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A New Conceptual Model for Business Ecosystem Visualization and Analysis

Luiz Felipe Hupsel Vaz *
E-mail: felipe.hupsel@coppead.ufrj.br
Universidade Federal do Rio de Janeiro – COPPEAD/UFRJ
Rio de Janeiro, RJ, Brasil.

Antonio Roberto Ramos Nogueira
E-mail: nogueira@coppead.ufrj.br
Universidade Federal do Rio de Janeiro – COPPEAD/UFRJ
Rio de Janeiro, RJ, Brasil.

Marco Aurélio de Souza Rodrigues
E-mail: marco.rodrigues@coppead.ufrj.br
Universidade Federal do Rio de Janeiro – COPPEAD/UFRJ
Rio de Janeiro, RJ, Brasil.

Paula Castro Pires de Souza Chimenti
E-mail: paula.chimenti@coppead.ufrj.br
Universidade Federal do Rio de Janeiro – COPPEAD/UFRJ
Rio de Janeiro, RJ, Brasil.

* Endereço: Luiz Felipe Hupsel Vaz
COPPEAD-UFRJ, Rua Pascoal Lemme, 355, Ilha do Fundão, Rio de Janeiro/RJ, 21941-918.

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Resumo

O presente estudo teve por objetivo plotar os efeitos de externalidade de rede e de *softwares superstars* na visualização e análise de ecossistemas de negócios. O resultado foi possível por meio da coleta de resultado de vendas de jogos, a partir de um *site* da indústria, associando cada venda a um consumidor único e utilizando um *software* de visualização de redes. O produto final foi um gráfico que mostra o posicionamento estratégico de editores e plataformas, servindo como ferramenta estratégica para acadêmicos e profissionais. A abordagem é escalável para outras indústrias e pode ser usada para apoiar a análise de fusões, aquisições e alianças.

Palavras-chave: ecossistema de negócios; análise de redes; *videogames*; inteligência competitiva; mercados mediados por plataformas.

Abstract

This study has the objective of plotting the effects of network externalities and superstar software for the visualization and analysis of industry ecosystems. The output is made possible by gathering sales from a tracking website, associating each sale to a single consumer and by using a network visualization software. The result is a graph that shows strategic positioning of publishers and platforms, serving as a strategic tool for both academics and professionals. The approach is scalable to other industries and can be used to support analysis on mergers, acquisitions and alliances.

Key words: business ecosystem; network analysis; videogame industry; competitive intelligence; platform-mediated markets.

Introduction

Recent academic research in strategy and competitive intelligence has increasingly focused on interfirm relationships. The value network concept (Brandenburger & Nalebuff, 1996) has evolved into a business ecosystem analysis, where firms coexist and establish interdependent and symbiotic relationships (Moore, 1996). This leads to a complex pattern of links and relationships between companies (Iyer, Lee, & Venkatraman, 2006).

Studies have been dedicated to plot such relationships in a graph using various network visualization techniques (Basole, 2009; Basole & Karla, 2011; Iansiti & Levien, 2004; Iyer *et al.*, 2006; Venkatraman & Lee, 2004). The main objective is to portray the complexity of these relationships in a clean and aesthetically pleasing way, so that it can provide insights into the dynamics of the ecosystem and strategy development.

Some technology driven industries are subjected to network effects (Shapiro & Varian, 1999) and the occurrence of superstars (Rosen, 1981). This means, respectively, that the value of a network is proportional to the number of users on it, and that some specific software titles (like *Mario*, in videogames) or artists (like *The Beatles*, in music) of exceptional quality yield a disproportionate payoff.

This study has the objective of bringing these considerations into network visualization, while suggesting a new technique: bringing the consumer into the graph. Furthermore, it focuses on a partial set of players (the platforms, publishers and consumers) to get a cleaner plot. Hence, this study provides a richer and more relevant visualization of interfirm relations in the videogame ecosystem.

This industry was chosen due to three main reasons. First, it's a high technology setting, which means that support from the complementors network is essential for a firm's success (Eisenmann, 2007; Katz & Shapiro, 1994; Shapiro & Varian, 1999). Second, this industry faces the occurrence of superstars (Rosen, 1981). Third, it's a growing and relevant industry: since 2005 it has grown at an annual rate of 8.65% and American consumers spent US$25.1 billion on video games, hardware and accessories in 2010 (Entertainment Software Association [ESA], 2010; Siwek, 2010). Thus, a better understanding of this setting is crucial for companies' decisions.

Theoretical Foundation

This study relies on several theoretical foundations. The literature review begins with an overview of the videogame ecosystem, in order to obtain a better understanding of the different players involved. Afterwards, since videogames are a platform-mediated business, some key concepts are shown. Finally, some previous studies on business ecosystem visualization and analysis are presented.

