different VWs tend to overlap and share common characteristics by their very nature. Far from being a limitation, we consider overlapping a resource, as it confirms that VWs are a type of Internet-based tool flexible enough to be customized by firms attending to their own needs.

To a certain degree, the core distinction between MMOGs and VWs should be found in the different processes of sense-making [81] that take place: in MMOGs, such a process is centralized, as it is built upon a developer's vision; in VWs it is decentralized, seeing that it is built upon a social construct [11] determined by a community of users. Cagnina and Poian [15] drew a framework (Fig. 2) able to explain such a social construction.

Looking at the frame on the vertical dimension, technology—the set of structural conditions that defines the characteristics of digital interactions—and the content
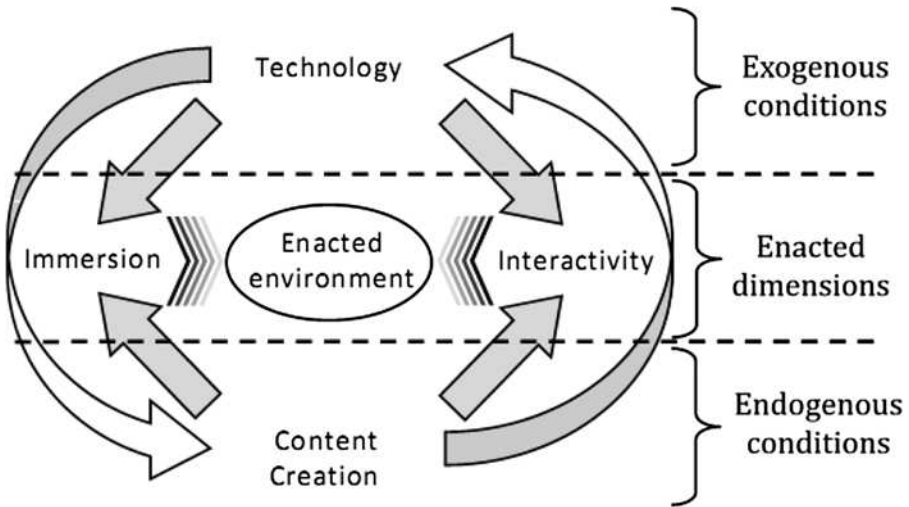
Fig. 2 A framework for VWs. The enactment of the environment [Cagnina, Poian, 2007]

creation—the way users manipulate the technology in order to satisfy their needs—are the conditions *sine qua non*: VWs cannot exist without them [15]. Although they are separated dimensions they are connected by feedback mechanisms, since the changes in technology lay the foundation for new production of content, and consequently, new content nurtures the demand for new advances. It should be noted that within the creation of content not only the activities carried out *within* the VW, but also those carried out *from* the real world *to* VW must be considered [2, 33, 37, 45]. On the horizontal level, two meaningful analytical dimensions are claimed to exist:

- *Interactivity* deals with all the actions, processes and feedback that are set up between users, hardware and software. Indeed, interaction can be defined as one of the most important and distinguishing technical characteristics of the aforementioned social media. In particular, the design and functionalities embedded in interfaces influence learning-by-doing processes and skills acquisition, which are the foundation for the phenomenon of User-Generated Content [46, 55, 80]. Therefore, the process is both social and technological.
- *Immersion* refers both to a technological [13, 38] and social [16] meaning. The latter refers to the process of involvement and the motivation experienced by the users, whilst from the technological side, immersion can be seen as a "*sensory immersion that had a positive impact on telepresence and on brand attitude, self-reported product knowledge and on purchase intention*" (40, p. 9).

The process leads to the enactment of the environment [58, 81], that is to say, an environment in which the experiences of the users, in terms of interactivity and immersion, affects and, at the same time, is affected by the dynamic process of sense-making. As a matter of fact, VWs embed editing programs that make it possible to create 3D digital objects, to modify the scripting language or even to embed digital content, videos or music, which is enjoyable in streaming.

4 Defining business models through VWs

The concept of business models emerged in the nineties due to the diffusion of IT and the boom of the Internet. In the industrial age, the primacy of production and the search for efficient assembly lines affected even academic thought. Tools and theoretical frameworks such as the value chain [66] and the five forces framework [67] filled the need for understanding the industrial context. The technological advances, represented by the spread of IT, and by the maturity reached by the Internet, dramatically changed such a scenario. Features such as the stability of the environment and the sequentialization of processes are no longer feasible in a context in which technology drives firms towards competitive advantages that relate to flexibility, global thinking and dematerialization [63].

As stated in the second section, the business model literature entered a phase of evolution when companies tried to manage and integrate the technological changes into business proposals. In particular, the exploitation of online potentialities led to the identification of the so-called e-business models, in which the business arrived on the Web. However, since the pace of technological development differs from business adaptation, the former produces changes that are not immediately understood and acknowledged by the latter. This occurred during the dot.com bubble in the nineties, but it is occurring nowadays in the transition phase from Web 1.0 to Web 2.0 [57, 80], and it will continue at a growing pace for VWs.

As noted by Pateli and Giaglis [64], new ways of evaluating business models are needed. The focus on financial flows is limited and sometimes produces a distorted evaluation of firms' efforts. Weill and Vitale [82] remarked that e-business should leverage on firm's intangible assets, which are recognized as ongoing business processes, customer perceptions, and IT infrastructure, whilst Chesbrough [21] and Dahlander and Wallin [24] highlighted the importance of communities as complementary assets to activate innovation processes. In the same way, Benkler [10] claimed that "commons-based peer production processes" have emerged, namely processes in which mass participation in projects cannot be explained by the direct presence of monetary return. Nonetheless, peer-based, collective approaches can be applied most effectively to create information, knowledge, and cultural content. The sharing of knowledge, awareness, reputation, relationships, loyalty, customers skills are factors that are more and more important for firms [80]. The problem is twofold: to recognize new, previously untapped sources of value; and to find how they yield value for the firm. Such a problem has been studied for community-based business models, in which the benefits granted by increased coordination and collaboration translate into cost savings and increased revenues only in the long-term [46]; that is to say, the business model factors that affect a firm's success in its early stages change at a more established stage [48]. As a result, the ability to drive conversion and participation, as well as the capability to integrate customers in companies' value chains, is crucial [34, 85].

The rise of VWs in the business model playground is significant. Many authors [17, 26, 40, 48, 56, 88] have emphasized the nature of the interaction enabled by VWs, which is claimed to deliver more engaging and intense experiences to final users. Therefore, it seems valuable to use the engagement generated by a VW to commit users on the business model of the firm. A few important hints are:

- VWs embody a community: the aggregation of users into communities is a typical trait of VWs, which originates from their interactive nature [10, 17, 51, 78]. As a consequence, VWs embody the same advantages as business models based on communities, for instance in terms of learning processes [56] or the production and sharing of digital content [48], and at the same time, they offer firms a powerful platform to interact with.
- VWs create a system of micropayment: the existence of a marketplace and a virtual currency makes it possible to create an easy way to implement a micropayment system [76], which is the basis for some sort of premium services, like the Freemium business model [70]. Virtual items are graphical metaphors for packaging behaviours that people are already practising [37]; as a consequence, people are ready to give them real value [33, 45, 84].
- VWs fulfil the desire of users for identity: when they surf the net, most people do not use their faces or real names, but create a different identity, by using a nickname and an avatar [8, 10, 17, 18, 78]. Therefore, VW participants can perform a process of "avatarization", in which they can construct a digital identity that may be either the same or totally different from the real identity [14, 15]. Such a process reinforces people's commitment to creating a digital identity [8, 83], which can give more information on users' interests.

