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From value chains to technological platforms:

The effects of crowdfunding in the digital game industry

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Abstract

This study contributes to understanding the effects of crowdfunding on the value creation process in the digital game industry. Specifically, it integrates the value chain logic with the platform logic to examine collaborative value creation enabled by opening up the business models of game developers to the crowd. Through a multiple case design this research shows that the benefit of using crowdfunding goes well beyond fundraising. As an implementation of open innovation, crowdfunding unifies the channels that bring capital, technology and market knowledge from the crowd into the game. This finding leads to the exploration of a new complex system of interactions between game developers and value chain stakeholders, and invokes the analysis of crowdfunding as a form of technological platform to identify and analyze new types of collaboration and competition. This research limits its findings to the effects of reward-based crowdfunding. Other forms of crowdfunding require further investigations. The paper also aims to help practitioners understand how crowdfunding is transforming the game industry.

Keywords – Reward-based crowdfunding, digital game industry, value chain, user communities, technological platforms.

Paper type – Research paper

1. Introduction

Crowdfunding has opened up a new channel for organizations and individuals to receive funding from a pool of individuals (i.e. the crowd) for different types of projects. Previous studies have identified four types of crowdfunding that are based on charity, equity, lending or reward (Wilson and Testoni, 2014; Kuppuswamy and Bayus, 2014; Meer, 2014; Moritz and Block, 2014; Dushnitsky et al., 2016). Charity-based crowdfunding is mainly used to support philanthropic and charitable causes (e.g. startsomegood.com), while equity-based (e.g. crowdfunder.com, crowdbnk.com) and lending-based crowdfunding (e.g. fundincircle.com) help entrepreneurs and businesses to share future financial returns with those who support them. Reward-based crowdfunding allows fund-seekers to seek financial support from the crowd in exchange for products or other perks (see Belleflamme, Lambert & Schwienbacher, 2014; Mollick, 2014; Frydrych, Bock, Kinder & Koeck, 2014; Zheng, Li, Wu & Xu, 2014; Thuerridl & Kamleitner, 2016). This paper focuses on reward-based crowdfunding, which has seen over 290,000 projects being funded on Kickstarter.com alone over the last three years (2013-2016). Some industries in particular show an intensive use of crowdfunding (i.e. games, music, and movie industries) due to difficulties not only in persuading traditional funders (e.g. venture capitals, banks) on account of their risk aversion but also in establishing a direct connection with the market before the creation of the product.

The digital game industry is a test-bed for crowdfunding because it provides an ideal domain for exploring emerging trends. This is mostly due to the digital nature of its products, the proliferation of independent studios and the consequent necessity of establishing a link with the end market during early phases of game development. By April 2016, game developers launched over 23,000 Kickstarter-based projects for US$480+ million (20% of total pledged funds on the platform), including 63 of the 166 US$1million+ projects. By engaging in crowdfunding campaigns, independent game developers have de facto opened their

business models to customers, leading to a new form of value creation (see on this also Wirtz, Schalke and Ullrich, 2010; Zott & Amit, 2010; Chesbrough, 2011; Abrahamson, Ryder, and Unterberg, 2013; Djelassi and Decoopman, 2013). This opening is only formally aimed to secure fundings for their projects; it actually allows game developers to validate their ideas, engage with user communities, refine and pre-test games with end customers. As a consequence, opening their business model comes along with changes in the industry value chain because it has impact on a series of relationships between developers and other industry stakeholders (e.g. investors, publishers, distributors, etc.).

From a methodological point of view, the paper adopts a research strategy based on multiple-case design to understand the different aspects of changes in the industry value chain. Multiple-case design also helps observe crowdfunding as a growing phenomenon in the game industry and uncover previously unexplored and emerging trends (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Yin, 2009).

From a theoretical perspective, the analysis of cases has first required the adoption of the value chain mental model to interpret them from the perspective of an individual firm (see Kaplan, 2011; Hadida and Paris, 2014; Huff, 1990; Porac and Thomas, 1990; Porac, Thomas & Baden-Fuller, 1989; 2011; Walsh, 1995; Hodgkinson, 2015). However, this perspective has then not revealed capable to capture the collaborative value creation enabled by opening the business models of game developers. For this reason, - keeping Gawer's (2014) organizational lens – the paper borrows her definition of technological platforms as "evolving organizations or meta-organizations" to discuss how a platform perspective helps grasp the value created by multiple stakeholders engaging in distributive and collaborative innovation at an industrial level. In fact, as in Gawer (2014), technological platforms interpret the digitalization and modularization of design and production practices. In an environment with a platform, producers and users interact and engage within distributed and collaborative networks

extending the networked idea of value discussed by Corsaro, Ramos, Henneberg & Naude' (2012) and Norman and Ramirez (1993).

The paper fills a gap in both strategic management and marketing literature. Extant studies have neglected the consequences of crowdfunding on customers' blending into the value creation process. The first attempt to bridge research gaps across strategic management and business marketing is by Djelassi and Decoopman (2013). They investigate the implications (i.e. benefits and issues) of customers' participation in product development through crowdsourcing, seen as driver of open innovation (see also Hopkins, 2011). Their work contributes to go beyond the idea of customers as revenue yielders as it reinforces their role of revenue generators. This paper builds on the idea of customers as active stakeholders in the process of value creation to investigate the effects of crowdfunding on the value creation process at an industry level. Furthermore, it helps practitioners understand the new structure of the game industry (Figure 1).

Figure 1 here

The paper is organized as follows. It refers to the value chain cognitive construct (Kaplan (2011) and Porac; Thomas & Baden-Fuller (2011)) touching upon the mental models linked to it (e.g. value network, business ecosystem, value grid, and value constellation), and it briefly reviews the existing literature on reward-based crowdfunding and technological platforms (Section 2). In line with Creswell (2012), the methodology section presents the research design and research method in detail (Section 3). The analysis of the game industry and the six case studies (Section 4) explore the transformation at the value chain level and open up to the role of reward-based crowdfunding as a technology-enabled platform orchestrated by game developers (Section 5). Concluding remarks follow in Section 6.

2. Literature review

2.1 The evolution of the value chain as a mental model

Kaplan's (2011) review paper on research in cognition and strategy refers to studies on cognition in organizations to provide an organizational response to their environments and the need to focus on managers' actions. The analysis of managerial and organizational cognition and cognitive processes familiarizes managers with the development of strategic patterns and helps them create mental templates that give form and meaning to information environments (Walsh, 1995; Wrona, Ladwig and Gunnesch, 2013). In fact, strategic decisions are based on managers' cognitive structures that label and make sense of environmental occurrences leading them to act on a mental model of the environment (see also on this point Porac and Thomas, 1990; Daft and Weick, 1984). As Walsh (1995) outlines in his review paper, some empirical works have become receptive to the use of knowledge structures at the industry level (Yates, 1983; Grisprud and Gronhaug, 1985; Porac, Thomas & Baden-Fuller, 1989; Feigenbaum and Thomas, 1995). Among them, Porac, Thomas & Baden-Fuller (1989) shed light on how industry recipes impact on corporate strategy and how cognition influences each step of the value chain (i.e. building and routinizing relationships among competitors, suppliers, retailers and customers) (see also Spender, 1989; Porac & Thomas, 1990).

