

# Business models for Serious Games developers - transition from a product centric to a service centric approach.

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## Abstract

*In the context of the serious games industry, up to now the most commonly used business models (BM) among developers representing small and medium enterprises (SMEs) consists in offering an individual product to the customer, based on tailored one-of-a-kind production. Such production has high costs and low re-usability and leads to a long time-to-market. For an industry dealing with products highly dependent on technological advances, this implies high risks for failure and thus being put out of business. Consequently, an increasing number of Serious Games (SG) developers are struggling to survive. These trends are not specific for the SG development sector, but can actually be observed in several others, like software industry as well as the manufacturing industry, where a transition to less product-oriented BM can be observed. This article analyses first the current use of BM within two application fields of SG, before it presents two examples of a successful transition towards a service oriented BM within the same fields. Based on this, it finally discusses the opportunities and the threats of using such BMs for SG developers.*

**Keywords:** Business models, services, products, extended products

## 1. Introduction

The success of the European economy is largely depending on the ability of its industry to foster innovation and to develop new products and services [1]. Innovation is perceived to be Europe's key to economic success in the current market environment in which strong competition from both the established and emerging Asian economies concern companies and politics [1]. A key role is here played by people in the Cultural and Creative Industry (CCI) as a driver for new ideas [2], involving the developers of Serious Games. These industries are a powerful motor for jobs, growth, exports and earnings, cultural diversity and social inclusion, representing 4.5% of total European Gross Domestic Product (GDP) and accounting for 3.8% of the workforce [3], and they also affect the innovativeness of other sectors like manufacturing and automotive industry (product and service development) by catalyzing the spill-over effects.

However, being innovative requires not only having the right ideas, but also meeting the customer requirements, fulfilling the market needs, as well as establishing suitable value propositions ensuring return on investment [4]. These goals are typically described in the business strategy of a company, which is then realized according to a specific business model (BM) [5]. So far, the SG industry has mainly followed a niche strategy, producing one-of-a-kind products, highly customised and costly, with a low degree of reusability and interoperability [6], and having a long time-to-market [7]. The resulting business models often feature costly solutions with low market shares [8], while rapid technology change increases the risk for failing market entrance [9]. Since most of the developers are SMEs, this article looks specifically into their requirements.



Within several other sectors like health, IT and manufacturing, new business models have emerged [10], [11]. These models are service centric instead of product centric, i.e. the tangible product is not a unique selling point, but is sold as a part of a package, including product and a set of (adaptable) services [10]. For Serious Games developers, the emergence of game engines opens up new opportunities, since development time and costs can be reduced considerably. New trends on funding, delivery channels, technology or platform have a significant repercussion on the business opportunities as well as the business challenges that need to be overcome in an effort to maintain and/ or gain a competitive advantage. For that reason, the employed business models need to be dynamic, responsive and adaptable to new trends [11]. The main objective of this article is to analyse under which conditions service centric business models can be established for SG developers, as well as to give examples of how this has already been realised. Thus, in a first step the underlying theoretical foundation of business modelling and its connection to the company's strategy are discussed. This is followed by an analysis of business models used for a variety of games targeting the health, business and management sectors. Based on the findings of this analysis, two case studies describe how a transition may be achieved. Finally, a SWOT analysis identifies the challenges and opportunities a change in business models brings.

## 2. Theoretical Background

This chapter describes the two main concepts required to discuss the transition between a product and service centric business – the BM and the business strategy – as well as the inherent relationship between the two concepts and approaches for business modeling.

### 2.1 Business models

#### 2.1.1 Definition

The origin of the term business model (BM) is still not settled [12] and is either attributed to the 1950ies from Peter Drucker (using the term 'logic of business') or to the beginning of the 1970ies from the field of information systems. The amount of definitions and descriptions of business models grew especially around the year 2000. An example is the one from Rentmeister and Klein [13]: "*A business model (BM) is an abstract model that depicts the relevant and essential aspects of a business in an aggregated and clear form. The model is used by the business to check and rank ideas and concepts. Business models concentrate on the decision makers and potential investors, and also employees and clients. A business model should depict the performance and information stream of the business and consider other involved actors.*" Timmers [14] specifies: "*An architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues.*"

A BM describes the rationale of how an organization creates, delivers, and captures value [15]. Consequently, it must be dynamic, being able to react promptly to internal (e.g. new processes, acquired competences) and external (e.g. customer and technology trends) changes and evolve accordingly and thus enabling the organisation stay competitive [16]. The dynamic and evolving characteristics are independent of implementation area. Within the Serious Games industry, business models have focused on designing and developing customized, often unique, game products generating revenue from their sales [4], [17]. However, the market is quite dynamic with rapid technology changes, new development concepts, delivery channels, customer needs, user needs etc., thus also the BM needs to be adaptable and dynamic [11]. The following section will give an overview of generic BM concepts that can help in establishing new business models for Serious Games developers.

#### 2.1.2 Generic business model concepts

This section describes the characteristics of traditional and service oriented business models.

##### 2.1.2.1 Traditional product or service business models



Conventional business models distinguish between product and service provision. Product centric business models are common in the manufacturing industry, mainly focusing on the efficiency of production and the sale of tangible products at a market price. The competitiveness of the BM is influenced by the organizational structure of the production. The use of machines, materials and need for qualified personnel leads to high fix costs, and thus standardization, automation and the technological advances are important factors for the success of product centric business models [18]. For the software industry, being labor intensive, this is the main cost factor also for service centric BM.

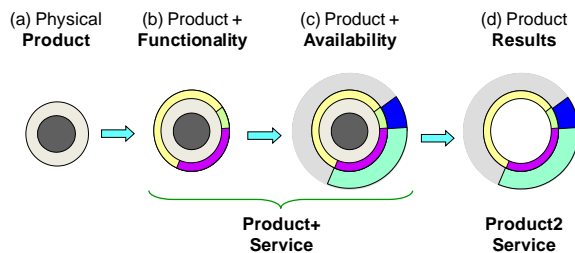
For such BMs, the consumer interaction and service customization is another key element, since customer relation is key indicator for service oriented business. Relationships to other service providers are relevant to indicate dependencies and options for scaling effects [19].