The videogame ecosystem

The videogame ecosystem comprises several adjacent industries, such as audio and video (Johns, 2006). If mobile gaming is considered, an even broader ecosystem can be drawn, including, for example, telecommunication carriers and smartphones (MacInnes, Moneta, Caraballo, & Sarni, 2002).

An overview of the more mature home and portable console industry, however, can provide a better understanding of the key players analyzed in this paper. The console industry involves six main participants: content providers, software developers, software publishers, platform providers, retailers and consumers (Bradley & Barlett, 2008).

Content providers license their intellectual proprieties to be used in games. The vast majority are either sports (like NBA and FIFA) or film/TV/cartoon licenses. By 1999, the world's top ten publishers had exclusive control over the best licenses (Bradley & Barlett, 2008).

Software developers (or, simply, game developers) are responsible for the creative process. They design and program the games. The development process differs a lot from complex to casual games. The more complex ones could cost up to 20 million to develop and have teams of more than 200 people working on them. These titles could sell for more than US$59.99 and, to be considered a hit, they would have to sell more than 500,000 copies. The casual ones cost from US$50,000 to US$200,000 to develop, but they sell for less, with hits selling 100,000 copies (Bradley & Barlett, 2008; Humphries, 2010).

Software publishers study the market, finance the developers, promote the games and deal with the platform providers. Usually, the publisher retains the intellectual property of the game, even though it was the developer's idea, in exchange for the financing. It is worth mentioning that many publishers have acquired their own game development studios (Bradley & Barlett, 2008; MacInnes *et al.*, 2002; Ofek, 2008).

Platform providers are the actual console manufactures. The main players in the home and portable console industry are Sony, Nintendo and Microsoft. These companies also have a specific sector for game development and publishing, focusing on exclusive titles to generate more value for their hardware (Bradley & Barlett, 2008; Eisenmann, 2008; Ofek, 2008). Each new title reveals the intentions of publishers and developers and influences relations with the platform providers (Venkatraman & Lee, 2004).

The revenue comes from the selling of game titles. Publishers pay royalties to platform providers for each sale, retain their margins and cover their costs. The hardware platform itself is subsidized, being sold usually below its cost, especially if it has been recently released, in order to achieve the maximum number of users. Although new business models like microtransactions and episodic content are getting common, the most significant revenue comes from sales (Bradley & Barlett, 2008; Ofek, 2008).

Retailers physically sell consoles and games. They have a limited catalog, and still play a relevant role in the industry. Digital download stores are becoming relevant, but major titles aren't yet available for digital download, only for in-store purchase (Anderson, 2006; Bradley & Barlett, 2008; Ofek, 2008).

Platform-mediated networks

Markets that have many participants (or sides) brought together by a platform are platform-mediated networks (Basole & Karla, 2011; Eisenmann, 2007; Rochet & Tirole, 2003). Those markets are subjected to network externalities (Shapiro & Varian, 1999) and have room for only a few players (Eisenmann, 2007).

Videogames are two-sided platforms (Eisenmann, 2007; Rochet & Tirole, 2003). The hardware platform is the console itself, one side is represented by the developers/publishers and the other is represented by the consumers (Figure 1). The developers/publishers act as complementors (Brandenburger & Nalebuff, 1996; Shapiro & Varian, 1999), releasing titles for a selected platform.

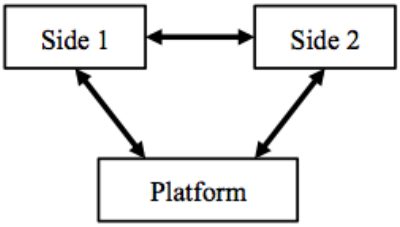

Figure 1. Two-sided Network.
Source: adapted from Eisenmann, T. R. (2007). Platform-mediated networks: definitions and core concepts (p. 3). *Harvard Business School Note, 9*(807-049), 1-34. doi: 10.1225/807049.

There are three main platforms in the home console industry (Wii, PS3, Xbox 360) and three more in the portable business (PSP, DS, 3DS). Some publishers and developers decide to launch their titles in more than one platform at the same time, creating a complex network of interrelations: the videogame ecosystem. Furthermore, publishers and developers that released their titles on several platforms grew in prominence in recent years, highlighting a power shift in the ecosystem from platform providers to game publishers and developers (Venkatraman & Lee, 2004). The competition, therefore, shifts from a firm standpoint to a network perspective (Iyer *et al.*, 2006).

Business ecosystem visualization and analysis

Transforming such complex interrelations in an easy to understand graph, in an aesthetically pleasing way, is no easy task. “Visualization is both art and science” (Basole, 2009, p. 145). The amount of information can be overwhelming and, therefore, a balance between detail, abstraction, accuracy, efficiency, perceptual tension and aesthetics is needed (Basole & Karla, 2011).

Even with those difficulties, the business ecosystem concept is key to strategic assessment. The possibility to map the ecosystem through a graph enables companies to better see strategic alliances and relationships with complementors. This provides valuables insights into strategy formation and implementation (Iyer *et al.*, 2006).

