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# A Phylogenetic Classification of the Video-game Industry's Business Model Ecosystem

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**Abstract.** Since 1990, Business Models emerged as a new unit of interest among both academics and practitioners. An emerging theme in the growing academic literature is focused on developing a system that employs business models as a focal point of enterprise classification. In this paper we attempt a historical analysis of the video game industry business model evolution and examine the process through the prism of two-sided market economics. Based on the biological school of phylogenetic classification, we develop a cladogram that captures the evolution process and classifies the industry's business models. The classification system is regarded as a first attempt to provide an exploratory and descriptive research of the video game industry, before attempting an explanatory and predictive analysis, and introduces a system that is not governed by the industry's specific characteristics and can be universally applied, providing a map for researchers and practitioners to test organisational differences and contribute further to the business model knowledge.

**Keywords:** Business Models, Video-game Industry, Cladistics Classification, Evolution

## 1 Introduction

The term "Business Model" continues to attract significant attention on behalf of both academics and practitioners since 1995. However, contrary to how often the term is used, current literature is far from converging in providing a unanimously accepted definition of what a business model actually is [1]. The lack of consensus among scholars over what exactly a business model is has not prevented them from employing the notion at the centre of management theory and strategic management,

opening new paths of research [2]. In this Section we aim first and foremost, based on the literature that governs business models, to establish the theoretical foundations of business model evolution through the three evolutionary principles, namely selection, variation, and replication.

Business models are regarded as something more than a simple recipe or blueprint for organizational change. According to [3], the business model is an opportunity-centric concept while strategic management is an environmental-centric one, rendering business model an integral part of the firm's strategic decisions regarding value creation and capturing. Compared to strategic management, it emphasises on cooperation, partnership and value creation. Consequently strategic management and business models are conceptually complementary [4]. Based on the above, the business model is regarded as a source of innovation and competitive advantage, providing support to the argument that places it at the core of strategic management ([5] and [6]). In other words, business models are viewed as a unified approach, on behalf of the enterprise, to meet different sets of success criteria both financial and non-financial ones ([7] and [8]), circumventing the narrow boundaries of enterprises, and in some cases industries, and has attracted much academic interest focusing on industrial and organisational change. Based on the above, it can be safely argued that business models are selected based on survivability maximization terms ([5] and [9]).

We have already discussed that business models can be a source, or facilitate the creation, of sustainable competitive advantage on behalf of the enterprise. Both intrinsic and extrinsic factors force enterprises to change their corresponding business models to realise both short and long-term strategic goals [10]. The mechanisms that govern this change, usually termed as business model innovation, have also been central to the growing literature. In [11], the authors examined the two sources of change, internal and external, and described these mechanisms in terms of their feasibility and effectiveness. Further work regarding the dynamics of business model innovation includes [12], the authors of which developed a theoretical framework that distinguishes between two interdependent processes, namely design and reconfiguration. The success of the process is governed by experimentation or imitation of other successful examples, usually derived from a given industry. Alternatively, the authors of [13] examined the evolution of electric vehicles business models through the prism of path dependencies. Several studies, including [14], provide evidence that the innovation process is strongly correlated with superior enterprise performance. Consequently, business models can be regarded as a focal point of replication ([1]; [4]; [11]; [12]; and [13]) and variation as the result of business model innovation ([1]; [2]; [10]; [14] and [17]).

In this paper we aim to contribute to the literature by employing business models as a conceptual tool and the focal point of enterprise classification. To achieve that, we shift our viewpoint to the biological school of classification, namely cladistics taxonomy, in order to organize an industry's business models into homogenous groups. We employ the dynamic, and relatively young, industry of video games as a typology to apply this new classification approach and examine its effectiveness. The short lifespan of the video-game industry allow us to perform a more detailed and thorough historical analysis of the industry which is essential for the classification process. As we will describe in Section 3, cladistics classification presents a series of scientific advantages and it is a well-developed and philosophically robust taxonomy

approach. The output of our analysis, the cladogram, could be regarded as a map of the evolution process of the industry's business models and could be used to identify the factors that affected this process through time. Our results are interpreted via the prism of a two-sided market networking providing empirical evidence that aims to explain the evolution of the industry's business models in order to meet the strategic goals imposed by the two-sided morphology of the industry's market [41].