These aspects may be used and combined to reinforce the business proposal of the company. For example, firms can use VWs to reinforce their brand awareness and presence, as in *Second Life*, where numerous companies own islands, or the replica of MTV shows in a VW; on the other hand, many opportunities still remain untapped. For example, after the initial scepticism, IBM launched a complex program that aimed to reach an interoperability between internet applications and digital worlds; in doing this, the ICT company collaborated with both Linden Lab (the owner of *Second Life*) and *Hipihi* (the Chinese counterpart): from forms of e-collaboration and e-learning, we are moving towards v-collaboration and v-learning, where the letter *v* stands for *virtual*.

In such a scenario, our aim is to provide a tool to make order within various VWs. Our basic assumption is that the variety of available VWs implies that when a firm plans to exploit a VW to implement a business model, it must choose the VW that best suits its own needs: that is to say, different VWs do not suit a business model in the same manner. In particular, we are concerned with the problem of defining some mapping criteria for VWs, in order to identify significant sources of differentiation.

5 A qualitative approach for mapping VWs

The previous section addressed the open question of the relevance of VWs for the creation of new forms of business model. Various authors [7, 14, 15, 33, 36, 54, 84] have turned their attention to understanding how firms may innovate their business models *joining* a VW owned by a third part company. Unlike them, this work is aimed at addressing another part of the problem: how firms may advance their business models developing and *running* a proprietary platform. Creating a VW suitable for a business

proposal may be very difficult. As a matter of fact, the heterogeneity of digital environments emphasized in previous sections has impeded the creation of taxonomies and ontologies that helped to shape the business model landscape. Therefore, the goal of this work is to create an analytical framework able to highlight the main drivers of potential value which are not usually considered by business models. That is to say, the attention is on those sources of value that companies fail to explain, due to the disproportionate attention given to short-term financial flows [48].

The research has its roots in qualitative methodology. We have collected information through external observation and case studies. As a distinctive subject of research, it seemed appropriate to collect data and information available on the Internet. In particular, we obtained data from VW sites, which are usually run by the developer/publisher, and fan sites—forums, blogs, wikis and so on. The information collected permitted us to gather evidence on a number of different VWs, which are shown in Table 1.

In order to better understand the characteristics of each world we have indicated in the columns:

• Name of the VW.
• Type (based on the classification adopted by Dougherty and Lastowka [25]).
• Targeted audience.
• Type of avatar—custom, when the changes relate only to aesthetic embellishments, such as dresses; modifiable, when avatars have skills or characteristics that can be modified, such as strengths or power.
• Free content creation—the level of content creation the VW's owner grants to final users.
• Revenue model.

Moreover, we also examined selected academic publications, in order to compare and check the adequacy of our approach. The main reason that led us to prefer a fully qualitative approach rather than a quantitative one lies in the fact that VWs are difficult to encapsulate in a quantitative framework, due to the great variety and the areas of overlap among VWs.

Identifying the proper drivers of value a business model should aim at and improving the understanding of how value can be generated and managed are relevant topics for the research. Accordingly, it is necessary to be aware of the perceptions and behaviour of players, as well as of the goals and choices performed by firms. Whilst some authors have actually looked at these topics separately, we propose an approach that is able to join them.

As far as the insights connected to the playing experience are concerned, there are a certain number of valuable studies of players' behaviour in VWs [33, 45, 86]. The most complete of these is the study of VWs conducted by Nick Yee [86]. The long-term research project of this author produced relevant findings, in particular about the motivations of players. Moving from the limits of the so-called Bartle test [9], Yee created one of the first frameworks able to fully explain players' behaviour [86]. In this original test, Richard Bartle divided players into Achievers—players that give themselves game-related goals, and vigorously set out to achieve them, Explorers—players that try to find out as much as they can about the VW, Socializers—players

Table 1 Characteristics of VWs. A preliminary categorisation

Virtual world	Type	Use	Type of avatar	Free content creation	Revenue model
Active Worlds	User-generated	Everyone	Custom	Yes	Free access, subscription fee
Barbie Girls	Social	Young girls	Custom	No	Free access, Selling Items
City of Heroes	Game	Everyone	Modifiable	No	Packaged software, Subscription fee
Club Penguin	Social	Kids	Custom	No	Free access, subscription fee
Entropia Universe	Game/User-generated	Everyone	Custom	Partial	Free access, Pay per item
Eve online	Game/User-generated	Everyone	Custom	Partial	Subscription fee
Everquest	Game	Everyone	Modifiable	No	Packaged software, Subscription fee
Forterra Systems	Game	Business	Not modifiable	Partial	Contract
Gaia Online	Game/social	Everyone	Custom	No	Free
Habbo Hotel	Social	Kids	Custom	No	Free access, Pay per item
Kaneva	Social	Everyone	Custom	No	Free access, Pay per item
Multiverse	User-generated	Everyone	Custom	Yes	Contract
Neopets	Game/Social	Everyone	Custom	No	Free access, Subscription fee
Pirates of the burning sea	Game	Everyone	Not Modifiable	Partial	Packaged Software, Subscription fee
Second Life	User-generated	Adults only	Modifiable	Yes	Free access, premium accounts
The Sims Online	Social/game	Everyone	Custom	No	Packaged software, Subscription fee
There	Social	Everyone	Custom	Partial	Free access, subscription fee
Ultima Online	Game	Everyone	Modifiable	No	Packaged software, Subscription fee
vMTV	Social	Everyone	Custom	No	Free
War of Warcraft	Game	Everyone	Modifiable	No	Packaged software, subscription fee
Whyville	Social	Kids	Custom	Yes	Free, Pay per item

that use the game's communicative facilities, and Killers—players that use the tools provided by the game to cause distress to other players [9]. Extending the concept, Yee obtained and tested a more complex set of relations, which may be aggregated

Table 2 Motivational components of play in MMOGs [Yee, 2005]

Achievement	Social	Immersion
Advancement	**Socializing**	**Discovery**
Progress, Power, Accumulation, Status	Casual Chat, Helping Others, Making Friends	Exploration, Lore, Finding Hidden Things
Mechanics	**Relationship**	**Role-Playing**
Numbers, Optimization, Templating, Analysis	Personal, Self-Disclosure, Find and Give Support	Story Line, Character History, Roles, Fantasy
Competition	**Teamwork**	**Customization**
Challenging Others, Provocation, Domination	Collaboration, Groups, Group Achievements	Appearances, Accessories, Style, Colour Schemes
		Escapism
		Relax, Escape from RL, Avoid RL Problems

in 10 main components and grouped into 3 classes. Yee's findings are summarized in Table 2.

This division is very useful, but for our purposes, it explains only part of the issue. Indeed, not every kind of VW is characterised by the predominance of play; as a consequence, the risk of inferring misleading analytical drivers is real. Moreover, the perception of players may be in contrast with the goals and needs of the firms that own and develop a VW.