There are two basic elements in an ecosystem visualization study: the vertex and the edge. A vertex is a node that represents a type or class of firm. An edge is a link that connects different vertices and it can be directed (representing some kind of flow) or undirected (Basole & Karla, 2011).

Venkatraman and Lee (2004) used network visualization to analyze the videogame ecosystem. The authors studied the relationships between platform providers (represented in squares) and game developers (represented in circles) over a seven-year period. If a developer had released a game title for a certain platform, a connection line (an edge) between them was established. The size of the squares and the circles are directly proportional to the number of titles released by a developer and available on a certain platform (Figure 2).

For the purpose of this paper, it is also worth analyzing the dynamics behind the determination of the size of each node. There’s no common approach. Iyer, Lee and Venkatraman (2006) used the number of alliances to determine the size of each node. Basole and Karla (2011) considered the global market-share to plot the sizes of each platform.

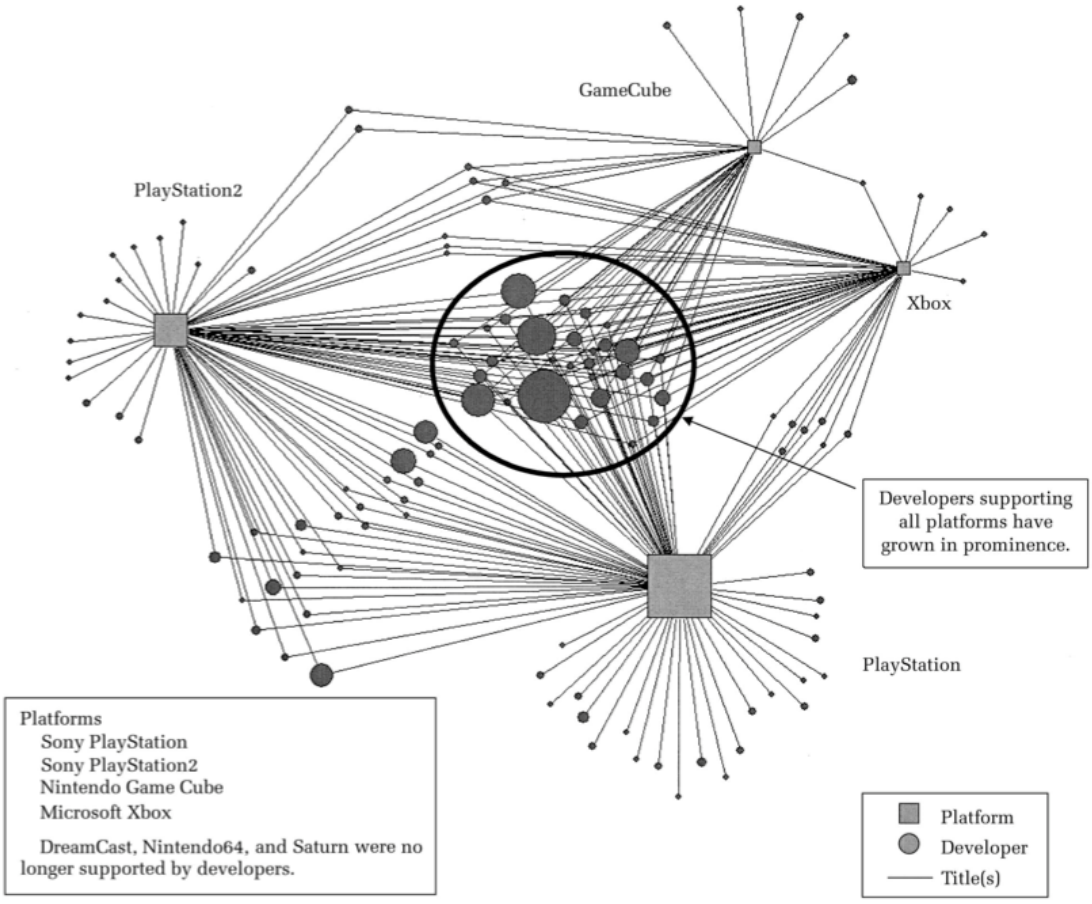

Figure 2. Videogame Network Topology, December 2002.
Source: Venkatraman, N., & Lee, C.-H. (2004). Preferential linkage and network evolution: a conceptual model and empirical test in the U.S. videogame sector (p. 889). *Academy of Management Journal, 47*(6), 876-892. doi: 10.2307/20159628

Superstars

The academic literature is almost exclusively focused on a single dimension of software availability: software quantity (Binken & Stremersch, 2009). For the videogame industry that translates as the number of titles introduced on a certain platform, like in Venkatraman and Lee (2004). However, in platform-mediated markets, the products are complementary and interdependent: the game console and titles (Eisenmann, 2007; Shapiro & Varian, 1999) are subjected to network externalities (Shapiro & Varian, 1999).

