



# THE UNIVERSITY *of* EDINBURGH

## Edinburgh Research Explorer

### The Industry and Policy Context for Digital Games for Empowerment and Inclusion

**Citation for published version:**

Stewart, J & Misuraca, G 2013, The Industry and Policy Context for Digital Games for Empowerment and Inclusion: Market Analysis, Future Prospects and Key Challenges in Videogames, Serious Games and Gamification. vol. JRC77656, Joint Research Centre of the European Commission (JRC).

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Publisher final version (usually the publisher pdf)

**Publisher Rights Statement:**

© Stewart, J., & Misuraca, G. (2013). The Industry and Policy Context for Digital Games for Empowerment and Inclusion: Market Analysis, Future Prospects and Key Challenges in Videogames, Serious Games and Gamification. Joint Research Centre of the European Commission (JRC).

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



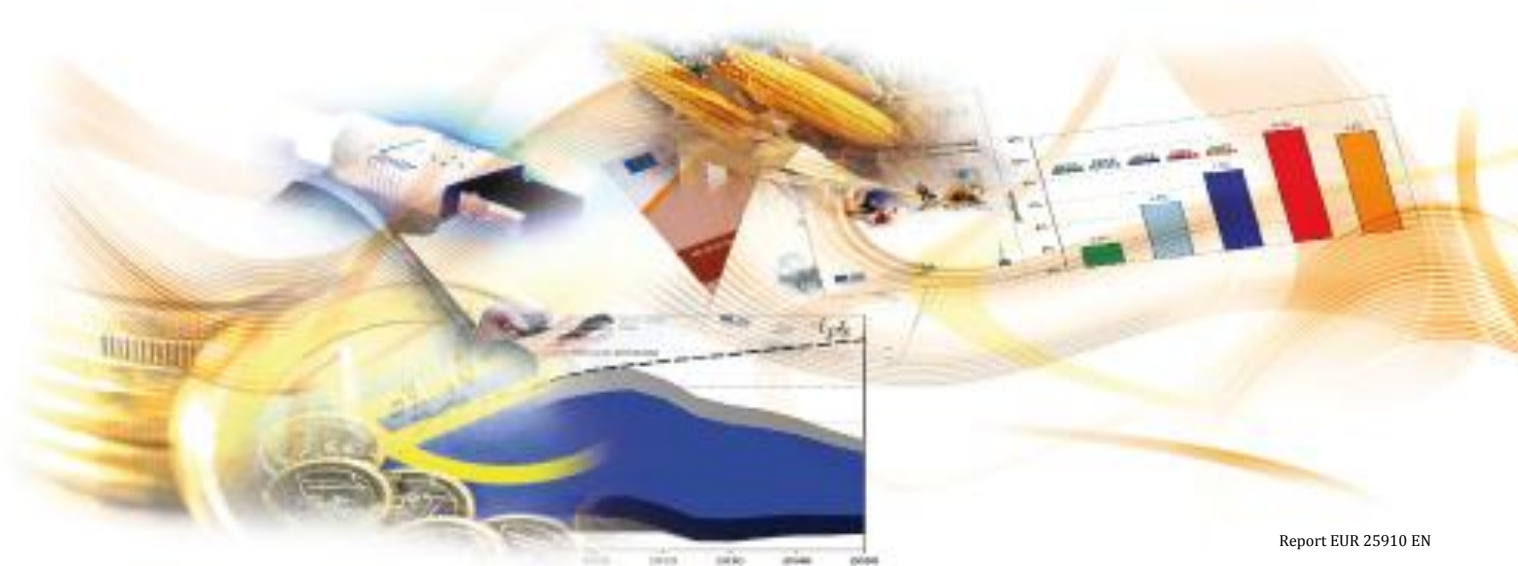
# JRC SCIENTIFIC AND POLICY REPORTS

## The Industry and Policy Context for Digital Games for Empowerment and Inclusion:

Market Analysis, Future Prospects and Key Challenges in Videogames, Serious Games and Gamification

James Stewart and Gianluca Misuraca

2013



Report EUR 25910 EN

European Commission  
Joint Research Centre  
Institute for Prospective Technological Studies

Contact information

Address: Edificio Expo. C/ Inca Garcilaso, 3. E-41092 Seville (Spain)  
E-mail: [jrc-ipts-secretariat@ec.europa.eu](mailto:jrc-ipts-secretariat@ec.europa.eu)  
Tel.: +34 954488318  
Fax: +34 954488300

<http://ipts.jrc.ec.europa.eu/>  
<http://www.jrc.ec.europa.eu/>

This publication is a Scientific and Policy Report by the Joint Research Centre of the European Commission.

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Europe Direct is a service to help you find answers to your questions about the European Union  
Freephone number (\*): 00 800 6 7 8 9 10 11  
(\*) Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.  
It can be accessed through the Europa server <http://europa.eu/>.

JRC77656

EUR 25910 EN

ISBN 978-92-79-29263-7 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/88361

Luxembourg: Publications Office of the European Union, 2013

© European Union, 2013

Reproduction is authorised provided the source is acknowledged.

Printed in Spain

## Acknowledgements

This report was carried out by the Information Society Unit at the Institute for Prospective Technological Studies (JRC-IPTS). It is part of the study **Digital Games for Empowerment and Inclusion** jointly funded by DG CNECT and JRC-IPTS (AA INF50/SMART 2011/0054 – JRC 32397-2011).

The authors would like to thank in particular Jean Paul Simon, Giuditta De Prato and Claudio Feijoo for their valuable contribution and for making available some of the material used in this report, and to IDATE and LUDOSCIENCE (Julian Alvarez, Damien Djaouti of Ludoscience and Laurent Michaud of IDATE) for use of their valuable reports.

They are also grateful to Flavio Escribano, Aphra Kerr, Ewan Mackintosh, and Lucia Pannese for their reviews to an early version of this document.