The value chain as a mental model has evolved since Porter's definition of "a series of value-creating activities" (Porter, 1985). Porter's perception of a "systematic way to divide a firm into its discrete activities, and thus […] examine how the activities in a firm are and could be grouped" has influenced the diagnosis of competitive advantage, the design of organizational structures at the firm level, the identification of industry segments, and the analysis of the interrelated value chains for different segments (i.e. for an application of the value chain model see for instance Singer and Donoso, 2008). Thereafter, to address the impact of an information revolution on competitive advantage more effectively, Porter (2008) has con-

sidered a company's value chain within a particular industry as being "embedded in a larger stream of activities", that is a value system. The value chain logic has, however, long ignored the dynamics of value creation at the network level. Inter-organizational networks have progressively emerged as a response to the need of "linking firms with different assets and competences together in response to or in anticipation of new market opportunities" (Corsaro, Ramos, Henneberg & Naude', 2012; Norman and Ramirez, 1993). Literature has then discussed different models of organization and activities (e.g. value network, business ecosystem, value grid, and value constellation) (Table 1).

Table 1 here

The models displayed in Table 1 mirror the increasing complexity of firms' relationships that develop from a sequential (one-way) series of activities linking suppliers, producers and buyers (i.e. the value chain) into an intertwined value chain. Value networks are, in fact, characterized by nodes shared among firms and a two-way flow of information which achieves – to cite just a few – improved service quality, innovation, and price reductions (Li and Whalley, 2002; Peppard and Rylander, 2006; de Reuver and Bouwman, 2012). The complementarity of such activities being carried out across the network in addition to the firms' multidirectional interaction has subsequently put emphasis on the idea of a value network. A business ecosystem and a value grid introduce, in fact, a growing complexity of relationships and show the difficulty in disentangling activities once belonging to single firms rather than to interconnected firms (Solberg Søilen, Kovacevic & Jallouli, 2012). Finally, in acknowledging the constant evolution of these models, value constellation explicitly introduces value co-creation whereas value chain stakeholders (including customers) reconfigure their role and relationships (see Prahalad and Ramaswamy, 2004; Chesbrough, 2006; Vanhaverbeke and Cloodt, 2006; Corsaro, Ramos, Henneberg & Naude', 2012).

Building on the vast literature on value chains as mental models, Hadida and Paris (2014) question the validity of value chain mental models in creative industries and acknowledge the limitations of a single value chain based analysis. In the analysis of the digital music industry, they specifically point out that cognitive configurations have different value in "hypercompetitive industries characterized by rapid changes in environmental factors, relative ease of entry and exit, and ambiguous consumer demand" when compared to mature or even declining industries. Accordingly, in their work they affirm that entrepreneurial newcomers are keen to contest and reject the "dominant logics and industry recipes of the traditional music industry" and they are eager to move away from historical taxonomy by creating new cognitive frameworks. However, at the same time, the core value proposition of disintermediation paradoxically still validates the linear representation of the digital music industry and "reinforces the hold of the value chain cognitive frame".

With the objective of understanding whether existing value chain models can capture the transformation of the industry settings prompted by crowdfunding, this study develops specific value chain mental models according to the object and nature of aggregation. The object of aggregation refers to "what" the mental model connects with, that is companies' activities or value chains. This helps differentiate the series of value-creating activities within a single company (i.e. value chain, virtual value chain, vertical architecture, and b-web value chain) from those value-creating activities in various types of networks that rely on relations across different companies (i.e. value chain network, value network, virtual value chain orchestration, value grid, radix organization, value constellation, and business ecosystem) (see Table 2). The nature of aggregation refers to "how" activities and companies are connected. Specifically, it distinguishes between value chains and networks linking activities within one company (i.e. value chain, virtual value chain, value network, value chain networks), and a system of companies (e.g. the value chain b-web, virtual value chain orchestration, vertical ar-

chitecture, value grid, radix organization, value constellation, and business ecosystem) (see Figure 2).

Figure 2 here

Table 2 here

The mental models in Figure 2 and Table 2 illustrate the existence of a complex set of definitions. They varyingly define the value chain as the core mental model in order to explore the value creation process within companies and across their network of relations. Each definition points out a precise characteristic of the value chain or sheds light on specific changes (e.g. the use of Information & Communications Technologies, the Internet, etc).

2.2 Value chain mental models in the game industry

In line with the aim of this study, it is useful to explore the evolution of the value chain mental model in the game industry. This is valuable in determining whether value chain mental models could be developed further, and if the consequences of crowdfunding practices could be considered as a major challenge for industry stakeholders. The analysis of the literature shows different representations of the game industry value chain (Williams, 2002; Jöckel, Will & Schwarzer, 2008; De Prato, Feijoo, Nepelski, Bogdaniwicz, & Simon, 2010; Broekhuizen, Lampel, & Rietveld, 2013). Williams (2002) organizes the activities performed in the industry as a linear sequence and groups them into five vertical stages: development, publishing, manufacturing, distribution, and retail. These stages group together a sector where games are physically distributed and played offline on PCs, consoles and handheld devices. Jöckel, Will & Schwarzer (2008) specify the difference between video games (played on dedicated gaming consoles) and computer games (played on multifunctional device such as a PC) and assume the term digital games includes both types of games. Building on this assumption, they investigate the value chain of the digital game industry and reconfigure the

traditional approach considering: a) the impact of online distribution, that is "either a disintermediation by eliminating one stage in the value chain (retail) or a transition at this stage of the value chain from retail to Internet service providers or gaming Web sites" (on this point see also Broekhuizen, Lampel & Rietveld, 2013); and, b) its main consequences (e.g. the integration of user-generated content in the value chain and the transformation of users into prosumers in application of the concept of productive consumption (Toffler, 1980) and presumption (Tapscott and Williams, 2006)).

Furthermore De Prato, Feijoo, Nepelski, Bogdaniwicz, & Simon (2010) elaborate on the traditional distribution retail value chain (i.e. Developers, Suppliers-Enabling technology: software/middleware, Publishers, Distributors/Retailers, Suppliers-User interface: Console, PCs, mobile devices) by pointing out the complexity of mutual relationships among actors (e.g. intermediate inputs supply, vertical integration) and the consequent potential transformation of the value chain that "might incur in the case of disruptive trends". Finally, Marchand and Hennig-Thurau (2013) review the state of the art in games-related research elaborating on the challenges within an intensely competitive industry. For this purpose, the authors present a conceptual framework of value creation, which identifies the main stakeholders and their mutual relationships. Specifically, the conceptual framework – centered on the game platform – distinguishes between a gaming environment made up of main players (i.e. game producers, console producers, and consumers), distribution and communication channels linking customers and content providers. The model builds upon the coexistence of content and platforms within the gaming environment with the objective of elaborating on competitive dynamics and thus illustrated the economics of the game industry.

The structure of the digital game value chain, discussed in the literature, shows the transformation of the sector over the last decade. Changes in the supply and demand characteristics - and their market interaction - are mostly a consequence of the use of the Internet as a

platform where stakeholders collaborate for game design and development. The profile of gamers - and with them the experience of gaming - has also changed significantly: online mobility has opened the market to new customer segments. Hardware and software manufacturers, game developers, publishers, intermediaries and end-users have gained importance across the value chain due to the implementation of digital technologies in their business models.