In such markets there's the occurrence of superstars (Rosen, 1981). In videogames, these are software titles of exceptional quality, which yield a disproportionate payoff and even positive effects on platform sales (Binken & Stremersch, 2009). Hence, for the videogame industry, a superstar title can't be treated in the same manner as a regular one, since its sales are substantially different (Figure 3) and they generate positive network effects (Shapiro & Varian, 1999), attracting new customers and complementors to a specific platform.

In fact, this phenomenon is often seen in the industry. Activision Blizzard, the biggest videogame publisher in North America, states that "our two key franchises of **Call of Duty** and **World of Warcraft** accounted for over 62% of our net revenues, and a significantly higher percentage of our operating income, in 2010" (Activision Blizzard, Inc, 2010, p. 5). "The company released twelve titles in 2010" (Activision Blizzard, Inc, 2010, p. 8).

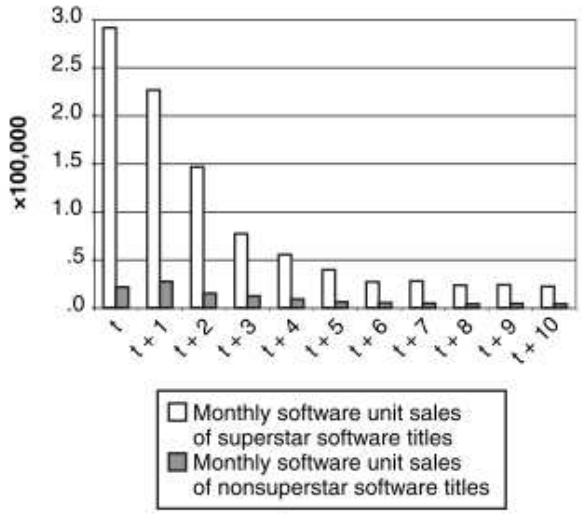

Figure 3. Software Unit Sales of Superstar and Nonsuperstar Software Titles.
Source: Binken, J. L. G., & Stremersch, S. (2009). The effect of superstar software on hardware sales in system markets (p. 90). *Journal of Marketing, 73*(2), 88-104. doi: 10.1509/jmkg.73.2.88

Halo 3, a superstar title published by Microsoft, sold over 8 million copies. In comparison, that's more than all 46 games published by 505 Games, an Italian videogame publisher, combined. Even though Microsoft released almost the same number of games as 505 Games, the company sold approximately 14 times more (Table 1) due to superstar franchises, such as *Halo*, *Gears of War* and *Forza Motorsports* (VGChartz, n.d.).

Table 1

Comparison between Publishers

Publisher	Microsoft	505 Games
Supported Platforms	Xbox 360	DS, Wii, PSP, PS3, Xbox 360
Number of Titles Released	45	46
Sales Figures (number of copies sold)	59,480,000	4,170,000

Note. Source: Authors with data from VGChartz. (n.d.). *Software Totals*. Database [online] Retrieved from VGChartz: http://www.vgchartz.com

It's clear that an approach to business ecosystem visualization and analysis that incorporates the effects of superstars would be useful. The output considering node sizes proportional to the number of titles released can be very misleading. In the previous example, Microsoft would be as relevant as 505 Games, leading to an incorrect supposition. A more precise way is to consider the actual overall sales of each title from each publisher for each platform. This can capture the effects of superstars and provide better insights.

Research Method

Data

The present study used data acquired from the tracking website VGChartz, which gathers sales information on all videogame platforms by publisher and by title. This source is frequently used by academic studies concerning the videogame market (Bond & Beale, 2009; Goel, Hofman, Lahaie,

Pennock, & Watts, 2010; Zawislak, Larentis, Machado, & Andrade, 2009). The decision to include only publishers and platforms (and exclude developers, for example) was taken due to the recommendations by Basole and Karla (2011): try to avoid an overwhelming amount of information by balancing aspects such as detail and aesthetics.

Data on total sales by publisher, title and platform were gathered during September 2011. The selected platforms were the most recent ones: Microsoft's Xbox 360; Sony's PlayStation 3 and PlayStation Portable; and Nintendo's DS, 3DS and Wii. By getting the sales for each title, it was possible to capture the effect of superstars, and not only the number of games released. The data was then sorted by platform and by publisher. Next, the sales by publisher were consolidated, leading to a dataset of sales by publisher for each of the considered platforms. Different subsidiaries of the same company were consolidated into the holding company. For example, Rockstar (publisher of GTA) and 2K (publisher of **Bioshock**) were combined into Take Two Interactive, the holding company.

The next steps were the most crucial ones. First, the main concept of this suggested approach is based on the fact that videogames are a two-sided network mediated by a platform. Gamers represent one side, game developers/publishers are the other, and the platform is the console, as shown in Figure 1.