### 2.1.2.2 Internet based business models

Internet based business models are often mistaken with product or service centric models only using the internet as a communication or delivery channel [20]. However, such BMs create additional value, often with a high ratio of automation. The ability to scale without fixed linked resources is a key driver of e-business, since infrastructure, applications and platforms can be added and removed on demand. The business is highly scalable because internet users are easily accessible via mobile or fixed entities. Different target groups can be reached through the same channel. The initial driver for e-business is often intellectual property combined with executing resources as coder or IT-architects [21].

### 2.1.2.3 Extended Product business models

A combination of product, service and internet based business models' characteristics by bundling tangible products with intangible services to an Extended Product, supported by information technology, creates new BMs providing more value to the customer [22]. The evolution of the Extended Product concept is illustrated in Figure 1.



**Figure 1: Evolution of the Extended Product concept** Errore. L'origine riferimento non è stata trovata.

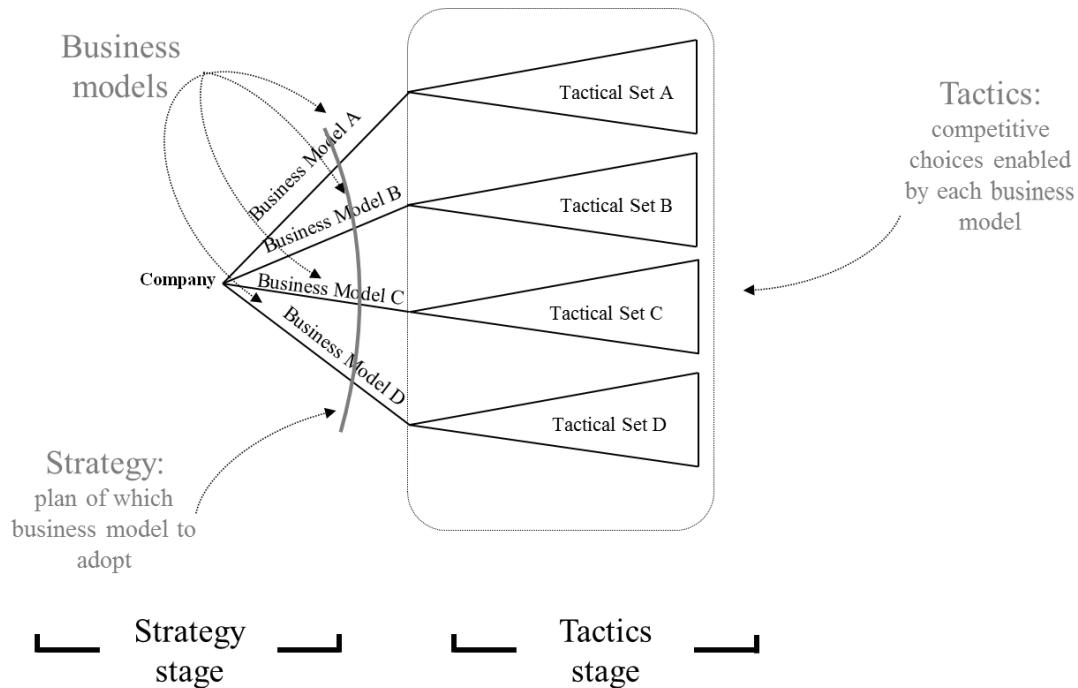
Figure 1 shows the logic of the Extended Product concept. The core product (e.g. the Serious Game) is surrounded by its shell (innermost ring) and different kinds of services (outer rings). While the product shell denotes tangible aspects like packaging, documentation etc., the services describe intangible additions to the product. The different options to configure Extended Products also create a number of possibilities for innovation of the value proposition. While in the past value is generated from selling the product (a), it is now extended by services (Product+Service): In a function-oriented business model, the functionality of the product is secured, e.g. through assistance services (b). Availability-oriented BMs additionally guarantee the usability of the product (c). In a final step (Product2Service), result-oriented business models sell only the benefits of the product to the customer, while the responsibility for its operation remains with the provider (d) [5].

## 2.2 Relationship between business model and business strategy

The terms BM and “business strategy” are mixed, but there is a general agreement in management research that these are different concepts affecting different conceptual levels. In this article, we use the

interpretation by Bieger et al.[12], stating that the strategy provide the framework for the development and the design of a business model. In general, a company deduces strategies from corporate vision or mission, and establishes an appropriate BM within this frame.

According to Casadesus-Masanell and Ricart [23], a strategy is a context specific plan aiming at reaching goals. The given frame or boundaries are the ‘raw material’ to create business models. The determination of a BM is part of the strategic process, consequently a BM is a reflection of a companies’ realized strategy (see Figure 2).



**Figure 2: Strategy, Business Model and Tactics [9]**

Following this, the BM is not a simplified representation of the strategy but rather an implementation of the realized strategy in respect to specific elements of the business model. Hence the planning of strategy and business model(ing) must be combined in order the gain and protect competitive advantages [9]. Therefore, to deduce new business models, first different business strategies have to be analyzed.

### 2.3 Business strategies

In the past 30 years, company strategies have been focusing on how to beat the competition and achieve a greater share of the existing demand [24]. Through analysis of the industry structure, a strategic position between cost leadership and differentiation could be chosen [25]. Kim & Mauborgne [26] call the classic approaches of cost leadership and differentiation the Red Ocean Strategy. As companies try to outperform their rivals, cutthroat competition turns the ocean of known market space red. They postulate the creation of untapped market space with new demand and profitable growth: Blue Oceans.

As can be seen from Table 1, the Blue Ocean Strategy differs in several aspects from the classic Red Ocean Strategy. In Red Oceans, the industry’s boundaries are defined and the competition takes place in the existing market space, while in Blue Oceans the goal is to create uncontested market space beyond the original boundaries and thus make the competition irrelevant.