2.3 Technological platforms

As discussed earlier in this work, literature widely acknowledges the relevance of collaboration for value creation (see again Figure 2 and Table 2). Traditional co-development processes (see for instance Fliess & Becker, 2006) based on interacting business models have progressively given way to new forms of collaborative value creation. The growing pressure for companies to innovate and do it effectively in cost, time, and risk management has in fact brought firms to the era of Open Innovation (Chesbrough, 2006) where industry stakeholders - including customers - participate firms activities to co-create value. This shift in how firms do business has opened traditional business models and made them able to use technologies and ideas from both competitors and the market. On this point, in a recent work published on California Management Review, Kortmann & Piller (2016) emphasize that recent socio-economic developments have threatened existing business models proving ample opportunities to reinvent themselves. Among those developments, the increasing willingness and ability of stakeholders to participate in firms activities has in fact contributed to open the whole business model to new forms of co-creation. This exact role of consumers enabled by ICT (Information & Communication Technologies) toolkits, devices, and platforms has led Kortmann & Piller (2016) to produce a conceptual framework to describe what they name as the “emerging closed-loop value chain”. Their framework presents and discusses nine

archetypes of business models based on different forms of collaboration (including the firm-consumer) and the various stages at which collaboration for value creation takes place. It shows the competitive and collaborative alternatives firms have in the value creation process whereas they aim to cooperate with other stakeholders.

Literature on organisational structures enabling forms of collaboration and competition at firms' and industries' level coalesces around the definition of platforms and their main characteristics (see on this also Gawer & Cusumano, 2002; McAfee, 2006; Gawer, 2010; Parker, Van Alstyne & Choudary, 2016). With this respect, Gawer (2014) organizes the literature on technological platforms to create an integrative framework that "allows multi-modal interaction between agents within and across platforms, and that would allow scholars to study the ways in which competition and innovation shape the way platforms evolve". To develop this framework, Gawer (2014) investigates platforms through an organizational lens defining them as "evolving organizations or meta-organisations that: (1) federate and coordinate constitutive agents who can innovate and compete; (2) create value by generating and harnessing economies of scope in supply and/or demand; and (3) entail a modular technological architecture composed of a core and a periphery". Building on this definition as well as on those of internal and external platforms provided in Gawer and Cusumano (2014), Gawer (2014) classifies platforms as internal, supply-chain and external depending on whether their scope lays within firms, across supply chains, or within the industry ecosystem.

2.4 Crowdfunding: taking stock of the existing literature

The digital game industry has seen a growing interest in game developers for crowdfunding. Industry reports shed light on crowdfunding characteristics and focus on the differences between their business models (e.g. community and financial return crowdfunding) (Wilson and Testoni, 2014; Hemer, 2011; IOSCO, 2014). The European Commission explores its po-

tential and analyzes its adjustment within the Internal Market (European Commission, 2014). Moreover, the EU has commissioned detailed reports to produce taxonomies, map diffusion, design policy strategies, and identify the consequences for professional and non-professional investors (De Buysere, Gajda, Kleverlaan & Marom, 2012; European Crowdfunding Network, 2014). The US government dedicates Title III of the JOBS (Jumpstart Our Business Startups) act to crowdfunding in order to enable small business owners and entrepreneurs to sell limited shares of equity to investors via crowdfunding platforms (Stemler, 2013).

Academic literature also dedicates increasing attention to crowdfunding, with the greatest number of studies on reward-based crowdfunding. These studies can be grouped in two main categories: i) papers addressing entrepreneurs' crowdfunding strategies and projects' characteristics (Belleflamme, Lambert & Schwienbacher, 2014; Frydrych, Bock, Kinder & Koeck, 2014; Mollick, 2014; Schwienbacher and Larralde, 2012; Zheng, Li, Wu & Xu, 2014; Thuerridl & Kamleitner, 2016); and ii) papers about the crowdfunders' behaviour (Burtch, Ghose & Wattal, 2013; Kuppuswamy and Bayus, 2013; Xu, Zheng, Xu & Wang, 2015). Other studies on crowdfunding touch upon its impact on specific industries, but few studies performed in-depth analysis at the value chain level (see Boeuf, Darveau, & Legoux, 2014; Kappel, 2009).

Studies on entrepreneurs' strategies and projects' characteristics highlight four key characteristics of reward-based crowdfunding. First, Belleflamme, Lambert & Schwienbacher (2014) point out that it allows for price discrimination. Entrepreneurs solicit individual funders either to pre-order products or to advance a fixed amount of money. In the event of pre-ordering, price discrimination is constrained by the amount of capital they need to raise to cover upfront fixed costs. However, price discrimination is only perceivable if below a certain threshold. Conversely (i.e. for large amounts), equity or profit sharing is preferable. Second, the literature tells us that the success of crowdfunding initiatives mostly depends on fund

seeker's personal networks (i.e. social capital) and location, and the perceived quality of the project (Mollick, 2014; Zheng, Li, Wu & Xu, 2014). Third, the literature links the projects' characteristics to legitimacy and success as research findings reveal that "lower funding targets and shorter duration of the campaign signal legitimacy by setting modest, achievable expectations" (Frydrych, Bock, Kinder & Koeck, 2014). Similarly, reward structures generate legitimate expectations of investment returns and can be considered as strategic assets when designing crowdfunding campaigns (Thuerridl & Kamleitner, 2016). Fourth, Schwienbacher and Larralde (2012) point out that the success of crowdfunding is rooted in the ability of fund seekers to actively manage the different features enabled by Web 2.0 (e.g. communication and managing stakeholders), exploit direct and indirect network effects that characterize an online platform, and the willingness to extend their skillset by opening up their projects to the crowd's opinion. In short, the importance of amplifying social networks is among the main motivations of the projects' creators. This is in line with what Gerber and Hui (2013) argue about the motivations (and deterrents) to crowdfunding participation for both projects' creators and supporters. Their findings show how the motivations of reward-based crowdfunding can go well beyond an interest in raising money or donating to an attractive project. In fact, - they claim - the importance of connecting with others and being part of a community is a driver for both setting up and joining crowdfunding activities.

Studies on crowdfunders' behaviour show clear links between marketing efforts to promote projects and their success. According to Burtch, Ghose & Wattal (2013), these links reinvigorate the great potential of crowdfunding in awareness- and attention-building around ventures and causes. In this sense, the literature shows: a) the existence of a crowding-out effect leading to contributors experiencing a decrease in their marginal utility from funding a project as it becomes less important for the fund-seekers (Burtch, Ghose & Wattal, 2013); b) the reduction of stimuli for backers to contribute to projects already successfully supported

because of the assumption that others will provide the necessary funding (Kuppuswamy and Bayus, 2013); c) the significance of predicting sponsors' satisfaction and dissatisfaction in crowdfunding projects (Xu, Zheng, Xu & Wang, 2015).

2.4 The rationale of crowdfunding success

Game development studios, especially independent ones, often face the challenge of finding funding for new projects. Attracting funding usually takes several months during which studios self-fund and develop a demo of the product for publishing companies (see Table 3). If the product meets the standards of the publisher, the two parties formalize a contract that provides the studio with the necessary funds to produce the game. However, problems usually appear when developers and publishers do not agree on the games' characteristics (e.g. game design, target market, contents) or when the latter do not meet the publisher's standard. The creativity of developers is then challenged. In fact, at this crossroads, development studios face the dilemma of either abiding by the publisher's requests to develop titles that are attractive for the publisher, or seeking alternative funding sources to avoid the publisher's requests.