## 2 Related work

An emerging theme of the literature revolves around business model classification ([15] and [16]) providing an initial step towards industry analysis and profiling [17]. Business model classification is mainly focused on fast growing and technologically driven industries, similar to the video game industry, because they provide a fertile ground for business models' evolutionary dynamics exploration. Most of the classification attempts were directed to biotechnology and pharmaceuticals ([16]; [24] and [15]), telecommunication and information industry ([19]; [20]) and e-business models ([21];[22]). Regarding, the development of a formal classification framework, in [23] the revenue streams are employed as a criterion, while in [24], the authors developed a two-dimensional classification framework based on the strategic perspectives and economic and operational factors of the enterprise. On the other hand, in [6], a first analogy is attempted between the biological objects of classification, namely species, and enterprises. Finally, [25] introduced a multi-dimensional e-business model classification system, arguing that the two-dimensional ones are far too limiting.

According to [2], most business model classification approaches are driven by the researcher's knowledge and is followed by a case-study based validation ([26] and [27]) or via the contingency theory ([28] and [15]). Consequently, the taxonomy approaches vary significantly among researchers based on their conceptualization and knowledge. In other words, compared to the biological school of classification, these phenetic approaches, which are based on similarities among the objects of classification are highly subjective [9]. One of the first works that aimed to implement cladistics classification in industrial evolution of manufacturing systems was [9] who argued that cladistics taxonomy provides a classification system that is scientifically more appropriate because of its objectivity.

## 3 Methodology

In this paper we employ the classification methodology as described in [9]. To facilitate discussion we provide a brief, yet solid description of cladistics classification. Cladistics taxonomy in biology classifies organisms based on identifying their most recent common ancestor. Similarities (dictated by *characters* and their corresponding *character states*) among organisms are examined in order to track the evolutionary process. However, the major difference between phenetic

classification and phylogenetic classification is that, in the latter, entities are classified based on their most recent common ancestor and characters are used to identify that ancestor.

Initially the industry has to be selected which formulates a form of classification as well [9]. In our case it is the video-game industry that interests us, albeit the business models that aim to create and capture value through the development, publication and distribution of video games no matter the content of the game (entertainment, fun, engagement, education etc.). In this analysis, we employed an elemental definition of what constitutes a business model based on the works of [30], [31] and [32]. Adopting a more general definition would result in analogies that would erode the descriptive power of our classification. Analogies, in the biological school of classification, are created by grouping entities together using characters inherited from two different ancestors.

### 3.2 Character Development and Selection

In order to determine the characters, a historical analysis is performed to track the milestones of the industry (technological advances, monetisation strategies, customer segments etc.) through the evolution process and identify the appropriate business model characteristics. This process is called *Character Search* and *Selection*. The historical analysis was based on published academic papers or reports that describe the operations of various enterprises through history and how they adapted to various environmental and internal factors. We elaborate further on this matter in Section 4.

The selection of a character is validated through a test of homology [33] and character conflict resolution. The process of character conflict resolution is a dynamic one that requires the construction of several conceptual cladograms followed by direct test of homologies. Character conflicts are the main source of creating analogies. Character conflict resolution takes place continually from the point of character determination, selection and conceptual cladogram creation.

The choice among the various conceptual cladograms is governed by the test of parsimony, which means that the clade with the least possible character changes is chosen, based on the parsimony rule which dictates that evolution follows the shortest path. Based on the outgroup comparison, characters are grouped into derived through evolutionary process (variation) and inherited from the most recent common ancestor (outgroup). This process is called “establishing character polarity”. Finally, after solving the character conflicts that may occur, the nomenclature is established. In this paper we aimed to define archetypes based on informative and commonly used terms by both academics and practitioners [42].

## 4 Data

Performing a historical analysis presents a significant challenge in order to avoid subjectivity during the process [29]. In our work, historical data are used for two purposes. Firstly, we aim to identify the video-game industry business model archetypes, and secondly the characters that are used for classification purposes. We

based our approach on the *Business model Canvas* developed in [34] followed by a video-game industry historical analysis ([29]; [35], [36]; [37]; [38]; [39] and [40]). The Canvas was also used to facilitate comparison among the different archetypes and as a reference point. Through the historical analysis, we created a time series of case studies and proceeded with a comparative examination focused on *Mining for Species* and character search and selection. We constructed several conceptual cladograms, followed by a series of parsimony tests. Character conflicts were resolved via a test of homology and the most parsimonious cladogram was chosen. The process of archetypes identification is dynamic, and as more data become available new business model archetypes could be identified. However, as new species become known, they enrich the already existent cladogram along with the newly acquired characters without having to undergo a whole character and species rearrangement. The business model archetypes (or species) we have identified through our analysis are 11: i) *Outgroup: Electronics Manufacturing*, ii) *Arcade Games Manufacturing* iii) *Console Manufacturing*, iv) *Console Manufacturing-sales-at-a-loss*, v) *Publishing*, vi) *Freemium-game publishing*, vii) *Independent game-developing*, viii) *Third-party game-developing*, ix) *In-house game-developing*, x) *Second-party game-developing*, and xi) *Crowd-funded game-developing*.