While classic approaches call for a trade-off between differentiation and low cost to exploit existing demand, the creation of new demand in Blue Oceans breaks this value-cost trade-off. The whole systems of a firm’s activity is no longer aligned to a strategic choice of differentiation or low cost, but

to both goals combined. The blue ocean strategy is of specific interest when also changing BM towards an EP.

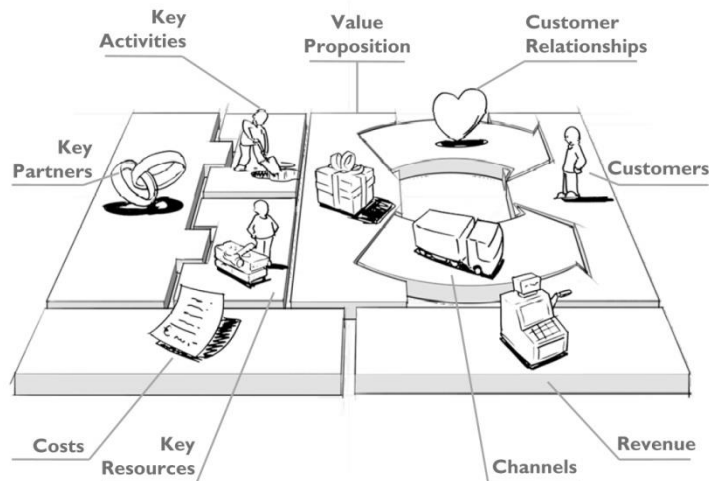


**Table 1: Red Ocean versus Blue Ocean Strategy [26]**

<b>Red Ocean Strategy</b>	<b>Blue Ocean Strategy</b>
Compete in existing market space.	Create uncontested market space.
Beat the competition.	Make the competition irrelevant.
Exploit existing demand.	Create and capture new demand.
Make the value-cost trade-off.	Break the value-cost trade-off.
Align the whole system of a firm's activities with its strategic choice of differentiation <i>or</i> low cost.	Align the whole system of a firm's activities in pursuit of differentiation <i>and</i> low cost.

## 2.4 Business Model Canvas

To analyze the impact of different business strategies on a business model, a concrete description of its elements is needed. Such a classification is offered by the BM Canvas as an approach for illustrating the building blocks of a BM [15]. The BM Canvas is a template that is often used within strategic management and offers the idea to describe how an organization creates, delivers and captures value. It divides a BM into four pillars with altogether nine building blocks that are intended to realize that claim. The pillars and building blocks of the BM Canvas are depicted in Figure 3:



**Figure 3: Business Model Canvas building blocks [15]**

The application of the BM Canvas, especially the nine building blocks, will deliver a holistic view on the changes business strategies inflict on a business model. Every business can be reflected with this model and every model is focused on different blocks. This makes the BM Canvas a generic framework without an own focus and characteristics of specific industries.

## 3. Research methodology and approach

According to Teece [9] innovators are likely to fail if they do not have the suitable business models. IDATE [17] has analysed traditional BMs within serious gaming and identified four categories of stakeholders: The prescriber (the one who buys the game), the funder (the one who pays the game), the

technical operator and the distributor. In this setting, depending on his business strategy, an SG developer either takes the role as a technical operator or as a distributor. However, in a dynamic environment, the underlying BMs need to be ready for timely adoption, in order to respond to the dynamics in the field. Within other industries like manufacturing **Errore. L'origine riferimento non è stata trovata.**, [27] and software development [11], a shift towards BMs supporting servitization can be observed [17] and approaches supporting a transition towards such models have been successfully developed **Errore. L'origine riferimento non è stata trovata.** The SG industry is also operating in a dynamic environment with rapid technology changes and the core product to sell from a developer perspective is also a tangible one. Thus, it seems likely that this industry can benefit from lessons learned on BM transitions strategies from the aforementioned areas.

In a first step, we examined current BMs of games for health or business and management by looking at samples of around 35 games each. The games were selected from literature [29], [30], [31], [32], [33], [34], [35] as well as from databases of games [36], [37], [38], [39], [40]. Several of the game descriptions available are missing relevant information for the business models, so only games with enough relevant information were selected for further analysis. Criteria for game selection (and also the criteria for the analysis) were: Funding channels; Geographical origin and type of developer; End-users; Licenses. This analysis gave the basis for the state of the art of BM in more detail than the one available from IDATE [17] and delivered quantitative data.

In a second step, we used a case study method [2]. A sector segmentation approach was applied, based on the sector the games are developed for (health, business and management, manufacturing and engineering, crisis and security, cultural heritage, social awareness), the sector structure (funding, end-user groups, and number of games for commercial use) and the relevance of the sector. Based on these factors, a case study for the management and business games sector and one from health were selected. Business and management games in management training have a successful history of game deployments since the 50ths. It is a complex market with higher institutions, consultancies and private companies as customers and also a sector in which we find games in use without BMs (in-house developments at higher educational institution, at pre-commercial level), as well as commercialized games. The reason for selecting the health sector is also the variation of user needs and markets within the sector. At one hand, SGs are used for disease treatment and prevention with very strong legal restriction and specific funding schemes and at the other hand there is a huge market for SG, targeting well-being and being consumer oriented. These do have a larger market, but have in several cases to compete with leisure games. Thus these represent two different set of business strategies.

The case study companies were chosen from a representative sample covering the variety of BMs. For selection of the specific company we used non-probability sampling method of quota sampling (for the given area), a method also used in similar studies [2]. Data collection was carried out in a two step approach- first the companies completed a questionnaire, which then was used as input for a semi-structured interview in combination with the framework [15]. This delivered qualitative data for the SWOT analysis. Finally, based on the comparison with manufacturing and software industries and the SWOT, a set of recommendations has been developed. The next chapter reviews the current state of the art of BM in these two sectors.