A more firm-centric picture is offered by Arakaji and Lang [6]. In their work, the authors explored how firms can determine effective innovation strategies for designing and building VW environments. The authors [6] pointed out that "*peer-based social production models challenge the traditional proprietary business paradigm by leveraging new technology-enabled organizational forms*" (p. 34). These could be seen as different ways of designing VWs, whereas the gap between totally closed—totally open VWs is filled by hybrid models. Some of them favoured proprietary ownership by appropriating most of the value that is generated by the user network, whilst the rest favoured collective ownership by sharing most of the added value with the community of users. In order to evaluate the opening, Arakaji and Lang [6] proposed that firms should take into account eight key factors, which are:

- Investment Risk.
- Development Risk.
- Coordination Risk.
- Motivation Risk.
- Control Risk.
- Security Risk.
- Governance Risk.
- Culture Risk.

The authors highlighted how a suitable strategy of VW design may mix elements of both open and closed models, depending on how each choice interacts with the aforementioned factors. Consequently, the effectiveness of the design choice could

be evaluated on the basis of the coherence between firms' goals and key factors. On the other hand, such a perspective failed to take into account the factors that may affect the commitment and engagement of the VW's participants.

In our work, we try to identify which drivers a firm should manage to create a successful business model, recognizing the need to bridge approaches that focus on users and approaches that focus on firms. When looking at understanding how to develop a VW, we have to take care of the dimensions that yield value to both users and developers. Since we are interested in bridging what drives players and developers, the approaches of Yee [86] and Arakaji and Lang [6] have been reframed. Therefore, we need to understand how the choices of implementing both developer-driven and user-driven environments may bias the value proposition carried on by the VW. Thus, we propose a framework that represents what drives the process of VW creation. Six main drivers of value are identified and described as follows:

- *Achievement*—this refers to the structure of goals users can (or have to) pursue during the in-world experience. The freedom of defining a structure of goals is biased by the choices of development design. Usually, the achievement is the stronger push in playful games, since the goals are clearly defined, starting from the structural decision imposed by the developer, whilst they can be loosely defined in social games and user-generated environments. For example, the gameplay based on fights PvP—player vs. player—or PvE—player vs. environment—and avatar power-levelling is a typical trait of MMOGs, and characterises the experience of players. On the other hand, players can determine for themselves the set of goals within the VW; this typically happens when users have the capability of (even partially) creating content, as in *Second Life, Active Worlds, Entropia Universe* or *Eve Online*. Within the business model, the issues posed by the structure of achievements are important to articulate a valid and proper playing experience, so we derive the first hypothesis:

    Hypothesis 1: the playing experience is positively affected by the achievement driver

- *Control*—this aspect refers to the implementation of forms and mechanisms of intervention, controlling and monitoring the behaviour of the users. Typically, in proprietary, gaming-based VWs like *World of Warcraft* or *City of Heroes*, this aspect is firmly in the hands of developers, who are unwilling to cope with unplanned situations. Indeed, in many social VWs too, the respect for guidelines of netiquette is fundamental, in particular when kids are involved. For example, the developer of *Habbo Hotel*, Sulake Corporation, implements a system that enables active moderation, user education and automatic language filtering. On the other hand, it is common for users to manage this important feature, as in *Second Life* or *Multiverse*. Therefore, the control driver makes it possible to deliver thrust and confidence. Within the business model, the issues posed by the controlling and monitoring are important to observe how users perceive and approve a company's governance, so we obtain the second hypothesis:

    Hypothesis 2: the VW governance is positively affected by the control driver

- *Creativity*—the creativity driver refers to the availability of instruments that permit final users to develop content related to the VW. It is possible to distinguish between *in-world content*, which refers to any of the digital items in the VW, and *out-world content*, which refers to all the content that relates to the VW but that can be accessed without connecting into it. In user-generated content VWs, in-world content is critical, since users, who have access to specific, user-dedicated development tools distributed for free, are the main developers of the world. On the other hand, creativity is fundamental for every VW, since the production of out-world content, such as blogs, photos and forums, nurtures the growth of the community. When content is created by users, developers' commitment is lower and cost savings can be obtained, for instance, when the digital environment is co-developed by users (reduction of development costs) or when users create their own communities and forums (reduction of post-sales costs). Within the business model, the issues posed by the level of creativity are important to integrate VW users into the company's value chain, so we obtained the third hypothesis:

    Hypothesis 3: the integration of users in a company's value chain is positively affected by the creativity driver

- *Sociality*—The sociality driver refers to the availability of tools and channels through which social relationships are established with other people. Many VWs offer a function of chat, ranging from MMOGs like *Everquest* to social worlds like *Whyville*, and recently, the VoIP—Voice over Internet Protocol—functions have been integrated. The types of social exchange can be varied, and they are not limited by geographical boundaries. VWs make it possible to integrate several forms of socialization, thanks to the sharing of experiences. For instance, meetings and forms of collaboration can be held on VWs: companies like IBM and Intel already do this, exploiting the possibilities offered by *Second Life*. Within the business model, the issues posed by socialization are important to establish and evaluate the relational capital created through the VW, so we derive the fourth hypothesis:

    Hypothesis 4: the relational capital is positively affected by the sociality driver

- *Realism*—the driver of realism deals with the capacity of the VW to create real value for users. When a digital environment is "real", users are willing to join and be members of it. It is important to note that "realism" must be correctly understood. Indeed, realism cannot be conceived as strict adherence to the real world—such a concept would be meaningless, since every VW with a fantasy background would be excluded. Rather, the notion of realism adopted here refers to the fact that the characteristics implemented in the platform, such as background, graphic style, pattern of interaction, must be coherent in respect to the users' experience. Simply put, elements such as the respect for physical laws, the abundance of graphic detail, the respect for historical context or the alignment with a set of cultural aspects reinforce users' involvement. For example, *Pirates of the Burning Sea* is a MMOG that allows players to live the experience of sailing in the Caribbean seas during the historical period of piracy, playing as a British, French or Spanish national commander or a buccaneer. Within the business model, the issues posed by a real digital environment are important in creating the conditions to reinforce the sense of immersion in the VW, so we derive the fifth hypothesis:

Hypothesis 5: the sense of immersion is positively affected by the realism driver

- *Membership*—Finally, the membership driver is presented. Membership deals with the sense of being a part of a community. In VWs, membership reinforces the sense of being immersed in a community, thanks to both the close interaction between people and social relationships and the organization of in-world events. Furthermore, membership favours e-learning, as witnessed by the VWs created for specific business activities, such as *Multiverse* and the programs of *Forterra Systems*. Within the business model, the issues posed by membership are important in creating loyalty and commitment among users, and in finding new ways of communication as well; so we obtained the sixth hypothesis:

  Hypothesis 6: loyalty and commitment are positively affected by the membership driver

Although a unique relationship between drivers of value and areas of value creation is claimed, it is fundamental to point out that the reality is more complex, since each driver may affect multiple areas. For instance, sociality is a factor that impacts on immersion and playing experience, whilst membership affects the creation of social capital. Therefore, the framework simply predicts which is the more significant relation between a specific driver and potential areas of value creation. The topic of understanding every relation that links drivers of value to areas of value creation will be discussed in the last section.