The initial research was presented and discussed for validation in January 2012 at an Expert Workshop held at IPTS in Sevilla. The report was subsequently presented to a Policy Maker's Workshop and a Stakeholder workshop in Brussels. The authors would like to thank the experts who attended these events and others who were unable to attend but contributed written and verbal feedback to the DGEI study.

Although these contributions were substantial, the responsibility of this final version clearly remains with the authors.

*Disclaimer: The views expressed in this document are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.*

For more information about the DGEI Project visit: <http://is.jrc.es/pages/EAP/eInclusion/games.html>



## PREFACE

Information, communication and media technologies have transformed the economy and our everyday lives in the last decades, and continue to surprise and challenge us with novel uses and unforeseen effects on society. While instrumental uses of technology, for information processing, military and business efficiency often leads the way, playful and social uses follow close behind, quickly becoming a fundamental part of contemporary culture. However, in addressing the social challenges of society – exclusion, unemployment, ill health, educational failure, discrimination – use of these products and techniques often lag behind or are even blamed for creating new social barriers.

Previous research has demonstrated how 'conventional' ICTs such as the PC and internet applications can support socio-economic inclusion processes for populations at risk of exclusion such as migrants, youth at risk, and the elderly and their carers. Recent growth of research and commercial activity in the use of digital games for non-leisure activities and the promise of gamification as a building block of social innovation promoted DG CNCT and the JRC-IPTS to launch a study, *Digital Games for Empowerment and Inclusion*. The goal was to better understanding of how this hugely popular media form is being applied to issues of concern for social inclusion policy, and inform future policy options.

The main output of the study is the JRC Scientific and Policy report "The Potential of Digital Games for Empowerment and Social Inclusion of Groups at Risk of Social and Economic Exclusion: Evidence and Opportunity for Policy. This is accompanied by two JRC technical reports, of which this is one. This report provides a picture of the industrial, market and policy context of digital games, both the mainstream videogame industry, and an emerging 'serious games and gamification' industry. It has presents a wide range of descriptive and analytical material in a form accessible to readers with no existing knowledge of the field, drawing primarily on a JRC-IPTS report on videogames and a series of market reports produced by the research team LUDOSCIENCE with business intelligence publisher IDATE. It then reflects on the potential of these industries to support the use of digital games for inclusion and empowerment, and the potential facilitating role of policy.

It is hoped that this report will help policy makers and other stakeholders in their decisions about the potentially exciting contribution to economic and social goals of the creative, cultural and technological industries that develop digital games and gamification.



# TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS .....</b>	<b>1</b>
<b>PREFACE.....</b>	<b>3</b>
<b>LIST OF FIGURES .....</b>	<b>7</b>
<b>LIST OF TABLES .....</b>	<b>7</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>9</b>
<b>1. INTRODUCTION.....</b>	<b>11</b>
1.1. Purpose and Structure of the Document .....	11
1.2. Industry and Markets in Leisure and 'Serious' Games .....	11
<b>2. OVERVIEW OF THE ENTERTAINMENT-FOCUSED VIDEOGAME SECTOR.....</b>	<b>15</b>
2.1 Introduction.....	15
2.2 A Glossary of Terms.....	18
2.3 The State of the Digital Games Industry and Market.....	21
2.4 Consumer Platforms.....	21
2.5 The Value Chain.....	23
2.6 Online Gaming emerges .....	28
2.7 New Handhelds and Mobile Gaming: State of Affairs and Challenges Ahead .....	31
2.8 Summary .....	36
<b>3. THE NON-LEISURE DIGITAL GAMES MARKET: "SERIOUS GAMES" AND "GAMIFICATION" ..</b>	<b>37</b>
3.1 Constituencies of Activity in Digital Games for Empowerment and Inclusion.....	39
3.2 The Emergence of Serious Games Research, Industry and Profession .....	41
3.3 The Digital Serious Games and Gamification Market: Demand Sectors, Customers and Users .....	45
3.4 Uncovering the Business Models and Value Chain of Digital Serious Games .....	49
3.5 Market Actors.....	51
3.6 Prospective Developments for Serious Gaming and a Serious Games Industry .....	53
3.7 Summary .....	61



<b>4. RELATIONSHIP BETWEEN THE EUROPEAN MAINSTREAM VIDEOGAME INDUSTRY AND THE EMERGING SERIOUS GAMES INDUSTRY .....</b>	<b>63</b>
<b>5. RELEVANCE TO DIGITAL GAMES FOR EMPOWERMENT AND INCLUSION .....</b>	<b>65</b>
5.1 The Relevance of the Videogame Industry to DGEI .....	65
5.2 Relevance of the Serious Games Industry to DGEI .....	68
5.3 Summary .....	69
<b>6. POLICY ACTIVITIES IN LEISURE GAMES AND SERIOUS GAMES DOMAINS .....</b>	<b>71</b>
6.1 Dimensions of Policy Activity related to Digital Games .....	71
6.2 Is there a Future Role for Policy in relation to Games Industries and DGEI? .....	75
<b>7. CONCLUSIONS .....</b>	<b>79</b>
<b>8. REFERENCES .....</b>	<b>81</b>
8.1 Key references .....	81
8.2 Other references .....	81

## List of Figures

Figure 1:	Evolution of the European Videogames Market Size.....	17
Figure 2:	Structure and Main Activities in the Mobile Games Ecosystem.....	33
Figure 3:	Evolution of the Digital Serious Games Market Worldwide 2010-2015 million EUR.....	54
Figure 4:	Relationship between Videogames, "Serious Games Industries" and DGEI Use.....	69

## List of Tables

Table 1:	Gamer Rates in France Q4 2011 - Q2 2012 (Source ISFE 2012).....	17
Table 2:	Glossary of Videogames Terms.....	19
Table 3:	Consoles - Unit sold by Manufacturer and Platform (in million of units sold).....	22
Table 4:	Top Game Publishers .....	26
Table 5:	Games on Facebook applications top 30 leader board June 2012.....	30
Table 6:	An Example Taxonomy of Serious Games.....	43
Table 7:	GBL Taxonomy – from EC-funded IMAGINE Project.....	44
Table 8:	Suggested Overview of the Digital Serious Games Actors.....	52
Table 9:	Challenges and Actions for the Serious Games Industry .....	61
Table 10:	Indirect Benefits of Videogame Industry to Production of Special-purpose DGEI Products.....	66
Table 11:	Policy Support for Videogames and Serious Games.....	71