#### **4. Review of business models and strategies among Serious Games developers**

As described in section three, two different sectors were selected based on criteria, like how long SG applications have been used in a field, how fast SG applications in a field is growing as well as on the variety of available markets and BM to be served. Based on this, health and B&M were selected. The main objective of the case studies is to show good practice on how a successful transition of a BM can be achieved, so that others can learn from these good practices. Thus the main selection criteria were the access to first hand information and if the BM used in the case study at the beginning was typically for the field. This chapter presents the results of the analysis of business models currently in use for games for health, business and management. The information collected is related to the canvas building blocks [15]. The information about the developers' geographical origin and type (company, university, others) is related to key partners and key resources. Funding information is related to costs and revenue, whereas the information on end-users is related to customer and customer relationship; however there are some specifics within the health sector regarding the customer and end-user relation. The information collected on licenses gives indication related to customer relationship, revenue and





channels. Since there is a specific value proposition for each single game, this information is not presented in the table.

#### **4.1 Business models for Business and Management games**

In order to identify patterns on the BM, 35 Serious Games for Business and Management related topics were analysed from different perspectives. The sources used for games' selection and data collection were: [29], [30], [31], [32], [35], [36], [37], [39], [41] and the results are shown in Table 2. More information regarding the data can be found in [42]. The majority of the SGs analyzed are developed by European organizations (25 SGs), some in collaboration with organizations from the USA. Most SGs are developed and/or published by private companies in collaboration with universities and research institutes. More than 50 organizations were involved in the development of these games. Even though some organizations have developed a couple of games like INSEAD [43], [44] contributing with 6 of the analyzed games, the large number of involved organizations is a result of collaborative development, mainly within research projects including a large variety of stakeholders [31], [45], [46]. These examples are considered in "Others" in Table 2. The consortia in such research projects do not only comprise small developing companies, universities and publishers, but also large companies like Nokia, Siemens and LEGO etc [46]. Most of these games are used within the organizations for corporate training but hardly commercialized.

The funding for Business and Management Serious Games seems to be driven by private companies, developer companies and user companies of the Serious Games, thus most of the Serious Games have a private license. In most cases, the developing companies are selling the product directly or providing their rights to a publisher bringing the product to the market. Some examples are Golf Resort Tycoon [47] Aerobiz [48] and Tropico 4 [49]. For Aerobiz that available to the public since 1993, it is also possible to get a free online version to play online on the internet [50], [51] or to download [52], [53]. Newer games like Tropico 4, being released in August 2011, are also available as free trial downloadable versions [54]. However, the advantages of availability of free versions on the internet may also lead to a reduction of potential revenue for the developers reducing the likelihood of selling the game to a player.

Regarding the platform, the analysis shows that, the PC (32 cases) is most used platform, but often the games are available for several platforms. For instance, Tropico 4 [49] is available both as PC and game console version. There are also examples of games available on different kind of game consoles including portable game consoles, like Harvest Moon [55] being edited for more than 10 different game consoles since release in 1996 or Aerobiz [48], available for at least three different game consoles. Another observation is the link to social media, even if the games are not available on a social media website. Tropico 4 is a typical example, as it offers interaction with social media (Facebook and Twitter) in their PC version [56].





**Table 2: Information overview BM for B&M games**

Serious Game	Developer					Funded			End-User			License			
	US	EU	Ot	Uni	Comp	Comp	Govt	R.P	G.P	P.	Ch	Pvt	Free	O.P	Demo
Merger Plan		x		x	x	x				x		x			
The Coaching Game			x		x	0	0	0		x		0	0		
Markpack		x			x	0	0	0		x		x			
Storwars		x		x		0	0	0		x		x			
Markstrat Online		x			x	x				x		x	x		
Markstrat-Pharma		x			x	x				x		x			
Stratpharm		x		x	x	x				x		x			
Sustainability Challenge		x		x	x	x				x		x			
Manage		x		x		0	0	0		x		x			
SIGMA Challenge		x		x	x	x				x		x			
Crisis and Consumption Smoothing		x		x		0	0	0		x		x			
Anti-money Laundering		x		x	x	x				x			x		
Datasecurity		x		x	x	x				x			x		
Interview Simulator		x		x	x	x				x			x		
The Root Beer Game: Supply Chain Simulation	x			x	x	0	0	0	x			x			1
COSIGA		x		x	x			x		x			x		
GLOTRAIN		x		x				x		x		x			
PRIME		x		x	x	x		x	x				x		
SPIKO		x		x	x			x					x		
LOGTRAIN		x			x	x				x		x			1
INTOPIA	x			x		x				x		x			
Lemonade Stand	x					x			x				x		
Aerobiz			x		x	x			x			x			
Harvest Moon GB			x		x	x			x			x			
Top Management			x		x	x			x			x			
Merchant Prince II	x				x	x			x			x			
Golf Resort Tycoon	x				x	x			x			x			
A-Train			x		x	x			x			x			
Airline Tycoon		x			x	x			x			x			
Wildlife Park 3		x			x	x			x			x			
Anno 2070		x			x	x			x			x			
Cities in Motion		x			x	x			x			x			
Tropico 4		x			x	x			x			x			
Patrician IV		x			x	x			x			x			
Hotel Tycoon Resort		x			x	x			x			x			
<b>Total</b>	<b>5</b>	<b>25</b>	<b>5</b>	<b>16</b>	<b>29</b>	<b>26</b>	<b>0</b>	<b>4</b>	<b>16</b>	<b>17</b>	<b>0</b>	<b>27</b>	<b>8</b>	<b>0</b>	<b>2</b>
Key:	US: United States, EU: European Union, Ot: Others, Comp: Company, Govt: Government, R.P.: Research Project, G.P.: General Population, P.: Professionals, Ch: Children, Pvt: Private, Free: Freeware, O.P.: Online Playable														
	In table 2 and 3 '0' indicates lack of information														



## 4.2 Business models in use for Health games

Accordingly to the analysis in the previous section, 30 SGs on the Health and Fitness topics were analysed. The games were selected based on information from [33], [34], [37], [38], [39], [40]. Almost half (14) of the games were developed by European organisations and the rest (16) by US organizations. It was not possible to obtain licensing information for eight of the games. Out of the 22 SGs licensing information available, just over half of them (12 games) are made available for free to the end-user. A further two had a limited free-to-play version, with payment required to unlock the full game. This finding suggests that there are two separate agents, the “customer” who pays for the SG and the “end-user” who plays the SG, who perceives the value proposition. The value proposition that attracts the “customer” may not be perceived to be as such by the “end-user”. This differentiation is especially identified on SGs related to patient education, medical education, treatment of ill-health, health promotion, health policy and health advocacy.