Next, it was assumed that a single sale is correspondent to a single consumer. That's a very reasonable assumption, since it's extremely rare for one person to buy the same game twice for the same platform. And since we had the sales by publisher and by platform, we could tell the number of gamers that played titles from any publisher in the studied platforms.

Finally, every actor in the ecosystem was connected. If a publisher had released a single title for a certain platform, they were connected. If a gamer bought a publisher's title, he was connected to both publisher and the respective platform the game was made for. Moreover, since we had the total number of gamers (assumed from the number of sales) that bought titles from the same publisher, **n** consumers were connected accordingly, where **n** is the total number of gamers (Figure 4). This rationale was repeated for all publishers and all platforms.

However, since several publishers had more than 10 million units sold, instead of considering each consumer as a node, we considered each consumer node as being a group of 100,000 gamers. This decision had to be made or otherwise the data would have been impossible to handle. Hence, if a publisher had a total of 400,000 games sold to a certain platform, considering all titles, it would have 4 consumer nodes connected to it and to the respective platform.

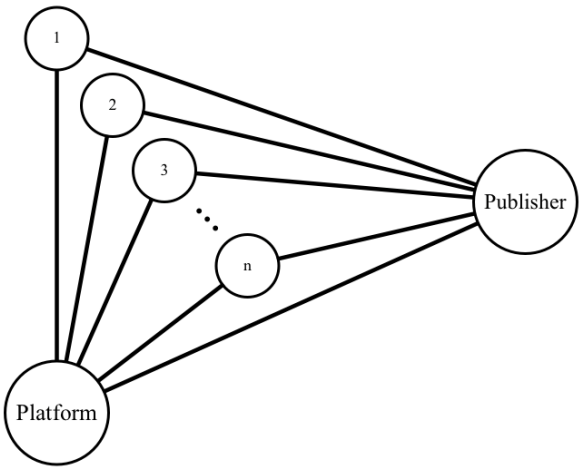

Figure 4. Consumers Linked to Both Platform and Publisher.
Source: Authors.

There are yet two more important points to consider: the force between vertices and the graph direction. As for the force, in our approach, all edges have the same weight. NodeXL allows us to assign an edge weight, which directly influences the attractive force on selected vertices: the bigger

the weight, the greater is the force. Our approach doesn't require different weights. Actually, since all edges have the same weight, the more connections a publisher and a platform have, the closer they will be pulled together. This has the same effect as if we had assigned weights equivalent to the number of consumers connected to a certain publisher and platform, with the downside of not showing the consumers on the graph.

Graph direction concerns the direction of the edges connecting vertices. In a directed graph, an edge connecting point A to point B is different from an edge that connects point B to point A. Since the relations we study work both ways, our graph is undirected, meaning that an edge connecting point A to point B is the same of an edge connecting B to A.

Visualization software and algorithm

There are several network analysis and visualization software tools available. Guess, Pajek and UCINet are some (Adar, 2006; Batagelj & Mrvar, 1998; Borgatti, Everett, & Freeman, 2002; Heer, Card, & Landay, 2005). However, some require the knowledge of a certain programming language and others have complex data handling and graphing. We found NodeXL (Smith, Shneiderman *et al.*, 2009; Smith *et al.*, 2010) to be more intuitive and direct.

NodeXL is an open-source template for Microsoft Excel and it's available for download for free. Data can be inserted in an Excel spreadsheet: connected nodes should be inserted in adjacent columns. Then the template runs the algorithms, plots the graphs and is able to calculate several metrics. Not surprisingly, NodeXL is being used in recent academic research (Hansen, 2011; Smith, Hansen, & Gleave, 2009; Shamma, Kennedy, & Churchill, 2009).

NodeXL possesses force-based algorithms built into its interface. The objective of such algorithms is to assign forces to edges and nodes, so that connected nodes are pulled closer together and unconnected ones are pushed apart. This procedure is applied to the whole system and repeated iteratively until it comes to a state of mechanical equilibrium (Fruchterman & Reingold, 1991).

The chosen algorithm was the Fruchterman and Reingold (1991) one, mainly due to its capacity to plot the graph in a very clean and aesthetically pleasing way. The downside was the processing time. Since the final database had thousands of entries, the algorithm took quite some time to process.

It is worth mentioning that the use of a two-step approach, as suggested by Brandenburg, Himsolt, and Rohrer (1996), didn't provide a suitable output. The two-step approach consists of running a first algorithm followed by a second algorithm, different from the first. We ran several tests using the Kamada and Kawai (1989) algorithm followed by Fruchterman and Reingold (1991) on Pajek. However, the result using only the Fruchterman and Reingold (1991) algorithm on NodeXL provided a better result.

NodeXL is also able to calculate several metrics once the graph is plotted. Those metrics include betweenness centrality, closeness centrality, eigenvector centrality, clustering coefficient and graph density. However, we deliberately chose to show only one of these metrics. The reason is that the main purpose of this article is to propose a new approach to ecosystem visualization and analysis. Thus, we can't compare these metrics with previous approaches. The only metric that we analyze is Vertex Degree, which measures the number of connections a certain node has.