## **EXECUTIVE SUMMARY**

The effective *use* of digital games for empowerment and social inclusion (DGEI) of people and communities at risk of exclusion will be shaped by, and may influence the development of a range of sectors that supply products, services, technology and research. The principal industries that would appear to be implicated are the 'videogames' industry, and an emerging 'serious games' industry. The videogame industry is an ecosystem of developers, publishers and other service providers drawn from the interactive media, software and broader ICT industry that services the mainstream leisure market in games. The 'serious games' industry is a rather fragmented and growing network of firms, users, research and policy makers from a variety of sectors. They are trying to develop knowledge, products, services and a market for the use of digital games and products inspired by digital games for a range of non-leisure applications. This report provides a summary of the state of play of these industries, their trajectories and the challenges they face. It also analyses the contribution they could make to exploiting digital games for empowerment and social inclusion. Finally, it explores existing policy towards activities in these industries and markets, and draws conclusions as to the future policy relevance of engaging with them to support innovation and uptake of effective digital game-based approaches to empowerment and social inclusion.

### **The Digital Games Industry**

The digital games or videogame industry is mature, but highly dynamic and growing, currently worth over \$56 billion a year. It has generated its own technological platforms which bring advanced technologies and interfaces to a mass market. The industry is going through radical change, with new mobile and online platforms, new business models and players, and a fast growing and diversifying audience. Globally, production of videogames in all parts of the value chain, especially developers and publishers, is largely non-European controlled. Ownership is concentrated in the USA and Japan, but with strong industrial poles in Canada, Korea, and for online gaming, in Taiwan and China. The industry in Europe is characterised by one major publisher (Ubisoft), a number of large development studios attached to overseas publishers, and a strong and innovative SME sector in games development, with some highly successful firms in emerging markets of 'casual' and mobile gaming. If change is opportunity for growth and diversification, then we see the emergence of strong European players in the 'new' digital games era. In general, the videogame industry is highly focused on the entertainment games market: little attention has been paid to non-entertainment markets for videogames, and indeed rather negative views have been expressed about 'serious games'. Nonetheless, there are signs that some developer firms are recognising alternative markets to exploit their existing competences and platforms in applied markets. In addition, the games industry has an indirect influence since technological and service innovations developed for entertainment games are spilling over into other sectors and non-leisure applications.

### **The “Serious Games” and “Gamification” Industry**

There is considerable debate over whether a 'serious games industry' exists at all, since the label 'serious' game covers a heterogeneous set of practices and products, from the use of generic devices and tools of the videogame industry to replace specialist technologies, though to the application of play and motivation techniques from videogame techniques to non-game scenarios (gamification). However, a 'serious game' research community has

produced a label that firms from interactive media and various sectors such as elearning, defence and health care are now using to align themselves and communicate a distinct sectorial 'brand'. The serious games approach has consolidated in research labs since the founding of the US-based 'Serious Games Initiative' in 2002, and it is in this research community where many aspects of the use of digital games and game technologies are being explored. Research has focused on raising the quality of low quality game-like products, and industry on developing products and services particularly in the corporate training, advertising and communication, and defence markets where budgets are increasing, especially in the US and parts of Asia. A small number of talented and multi-disciplinary game development teams working in a range of organisations contexts, are bridging interactive media and gaming to produce successful products. Most commercial projects are funded by key accounts, often market intermediaries such as telecoms companies, advertising commissioners etc, and developed in collaborative partnerships. There is some movement to open markets in some sectors, but in general markets not well developed: there is little cross-market competitive supply of products with well understood criteria of features and quality on the part of customers. Since 2010, the term 'Gamification' has come into popular use, reinvigorating some of the serious game work, which may be too serious, focusing on how to exploit the gameplay elements of digital games in applications that are not strictly games, but frequently based in online services and mobile apps. Despite many studies, currently evidence of potential impact is not well documented and there is little awareness outside some key users groups, such as large firms willing to risk investment. Nonetheless Alvarez et al (2012) estimates the current global market is estimated at €2.35 billion, with steady growth and huge potential.

### **Digital Games and Policy**

Policy at all levels has supported, and some would suggest hindered, the development of the videogame industry in Europe, and is funding research and development in the field of serious games. Policy makers have offered support to the videogame industry in ways such as cluster support, grants and tax incentives, and support to research and development in both videogames and serious games. In some countries and regions policy has played a leadership role in both domains. At EC level consistent support has only been found in particular DGs, and mainly through research and implementation grants, rather than a more cross-cutting support to industry and use. Policy needs to consider how different policies can support the videogame industry and the emerging serious game industry(ies) in a holistic manner, with the goals of both economic growth and employment, and the stimulation of innovation to support goals of social, education and employment policies

# 1. Introduction

## 1.1. Purpose and Structure of the Document

This background document has been prepared by the Information Society Unit of the European Commission's JRC-IPTS as part of the Research Line on ICT for Inclusion. The document is based on a preliminary analysis conducted as part of an exploratory research project on the 'Potential Impact of Digital Games for Empowerment of Groups at Risk of Social and Economic Exclusion: Opportunities, Challenges and Possible Actions'. It explores the supply side, including various typologies of digital games, technological platforms; current knowledge of market diffusion and adoption.

The document provides a brief overview of the state of the digital games industry, with a focus on its digital 'serious' games component. It builds on previous work conducted by the JRC-IPTS on videogames (De Prato et al 2010) and a preliminary analysis and overview of literature and practice of the domain (JRC-IPTS Draft Working paper, 2011), a series of market reports produced by the research team LUDOSCIENCE with business intelligence publisher IDATE published in 2008 (Alvarez and Michaud, 2008) 2010 (Alvarez, et al, 2010) and 2012 (Alvarez, et al, 2012) and other relevant literature. It addresses the evolution of the industry from a technological and market perspective, identifying barriers and drivers of change, the key players, emerging trends and future directions.