Table 3 here

In this scenario, reward-based crowdfunding stands out as an alternative source of funding. Game players can fund game projects online, pledging money to ventures posted and advertised by independent game developers. Mollick (2014) defines crowdfunding as "the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit – to fund their ventures by drawing on relatively small contributions from a relatively large amount of individuals using the internet, without standard financial intermediaries" (see also Ordanini, Miceli & Pizzetti, (2011)). As a consequence, Crowdfunding as "a unique category of fundraising" (Mollick, 2014) uses specific Internet platforms to raise money from a broad set of (individu-

al) investors "in the form of donation or in exchange for some form of reward […]" (Schwienbacher and Larralde, 2010). A growing number of successful crowdfunding platforms (e.g. Kickstarter, Indiegogo) are becoming very popular among fund seekers. According to data published on one of the largest platforms, Kickstarter.com, about 23% of total pledges relate to games projects, making the games category the most attractive for the platform's registered visitors. Some widely acknowledged games such as '*Torment: Tides of Numenera'* by inXile Entertainment (funded for over US$4.1 million by over 74,000 backers), and '*Project Eternity'* by Obsidian Entertainment (it raised over US$3.9 million, surpassing its US$1.1 million target, with the support of over 73,000 funders) are among the most highly funded projects.

However, crowdfunding *per se* cannot be considered as a recipe for success. Extremely successful campaigns and the high success rate of crowdfunded projects on kickstarter.com are only the most evident consequence of the impact of crowdfunding on the game industry. Crowdfunding is in fact spreading the financial risks associated with the development of games across a more varied pool of funders that includes the final market. This allows companies to raise awareness of new game projects, ask for technical feedback from future players, control publication and distribution channels, as well as help distribute profit sharing, and potentially prevent market failure. In short, crowdfunding impacts the design of games by enabling a series of domino-effect consequences in the industry.

3. The Research Design and Empirical Work

This study aims to explore how reward-based crowdfunding transforms the value creation process in the game industry. Specifically, it contributes to understanding why crowdfunding is a technological platform and how it enables customers to create value at the industry level. To reach this aim, this study adopts a qualitative research method (see Schutz, 1954; Crotty,

1998; Easterby-Smith, Thorpe & Jackson, 2008). For the sake of understanding and interpreting a social phenomenon, this research looks at the interaction between the investigator and the object of investigation by examining specific cases. This follows an inductive approach and as such gives a new perspective to the existing literature. In keeping with Eisenhardt (1989), Eisenhardt and Graebner (2007), and Yin (2009), the study adopts a multiple case design to compare six cases (i.e. identifying similarities and differences), which explore the same phenomenon in different settings, achieve abstraction in the use of data, and consolidate the validity of the study (see Table 4). As in Eisenhardt and Graebner (2007), the individual cases serve as "a distinct experiment that stands on its own as an analytic unit". Multiple experiments subsequently become discrete experiments serving as "replications, contrasts, and extensions to the emerging theory" (on this point see also Yin, 1994). For this reason, the paper uses a multiple and diverse set of cases and cover problems of data generalization in at least three ways.

First, the set of cases include game developers located in two different countries (i.e. the US and the UK) where reward-based crowdfunding was first made available. Second, these developers differ in terms of the number of employees, contributing to grasp the impact of crowdfunding on companies of different sizes. Third, the cases cover crowdfunding campaigns run both on the Kickstarter platform and the companies' own website, with evidence of the effects of crowdfunding not limited to Kickstarter-based projects. To confirm the reliability and validity of the analysis and strengthen the generalizability of findings, initial results were discussed with three industry experts. The interviews were conducted between November 2013 and December 2014.

Table 4 here

Data were collected through face-to-face semi-structured interviews to leave room for emerging issues and for personal interaction beyond the topics of the questions (Mason,

2002). In one case, a CEO asked to see the list of questions in advance via e-mail. In consideration of the limited availability of time of senior executives in fast-moving industries, one interview per company at the senior level (CEO, the COO or the Managing Director) was collected. Each interview lasted for about 45 - 60 minutes. The interaction with senior management of these firms revealed the key strategic reasons of crowdfunding campaigns. The interviews were supplemented by secondary data (e.g. reports, news articles).

The interview questions were designed to collect data on their crowdfunding campaigns (e.g. duration, campaign design, target funding, channel of communication with funders, and expectations), their effects on each value chain activity (e.g. other sources of funding, strategies for game development, self-publishing, online vs. offline distribution), and their relationships with main stakeholders (e.g. freelancers, publishers, online distributors, user communities). Information gathered were then organized around each stage of the value chain they referred to (i.e. funding, development, publishing, distribution, and retail) to map the activities carried out and visualize the connections among stakeholders in a value chain model. The abstraction in the use of the information helped move data from the case-specific setting to the value chain construct. As a result, the traditional relationships along the value chain (as per the analysis of literature) were compared with those captured from the interviews to identify a new structure of the industry value chain.

Finally, it is worth noting that in order to observe the effects of reward-based crowdfunding on the value creation processes at the industry level, this study adopts the game developers' perspective. Most stages of the value chain have in fact been internalized with the use of crowdfunding. For this reason, the impact of crowdfunding on the relationships between developers and other industry stakeholders (i.e. traditional funders, publishers, distributors, and retailers) can be understood from the perspective of game developers. Shifting then from a value chain logic to a platform logic will still allow us to adopt the game developers'

perspective because the collaborative value creation is centered on the decision to open their business model.

4. Analysis: The digital game industry

The game industry is considered part of the entertainment industry (Marchand and Hennig-Thurau, 2013), although "[M]odern computer gaming technologies initially provided low-end capabilities for a small niche within the simulation industry" (Smith, 2007). Despite its origins being deeply rooted in the software industry, the development of the game industry has been characterized by: i) a high degree of technological innovation; ii) dynamic supply (e.g. products and related auxiliary services) and demand (e.g. user profiles, market needs) trends; and, iii) a unique combination of creativity, digital technologies and game development practices (see also Panourgias, Nandhakumar & Scarbrough 2014; Sapsed and Tschang, 2014). Evans, Hagiu & Schmalensee (2005) argue that this evolution started in the late 70's with the shift from Atari's Home Pong (1975) – where a single game was hardwired into the console's circuit – to Fairchild's Channel F game console that opened up the market to games stored in interchangeable cartridges. Thereafter, the technological innovation embedded in hardware and software solutions has led to the transformation of the industry first into a two-sided market and then into a multi-sided market (Rysman, 2009). The gaming experience now takes place on many different platforms ranging from PCs to handsets, consoles and a series of mobile devices (e.g. tablets, phablets, and smartphones).

In 2013 the global annual turnover of the game industry exceeded US$70bn and by the end of 2016 it is expected to reach US$86bn, with an average annual growth rate of above 8% (Newzoo, 2014). The fastest growing market segments include mobile phone and tablet games as well as Massively Multiplayer Online games (MMOs) and console games. However, PC, bespoke portable devices and social games, are expected to lose ground in the next peri-

od. The demographic reach of computer games has also broadened during the last few years, with almost 47% of the player base being women and 27% of people aged above 50 playing games on a weekly basis (Newzoo, 2014). The increased demographic reach has also contributed to raising awareness of the cultural impact and contribution of digital games to society (Oxford economics, 2008).

1. *Case studies*

Based on the information collected during the interviews, Table 5 shows the impact that crowdfunding has on each of the value chain activities.