Analysis and Discussion

The main objective of this research is to suggest a new conceptual model for business ecosystem visualization. The idea is to produce a graph that can capture the effects of superstar titles and network effects. This leads to many improvements over the current approaches.

The greater the sales of a publisher on a platform, the closer it will be to that platform. This happens because the algorithm pulls together connected nodes and repels unconnected ones. Since a publisher that has had enormous success with a certain platform will have many users connecting it to the platform, the publisher will be pulled closer together to that platform. The opposite happens if this publisher hasn't sold a single title for another platform: it will be pushed apart. This fact results in the first major improvement: this approach is able to show strategic positioning of publishers and platforms.

In order to make this concept more clear and before continuing to the final result, a section of the ecosystem as drawn is shown in Figure 5. The platforms are the grey spheres, the publishers are the black ones and the sizes are proportional to the number of links. That's the second major improvement: the sizes of each node reflect not the number of titles released, but the actual sales, showing the effects of superstar software. The small dots are the consumer groups, which are connected to both publishers and platforms by as many edges as the number of consumer groups.

For example, Sony Computer Entertainment (SCE) is a publisher owned by Sony that has a strategy of releasing games exclusive to its platforms. Therefore, it's connected only to those platforms and it's far away from the others. The French company Ubisoft, on the other hand, publishes on all platforms. However, Ubisoft sales are small for PSP and 3DS compared to the other platforms. Hence, the company is pulled closer to the platforms in which its presence is more relevant.

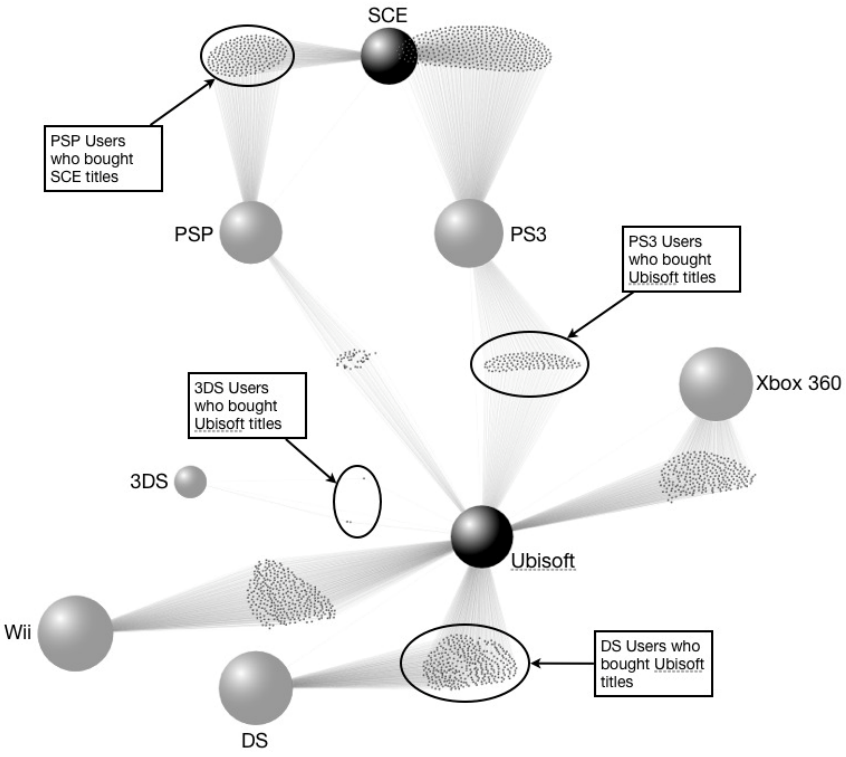

Figure 5. A Section of the Ecosystem.
Source: Authors.

The same principle is used throughout the ecosystem. It's important to mention that the small dots representing the consumers were faded out, in order to improve visualization. The edges, however, remain and they are an indicative of how many users are present. The final result is shown in Figure 6.