The initial objective of this document was to provide input for discussion during a consultation process on Digital Games for Empowerment and Inclusion. The main elements emerging from the final version of this background paper have been integrated into the IPTS report: ***The Potential of Digital Games for Empowerment of Groups at Risk of Social and Economic Exclusion: Evidence and Opportunities (2012)***.

Section 1 of this document presents an overview of the current state of the digital games industry, based mainly on (De Prato et al 2010) and the paper Feijoo, C. et al. (2012).

Section 2 presents an analysis of what has been termed the 'serious' digital games market and industry, building on the Ludoscience/IDATE market analysis (1st, 2nd, and 3<sup>rd</sup> editions) and the preliminary analysis conducted by JRC-IPTS in 2011. It discusses the evolution of the 'serious' digital games sector and the changing innovation landscape. It also offers an outlook on prospective developments of the digital 'serious' games industry and market, some indications of future directions and ideas on how to address the challenges ahead in the sector. It also draws on the discussions in an expert workshop held at IPTS in Sevilla on 23 - 24 January 2012.<sup>1</sup>

## 1.2. Industry and Markets in Leisure and 'Serious' Games

The framework for understanding the application of digital games for empowerment and inclusion highlights the use of commercial videogames, special-purpose games, and game making (Bleumers et al 2012). This report explores the potential source of tools and expertise necessary to exploit digital games, and the industrial sectors that may respond to a growing demand for products and services, and are in some cases are actively stimulating use and innovation. When exploring the supply side of digital games, the obvious response would be to turn to an industry that calls itself the 'digital games

---

<sup>1</sup> Presentations from the workshop are available on the IPTS website.

industry'. Unfortunately this term is almost unused, and the definition of the type of firm that produces digital games is not straight-forward.

Various industry groups and trade associations in the English speaking world use terms such as 'entertainment software',<sup>2</sup> electronic entertainment,<sup>3</sup> interactive entertainment,<sup>4</sup> videogames, computer games,<sup>5</sup> videogames and interactive entertainment, 'games' and interactive software,<sup>6</sup> as formal titles or sector designations, but almost all refer to the 'videogame industry' in contemporary documentation. This term will therefore be used in this part of the report to refer to the industry that primarily supplies the consumer leisure market with interactive entertainment products commonly recognised as videogames. Using the terms games for the leisure market or entertainment games market to contrast with the essentially non-leisure markets that DGEI is concerned with largely addresses this, although for example, education, and edutainment have always been a market for the games industry. This 'videogames' industry is an ecosystem of hardware, software and online platform providers, game developers, publishers and other service providers drawn from the interactive media, software and broader ICT industry that services the mainstream leisure market in games, covering many types of companies and professions.<sup>7</sup>

However this videogame industry also overlaps with a much larger industry of interactive media and software, animation, video, consumer-internet services, e-learning and educational software firms that operate in a range of markets and produce interactive software and content that are often games, or used in games.<sup>8</sup> Recognition of this wider industry is important, since it would be a mistake to characterise and analyse the self-defining videogame industry as the source of products and services for empowerment and inclusion, when in fact there is a much broader set of firms who can play this role. The rise of the app market – interactive software products, many aimed at the consumer and leisure market – is clearly blurring the notion that entertainment software are games, and produced by the 'games' industry.

Part of this broader ecosystem is a newly emerging 'serious game' industry, which is starting to carve out a distinct identity. The 'serious game' research community has produced a label that firms from interactive media and various sectors such as elearning, defence and health care are now using to align themselves and create awareness among potential clients, professionals and government that there is value in associating a set of emerging markets and firms and recognise the particular strengths of using the digital games in applied applications. Compared to the mainstream videogame industry, the serious game industry is much smaller and ill defined, and closely associated with research and experimentation despite rapid growth in some markets. The leisure-market videogame industry often dismisses the 'serious' game industry as irrelevant, and the so-called applied

---

<sup>2</sup> For example the US Entertainment Software Association, serving "companies that publish computer and video games for video game consoles, personal computers, and the Internet."

<sup>3</sup> The leading trade show is called the 'electronic entertainment expo' E3

<sup>4</sup> THE ASSOCIATION FOR UK INTERACTIVE ENTERTAINMENT (<http://ukie.info/>)

<sup>5</sup> Skillset UK classifies people working in the Computer games industry and the Interactive Media Industry

<sup>6</sup> Such as the Interactive Software Federation of Europe (ISFE).

<sup>7</sup> For example TIGA, a UK industry body claims to represent "independent games developers, in-house publisher-owned developers, outsourcing companies, technology businesses and universities".

<sup>8</sup> See for example UK data 34,250 people are employed in interactive media, and 7000 in (computer) games Skillset UK [http://www.creativeskillset.org/uploads/pdf/asset\\_16891.pdf?1](http://www.creativeskillset.org/uploads/pdf/asset_16891.pdf?1) measures employment in the Computer Games Sector (485 companies), and the much larger Interactive Media Sector ([http://www.creativeskillset.org/uploads/pdf/asset\\_13233.pdf?4](http://www.creativeskillset.org/uploads/pdf/asset_13233.pdf?4))

games they produce as not the 'real thing'. However this is probably a passing phase: the videogame industry is already in turmoil from new technologies and markets, and as firms start to produce game-based or like products and services for professional and leisure markets, then the distinction is likely to erode.

This report will focus first on the structure of the traditional leisure-oriented videogame industry and market with its rapid transformation towards new mobile and online markets, and then explore the emerging 'serious' games industry. Both the leisure and serious games industries produce products and services that can be used for empowerment and social inclusion.