Insert Table 5 here

The crowdfunding impact is not limited to funding but also has overarching effects across the entire value chain, and it modifies the relationships between industry stakeholders. Four main effects deserve a special mention. First, reward-based crowdfunding can ease access to funding from traditional sources. It can provide developers with budgets beyond their expectations (e.g. Cloud Imperium, Introversion Software, Revolution software) by facilitating access to venture capital investments and bank loans as well as funding from the crowd. As confirmed by some of the cases (e.g. Payload Studios, Revolution Software), this is mostly a consequence of market and technological risk sharing with end customers. Second, all companies (with the exception of Revolution Software) have developed games for Windows (i.e. versions older than Windows 10) and in some cases also Mac and Linux, thus clearly positioning their product in the PC gaming industry and avoiding both consoles and mobile games. As commented on by an interviewed Managing Director, “this strategic choice is mostly driven by the necessity to target a niche market segment of PC players and bypass commercial agreements with publishers and distributors”. In fact, as also confirmed by other Senior Business Executives, the role of publishers for this type of games has profoundly

changed. Almost all PC games can (and will) be published by game developers themselves and distributed online via the companies' websites or via Steam, which will act as a two-sided platform upon payment of basic fees for games distribution. As an interviewed Chief Executive commented, "crowdfunding has in fact enabled a great degree of freedom [in this sense] by letting game developers extend their control from development to publishing and distribution" (i.e. internalization of activities in the industry value chain). Third, the analysis of case studies shows that crowdfunding is a management practice that allows game developers to gain technical and market knowledge for timely and more successful release of the final product. Specifically, developers find out about market expectations on new games (i.e. intensive use of ad hoc forums, blogs, mailing lists and social media) and let their niche market players help raise awareness of a new game release (i.e. word of mouth and the large audience of crowdfunding campaigns). As confirmed by the interviews, crowdfunding campaigns push game developers to develop effective channels of communication with funders/players. In fact, online fund-raising practices have been mostly associated with the possibility of providing suggestions, creating diverse expectations and ideas, and sharing updates on games development during different stages. Forums, blogs, social media, and the Kickstarter platform itself have enabled a two-way communication with the increasing demand from game players to participate. Fourth, crowdfunding allows developers to achieve an early form of validation of product by opinion leaders and game fans before the market launch, especially if the game is released in modules and a free alpha version of the game is distributed. This creates a trusting relationship with a market niche and allows value creation, capture and delivery to happen in collaboration with gamers. It then becomes possible to affirm that the crowdfunding phenomenon potentially enforces the polarization of games developers' profiles. In fact, the digital game supply side is now populated by multinational developers - acting as market oligopolies in close relations with major hardware producers - and a myriad of

small developers, releasing low cost games to be launched on crowd platforms in search of market fortune.

5. Discussion

5.1 The implications of crowdfunding for the game industry

This work has employed a value chain perspective to identify the main impact of crowdfunding on the value creation process in the game industry. In this sense, the results of case studies back up the hypothesis that in the game industry reward-based crowdfunding redesigns the interactions among developers, their traditional stakeholders (e.g. publishers and distributors) and customers (i.e user communities). For example, the developers' own funding, the crowd's contribution, publishers' investments, and professional investors' capital can all merge together to fund new games. Thereafter, crowdfunding allows game developers to choose from a portfolio of options including: a) working with publishers to gain additional market knowledge, b) bypassing publishers altogether (as well as distributors and retailers), or c) integrating their own publishing with specific publishing, distribution and retail deals (see Figure 3).

Figure 3 here

Case studies have also suggested that a value chain logic may not be able to grasp the collaborative value creation enabled by opening the business models of game developers. In fact, the value chain analysis does not acknowledge the full effect of crowdfunding on the game industry. Specifically, the value chain analysis does not capture the quality of crowdfunding's effect on the nature of the relationships across the value chain, that is collaborative and/or competitive. Figure 3 helps analyze the implications of crowdfunding on the value creation process at an industry level as it displays a novel system of interactions among developers, user communities and other stakeholders across the entire value chain. For this

reason, it is worthwhile to recall and employ the Gawer's (2014) notion of technological platform. Acting as a platform orchestrated by the developer and driven by network effects (Gawer, 2009; 2014; Gawer and Cusumano, 2008; 2014), the crowdfunding campaign connects the developer with crowdfunders and creates incentives for an even bigger crowdfunding community to grow. Moreover, a reward-based crowdfunding campaign acts as a platform because it brings together different stakeholders and allow them to interact. Specifically, crowdfunding allows game developers to open their business models to different user communities that act as one (i.e. funders) and span its impact over a set of firm's activities (e.g. funding, co-development, technical and market testing) (on this point see also Burger-Helmchen and Cohendet (2011) who analyzed the relationships among firms manufacturing games and user communities in an industry not yet reshaped by crowdfunding.). Thus, crowdfunding creates a new type of technological platform enabling collaboration among developers and a multi-purpose user community for the funding and co-development of new products. One Managing Director pointed out that: "opening up the funding to the crowd creates a primary gate to co-development, knowledge sharing, and market testing". It also unifies the channels that bring capital, technical and market knowledge from the crowd to the game developers. At the same time, a crowdfunding campaign acts as a platform stimulating competition among different stakeholders within the industry value chain. Developers, publishers and distributors - for instance - will compete to publish a game that attracts a large community of crowdfunders, determining new competitive dynamics within the industry.

5.2 Crowdfunding implications for value chain and platform literature

The discussion on the implications of crowdfunding for the digital game value chain would benefit from a more extensive investigation of the literature on value chains. The framework proposed in Figure 2 has shown that the existing mental models of value chains

can be grouped in 4 main categories: Traditional value chain, Diffused value chain, Value chain networks and Diffused networks. This grouping stems from the analysis of the object of aggregation (i.e. "what" the mental model connects) and the nature of aggregation (i.e. "how" activities and companies are connected). It is then possible to cross-check the characteristics of the 4 categories of Figure 2 with the key features of the crowdfunding-enabled value chain in Figure 3.

With respect to the object of aggregation, the case studies suggest that the set of activities performed by different stakeholders within the game industry can be identified with the crowdfunding-enabled value chain (see Figure 3) resembling either the "traditional" or the "diffused value chain". However, both the traditional and the diffused value chain models are ineffective in considering the impact of the user community on the value chain activities. Crowdfunding, co-development and markets pre-test as well as their consequences (e.g. ease of access to third-parties investments, freedom in game contents development and timeline of product release, independence from publishers) have not been accounted for in "traditional" and "diffused value chain" mental models. They account only for activities run by companies and do not take into account the value creation process brought to the game industry by the community of gamers.

With respect to the nature of aggregation, case studies revealed that the portfolio of choices given to game developers (as enabled by crowdfunding) is a key feature of the crowdfunding-based value chain. The crowdfunding-based value chain consists of a map of actions that the game developers can choose. Existing value chain mental models are used to identify the main activities at an industry level, the path to value creation, and the relationships among stakeholders. Conversely, cases suggest that the value chain mental model can be employed to identify the consequences of crowdfunding on different value chain activities. For this rea-

son, it is not possible to include the crowdfunding-enabled value chain among those value chain models that link activities of one or more companies.

The implications of crowdfunding can be restricted to the changes occurring along the value chain. These relationships, in fact, do not account for the nature of the interaction among stakeholders. For this reason, it is worthwhile to elaborate on how crowdfunding campaigns act as technological platforms fostering collaboration (i.e. game developers with user communities) and stimulating competition (e.g. game developers against publishers and distribution).