The second step we took was to establish a range of values for each value driver. A range of values between 0 and 10 has been hypothesized, on the basis of the observation we collected from web sites, blogs, forums and communities. A value close to ten means strong commitment to managing the driver, while users are marginally involved in it. A value close to one means little commitment of the developer to the driver, which is managed by users. A medium value indicates a hybrid form, one in which developers and users adopt some forms of collaboration. Finally, when the value reaches zero, it means that neither developers nor users are committed to controlling the driver; thus, its impact cannot be controlled. The final step has been to create a graph radar map for a series of significant VW cases. Such a process implies a certain degree of subjective evaluation in order to design the framework. Whilst this choice appears to be consistent with the process we follow, it implies that any general principle must be weighed up very carefully.

Below are reported the radar maps of six VW cases (Figs. 3, 4, 5, 6, 7, 8).

These samples include the most well-known types of VWs: user-generated worlds, social worlds, serious games and MMOGs. User-generated worlds are represented by *Second Life*, the most famous among these types of platform. *Habbo Hotel*, run by Sulake Ltd, which can rely on a monthly basis of 9.5 million active subscribers (updated in Sept 2008), and *vMTV*, which is held by the well-known MTV broadcast, are successful social worlds. *Forterra Systems* is a society that specialized in offering VWs structured as serious games, which are used to train employees, simulating hospital situations or simulating critical situations and so on; finally, there are MMOGs such as *World of Warcraft*, the planetarium phenomenon that peaked at more than 10 million paying subscribers in January 2008, and *Eve Online*, an original Sci-Fi-based MMOG that enables a complex eco-socio-political system of in-world governance.
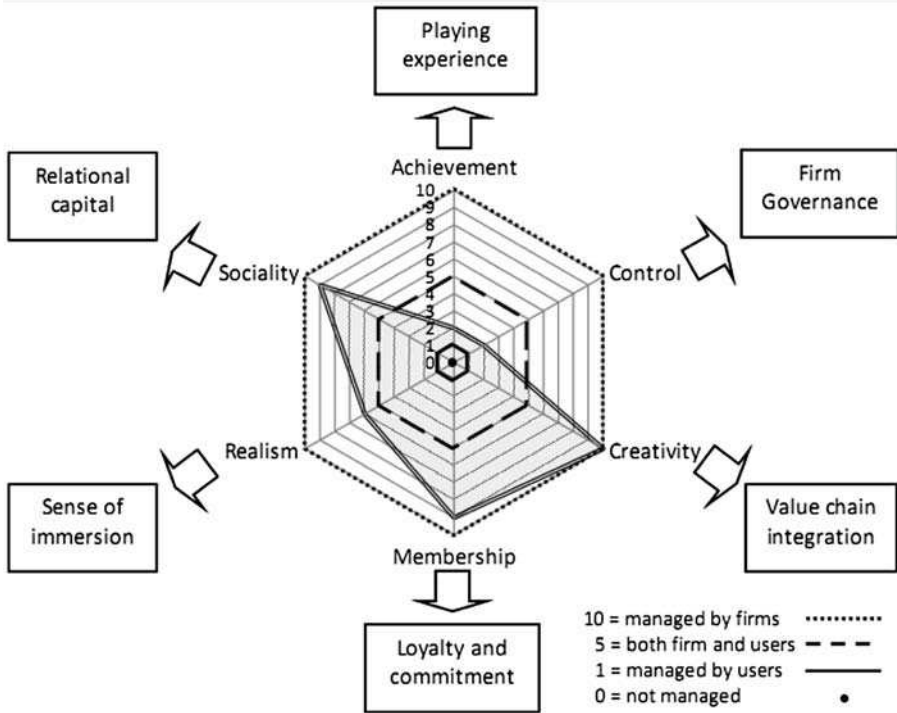
Fig. 3 Second life Graph radar map

With our approach, radar maps can be compared in order to unveil differences and analogies among VWs. As expected, there are no identical frames, because VWs are very different from one another. Below we report some significant findings about the frameworks.

- *Impoverished development.* In the case of a user-generated world (Fig. 4), the focus on creativity, sociality and membership comes at the expense of achievement and control. The design choice made it possible to outsource the development phase to users, in accordance with the attention paid to membership and sociality: people invest time in improving their skills, reinforcing their loyalty and commitment, sharing their results with other members. Lack of concern about achievement and control yields poor playing experience and anarchic development of the world. These aspects explain, for instance, why in *Second Life* a high churn rate coexists with a community of very active users.
- *Difficulty in integrating users.* It seems there is a trade-off between control and creativity (Figs. 3, 5, 6, 7). Such an incompatibility derives from the juxtaposition between how to improve the offering and how to let users customize and modify it. The latter may be insufficient in supporting the former, creating poor experiences. Probably, this occurrence depends on the fact that the management of this trade-off requires the development of technical and managerial competences. When not dealt with efficiently, such a mismatch reflects an excessively rigid struc-
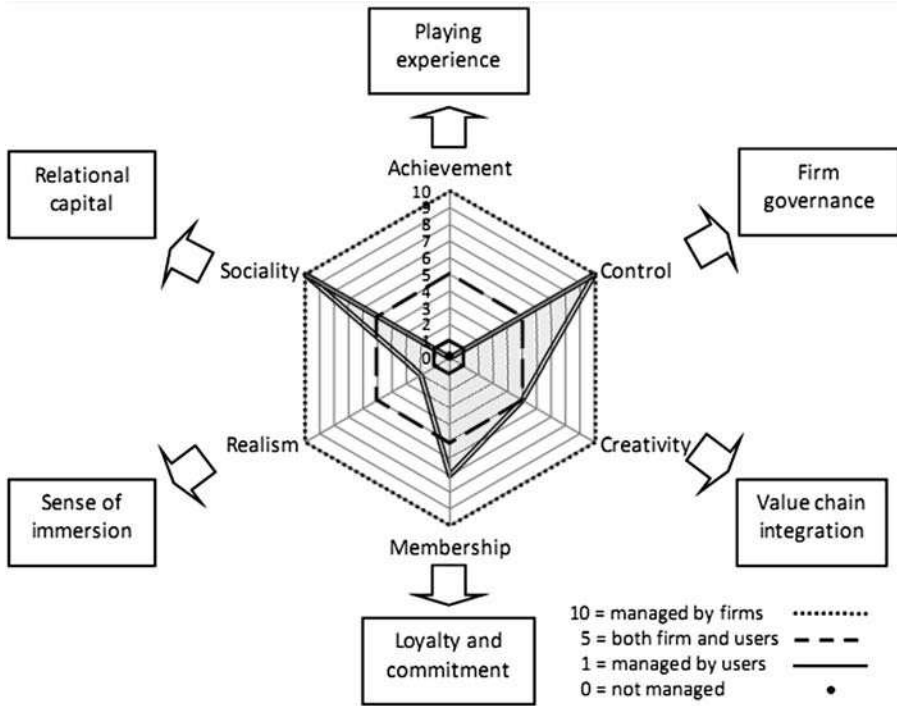
Fig. 4 Habbo Hotel Graph radar map

ture of governance, which hampers the integration of users into the company's value chain. In effect, this is one of the problems that firms are facing nowadays.