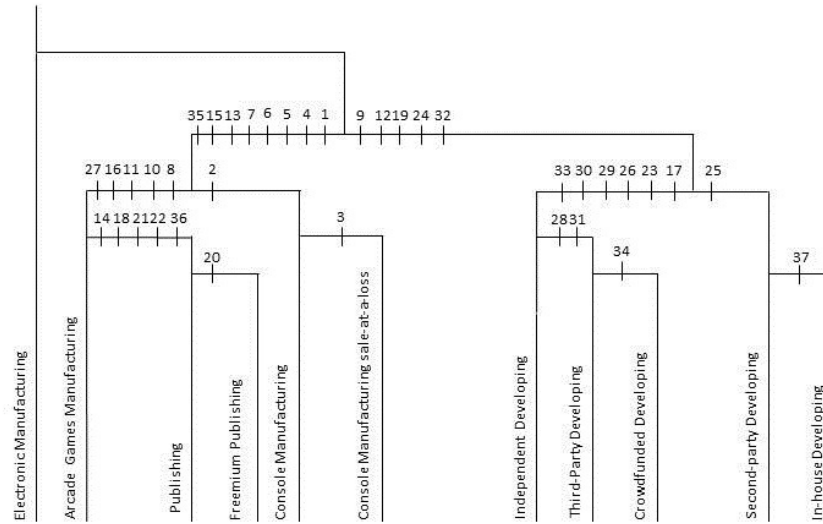
**Table 1.** List of classification characters and character coding.

Code	Character	Code	Character
1	Platform manufacturing	19	Outsourcing publishing
2	Console manufacturing	20	Price discrimination
3	Selling-at-a-loss revenue stream	21	In-game advertisement
4	Own distribution channels	22	Digital distribution
5	Third-party distribution channels	23	Outsourcing digital distribution channels
6	Own development studios	24	Multidisciplinary development team
7	Outsourcing game development	25	Exclusive publishing agreements
8	Localisation services	26	Development Independence
9	Video games development	27	Revenue stream via royalties
10	Layout design and printing	28	More than one publishing contracts
11	Intellectual Property (IP) acquisition	29	Small, close-knitted teams
12	IP creation	30	Use of middleware
13	Universal development support	31	Exit strategy
14	Production risk minimisation strategy	32	Cost minimisation strategy
15	High marketing costs	33	Engine released as open-source
16	Hit driven strategy	34	Crowd-funding
17	Royalty payments	35	Self-funding
18	Hardcopy sales	36	No platform-manufacturing
		37	Owned by publisher

The character that were chosen for the classification purposes, based on [34], for systematic reasons are shown in Table 1. For space considerations we will not include a table that contains the character states for each business model archetype of the video-game industry. However, the character evolution (and polarity) can be seen in Figure 1 in the next Section.

### 5 Results and Discussion

In this Section we include, and discuss, the factual cladogram that tracks the evolutionary process of the video-game industry’s business model archetypes shown in Figure 1.



**Figure 1.** The Video-games Industry Cladogram: Business model archetypes are grouped together based on their most recent ancestor. Numbers represent the characters that have been inherited or developed through the evolutionary process.

Figure 1 shows the evolution of the video-game industry’s business model ecosystem based on their most recent common ancestor. The figure also depicts the evolution of characters through time. Business models are grouped together into two broad categories or families: 1) the *Platform Manufacturing* and *Publishing*, and 2) *Video-game Developing*. We examine the relations among these archetypes and focus our analysis through the prism of two-sided market economics, as part of the networking literature that focuses on the intermediaries of the market [41].