Moreover, the Gawer's (2014) notion of technological platform leads to read a crowdfunding campaign as a value chain platform with the characteristics of an evolving or meta-organisation (i.e. it is in fact rooted in the collaborative and competitive interaction generated by a crowdfunding campaign). Value chain agents influenced by a crowdfunding campaign innovate and/or compete whereas crowdfunders are asked to co-develop the game. Publishers, however, are attracted by novel games backed by a wide crowd of crowd investors. Moreover, the crowdfunders' incentives to fund (and co-develop) a game are influenced by the number of existing crowdfunders (direct network effects): a large crowd of backers positively influences the number of traditional investors (i.e. banks and venture capitalists), and - for instance - publishers willing to publish the game. Finally, a crowdfunding campaign is orchestrated by a core agent (i.e. the game developer) that assigns specific tasks to peripheral agents (i.e. user communities) and uses the results of the crowdfunding campaign to redefine specific roles across the value chain.

6. Conclusions and Future Research

Primarily considered as a funding mechanism for game development, crowdfunding is rapidly gaining importance in the digital game industry thanks to a series of implications as-

sociated with online fundraising. This research found that the benefit of using crowdfunding goes well beyond fundraising as it unifies the channels that bring capital, technical and market knowledge from the crowd into the game. This finding leads to the exploration of the new complex system of interaction between game developers and value chain stakeholders.

The analysis of 8 case studies has led to two major conclusions. First, the use of crowdfunding confirms the relevance of the value chain as a mental model for strategic decisions but it also advances the need to update it by examining the consequences of crowdfunding on the set of relationships within the industry, the emergence of a new user community, and the existence of a portfolio of strategic choices in developers' hands. Crowdfunding brings in fact an element of novelty to the existing approach to the value chain. The game industry value chain cannot be included in any of the existing categories displayed in Figure 2 with the need of a new theoretical approach to value chain mental model. Its characteristics are distinctive, identifying a new use of the value chain where the user community actively participates in a series of value adding activities thus modifying the set of actions (and of relationships) available to game developers. Second, cases suggest to analyze crowdfunding as a form of technological platform enabling new forms of collaboration and competition. Customers (i.e. the user community) engage in a series of value adding activities modifying the set of actions (and of relationships) available to game developers and establishing close collaboration with developers. At the same time, new competitive dynamics arise between developers and traditional stakeholders (i.e. publishers and distributors), facilitating the delivery of most successful projects to the market.

At least three directions for future research exist. First, there is still lack of knowledge about the effects of crowdfunding on both entrepreneurial decisions and value creation activities in the creative industries. Further studies in this direction would allow researchers to understand the effects of social capital on fund-seeking decisions, guide entrepreneurs in

the design of crowdfunding campaigns, and maximize the potential of crowdfunding in awareness- and attention-building. Second, literature misses an accurate mapping of the different sets of interaction among entrepreneurs, crowdfunding platforms and the crowd to identify emerging business models and new forms of value creation. Third, fresh research is needed to understand the characteristics of crowdfunding strategies as platforms. A multiple cases strategy can help in this sense by defining direct and indirect network effects generated by the competitive and collaborative dynamics between value chain actors and the nature of the inter-modal interaction across the value chain. Research could explain the economics of crowdfunding with a special focus on reward-based crowdfunding, and further develop the findings of Agrawal, Catalini and Goldfarb (2014).

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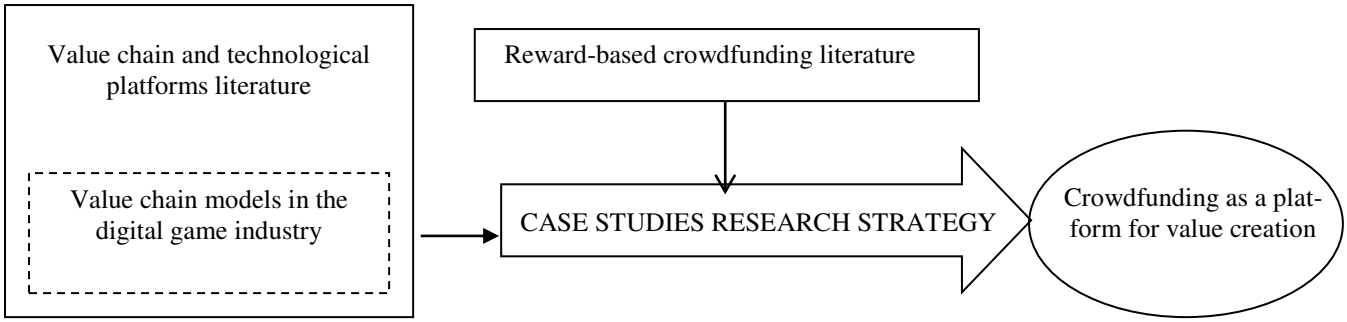

Figure 1 – The structure of the paper.

Value chain	***Value network***	***Business ecosystem***	***Value grid***	***Value constellation***
A series of value-creating activities. The appropriate degree of activities disaggregation depends on their economics and the purposes for which the value chain in being analyzed (Porter, 1985)	A series of intertwined value chains where some nodes are simultaneously involved in more than one value chain (Li and Whalley, 2002)	Value networks as business ecosystems where the value proposition is offered by a group of companies which are mutually complementary (Clarysse et al., 2014)	Value creation is multidirectional (rather than linear) allowing companies to map out novel opportunities and threats along vertical (upstream or downstream from the adjacent tiers in their existing value chain), horizontal (spanning similar ties in multiple value chains) or diagonal pathways (looking across value chain and tiers) (Pil and Holweg, 2006)	The reconfiguration of roles and relationships among a constellation of actors (i.e. suppliers, business partners, allies, customers) mobilizes the creation of value in new forms and by new players leading to a value-creating system that co-produces value (Normann and Ramirez, 1993)

Table 1 - Mental models of value chain.