- *Specific VWs for specific goals.* When a VW has been created for a specific, well-defined purpose, firms tend to concentrate their efforts on a limited subset of value drivers. For example, in the case of Forterra System products (Fig. 6), the levels of sociability and membership are very low, because they are not functional in respect to the characteristics of the platform and aims of the firm. As a consequence, when the focus is on realism, achievement and control, the playing experience should be developed as a complete training tool. Far from being a limitation, this could suggest VWs are flexible platforms that can support a firm's activities.

In order to maintain analytical coherence, we were concerned to outline the critical points and potential flaws embedded in our approach. Two important criticisms are posed:

- *Lack of generalization.* The methodology we followed led us to define a framework able to show the connections between driver value and sensitive areas. Whilst valuable information can be obtained from the comparison of radar maps, nothing can be said about general rules. Indeed, this research paper is a preliminary step towards an understanding of the relationships between VWs and business models. As a consequence, we have defined several hypotheses for research, but we need
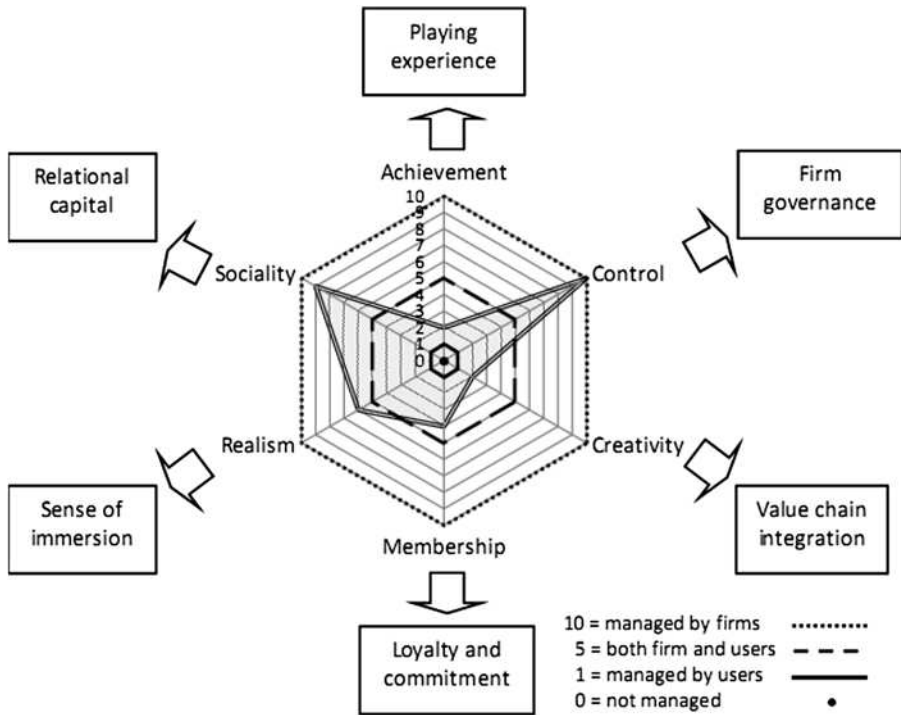
Fig. 5 vMTV Graph radar map

to test them. More data should be collected, in order to enhance the robustness of any findings.

- *Lack of performance measurement.* The radar map framework helps to support the decision-making process performed by the firm, since it identifies drivers of value and the areas in which these drivers have relevant effects. However, nothing can be said about the quality of the relationship. Indeed, the framework does not explain what the best combination of developer/user effort is. Therefore, the values in the framework help us to define how to approach a specific driver—ranging from company-driven vs. user-driven—but it does not measure the efficacy of the performance yielded by the combination of firm/user involvement.

6 Conclusions

VWs are starting to be accepted amongst academics and practitioners, since they enable the convergence of social and technological aspects. Accordingly, we have tried to provide a contribution that is able to shed more light on the evolving relationship between business models and VWs. More specifically, the aim of the paper has been to offer some guidance to firms interested in exploring business opportunities provided by creating a proprietary VW. In particular, we start from the assumption that VWs are platforms that make it possible to identify non-monetary sources of value.
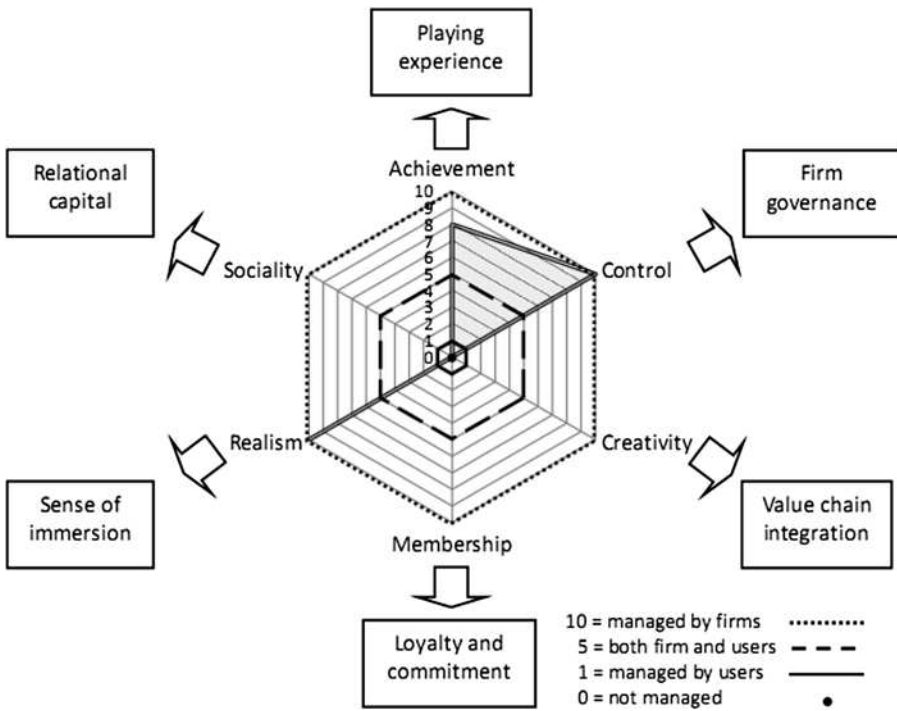
Fig. 6 Forterra Systems Graph radar map

To a certain degree, these assumptions are consistent with the idea that persistent, digital online worlds are driving us towards new business models. We followed a qualitative approach that led us to hypothesize the existence of a set of value drivers, which are claimed to affect in turn the design of a hypothetical business model. Despite the conceptual simplicity, we believe the framework we propose is analytically useful. Firstly, the framework appears to be able to identify untapped sources of value, whereas traditional revenue-centric models lack this ability. Moreover, the framework sees users as being an active part of the process. Nowadays, technological advances have allowed people to become developers of the Internet. Such logic permeates the framework, in view of the fact that the possibility that some value drivers might be managed by users is recognized.