*Arcade Games Manufacturing:* This business model is focused on manufacturing platforms dedicated to a single game. The enterprises characterized by this business model were combining characteristics of both publishing and manufacturing in an all-in-one approach. The key partners were entertainment hubs and public houses which was the main target group of coin-operated machines similar to pinballs. Due to the increased manufacturing costs and the technological limitation vertical disintegration was impossible during the early days of the industry [42]. The vertical disintegration of this family of business models placed the foundations of the video-game market transformation into a two-sided one.

*Console manufacturing:* with the advent of new technological advances that allowed lower manufacturing costs new platforms, no longer dedicated to a single game, were produced. Console manufacturing business model is focused on

maximizing the console sales which are supported by games developed specifically for a given platform preventing cross-platform compatibility. This interdependence between publishing hit-driven titles and player-base maximization was responsible for another business model (*sale-at-a-loss*), also known as *razor-blade*, which effectively entails that console manufacturing business model focuses on market infiltration maximization instead of profits [43];[44]. To achieve that, the business model needs to establish networks [42] with another business model, namely *publishing*, operating in a form of two-sided market [41]. It is safe to argue at this point that multi-sided markets determined the emergence of a symbiotic relationship between more than one business models [18]. This business model archetype acts as the intermediary between publishing/developing business models on one hand and customers on the other.

*Publishing*: the publishing business model is focused on revenue and profit maximization through video-game sales (physically or digitally) following a risk-averse strategy [42] that skews the publishing decision making heavily towards hit-driven titles. The apomorphic event took place when the business model discarded the manufacturing character and focused instead on monetisation strategies of physical and digital copies of video games [45]. This business model acts as the major revenue source and financially supports the console manufacturing business models in a symbiotic relationship, as discussed earlier, and the major source of funding for the *Video-game Developing* business models. Consequently, Intellectual Property (IP) acquisition and creation, internally via in-house development, is very important for the sustainability of this business model [42]. A specific aspect of two-sided market, publishers currently operate in, led many publishers to follow a price-discrimination strategy, usually called *Freemium Business Model* [41].

*Video-game Developing*: this family of business models focuses on the development of original or licensed titles creating new video games for all platforms. The group consists of *Independent developing*, *Crowdfunded Developing*, *Third-party developing*, *Second-party developing* and *In-house developing* business models. Their evolutionary trajectory is heavily affected by the relationship they develop against publishing business models which act as their major partners for financing and revenue streams. The major goal is survivability maximisation through production costs minimisation. To overcome these challenges, developing business models focus on the production process and key resources when it comes to business model innovation. *Independent developing* operates usually under the radar [38]. They employ digital distribution channels to directly sell the products to consumers, or via online markets (GoG, Steam, etc.). *Third-party developing* business models are focused on creating original titles or entering a contract with a publisher. The challenges that developing-studios face during project financing lead to the emergence of a new business model, namely *Crowdfunded-developing*, which aims to attract funding directly from customers. This initiated a series of domino effects on the production and monetization process of the games and is heavily based on the loyalty of the customer base, which is placed at the centre of production process for feedback and word-of-mouth marketing strategy. Economies of scale usually lead Publishing and developing business models to merge or acquire competitors [42]. *Second-party developing* business models are focused on engaging in dedicated contracts with a single publisher who acts as the financier of the project and the final



customer. The studios operating under this business model rarely enjoy production independence and are focused on a hit-driven development strategy. Finally, *in-house development* studios are effectively owned by publishers in a strategically driven strategy to fuel IP creation but usually they operate in a relatively more autonomous way.

## 6 Concluding Remarks

This paper presents a new classification approach, namely cladistics classification. Assuming that business model change is governed by the three principles of evolution: 1) selection, 2) variation and 3) replication, we employ cladistics classification to group business models based on their most recent common ancestor. Other kinds of classification are based on a two-dimensional, phenetic approach, which in one hand informative, but on the other hand lacks the objectivity and overall applicability, cladistics classification offers an objective and philosophically robust alternative when it comes to business model classification.

We perform a historical analysis of the video games industry, which is used as a typology to examine the applicability of the cladistics classification when it comes to business models. The result of the classification process, namely the cladogram, is validated through the lenses of two-sided market economics and networking and we provide some initial evidence about the dynamics of the video-games-industry business model evolution.

As part of the creative industries, video-game industry business model analysis and classification could potentially be of value for cross-industry fertilization of new and innovative business models that could benefit music and film industry alike. Price discrimination and servitization, along with the dynamics of the business model networking, could provide valuable lessons, highly applicable to other creative industries or industries that share similar attributes as the video-games one.

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