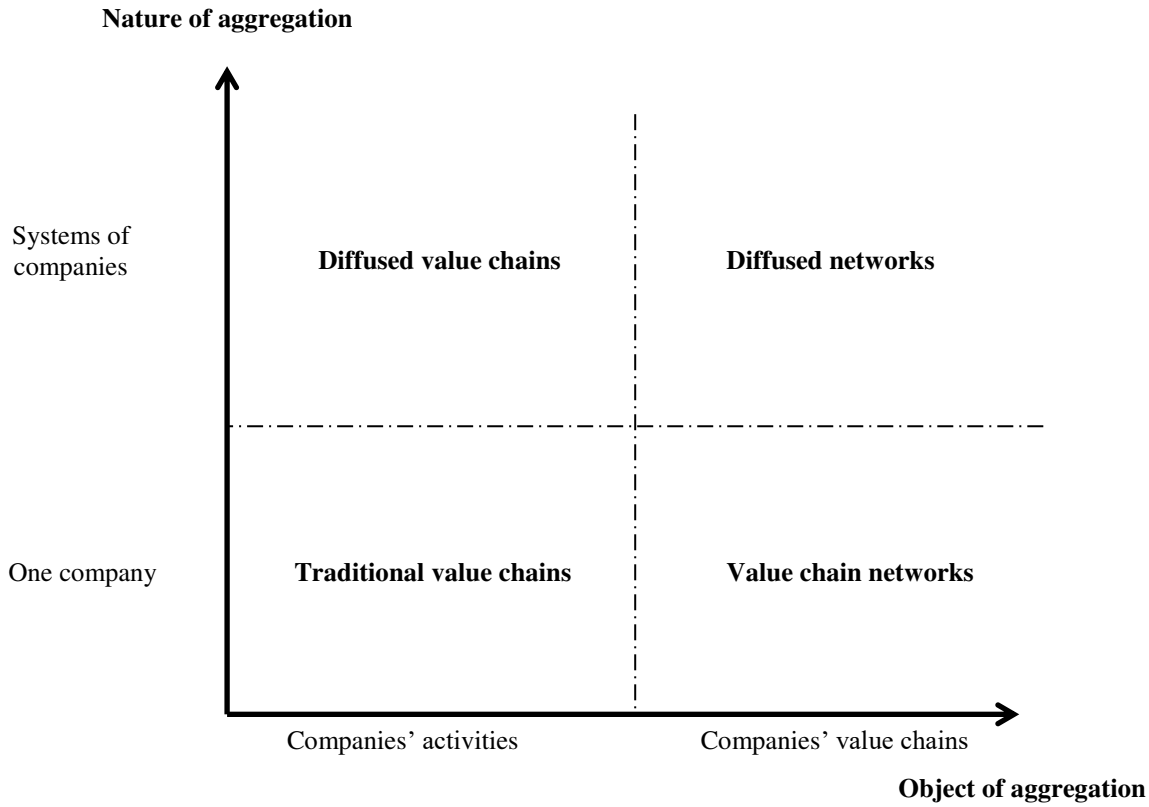

Figure 2 – A conceptual framework for value chain mental model literature.

Categories	Mental model	Definition	Reference
Traditional value chain	*Value chain*	A series of value-creating activities	Porter, 1985
	Virtual value chain	The result of moving a number of value-adding activities from the marketplace to the marketspace through and with information	Rayport & Sviokla, 1995
Diffused value chain	Vertical architecture	The overall structure of a firm's value chain and it includes the choice of where to participate in the value chain, how to interface with internal and external suppliers and buyers at each stage of the value-added process, and vertical and horizontal relations, including transfer pricing, resource allocation among SBU's, and managing divisional incentives	Jacobides & Billinger, 2006
	Value chain b-web	The value chain where the context provider defines the goals and coordinates the integration of value contributors, controls the design of the product and choreographs the key steps in value integration	Tapscott, 2000
Value (chain) network	Value chain network	The solution (including Network Organizations, Virtual Corporations, and Value-adding Partnerships) that enables meeting the constantly changing needs of the customer at low cost, high quality, small lead times and high variety	Talluri et al., 1999
	Value chain architecture	a conscious design of the network structure consisting of suppliers, manufacturers, distributors and customers in order to maximum the value creation for the focal firm	Holweg & Helo, 2014

	Value network	The result of the deconstruction of value chain due to lowered transaction costs that enable the diversity of players, strategies and business models and the creation of multiple entry and exit points	Li & Whalley, 2002
Diffused network	Virtual value chain orchestration	A way of creating and capturing value by structuring, coordinating, and integrating the activities of previously separate markets, and by relating these activities effectively to in-house operations with the aim of developing a network of activities that create fundamentally new markets	Hinterhuber, 2002
	Value grid	The vertical, horizontal and diagonal integration of different companies' value chains creating new pathways to enhanced performance	Pil & Holweg, 2006
	Radix organization	The radix organization acknowledges the unique competencies of other organizations, and tends to link them into its value chain by utilizing the collective resources of firms located along the value chain	Schneider, 2002
	Value constellation	Network of actors and their relationships that mobilize customers to create their own value from the company's various offerings	Normann & Ramirez, 1993
	Business ecosystem	Value networks refer to business ecosystems where the value proposition is offered by a group of companies which are mutually complementary	Clarysse et al., 2014

Table 2 - Categories and definitions in the value chain mental model literature.

Source of funding		Advantages	Disadvantages
Global publishers		Established deals with retailers and distributors; faster and more direct access to market; knowledge of demand; additional support services to studios to finish games development); low risk for titles' market success	Low royalties; low propensity to innovation (i.e. low risk appetite); lack of control of value chain processes; scarce learning of market appetites
Venture capital companies		Availability of funding resources; moderate degree of freedom in product development	Interest in business profitability rather than project innovativeness
Corporate finance	Debt	Scarce engagement of investors in product development and profits sharing	Financial risks related to loan conditions and reimbursement of corporate bonds
	Equity	Possibility to engage investors in long-term investments with risk sharing	Moderate/high engagement of investors in product development and profits sharing
Own capital		Possibility to sell publishing rights to third parties; high degree of freedom in product development; direct relationship with its own customers	Possible limited capital and need to establish deals with publishers, and distributors; need to implement effective marketing policies

Table 3 - Sources of funding for video games development (Adapted from NESTA, 2010)