## 2. Overview of the Entertainment-focused Videogame Sector

### 2.1 Introduction

Digital or videogames have become established as an important media sector over the last 30 years, with the market being built on proprietary consoles and handheld devices, of which over 600 million physical units have been bought since they were first launched in 1977. In addition, millions of games are now available on home computers and mobile phones. The videogame industry contributes to the economy in many ways, not only in terms of the value of direct sales, but in innovation, technology spill-over, building the domestic infrastructure for advanced online services, stimulating complementary sectors including the broader media sector, semiconductor electronics and software.<sup>9</sup>

More than any other area of the ICT industry, the games industry has exploited the interactive multimedia potential of the technology, allowing creative development of new media forms, and leading the development and mass commercialization of graphical and input interfaces far beyond 'office' IT. While digital games (the software as opposed to the hardware) are computer software packages,<sup>10</sup> they are simultaneously cultural and media products. They are built on the heritage of film, graphic arts, theatre, television and literature, but they also have the unique dimension of 'interactivity'.<sup>11</sup> Since games creatively combine multimedia, narrative, drama, competition, networks, and interactivity in rich and multitudinous forms highlights two issues important for policy:

- i) to produce these products, the digital game workforce has to be highly multi and interdisciplinary, often requiring staff with multiple skill sets, and
- ii) the industry falls across the 'technology' and 'culture media' sectors, with implications for policy support and intervention.

The economic growth and jobs in digital games industry are also 'new', putting the games sector at the centre of economic and employment growth of the cultural and technology industries (De Prato et al 2010).

This industry covers many types of companies and professions, for example TIGA, a UK industry body claims to represent "independent games developers, in-house publisher-owned developers, outsourcing companies, technology businesses and universities". Industry players can be grouped in the following way: 1) the 'core' 'videogame industry', traditionally focused around a very small number of oligopolistic hardware vendors, and a few large publishers and developers, 2) a long tail of medium and small businesses developing digital games, and 3) an extensive ecosystem of businesses producing technologies, (particular middleware<sup>12</sup>) providing services such as testing, and publishing, distribution, marketing and various systems and services associated with online gaming.

---

<sup>9</sup> See for example the industry sponsored report Crandall, Robert W. and Sidak, Gregory Gregory, Video Games: Serious Business for America's Economy. Entertainment Software Association Report, 2006. Available at SSRN: <http://ssrn.com/abstract=969728> for a discussion.

<sup>10</sup> The DG INFSO study Economic and Social Impact of Software & Software-Based Services (Smart 2009/0041") estimates that the European Games industry made up 5.9% of total Software & Software-Based Services market in Europe in 2009

<sup>11</sup> See for example O'Donnell (2012) This is Not a Software Industry, in Zackariasson Peter and Timothy L. Wilson (Eds.) *The Video Game Industry: Formation, Present State, and Future*. New York: Routledge

<sup>12</sup> Middleware being the software 'engines', development tools for graphics, animation, audio etc, and libraries of specialist code to that enable game developers and designers to create the final game product.

The videogame industry suffers from considerable volatility, as a cyclical industry with long development lead times, and market success shaped by 'hits'. Constant changes in technology, and the normal operational exigencies of small companies operating under these conditions, add to the fragility of the industry.

The whole industry is in a period of particularly rapid change including the arrival of aggressive new competitors from mainstream computing and internet business in platforms and distribution such as Apple and Google (De Prato et al 2010). The market trajectories and dominant firms of the last 20 years are being rapidly upset by the arrival of online, and 'social' and 'casual' games, and generic hand-held devices, like mobile smart phones and tablets, that have brought in new consumers and created opportunities for new producers and new intermediaries. Maturing development platforms and middleware supply, and new forms of game monetization have also contributed to this change.

From a market perspective, the industry continues to show strong growth overall, particularly dynamised by the development of social and mobile media markets. In 2010, the world market exceeded 56 billion US\$ according to estimates by PWC (2009) and it is expected to grow to a global turnover of more than 82 billion US\$ by 2015 if predictions of annual cumulative growth of 8.2% over the period 2011-2015 are realised. The most popular titles sell over 10 million copies, with online 'casual' games reporting up to 70 million monthly annual users (MAU), and the leading game publisher has revenues of over €4 billion a year,<sup>13</sup> from both 'core' and casual' games business.

Much of this growth is coming from growth in overall gaming audiences. Digital games of all types are enjoyed by millions of people. Children are the traditional core market (over 90% of users), but adult markets are expanding consistently and fast. Digital games offer an alternative model of ICT use that is based on play, sociality and relaxation. Casual gaming, as opposed to 'hardcore' or core gaming markets (typically, young men playing violent games), is fulfilling a hitherto unsatisfied demand for IT-based leisure across generations, socio-economic classes and gender, and thus becoming mainstream. A 2012 (non-internet) panel study (ISFE 2012) puts average digital game player rates for the 11+ population in the UK as 35%, France 46%, Germany 25% and Spain 29%.<sup>14</sup> Recent US data puts female players at 47% of total game players,<sup>15</sup> with adult women a major growth market,<sup>16</sup> and recent figures from France show a similar trend. Like use of the Internet in the early days, usage drops away quickly with age. However, while many general online services now have high uptake among older people, this has only occurred slowly in relation to digital games. The strong effect seems to be on the cohort of people who used games as children taking this practice into later life.

---

Traditionally a key asset of a developer, these technologies are increasingly obtained from specialist suppliers, commercial or as open source.