On the other hand, we must note that this work is part of an ongoing research project. We are trying to build a set of instruments that will fill our theoretical toolbox. In keeping with this assumption, we are also aware that preliminary indications provided by this work must be tested. In particular, a research agenda may be structured as follows:

- Enhance our database regarding VWs, through public information and data, by interviewing VW developers and owners, collecting metrics, making on-line surveys.
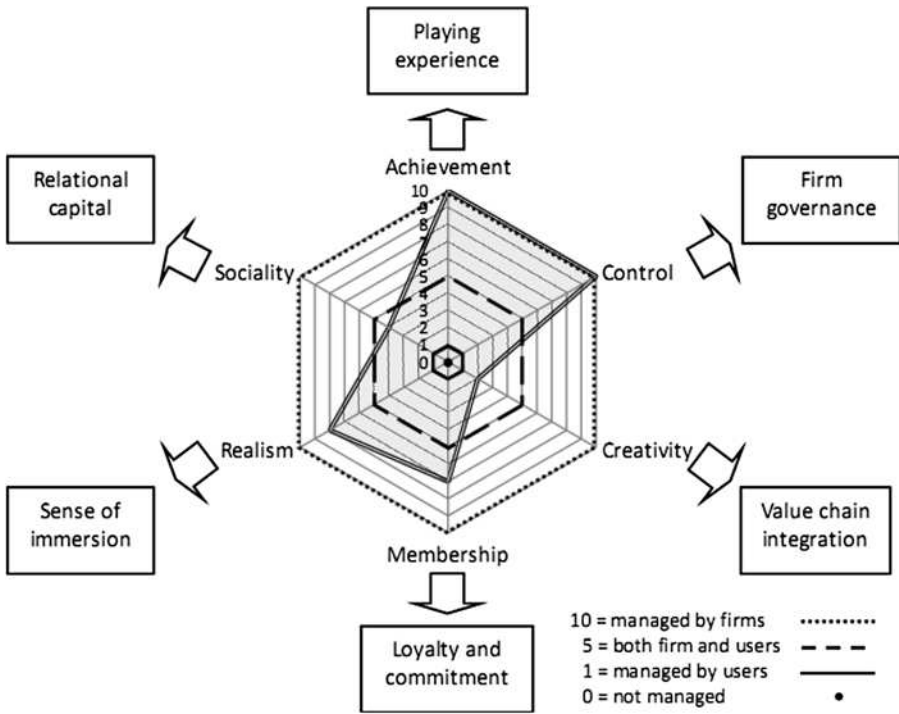
Springer

Fig. 7 World of Warcraft Graph radar map

• Testing our initial assumptions. In particular, we need to verify the significance of the identified drivers of value, as well as the significance of the relation between drivers and impacted areas.
• Finally, we plan to improve the detailed level of the analysis, trying to deconstruct all the relations that exist among value drivers and between value drivers and affected areas. Despite the fact that the framework suggests a single connection—such as achievement and playing experience—it seems more realistic to support the existence of a number of connections. Therefore, mapping the whole set of connections appears to be a reasonable path to follow in order to achieve the complete knowledge of the phenomenon.

Whatever the attention of scholars is, on firms joining an existing VW or developing a proprietary one, future research about the relation between VWs and business models should deal with two relevant topics:

• How the virtual environment fits with the needs and strategies of firms;
• How it is possible to appreciate the impact on collaboration between firms and users on the development of the world.

In regard to the first issue, it must be noted that companies have little knowledge of VWs. Since VWs are linked to a different cultural background—digital entertainment is very far from business activities—the research should help companies to improve their knowledge of digital environments and to find new uses for these technologies
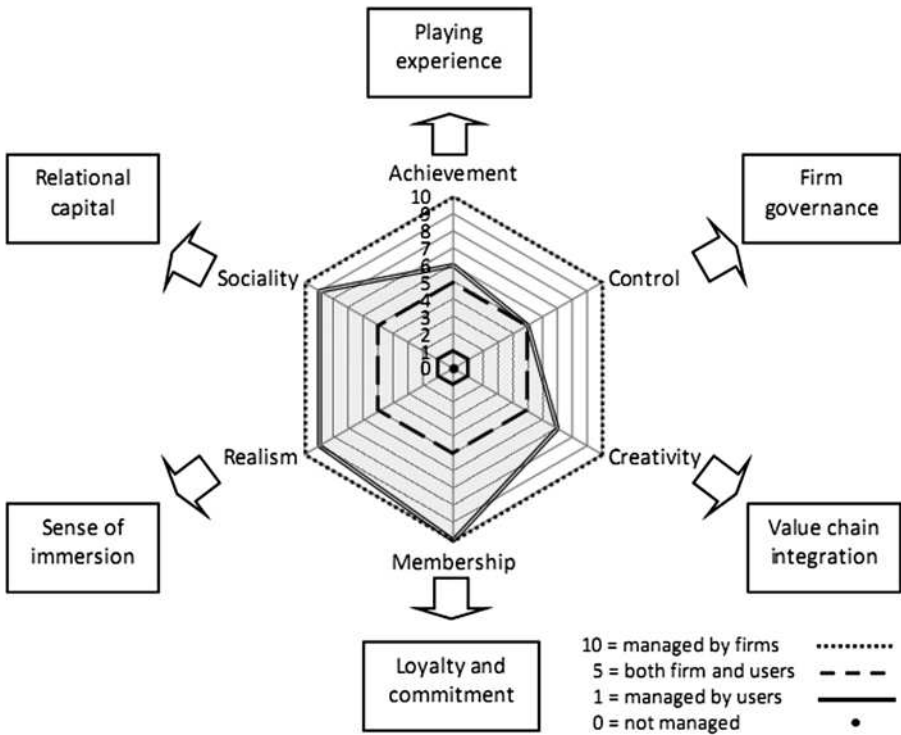
Fig. 8 Eve Online Graph radar map

in their businesses. In line with the second issue, it must be noted that it is now possible to detect if some of the development issues surrounding VWs are dealt with by collaboration between users and professional developers. What is not possible here is to verify what degree of collaboration is *better*. Indeed, we have observed that there are many possible combinations of involvement of users and developers on value drivers, but we are not able to measure the performance of each combination. This is a common flaw of research on business uses of VWs, and research should try to address this open question.

References

1. Afuah, A., & Tucci, C. L. (2003). *Internet business models and strategies* (2nd ed.). Boston: McGraw Hill.
2. Alves, T. R., & Roque, L. (2005). Using value nets to map emerging business models in massively multiplayer online games. *Proceedings of the 9th Pacific Asia Conference on Information Systems, PACIS 2005*, Bangkok, Thailand.
3. Alves, T. R., & Roque, L. (2007). Because players pay: the business model influence on MMOG design. *Proceedings of DIGRA 2007: Situated Play*, Tokyo, Japan.
4. Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, 22(6/7), 493–520.

5. Applegate, L. M. (2001). E-business models: making sense of the Internet business landscape. In W. G. Dickson & G. DeSanctis (Eds.), *Information technology and the future enterprise: New models for managers*. Upper Saddle River: Prentice Hall.

6. Arakaji, Y. R., & Lang, R. K. (2007). The virtual cathedral and the virtual bazaar. *The DATA BASE for Advances in Information Systems*, *38*(4), 33–39.

7. Arakaji, Y. R., & Lang, R. K. (2008). Avatar business value analysis: a method for the evaluation of business value creation in virtual commerce. *Journal of Electronic Commerce Research*, *9*(3), 207–218.