**Table 3: Overview of collected information on games for health related to their business models**

Serious Games	Developer					Funded				End-user				License		
	US	EU	Uni	Comp	Govt	Comp	Govt	R.P.	C.A.	G.P.	H.P./Stu	Ch	S.P.	Pvt	Free	O.P.
SpiroGame		x	x			0	0	0	0			x		0	0	0
Snow World	x		x						x				x	0	0	0
Foldit	x		x					x		x					x	
Coronary Artery Bypass Surgery		x		x		0	0	0	0		x			0	0	0
Pulse!!	x		x	x			x	x			x			0	0	0
The Oncology Game	x		x			0	0	0	0		x			0	0	0
Triage Trainer		x		x			x	x	x		x			0	0	0
Air Medic Sky One		x	x	x		0	0	0	0		x			0	0	0
Glucoboy		x		x		0	0	0	0			x	x	x		
Bronkie the Bronciasaurus	x			x		0	0	0	0			x	x	x		
Packy and Marlon	x			x		0	0	0	0			x	x	x		
Re-mission	x			x		0	0	0	0			x	x		x	
Dumptown	x				x		x			x						x
Climate Health Impact		x		x					x		x					x
Food Force		x		x	x(UN)		x(UN)					x			x	
Sports Active 2	x			x		0	0	0	0	x				x		
Dance Central	x			x		0	0	0	0	x				x		
Lightspace	x			x		0	0	0	0	x				x		
Makoto II	x			x		0	0	0	0	x				x		
iDance		x		x		0	0	0	0	x				x		
Web Racing		x		x		0	0	0	0	x				x		
Tourality		x		x		0	0	0	0	x				x	x	
GPS Mission		x		x		0	0	0	0	x					x	
Fizees		x		x		0	0	0	0			x		x		
Get Fit	x			x		0	0	0	0	x						x
International Health Challenge				x		0	0	0	0	x				x	x	
Fatworld	x			x		0	0	0	0	x					x	
Sid the Slug		x			x		x			x				0	0	0
What should we tell the children		x		x		0	0	0	0	x						x
Emergency Birth	x		x	x		0	0	0	0	x						x
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Key: US: United States, EU: European Union, Comp: Company, Govt: Government, R.P.: Research Project, C.A.: Charity Association, PC: Personal Computer, P.G.C.: Portable Game Console, C.D.: Customized Device, G.P.: General Population, H.P./Stu: Health Professional/Student, Ch: Children, S.P.: Special Population, Pvt: Private, Free: Freeware, O.P.: Online Playable  
In table 2 and 3 '0' indicates lack of information

There is no available information on funding for 8 out of the 12 games offered for free. The remaining games are funded by a research project like Foldit [58], or by governmental institutions (Food-Force [58], [42] and Dumptown [59]). The funding comes mainly from public institutions so there is an interest from public agents that these games are played. The exception is Foldit [58]. Her it might be assumed that the game is made freely available for reducing the costs of future research leading to a benefit of the institutions involved in the project. A prominent example for a game offered to end-users is EA Sport Active [60] which sold over 600.000 units world wide in the first two weeks after launch in 2009. Such success stories are very rare within SG domain, but by assessing this success,



it should be taken into account that a consolidated company like Electronic Arts (EA) has very different the marketing and business channels and opportunities compared with most SGs being SMEs. The analysis also shows that only in 25% of the cases the developer can directly approach the end-user through internet, in all the other possibilities there is a need of at least one intermediary. Specifically for this sector, we see that the customer paying for the game is often not the end-user playing the game, like for Dumptown developed by the USA Environmental Protection Agency and offered for free [61]. The described examples of delivery channels and funding schemes might also be transferred to other application sectors initiating new and innovative approaches for both reaching end-users as well as for funding purposes by considering drivers and barriers within the different sectors [62].

### 4.3 Findings

Based on the analysis of internet seems to be the most appropriate delivery channel for the game itself as well as for related features; Thus, this indicate a trend towards EP related BMs.

The funding scheme in both sectors (in health for treatment and prevention) shows high degree of governmental or non-profit organizations involvement. The development process itself is often collaborative. This contributes to reduce the risks for the developers. The SG industry seems to contribute more to the coordination of ideation and technology than to the economy. According to [6] this is typically for an innovation model. However, it can also be related to a lack of real markets, in this case, the underlying model is a welfare model. The analysis also shows the importance of customized products with specific requirements for different agents. Regarding the customer considerations in the business canvas, it can be stated that the customer is often different from the end-users, even though there are large differences within the sectors. For many games, the funder and the customer is the same, but especially within education and health treatment, the funder is different from the end-users (end-users could be teachers, students, patients, medical personnel), whereas the customer in these cases often are governmental organizations (schools, ministry of education, health assurances, pharmaceutical industry). This approach is included in the traditional product or service BMs, however it is a challenge to provide a proper value proposition to all actors. Organizational challenges related to the inter-disciplinarity.

## 5 Transition examples for business models within Serious Games industry

New trends on funding, delivery channels, technology or platform have a repercussion on the business opportunities and challenges that need to be overcome. Thus, BMs employed in SG industry need to be dynamic and adaptable to new trends [11], [63], [64]. This section will present two case studies of a successful transition toward innovative and service oriented BMs.

### 5.1 Case study of a transition to a service oriented business model for SG for health: Virtualware

#### 5.1.1 Case description

VirtualRehab ([www.virtualrehab.info/en/](http://www.virtualrehab.info/en/)) is a cloud-based physical rehabilitation system that incorporates videogame technology and allows the monitoring of the patients' progress from everywhere. Patients can perform complex rehabilitation programs using entertaining therapies either in a rehabilitation clinic or at home.