<sup>13</sup> For example Electronic Arts reported GAAP net revenue of \$4,143m to end 3/31/12 <http://investor.ea.com/releasedetail.cfm?releaseid=671113>

<sup>14</sup> Gamer defined as someone who played a video game on any platform in the last year, data Q4 2011 - Q2 2012

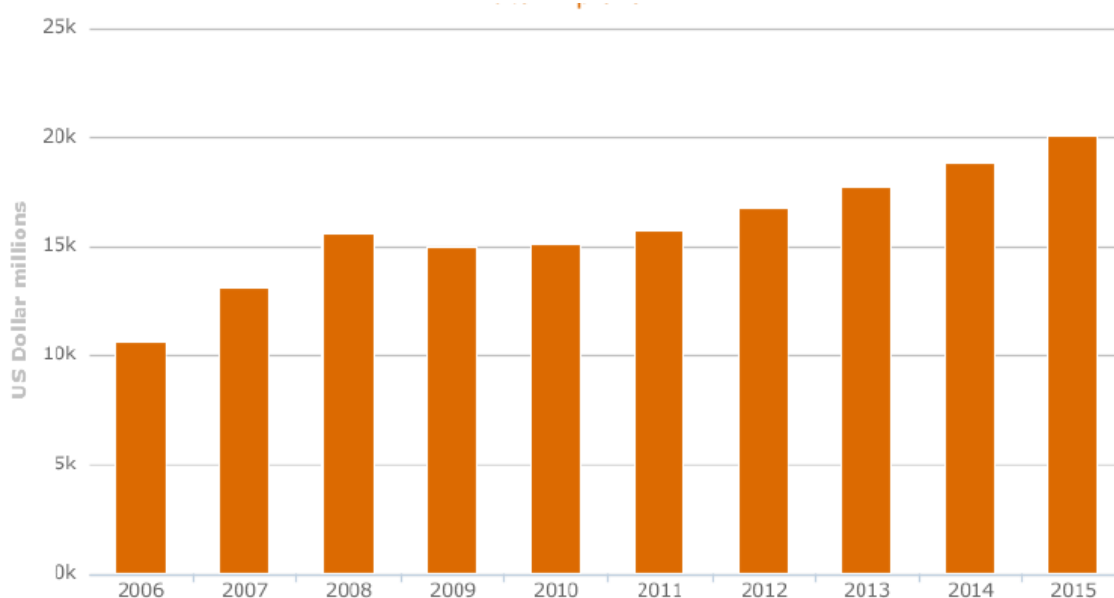
<sup>15</sup> Entertainment Software Association figures <http://www.theesa.com/facts/gameplayer.asp>

<sup>16</sup> ESA claim adult women are 30% of digital gaming population, and Mom Central consulting suggests nearly 70% of mothers play 'casual' games <http://insightblog.momcentralconsulting.com/2012/02/moms-and-the-rise-of-casual-gaming.html>

**Table 1: Gamer Rates in France Q4 2011 - Q2 2012 (Source ISFE 2012)**

Age	11-14	15-24	25-34	35-44	45+
Female	89%	75%	59%	43%	23%
Male	87%	86%	72%	53%	23%

Until recently, the European, Middle Eastern and African (EMEA)<sup>17</sup> regions were the biggest markets for videogames in 2009, but these were overtaken by the Asia-Pacific region in 2010, which now accounts for 22 billion US\$ comparing to 16,9 billion US\$ of the EMEA market. Figure 1 shows the estimated evolution of the market and the estimated growth in Europe (PWC, 2011). Five countries, France, Germany, Italy, Spain and the UK, had a market of more than 1 billion US\$ and altogether accounted for 15.2 billion US\$. These markets provide a total of nearly 30% of the global market. France and the UK are leading with a turnover of 5.1 billion US\$ and 4 billion US\$ respectively. Germany follows with 2.9 billion US\$. Sales reached 1.8 billion US\$ in Spain and 1.4 billion US\$ in Italy.

**Figure 1: Evolution of the European Videogames Market Size**

Source: PWC, 2011

Headline figures mask the important changes in the market structure. NPD Group data on the US retail market for console games and (conventional) handheld games show a drop of over 30% in sales from Q1 2011- 2012, with a similar trend in the UK. In its place, mobile and social network-based games are growing fast. IDATE (2012) data estimates that global online games revenues rose from 11,684.6 in 2010 to 13,292 in 2011, and are predicted to grow at a similar rate. IDATE (2012) also predict that revenues of mobile games will grow to meet those of conventional handheld console games in the next 3 years.

Europe has not had a strong presence in the videogame industry, either in development, publishing or hardware. Only the Paris-based Ubisoft is among the 20 leading global games publishers. However, there is a large spread of SME developers and suppliers, though these

<sup>17</sup> Europe is the core market of this region.

are often owned or working for foreign owned publishers.<sup>18</sup> This current shift in the market would appear to offer opportunities for growth of European business if it were to be suitably supported as public policy supports the games industry in other countries such as Korea, Canada or Singapore.<sup>19</sup> As Malte Behrmann, Secretary General of the European Games Developer Federation (EGDF) argues in his statement on the future “EU 2020” Strategy, the games industry is *“in the very centre of the digital shift. ‘As the first truly digital medium, computer games have developed considerably over the last twenty years into an important content driven industry at the crossroads of culture, technology and economic growth. While being a so central link between those three areas, computer games have not yet received the place on the agendas of the European Union they deserve. The EU 2020 strategy is an opportunity to rectify some omissions of the past and to give the development of computer games in Europe more positive attention as a creative and cultural industry, deeply embedded in the digital economy of tomorrow”*.

## **2.2 A Glossary of Terms**

The videogames market can be analysed in a number of ways. The following categories, distinctions and concepts are current in the industry, and will aid the reader without a background in videogames. This list is drawn from definitions and discussions in the literature, especially (De Prato et al 2010).

---

<sup>18</sup> See Kerr, A. (Forthcoming) "Space Wars: The Politics of Games Production in Europe. "Gaming Globally", Nina Huntemann and Ben Aslinger(Eds.), Critical Media Studies: Palgrave.

<sup>19</sup> See for example Game Development and Digital Growth report from European Games Developer Foundation (2011).