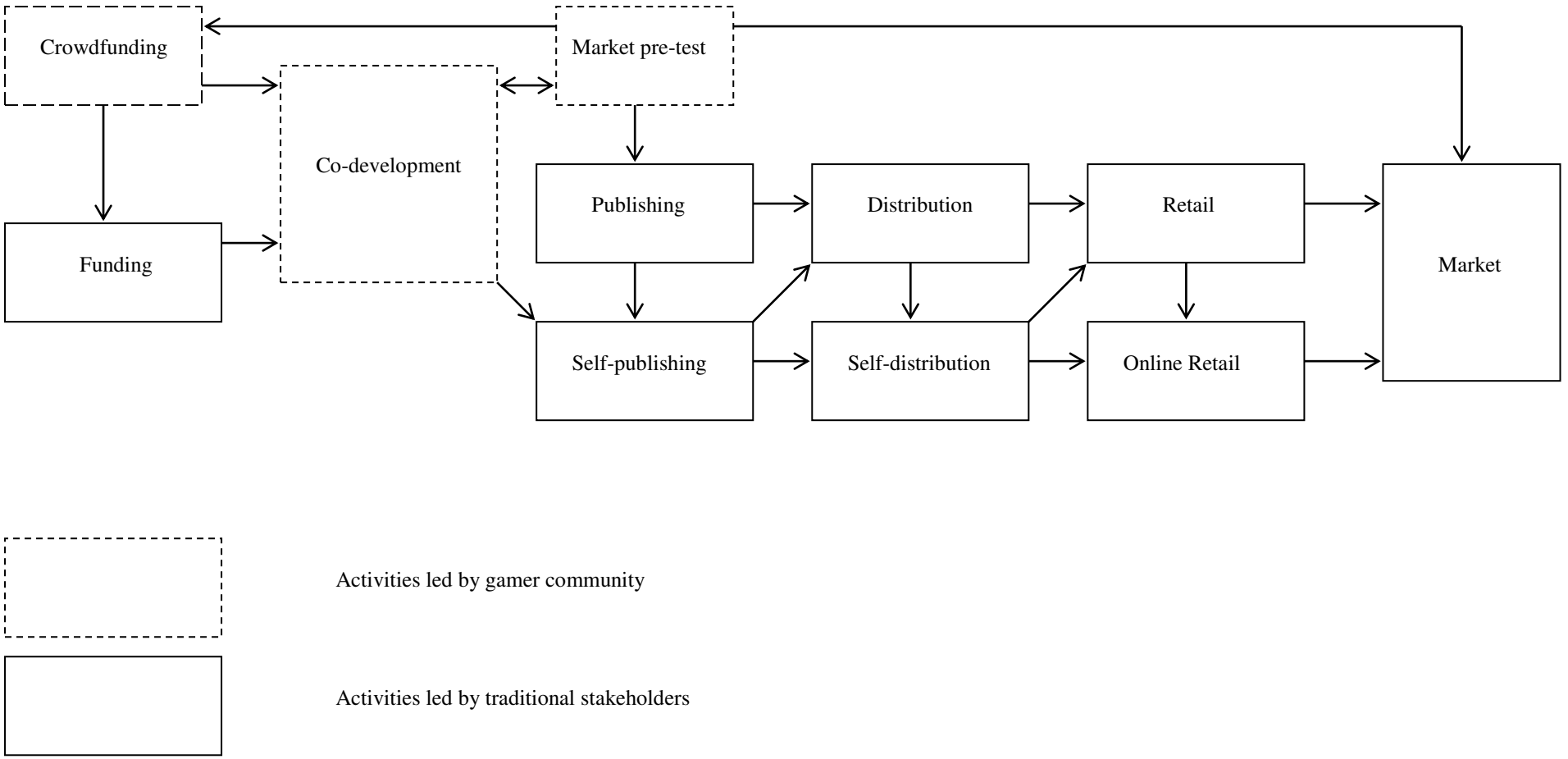

Figure 3 – The crowdfunding-enabled value chain.

Game (Company name)	**Prison Architect (Introversion)**	**Star Citizen (Cloud Imperium Games Corporation)**	**Pillars of Eternity (Obsidian Entertainment)**	**Torment: Tides of the Numenera (inXile Entertainment)**	**Broken Sword 5: the Serpent's Curse (Revolution Software)**	**TerraTech (Payload Studios)**
Country	UK	USA	USA	USA	UK	UK
Year of foundation	2002	2011	2003	2002	1990	2013
Number of employees	1-10	51-150	51-150	11-50	11-50	1-10
Year of game release	2012	2014	2014	2014	2014	2014
Platform for game play	Windows, MacOs, Linux	Windows	Windows, MacOs	Windows, MacOs, Linux	Apple IOS, MacOs, Windows, Android	Windows, MacOs
Crowdfunding	Yes	Yes	Yes	Yes	Yes	Yes
Crowdfunding platform	Own website	Own website and Kickstarter.com	Kickstarter.com	Kickstarter.com	Kickstarter.com	Own website and Kickstarter.com

Raised funding	US$1.5million	US$37.6million	US$4.1million	US$4.5million	US$800K	US$70K
Game available	Yes (alpha version)	Yes (first module)	No	No	Yes	Yes (alpha version)
Total downloads	About 350,000	About 300,000	n.a.	n.a.	n.a.	About 6,000
Phase of development	Under development	First module released	Under development	Under development	Released	Under development
Payment model	To-be-defined	Buy-to-play, Micro-transactions	Buy-to-play	Buy-to-play	Buy-to-play	Buy-to-play

Table 4 – Case studies main features.

		Prison Architect (Introversion)	Star Citizen (Cloud Imperium Games Corporation)	Pillars of Eternity (Obsidian Entertainment)	Torment: Tides of the Numenera (inXile Entertainment)	Broken Sword 5: the Serpent's Curse (Revolution Software)	TerraTech (Payload Studios)
Value chain activities	**Funding**	Own crowdfunding campaign brought high degree of freedom in setting timeline (i.e. no deadline for funding raising) and limit (i.e. no pre-set funding goal)	Kickstarter-based campaign raised US$37.6M with support of 370,000 pledgers	Kickstarter-based campaign raised US$4.2M with the support of 74,000 pledgers	Kickstarter-based campaign raised US$4M with the support of about 34,000 pledgers integrating own funding (i.e. US$300K)	Kickstarter-based campaign raised US$800K integrating own funds (US$500K), PayPal money collection via own website, and easing financial support from professional investors	Kickstarter-based campaign raised US$70K easing the access to other funding sources (e.g. venture capitalists and bank loans)
	Development	Freedom of choice in game development steps, partners (e.g. partial outsourcing to skilled freelancers), game features, time release and game sequels	- Freedom of game development (in modules) given by direct feedback of funding customers and step-by-step product testing. - Partial outsourcing to Behaviour Interactive and VoidAlpha to shorten release time	Crowdfunding campaign was associated with the request to players to provide suggestions and insights on game features	Raised funding asked for a scale-up of initially planned development to meet expectations. Outsourcing to skilled freelancers of specific game development phases	Development phases updates to supporters who were asked for technical (i.e. software) and non technical (i.e. game specifics) comments and suggestions	- The inputs received throughout the crowdfunding campaign have brough in technical and market knowledge, important for the development phase - Development phases have benefited of crowdsourcing in the form of activities livestream on Twichtv, blogging, and participation at public events

	Publishing	Crowdfunding successful campaign enabled a full control over publishing and did not create the need to deal with traditional publishers	Lack of interest of publishers for PC games (considered a niche market) and crowdfunding created room for self-publishing	- Lack of interest of publishers for PC games (considered a niche market) and crowdfunding created room for self-publishing. - Increased freedom to include contents directed to a mature audience without restrictions in terms of morality, violence etc.	Lack of interest of publishers for PC games (considered a niche market) and crowdfunding created room for self-publishing	- Crowdfunding ceased the collaboration with their traditional publishers avoiding tight schedule and milestones in the development process with possible increase of risks associated with earning from royalties - Achievement of increased freedom in game contents - Lack of interest of publishers for 2D adventure games	Crowdfunding has reduced the financial dependence on publishers and has put the developer in a position to choose whether or not working with publishers
	Distribution	The success of crowdfunding campaign allowed distribution via Steam platform and own website	Increased control over the value chain led to distribution via own website, Steam platform, and GOG	Distribution via own web site enabled by the control over the entire value chain	Increased control over the value chain led to distribution via own website, Steam platform, and GOG Hard copies to be shipped to pledgers over US$45	Digital distribution only (i.e. via Steam and GIG for the PC market, Apple App Store and Google Play for smartphones) with higher profit margins and opportunities for costs minimization	Distribution via own web site and Steam

	Market	- The control over the value chain required improved customer relationship, the full exploitation of Steam's social platform attributes (i.e. use of forum for gamers), the development of a customer support and a marketing strategy (to be delivered via mailing list, blog, and videos). - A game tutorial was developed and an alpha version sold to pretest the game	Crowdfunding and crowdsourcing created high expectations in customers that pre-tested game modules	Game promotion during the crowdfunding campaign and product pretest in the development phase	- Crowdfunding established a close connection to the the relevant market, allowing gamers to promote the game themselves (i.e. technical feedback on the game highly encouraged). - The active engagement of players' community was considered a key asset.	Crowdfunding opened multiple channels of communications with customers (e.g. online forums, Kickstarter web page, Faceboob and Twitter dedicated pages, and email) and helped the success of the game as it enabled the word-of-mouth communications among gamers.	Crowdfunded game as a community-driven project that enables a direct link between gamers and developer, generating a flow of feedback, new segment of players, and product validation throughout its development

Table 5 – Case studies disentangled in value chain activities. Data and information as collected from interviews at CEO/COO level.