VirtualRehab was developed in 2010 by Virtualware ([www.virtualwaregroup.com](http://www.virtualwaregroup.com)), a Spanish SME established in 2007 and involved in spreading the use of Virtual Reality (VR) solutions in multiple sectors. The company provides on-demand solutions according to clients' needs and commercializes their own products. Virtualware is organized around three business units: Interactive solutions for Cultural Heritage and Education, Health, and Training. VirtualRehab is the most successful product from the health area. It is commercialized in four countries and has more than 500 patients as users. VirtualRehab has nine different games that assist the treatment of various physical symptoms using customized physical rehabilitation programs. These symptoms include motor deficits (paralysis), movement and posture disorders, balance problems and lack of coordination amongst others. KINECT



technology is used to adequately monitor the performance of the patients. The product was launched as a stand-alone solution. However, after one year, it became apparent that a cloud-based system would be more suitable. Currently the product is provided to the final user or patient either through a distribution company, or mostly by professionals like physiotherapist or rehabilitation centres, hospitals and medical associations. In these cases the EP BM is SaaS (Software as a service), and gives the health service providers the possibility to allow their patients to use VirtualRehab. The health service provider pay a fix amount per patient to Virtualware depending on the number of patients using the serious game. The technology remained the same.

### 5.1.2 Analysis of the strength and weaknesses in the different business models

Due to the selected stand-alone solution requiring local installations, VirtualRehab was launched to the market using a traditional product BM. Table 4 shows the strength and weaknesses related to this BM according to the canvas parameters. Looking at the key activities which was the monitoring of medical treatment a stand-alone solution storing the data on the patient's PC is fairly secure, as long as their PC is secured or not online. However this is at the same time weakness since the patient himself is responsible for keeping his PC secure and protected, often lacking the knowledge. In addition, such a BM offers only the core product.

**Table 4: strength and weaknesses of the original business model**

2010	Strength	Weaknesses
Technology		
Platform	Stand-alone solution	How to manage patient data & privacy
Market Channel		
Market	Rehabilitation services (both final users & physiotherapist)	How to reach them and create on them the need of using it in their rehabilitation therapy
Key Activity	Monitoring of medical treatment	
Key Resource	Microsoft KINECT	
Key Partnership	Medical Associations, Physiotherapist, medical professionals	To reach final users
Sources of Funding		
Intellectual Platform		

After experiencing some technical problems at user level, as well as complications that concerned the update of a stand-alone solution, VirtualRehab was moved to a cloud Azure solution. This intermediary situation is a special case of the EP BM, which referring to chapter 2 is considered under EP (b) and (c) (see table 5). It is worth to note that not the business considerations, but technical problems forced a change. The new model offers the possibility to have a professional and up-to date protection of data, as well as to reduce the challenges of installation of the software.

**Table 5: strength and weaknesses of the intermediate business model**

Q2-2011	Strength	Weaknesses
Technology		
Platform	Move to Azure cloud solution. A more efficient way to manage data privacy and reduce installations "default"	Move contents from a stand-alone solution to a SaaS Solution.
Market Channel		
Market		
Key Activity	Server update and maintenance	Server privacy and security
Key Resource		Technical team that support the clients with the service
Key Partnership		
Sources of Funding		
Intellectual Platform		



In order to increase the market possibilities and success of VirtualRehab, a new market target was approached in 2013. This new target consists of companies or professionals who can use VirtualRehab to offer services to third parties and that can also request their own requirements on the product specification. Since VirtualRehab is becoming a service out of what at the beginning was a product, the current situation is EP BM (c), what in the IT sector is also called Software as a Service.

**Table 6: strength and weaknesses of the final business model (SaaS)**

Q2 2013	Strength	Weaknesses
Technology		
Platform		
Market Channel		
Market	New Target: Companies offering service packages to their customers. They can be public or private (i.e. assurance companies)	Provide to this new clients: - An increased portfolio of services and allow differentiation from competition. - Or they can build new services around service VirtualRehab
Key Activity		
Key Resource		
Key Partnership	Service packages companies	
Sources of Funding	Private or public medical companies	
Intellectual Platform		

The case study above shows how it is possible to change from a product centric BM to a service based BM, for which the original product is just a part of the package. In the case of the product described in the case study it was possible to reach new markets. The end-user is still the patient, but he does no longer need to install and operate the product himself, but get an access to the product as a part of a service provided by professionals. For Virtualware the BM change does not only open new markets, but also helps in order to establish a customer relationship in which they can also provide different option and eventually also other products related to health treatments.

## 5.2 Case study on the transition to a service oriented business model for SG for business and management: LEGO LSP

### 5.2.1 Case description

This case study describes a board game used for support in strategy development within the business and management game field. LEGO Serious Play (LSP) is a facilitated workshop where participants are asked different questions in relation to an ongoing project, task or strategy. The participants answer these questions by building symbolic and metaphorical models of their insights in LEGO bricks and present these to each other. An essential part of the LSP workshop is the non-judgmental, free-thinking and playful interaction between the participants [65]. The LSP process has four central elements: (1) Construct, (2) Give meaning, (3) Tell the story, (4) Reflect.

The game was developed to be used in a workshop setting, which is typical for such games. The game was designed on behalf of the Danish toy producer by IMD in Switzerland for in-house training of strategy communication and strategy development. The ideas behind LSP were so convincing that the owner of the Danish toy producer decided to encourage and sponsor a commercial application under the auspices of the company. For this commercialization, a typical BM for this sector was selected: The tool kit to be used in the workshop setting is only sold to certified facilitators having a license based on yearly fees. The BM proved difficult to maintain. The turnover for LSP was limited and the acceptance of having to purchase a new toolkit for every workshop was lacking (Table 7), thus in 2010 LEGO choose to discontinue the further development. Instead, they changed the BM and offer now LSP Open Source that can be used by anyone. The toy producer still provides the LSP-kits by



LEGO. The change of the BM has increased the targeted market, resulting in more users. Some trained facilitators run independent facilitator courses for new users.