**Table 2: Glossary of Videogames Terms**

<b>Hardware platform</b>	The different consoles and handhelds are distinguished, and these are distinguished from the PC, Mac, and now mobile phones, smart phones, tablets and next generation connected televisions
<b>OS platform</b>	For consoles and traditional handhelds, the OS is inseparable from the hardware, but PC/Mac is differentiated, and now mobile OSs such as Android and Apple iOS.
<b>Browser v. Standalone</b>	In PC and mobile gaming, stand alone games are installed as separate applications on the computer or phone, while browser games run directly in the Web browser using standard technologies designed for enabling interactive multimedia, such as Flash, Java. Browser games are usually casual games, and often made available with a free (advertisement funded) or 'freemium' business model (see below).
<b>Online-offline-browser games</b>	Offline games are played without the need for an internet connection, installed as an application; online games can include both those played with an application or client on the player's device, or through a generic browser, connected to a server or other clients over a network, but will generally refer to the former, and often to Massively Multiplayer Online Games (See below).
<b>Social games</b>	Does not refer to games that are played socially, as many are, but to digital games that are played on and using the capabilities of social network services such as Facebook, GREE etc. Games can be individual use with sharing of scores, badges etc, or truly multi-player with in-game interaction
<b>Mobile games</b>	A term used to refer to games produced for and played on mobile phones and similar platforms, The products and industry are differentiated by having to respond to the particular structure of the mobile telecommunications industry the capabilities of telephones, and the rather closed game distribution systems available in this industry. Occasionally called 'wireless' gaming. Tablet-based gaming falls uncomfortably between PC and mobile gaming in this definition.
<b>Multi-player games; 'social' – social network based; multiplayer; massively multiplayer;</b>	Many digital games, like non-digital games, are designed to be played by several people at the same time. This can be turn taking or simultaneous play. Players can be co-located, using the same or different devices, or play over a network. Network play will generally be facilitated by a game server. In-game interaction will generally be complemented by out-of game interaction, though text chat, voice, video, social media or other communications channel. Massively Multiplayer Online Games (MMOG), with 10s or 100s of thousands of players playing individually or in teams are a major growth and innovation sector of the market, and basics for complex new social and cultural forms of interaction.
<b>Augmented reality, alternate reality (ARG), and gamification.</b>	Although rather different concepts, these are all areas of gaming that extend into 'real life', where game software and the internet facilitates and supports games and play physical space and 'real life' relationships.

**Table 2 (continued)**

<b>'Gamers', non-gamers and casual gamers.</b>	'Gamers' usually refers to those people who make up the core of the digital game market: they invest time and money in playing games, it is a hobby and even a lifestyle and identity, involving consumer and social activities around games (websites, magazines, competitions, parties etc), and without question gamers are predominantly young men. Non-gamers can either be those who do not play digital games, but these are increasingly rare. Instead it can refer to <b>casual gamers</b> , who do not identify themselves as gamers, but will play (with) digital interactive entertainment products. This group of people who now have access to the means to play digital games and game-like products is now recognised as the fastest growing market segment, and the growth of casual games is changing the definition of digital games and gamers.
<b>AAA, Casual and Indie games.</b>	AAA games are the multi-million dollar budget games produced by AAA Studios that can take 2-3 years to develop, and sell in millions of 10s of millions of copies, or count 100s of thousands of online users. They tend to make maximum use of the possibilities of hardware technology of consoles and the PC. AAA games are made in all genres, and generally targeted at 'Gamers'. Casual games include games for the mass market, and are generally simple to learn, cheap and can be created for platforms such as the web browser and mobile phone. They work in many genres, but include digital version of puzzles, board games, and card games. However many high value games for consoles including music, dance, fitness games are also termed casual 'Indie games' primarily refers to games produced by independent studios, often with a focus on innovation, creativity and exploration of genres and gameplay.
<b>Serious, Meaningful or Applied Games.</b>	The use of game techniques, genres and technology to design tools and products used specifically for non-leisure ends, such as defence or education. Difficult to produce since it requires integration of expertise in 'serious' application domain with expertise in producing 'good' games. Though hotly debated, there is widespread use of the term serious games and identification of a serious game market and industry.
<b>Game Genres</b>	Games are categorized according to form, gameplay and interactivity etc for analysis and marketing. Most popular genres include Strategy, Simulation, such as Sports, Driving, Construction, Life and Social simulation, Action including fighting and shooter, Adventure, Role-playing, Music and Dance etc. There are other cross-cutting genres, such as party games, multiplayer games. Educational and 'Serious' games can work in many of these genres as well. Some purists <sup>20</sup> would suggest many of these are not true game genres, but variations on puzzles, competitions etc.
<b>Business model: pay, free, freemium and 'monetisation'</b>	Digital games have traditionally been sold as paid products, and more recently by subscription on online games. Free games characterize much of the casual, browser-based market, often funded by advertising. Freemium is a model common in browser, social and mobile markets, where game-play is initially free, but continued play usual requires purchases, such as in-game credits, virtual goods, extra levels etc. Monetisation is a general term used in free and freemium business for ways to make money from player. In-game adverts and coupons giving game developers a percentage of 'real world' sales is one mechanism. <sup>21</sup>

<sup>20</sup> Such as game guru Chris Crawford, Chris Crawford (2003). *Chris Crawford on Game Design*. New Riders.

<sup>21</sup> See for example leading European operator in this field, Sponsorpay, <http://www.sponsorpay.com/>

### 2.3 The State of the Digital Games Industry and Market

In this section, we present briefly an overview of the current state of the digital games industry, based on analysis conducted by JRC-IPTS (De Prato et al 2010).

The videogame industry is made up of a number of building blocks – the *Consumer platforms*, both hardware and software – the game 'devices'; *Content development and production*, which includes publishers providing capital and IPR management, marketing, networks of developers, animation studios and other creative teams, middleware and software tools production; *Distribution*, both 'digital' (online/mobile), including the servers and network technologies, and physical distribution. There is also an active end-user developer movement.

### 2.4 Consumer Platforms

The consumer market has primarily been conceived in terms of the devices that run the games, as these have shaped the distribution, game forms, user segments and integration of industry value network. An introduction and comparison will now be given to the main device-focussed sectors: PC, console and handheld.