8. Bailenson, J. N., & Beall, A. C. (2006). Transformed social interaction: exploring the Digital Plasticity of Avatars. In R. Schroeder & A.-S. Axelsson (Eds.), *Avatar at work and play*. Dordrecht: Springer.

9. Bartle, R. (1996). Hearts, Clubs, Diamonds, Spades: players who suit MUDs. *Journal of Virtual Environments*. http://www.mud.co.uk/richard/hcds.htm. Accessed 18 September 2008.

10. Benkler, Y. (2006). *The wealth of networks. How social production transforms markets and freedom*. New Haven: Yale University Press.

11. Berger, P., & Luckmann, T. (1966). *The social construction of reality: a treatise in the sociology of knowledge*. New York: Doubleday Garden City.

12. Bridges, E., Goldsmith, R. E., & Hofacker, C. F. (2005). Attracting and retaining online buyers: comparing B2B and B2C customers. In I. Clarke & T. B. Flaherty (Eds.), *Advances in electronic marketing*. London: Idea Group Publishing.

13. Brown, E., & Cairns, P. (2004). The grounded investigation of game immersion. *Conference on human factors in computing systems*, Vienna, Austria.

14. Cagnina, M. R., & Poian, M. (2007a). How to compete in metaverse: the business models in second life. Working paper series in management and organizational studies, n. 01-07, Department of Economics, University of Udine. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1088779. Accessed 18 July 2008.

15. Cagnina, M. R., & Poian, M. (2007b). Second life: a turning point for web 2.0 and e-business? *ITAIS 2007 IV—Conference of the Italian Charter of AIS*, Venice, Italy.

16. Carù, A., & Cova, B. (2006). How to facilitate immersion in a consumption experience: appropriation operations and service elements. *Journal of Consumer Behaviour*, *15*, 4–14.

17. Castronova, E. (2005). *Synthetic worlds: the business and the culture of online games*. Chicago: University of Chicago Press.

18. Castronova, E. (2003). Theory of the avatar. CESifo Working Papers n. 863, February.

19. Castronova, E. (2001). Virtual worlds: a first-hand account of market and society on the cyberian frontier. CESifo working Paper, n. 618, December.

20. Chesbrough, H. W. (2007). Business model innovation: it's not just about technology anymore. *Strategy & Leadership*, *35*(6), 12–17.

21. Chesbrough, H. W. (2006). *Open business models. How to thrive in the innovation landscape*. Boston: Harvard Business School Press.

22. Chesbrough, H. W., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: evidence from XeroX corporation's technology spin-off companies. *Industrial and Corporate Change*, *11*(3), 529–555.

23. Crawford, C. (1992). Spatial versus verbal reasoning. *Journal of Computer Game Design*, *6* (1992–1993).

24. Dahlander, L., & Wallin, M. W. (2006). Unlocking communities as complementary assets. *Research Policy*, *35*(8), 1243–1259.

25. Dougherty, C., & Lastowka, F. G. (2007). Virtual trademarks. *The Santa Clara Computer and High Technology Law Journal*, *24*(4), 749–828.

26. Ducheneaut, N., Yee, N., Nickell, E., & Moore, R. J. (2006). Building an MMO with mass appeal. A look at gameplay in world of warcraft. *Games and Culture*, *1*(4), 281–317.

27. Evans, P. B., & Wurster, T. S. (1997). Strategy and the new economics of information. *Harvard Business Review*, *75*(5), 70–82.

28. Gordijn, J. (2002). Value-based requirements engineering–exploring innovative e-commerce ideas. Doctoral Dissertation. Amsterdam, NL, Vrije Universiteit.

29. Gordijn, J., & Akkermans, J. M. (2001a). A conceptual value modeling approach for e-business development. *Proceedings of K-CAP 2001, first international conference on knowledge capture, workshop knowledge in e-business*, Victoria, USA.

30. Gordijn, J., & Akkermans, J. M. (2001b). Ontology-based operators for e-business model de- and re-construction. *Proceedings of K-CAP 2001, first international conference on knowledge capture*, Victoria, USA.

31. Gordijn, J., & Akkermans, J. M. (2001c). Designing and evaluating e-business models. *IEEE Intelligent Systems*, *16*(4), 11–17.
32. Gordijn, J., Osterwalder, A., & Pigneur, Y. (2005). Comparing two business model ontologies for designing e-business models and value constellations. *Proceedings of the 18th econference "eIntegration in action"*, Bled, Slovenia.
33. Guo, Y., & Barnes, S. (2007). Why people buy virtual items in virtual worlds with real money. *ACM SIGMIS Database*, *38*(4), 69–76.
34. Hagel, J. (1999). Net gain: expanding markets through virtual communities. *Journal of Interactive Marketing*, *13*(1), 55–65.
35. Hamel, G. (2000). *Leading the revolution*. Boston: Harvard Business School Press.
36. Hemp, P. (2006). Avatar-Based Marketing. *Harvard Business Review*, *June*, 48–57.
37. Isabella, S. (2007). Ethnography of online role-playing games: the role of virtual and real contest in the construction of the field. *Forum: Qualitative Social Research*, *8*(3), Art. 36.
38. Jaynes, C., Seales, W., Calvert, K., Fei, Z., & Griffioen, J. (2003). The metaverse – a networked collection of inexpensive, self-configuring, immersive environments. *ACM International Conference Proceeding Series*, *39*.
39. Kehal, H. S., & Singh, V. P. (Eds.). (2005). *Digital economy: impacts, influences and challenges*. London: Idea Group Publishing.
40. Klein, L. (2002). Creating virtual experiences in computer-mediated environments. Review of marketing science working papers, n. 1-4-1001.
41. Krüger, C. C., van der Beek, K., & Swatman, P. M. C. (2004). New and emerging business models for online news: a survey of 10 European countries. *Proceedings of the 17th bled ecommerce conference "eglobal"*, Bled, Slovenia.
42. Lambert, S. (2006). Do we need a 'real' taxonomy of e-business models? School of commerce research paper series, 06-06.
43. Lastowka, F. G., & Hunter, D. (2003). The laws of the virtual worlds. SSRN electronic paper collection. http://papers.ssrn.com/abstract=402860. Accessed 7 June 2007.
44. Lazonick, W. (2007). Evolution of the new economy business model. In E. Brousseau & N. Curien (Eds.), *Internet and digital economics. Principles, methods and applications*. New York: Cambridge University Press.
45. Lehdonvirta, V. (2005). Real-money trade of virtual assets: ten different user perceptions. *Proceedings of digital art and culture conference*, IT University of Copenhagen.
46. Leimeister, J. M., & Kremar, H. (2004). Revisiting the virtual community business model. *Proceedings of the 10th Americas conference on information systems*, New York.
47. Linder, J., & Cantrell, S. (2000). *Changing business models: surveying the landscape*. Accenture Institute for Strategic Change.
48. MacInnes, I., & Hu, L. (2005). Business models for online communities: the case of the virtual worlds industry in China. *Proceedings of the 38th international conference on system sciences*, Hawaii.
49. Mahadevan, B. (2000). Business models for Internet based e-commerce: an anatomy. *California Management Review*, *42*(4), 55–69.
50. Magretta, J. (2002). Why business models matter. *Harvard Business Review*, *May*, 86–92.
51. Manninen, T., & Kujanpää, T. (2007). The value of virtual assets – the role of game characters in MMOGs. *International Journal of Business Science and Applied Management*, *2*(1), 21–33.
52. McLuhan, M. (1964). *Understanding media: the extensions of man*. New York: McGraw Hill.
53. Methlie, L. B., & Pedersen, P. E. (2007). Business model choices for value creation of mobile services. *Info – The Journal of Policy, Regulation and Strategy for Telecommunications*, *9*(5), 70–85.
54. Nissim, B. (2007). Virtual world transition: what SL business model works best? http://www.marketingprofs.com. Accessed 14 May 2007.
55. OECD (2007). Participative web: user-created content OECD report. www.oecd.org/dataoecd/57/14/38393115.pdf. Accessed 20 February 2007.
56. Ondrejka, C. (2007). Collapsing geography second life, innovation, and the future of national power. *Innovations: Technology, Governance, Globalization*, *2*(3), 27–54.
57. O'Reilly, T., & Musser, J. (2006). *Web 2.0 principles and best practices*. O'Reilly Media.
58. Orlikowski, W. J. (2002). Knowing in practice: enacting a collective capability in distributed organizing. *Organization Science*, *13*(3), 249–273.
59. Osterwalder, A. (2004). The business model ontology – a proposition in a design science approach. Ph.D. thesis, University of Lausanne, École des Hautes Études Commerciales HEC: 173.
60. Osterwalder, A., & Pigneur, Y. (2002). An e-business model ontology for modelling e-business. *Proceedings of the 15th ecommerce conference, e-reality: constructing the e-economy*, Bled, Slovenia.

61. Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). *Clarifying business models: origins, present, and future of the concept*. Communications of Association for Information Systems, 15. http://www.businessmodeldesign.com/business-model-research.html. Accessed 29 September 2008.

62. Papagiannidis, S., Bourlakis, M., & Li, F. (2007). Making real money in virtual worlds: MMORPGs and emerging business opportunities, challenges and ethical implications in metaverses. *Technological Forecasting & Social Change*, 75, 610–622.

63. Parolini, C. (1999). *The value net*. Chichester: Wiley.

64. Pateli, A., & Giaglis, G. (2003). A framework for understanding and analysing ebusiness models. *Proceedings of the 16th ecommerce conference "etransformation"*, Bled, Slovenia.

65. Petrovic, O., Kittl, C., & Teksten, R. D. Developing business models for ebusiness. *Proceedings of the international conference on electronic commerce 2001*, Vienna, Austria, 2001.

66. Porter, M. E. (1985). *The competitive advantage: creating and sustaining superior performance*. New York: Free Press.

67. Porter, M. E. (1980). *Competitive strategy: techniques for analyzing industries and competitors*. New York: Free Press.

68. Pottruck, D. S., & Pierce, T. (2000). *Click and mortar: passion-driven growth in an Internet-driven world*. San Francisco: Jossey Bass.

69. Rappa, M. (2004). The utility business model and the future of computing services. *IBM System Journal*, 43(1), 32–42.

70. Rappa, M. (2001). Managing the digital enterprise – business models on the web. North Carolina State University. http://digitalenterprise.org/models/models.html. Accessed 11 September 2007.

71. Schroeder, R., & Axelsson, A.-S. (Eds.). (2006). *Avatar at work and play*. Dordrecht: Springer.

72. Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. *Business Horizons*, 48, 199–207.

73. Shubar, A., & Lechner, U. (2004). The public WLAN market and its business models – an empirical study. *Proceedings of the 17th ecommerce conference "eglobal"*, Bled, Slovenia.

74. Stähler, P. (2002). Business models as a unit of analysis for strategizing. *International Workshop on Business Models*, Lausanne, Switzerland.

75. Steen, F. F., Davies, M. S., Tynes, B., & Greenfield, P. M. (2006). Digital dystopia: player control and strategic innovation in the sims online. In R. Schroeder & A.-S. Axelsson (Eds.), *Avatar at work and play*. Dordrecht: Springer.

76. Tapscott, D., Ticoll, D., & Lowi, A. (2000). *Digital capital – harnessing the power of business webs*. Boston: Harvard Business School Press.

77. Tapscott, D., & Williams, A. (2006). *Wikinomics: how mass collaboration changes everything*. New York: Penguin Books.

78. Taylor, T. L. (2006). *Play between worlds. Exploring online game culture*. Cambridge: MIT.

79. Timmers, P. (1998). Business models for electronic markets. *Electronic Markets*, 8(2), 07.

80. Weber, L. (2007). *Marketing to the social web. How digital customer communities build your business*. Hoboken: Wiley.

81. Weick, K. (1995). *Sensemaking in organizations*. London: Sage.

82. Weill, P., & Vitale, M. R. (2001). *Place to space: migrating to ebusiness models*. Boston: Harvard Business School Press.

83. Wind, Y., Mahajan, V., & Gunther, R. E. (2002). *Convergence marketing. Strategies for reaching the new hybrid consumer*. Upper Saddle River: Prentice Hall.

84. Wu, S. (2007). Virtual Goods: the next big business model. TechCrunch, 20 June 2007, http://www.techcrunch.com/2007/06/20/virtual-goods-the-next-big-business-model. Accessed 21 September 2007.

85. Vatanasakdakul, S., Boon Kiat, E. L., & Cooper, J. (2004). The success strategies for hybrid business model. In M. J. Mendes, R. Suomi, & C. Passos (Eds.), *Digital communities in a networked society*. Boston: Kluwer.

86. Yee, N. (2005). *Motivations of play in MMORPGs*. Presented at the International DiGRA Conference, Vancouver, Canada.

87. Yousept, I., & Li, F. (2004). Online supermarkets: emerging strategies and business models in the UK. *Proceedings of the 17th ecommerce conference "eglobal"*, Bled, Slovenia.

88. Zackariasson, P., & Wilson, T. (2005). Marketing considerations for massively multiplayer online games (MMOG). *The 18th Scandinavian academy of management conference*, Århus.

Maria Rosita Cagnina has been assistant professor of Management at the Faculty of Economics in the University of Udine since 2005. She took her Ph.D. in the Organization and Management of Enterprises in

2000 at the Departments of Economics in University of Udine. She is also Adjunct Professor of Management Information Systems. Previously she was professor in charge of a course in Marketing and Advertising at the Faculty of Science and Multimedia.

Her research interests are the Knowledge Economy, networks and management of innovation. Her current area of research is the digital economy, business models and e-marketing strategies in virtual worlds and web communities.

Michele Poian graduated at the faculty of Economics of the University of Udine in Business and Economics. He took his degree in 2006 with the thesis: "The Analysis of the Digital Interactive Entertainment Industry. The Co-opetitive Approach".

Currently he is in his second year PhD at the XXII Cycle of the Doctorate of Research in Business Science, at the faculty of Economics at the University of Udine, Department of Business Finance and Financial Markets. His areas of scientific interest are: business strategies and management within co-opetitive approach; interorganizational networks; the economy of virtual environments and multimedia.