### 5.2.2 Analysis of strength and weakness

LSP started their business in 2004 with a product and some related services, being an EP BM (b)/(c). The tangible product was the pre-packed LSP-kits, which was essentially nothing but ordinary LEGO bricks. However, the associated service which was the training and the organizing of knowledge sharing between facilitators was the essential part. The service element was far from the core business of the LEGO Company and this also applies to the associated development activities.

**Table 7: strength and weaknesses of the original business model**

Before Open Source in 2010	Strength	Weaknesses
<b>Technology</b>	LEGO bricks	LEGO bricks are seen as pure toys
<b>Platform</b>		
<b>Market Channel</b>	Web site and articles in business magazines. Established consultancy companies	Large organizations want to engage with the prime developers at LEGO directly
<b>Market</b>	Private and public organizations of various kinds	
<b>Key Activity</b>	Train more facilitators and develop new applications	Shortage of internal resources since LSP is only a small niche product
<b>Key Resource</b>	The most engaged facilitators and university research	Facilitators don't share their insight with potential competitor facilitators
<b>Key Partnership</b>	To certify facilitators and to engage these with developers at LEGO. Facilitators organized in networks.	Strong competition between facilitators within same region
<b>Sources of Funding</b>	Training of facilitators and selling the LSP kits	Customers do not accept to be forced to by a new LSP kit for a second workshop
<b>Intellectual Platform</b>	Based on solid psychology and communication research	All knowledge is publicly available and can not be protected

There are several challenges to be overcome in the situation “before open source” in order to achieve a sustainable business model. Based on the characteristics of the product, the facilitator is a key issue. The challenge to have enough facilitators that are able to use the LSP kit was not easy to overcome, and in addition independent facilitators started to provide their own services using the LSP kit. This was the main reason for changing into an Open source solution for the business model. The characteristics are shown in Table 8.



**Table 8: strength and weaknesses of the final business model**

After Open Source in 2010	Strength	Weaknesses
Technology	LEGO bricks	LEGO bricks are seen as pure toys
Platform		
Market Channel	A large number of independent private consultants	To keep integrity of the LEGO brand
Market	Private and public organizations of various kinds	
Key Activity	The many private consultants develop their own applications	Many applications are not based on research knowledge
Key Resource	Independent facilitators and university researchers	The gained insight are not shared
Key Partnership	To keep a dialogue with a few of the most experienced facilitators	Facilitator don't need communication direct with LEGO
Sources of Funding	Selling LSP kits	Facilitators compose their own LSP kits
Intellectual Platform	Based on solid psychology and communication research	Many facilitators have limited knowledge of the research background

The Open source BM has less risk associated for the sustainability of the BM and it is also easier to manage for the company, since they keep offering services in their core business. So this change into a less ambitious BM must not be seen as a failure of the BM evolution, rather a success since this evolution allows keeping the product/service into the market in a sustainable way. The further development of the SG is now done by the facilitators solely, and their BM towards their customers is a pure Product2Service model (d).

### 5.3 Comparative analysis of the two application areas - opportunities and threats

The two case studies illustrate how a transition can be carried out, but also which are the risks for failing the transition. In both cases, a blue ocean strategy was followed, since the old BM did not guarantee a return on investment. Using tools like the business canvas can help to identify a suitable business model before the revenue situation forces a change, but this requires foresight and an environment fostering innovation and new ways of thinking. In both case studies, the transition was successful, but it was driven based on a technical challenge (Virtualware) or lack of ROI (Lego) and not on trend analysis or innovation, i.e. the transition was forced. In ideal cases, the transition starts due to the discovery of new business opportunities, and thus the next sections will look at the general opportunities and threats within the two application areas.

#### 5.3.1 Opportunities and threats for games targeting health

In the health area, the customer segment addressed is split into two different agents (customer and end-user) [66]. Within the first group health professionals often buy the game, whereas in the second group the patients are actually users. The market is bound by the number of health professionals as well as the patients needing a specific treatment. Thus the resulting volume is low in niche applications at high price (to recover the costs of production). This has a number of implications: market expansion can either be achieved through increasing the potential number of customers (this requires promoting and marketing of customized SGs to large companies and others willing to pay the high price (government and public bodies, research projects)) or radical attempts to cost-reduction and new revenue generation need to be found, otherwise they will remain in quality-niche markets [62], [66].

An opportunity is to target the patients as customers directly, using alternative marketing and revenue models. Therefore, also the customer relationship has to be adapted from the current seller-buyer connection between the developers and health professionals towards a service driven relationship, including co-creation of personalized solutions as well as direct marketing of topical games to end-users. Another opportunity is to involve the intermediate as key partners in the BMs, and thereby benefit from their delivery channels and market knowledge. The current value proposition





o is mostly targeting the buyer of the SG with a customized solution supporting health professional in the treatment of patients. However, the technological advances give rise to opportunity for offering different kinds of analysis and also to personalize the offers to the specific needs giving patients and professionals a dynamically adaptable solution based on reusable and inter-operable components. Consequently, costs could be reduced by offering derivative and customized games, while the revenue would be generated by using rental, pay per play or even pay for success models [67].

### **5.3.2 Opportunity and Threat analysis for games targeting business and management**

Serious games used within management and business are often dedicate to training managers and employees to act in a dynamic environment [43], [44], [68]. This requires adaptable and customized games. In line with the general trend on the SG market, the social connotation has become more crucial for the business and management oriented solutions. Thus, there is an opportunity for SG developers offering games with multiplayer elements, allowing the employees to collaborate and communicate [69] and comprising competitive elements for improvement of the individual performance [70], [71]. This requires integrated key performance indicators [72] related to specific business needs. The BMs should link the SGs with the human resources (HR) development approach offering the SG as an adequate tool to measure the relative performance and the degree of team collaboration [71].