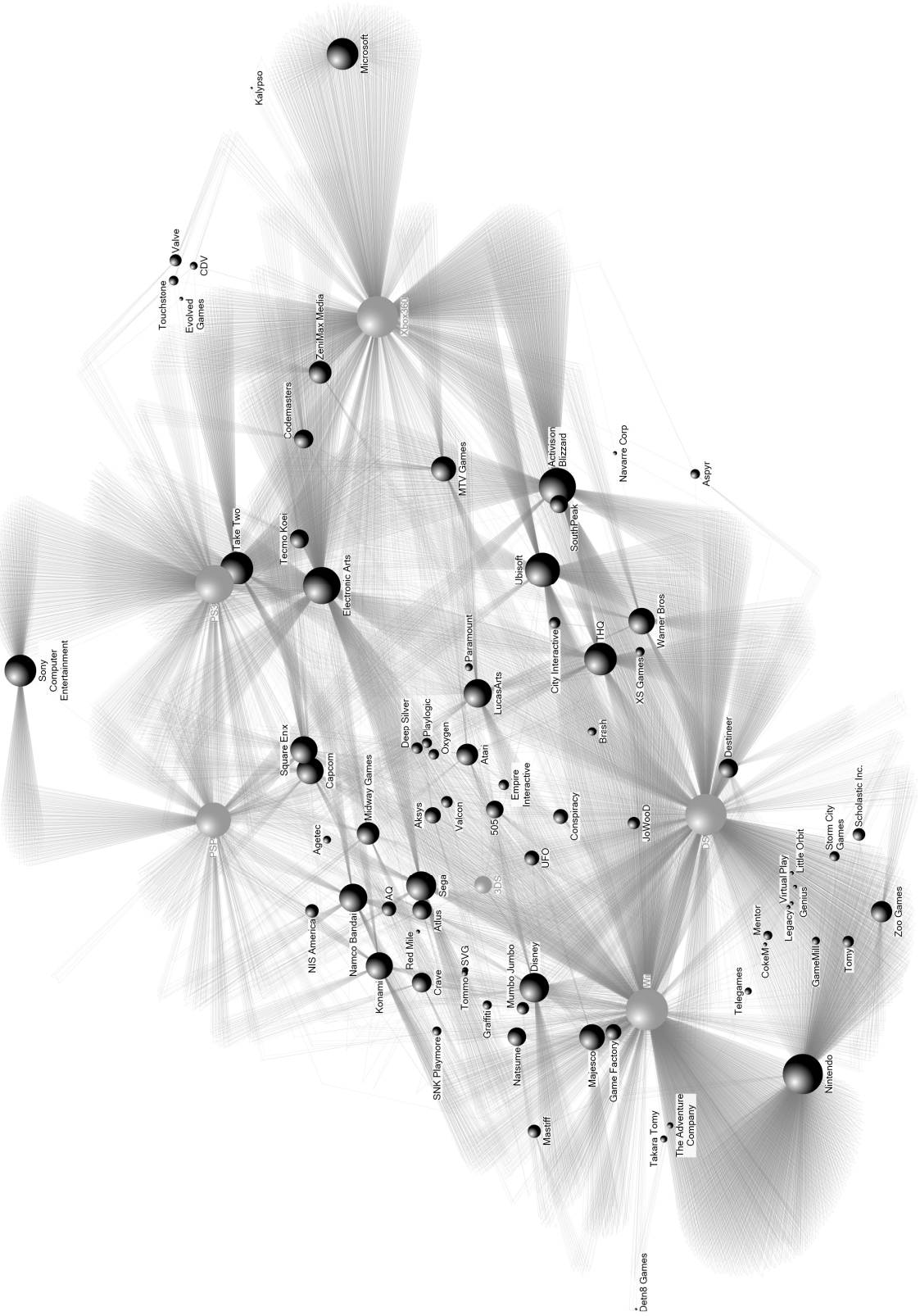

Figure 6. The Videogame Industry Ecosystem Using the Suggested Approach.
Source: Authors.

Publishers that are present on all platforms won't all be in the middle, like in Venkatraman and Lee's (2004) approach. For example, Disney is a publisher well known for its games and characters with a more casual appeal. The company is closer to Nintendo's platform, which shares the same

positioning. Take Two, on the other hand, known for hardcore titles such as GTA and Bioshock, is closer to PS3 and Xbox 360, the more hardcore-gamer oriented platforms.

This insight can be very useful for the industry. First, a developer seeking financing for its production can now have a better understanding of the several different publishers according to strategic positing. This makes the decision of whom to approach much easier and more straightforward: seek the publishers more closely associated with the desired platform. Figure 7 illustrates this exact point, using Wii as an example. All vertices that weren't connected to the platform were removed, only the publishers that actually had released titles to the Wii remain.

Figure 7. Wii and Publishers.
Source: Authors.

Second, the graph can be used to support analysis on mergers, acquisitions and alliances. A company can identify firms with similar strategic positioning and try an alliance, a merger or an acquisition that can improve synergies, for example. Differently, if a publisher desires to enter a platform that it never has before, maybe it can partner with a more experienced company.

Third, it provides insights for platform providers. All three main competitors have their own exclusive publishers and these play a key role, as can be seen from the sizes of the nodes labeled Nintendo, Sony Computer Entertainment and Microsoft. If a different company desires to enter the home/portable console market, strong support from an owned publisher seems vital. They are, in fact, more relevant than several independent publishers that are present on all platforms.

This can be concluded from several comparisons from the graph. For example, 505 Games and Microsoft. Even though 505 Games has released more titles, and on all platforms, its size is way smaller than Microsoft's, really demonstrating the actual performance and relevance of the firms.