The difficulties of measuring learning outcome achieved through the use of SG have been a main barrier for successful deployment of SG within corporate training [73]. The availability of in-process assessments [74] by the use of stealth measurement of specific KPIs [75], [76] offers new opportunities. The use of several KPIs allows identifying tangible ROI related to gaming solutions. The business models' implication is the development of relevant KPIs which are able to monitor the desired performance (whether it's employee engagement or supply chain optimization). ROI remains the most delicate subject in the field of serious games; the marketers need to develop complex strategies in order to justify the viability of the gaming solutions within organizations. Regarding the strategic management aspect of the organization, increased focus should be put on an having an integrative set of statistical data, business strategy and forecasted direction, so that the investment in serious gaming solutions are done in the most optimal way as possible. Innovative services related to this need is again to offer analytics or a less innovative, but still very effective BM to include the facilitator in the BM. However, the LEGO case showed the limitation of this model.

The developers' strategy evolves from unique game production to delivering more generic SGs, being adaptable to customer needs. For cost reduction purposes, SMEs provide licensing over developing approach. A trend towards open systems can be identified allowing the customers to upgrade the products or to develop their own application. This gives new opportunities for SMEs, non-profit organizations and universities for collaborative development of new SG [77]. Regarding the aspect of re-usability and interoperability, it can be stated that they are a key for cost reduction, high performance and increased added value, as well as for staying competitive; this has to be covered in the BM. Furthermore, there is also a transition towards more online applications, with mobile devices registering as well as cloud or web based applications. On the side of the developers, their key products should also become more flexible, in the sense that they can be supported by a multitude of platforms (windows-based, mobile-based etc.).

### **5.3.3 Implication on BM selection based on lesson learned**

The changes towards a networked society as well as the access to new technology like mobile devices and tablets have opened new possibilities for the use of SG in health and business and management area [1],[2]. The new distribution channels through internet put cost reduction pressure on the developers, since it reduce the relevance of being geographical next to the market [4]. Customer expectation of free access to on-line games is a threat, thus a large risk is related to the commoditization of the products leading to a constant pressure on the price, selling the product on-line facilitates the reduction of distributions costs and economies of scale's possibilities [67]. Within CCI a change toward service centric business models can be observed [2], [4], [6] and confirmed in both case studies. Even though the transition towards a service oriented BM in both cases was successful, the analysis reveals two main challenges: the lack of change in BM based on systematically trend analysis



and discovery of new market opportunities and the long time it takes to implement the transition. For the case study on health, the first change of BM was initiated by technical problems. The intermediate solution solved this problem, but did not open up new markets (see section 5.3.1). In fact, also the new BM did not address a large enough market to ensure long term positive revenues and ROI. Consequently, the company was forced to change once more. By changing their key customer to professional care providers instead of end users, they could build a more long term customer relationship, offering services adaptable to the different needs and in addition, this BM also provides the opportunity to offer other products for different groups of patients, thus they can target a larger market. However, the transition time is more than three years, which in many cases is too long for small SG developing companies. In the second case study, the situation is different. Within B&M it is very common to offer SG in a facilitated workshop setting, i.e. they started with a tangible product and a service, but in which the service played a minor role in the business strategy. LEGO based its BM and revenue model mostly on selling the tangible product. The yearly fee the facilitator had to pay was never a part of the core business strategy. Thus, in order to reach ROI, the company had to sell a new product for each workshop. This was not sustainable, since the tangible product (the LEGO bricks) is a product that typically can be reused, and thus LEGO tried to force its customer to buy a product they did not need, i.e. they did not have a sustainable market. The change to an open source solution gave access to new customer groups since now everybody can buy the core product and in addition, the change opened up for the facilitators to develop their own applications and thus expand the market for the core product, based on the facilitators knowledge of needs in the training market. In both cases, the main threat for sustainable BM is the lack of changes based on innovation and discovery of market opportunity. However, as explained in section 5.3.1 and 5.3.2, there is enough available information about market, market trends and potential user needs, so that a proactive assessment of current business models would have both shown the weaknesses within the company as well as shown possible opportunities.

The main threats are related to changes in technology, the high rate of tailored products, as well as the lack of suitable analytic tools that help to bring the proof of evidence. Companies' weaknesses or strengths are related to the use of game engine, and the development of interoperable applications.

## 6 Discussion and conclusions

A key for success lies in early discovery of market changes, the focus more on reusability and interoperability of the product in order to reduce the time-to-market and increase the flexibility to react on customer needs regarding service composition. Based upon an analysis of transition towards service oriented BM in the manufacturing and IT industry, we have identified similarities and differences in order to identify if lessons learned in these industries can be transferred to the SG sector. The analyses, as well as the case studies show that this is possible, but it also shows that there needs to be focus on innovation, incremental and discontinuous/ radical innovation, in order to be able to take advantage of concepts like extended products including SaaS. This innovation is not only related to technical innovation, but also on discovering marked needs and desires at an early stage. This is a challenge for several SG developers. So far we have seen that the severity of technical restrictions drive real change. Such constraints make companies consider trends and opportunities because they cannot operate properly, however they would profit to assess such trends systematically. In order to make the business models more efficient, serious games can also prove a viable solution, leading to cost reduction, increase in productivity and better prepared employees. The future opportunities lie in the field of collaboration, as licensing opportunities will reduce the differences between SMEs and large companies regarding serious games implementation (licensed products are less costly). The companies will need to capitalize on the frenzy for solutions with social content, as well as on developing tools which would quantify better the benefits of the serious games solutions for business and management. Innovation of the value proposition through the offering of Extended Products is suggested as an approach to escape the competition, especially from low-cost countries. Value innovation however cannot be implemented as a stand-alone concept. It has been shown that it implies changes to other areas of the business model, i.e. requiring new competencies and thus new networks of partners. In order to show the effects of the above approaches to the elements of a SG developers' business model, the BM Canvas can be chosen as a graphical representation of the BM areas. EP



business models have some specific aspects, which require the adaption of the Canvas towards an integrated EP BM Framework. For example, the deeper involvement of customers leads to a disappearing delimitation from other key partners, as shown in the case study of Virtualware and also in the Lego case, in which the service model includes collaboration with professionals.

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