Table 2 takes this analysis even further. Microsoft has a degree of 596 and 505 Games has a degree of 47. Degree is a metric that shows the number of connections to a certain node. Microsoft has a higher degree than 505 Games, which means that Microsoft plays a more relevant role in the industry ecosystem.

Table 2

Vertex Degree: Top 50 Most Relevant

Vertex	Degree	Vertex	Degree
Wii	4074	Atari	100
DS	3430	Zoo Games	91
Xbox360	3419	Crave Entertainment	68
Nintendo	2689	Codemasters	67
PS3	2072	Atlus	64
Electronic Arts	1758	Destineer	63
Activision Blizzard	1587	Tecmo Koei	59
PSP	1083	Natsume	56
Ubisoft	1080	SouthPeak Games	50
Take-Two Interactive	744	505 Games	47
THQ	699	3DS	46
Sony Computer Entertainment	602	Aksys Games	37
Microsoft	596	Game Factory	33
Sega	443	UFO Interactive	29
Disney Interactive Studios	402	Conspiracy Entertainment	29
LucasArts	323	AQ Interactive	27
Namco Bandai	317	NIS America	22
Square Enix	269	Mastiff	21
Konami	262	Scholastic Inc.	19
Capcom	254	JoWooD Entertainment	18
Warner Bros. Interactive	233	Mumbo Jumbo	18
Majesco	201	Valve	17
MTV Games	179	Valcon Games	16
ZeniMax Media	120	City Interactive	15
Midway Games	116	Deep Silver	15

Note. Source: Authors.

It is worth mentioning the main role of platform providers. They hold the highest degrees, showing their importance relative to publishers. This contrasts with the findings of Venkatraman and Lee (2004). Nintendo, for example, plays a huge part as both publisher and platform provider. This is particularly interesting, as the company will launch its new home console, called WiiU, by the end of 2012. Will this strong position play a significant role on platform evolution? That's an intriguing question that can be answered with further research once the new platform is released.

Conclusion

This new approach is a real improvement on the visualization and analysis of business ecosystems. Since platforms and superstars are the heart of many emerging and high growth markets this study opens new horizons. This paper builds on previous research and brings a new perspective into the academic literature.

The main objective was to bring the effects of network externalities and superstar products to the visualization and analysis of industry ecosystems. The output was made possible by gathering sales by publishers and by platforms, associating each sale to a single consumer and plotting these relationships. The result was a graph that shows publishers' strategic positioning and node sizes that actually reflect the relevance of superstars.

Limitations

This study isn't without its limitations. The visualization mostly depends on the accuracy of the data. Hence, it's possible that some relationships weren't captured. Also, the paper deliberately set aside some industry players, such as the developers, in order to improve visualization. In addition, the research didn't capture mobile platforms such as Apple's iOS and Google's Android. Data is fragmented and difficult to validate on those platforms. Finally, since most of the AAA titles aren't available for digital download yet and customers have to buy the physical media, we decided not to include digital downloads in our research.

Nevertheless, this study has accomplished its goal. It provides a new approach that can be used in other industries and ecosystems that are mediated by a platform and subjected to network effects and superstars.

Future research

Several studies can be derived from this one. Within the videogame industry, a relevant research would be to analyze the impact of the new emerging mobile platforms such as iOS (iPhone, iPod, iPad) and Android on the home/portable videogame industry. A recent report revealed that the portable game market revenue from iOS and Android devices grew from 19% in 2009 to 58% in 2011, Nintendo DS fell from 70% to 36% and Sony PSP dropped from 11% to 6%. The total portable game market estimate was US$2.7 billion in 2009 and US$3.3 billion in 2011 (Flurry Analytics, 2011).

Nevertheless, several developers working on iOS and Android publish their games directly, bypassing the traditional publishing method. This is made possible due to the lower development costs in those platforms. A huge challenge here is to get accurate data on the number of developers, publishers and sales in all of those platforms. The data is very scattered, but some superstar titles are appearing such as **Angry Birds**. The game has already surpassed 500 million downloads (Whitworth, 2011). One can be even more thorough and add to these analysis social games, including games played on social networks such as Facebook.

Further research could also focus on platform evolution. This would be similar to the study by Venkatraman and Lee (2004), but it would use our suggested approach to ecosystem analysis. We believe that such a research could shed light on how important superstars are when a new generation arrives and how they impact user adoption. One could analyze several past generations, investigate how platform evolution took place and even analyze the WiiU launch.

In conclusion, other researches may include virtually any market driven by network externalities. One can study the adoption of social networks by users and make a longitudinal study showing the adoption of Facebook and the decline of My Space, for example. The same can be made to analyze the introduction of new platforms and the adoption by its many sides. Mobile payment, for

example: several carriers, platforms and financial institutions are trying to establish a standard for this type of service. This approach can be useful to show the relevant players in the market and highlight potential alliances.

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