- i. *PC-based games.* Though the PC-based digital games market is smaller than the dedicated gaming device market, it has played an important role as a more 'open' platform. In the dedicated game console market, imaginative programming and risk-taking perform best since development here has long required specific tools and publishing agreements with major vendors. The PC game market is not as clearly defined as the console market, as figures on the PC games market in terms of units of games sold are difficult to collect, due to the large number of producers, the loose linkage with the hardware architecture, and to the much more fragmented market in general.<sup>22</sup> However, figures on three of the leading games, namely *The Sims*, *The Sims 2* (social simulation games), and *StarCraft* (Strategy game), which shipped respectively 16 million units, 13 million units, and 11 million units show the scale of the market (De Prato et al 2010). The *Call of Duty* franchise of games has sold over 100 million units. Traditionally, the development for the PC platform has presented developers with lower entry barriers than developing for the restricted proprietary platforms. These often required payment of licensing fees, and also benefit from lower development costs (no need for specific –and highly expensive– software development kits, very low costs of duplication and deployment). However this is no longer the case, as proprietary platforms today are much more open to developers, although still not completely open. Nonetheless, as a platform for developing and distributing the low-budget games that characterise specially-made games for empowerment and inclusion, the PC is the lead platform. The PC platform, as a gateway to the Internet, dominates the fast-growing online game segment (both client-based and browser-based games), despite the adaptation of dedicated consoles and handhelds (e.g. Nintendo DS), and general purpose wireless handheld platforms such as smartphones (primarily Apple iOS and Android). Overall, the PC and emerging general purpose online platforms like smartphones and Social Networking Systems provide an increasingly stable environment in which to operate.

---

<sup>22</sup> An approximate list of PC game titles which sold at least 1 million copies comprises 96 PC games, without taking into account different sub-releases of the same game. Source: (De Prato et al 2010), built on data collected online from different sources at company level.



- ii. *Consoles and dedicated handheld game platforms.* These are currently the best-known set of products in the digital games industry, with the main console product families being Playstation (Sony), the Xbox (Microsoft), the Wii (Nintendo) and handheld devices such as the Nintendo DS and PlayStationPortable (PSP). Consoles still dominate the overall market for digital games: In 2011, the value of console and handheld digital games hardware and software rose above €30 billion (Alvarez et al 2012). The console market is currently led by Sony, Nintendo and Microsoft. Table 3Table 3 shows the cumulative number of units sold for a selection of the most diffused home console devices, (not including the 100s of millions of consoles from 1990s). Consoles, and handhelds, are hugely expensive to develop, and a given platform with particular technological strengths is supported for 5-6 years before being replaced with a new generation device. 2012 sees the end of a cycle of consoles, with falling sales and release of new game titles pending a new cycle.

**Table 3: Consoles - Unit sold by Manufacturer and Platform (in million of units sold)**

Manufacturer	Platform	Year of release	Million units sold
Sony	PlayStation 2	2000	138
Nintendo	Wii	2006	>96(2012)
Sony	Playstation 3	2006	63.9 (2012)
Microsoft	Xbox 360	2005	55 (2011)

Source: De Prato et al 2010, elaboration on data by manufacturers available on the Internet, updated by author for this report.

- iii. *Dedicated handheld digital game.* For many years, these systems have represented a market exclusively devoted to young pre-teenagers, offering limited-complexity games. This market is dominated by the almost monopolist Nintendo, which has sold over 300 million handheld devices since 1989, and continues to have strong sales of the latest 3DS (17.13 by end 2011) despite overall losses.<sup>23</sup> As will be discussed later, the definition of a handheld market is being radically changed by the *general purpose handheld platforms* now available.

The oligopolistic position of hardware platform companies in dedicated handheld and console segments is evident from the above figures. The reasons can be identified as the high market entry costs related to technology, distribution and the investment needed to develop prototypes. The most relevant fact in both markets is related to the proprietary characteristics of the devices: each manufacturer defines the technical features and characteristics of its device and the technologies adopted. The console and handheld games markets have revolved around the release of new consoles which set the baseline capabilities for the games developers and attractiveness to consumers. The competition between vendors has brought a range of new technologies to the market over the years, including high quality 3D graphics, and motion sensor interfaces – innovations that were hardly available on PC platform. Gaming devices are sold at a loss by vendors, in an attempt to build market share for games and deliver a large consumer market to developers and publishers by achieving rapid sales, and a good selection of games for the

<sup>23</sup> Nintendo Consolidated Results for the Three Months Ended June 2011 and 2012 <http://www.nintendo.co.jp/ir/pdf/2012/120725e.pdf>

console to attract those consumers. However in recent years, it is increasingly easy to develop games that work across platforms, thus undermining the distinct dynamic of the industry.

The supply of games for the console and handheld market is broader, but dominated by major publishers with in-house development studios (see below). Distribution is also controlled by physical distribution and marketing companies, and specialist and generalist retailers.

Looking to the near future, there is agreement among analysts that the overall market will grow, with the off-line retail sales of games falling, but digital downloads, and online and mobile revenues growing. Prediction is difficult. IDATE (2008) for example predicted considerable growth in console games and online computer markets in 2008, only to see the former fall sharply and the latter grow much more strongly than expected. The console market, both hardware and software, depends considerably on the release of new consoles by Nintendo, Sony and Microsoft in 2012-2013. These, however, are expected to be increasingly general purpose multimedia devices with capabilities that link to mobiles, tablets, computers and the internet. The general-purpose platforms, such as smart phones and smart TVs, are now bringing innovative interfaces and modes of interaction to an even wider market than the games devices. This somewhat dents the innovative edge of dedicated devices. Today the most important developments in gaming platforms and markets are occurring elsewhere - online, in network technology, and on these general purpose mobile phones and tablets.

#### **Implication for DGEI**

For DGEI, the console and handheld market is important, since it still represents the mainstream of videogame play and an important source of innovation in the consumer market. For example, motion controllers first appeared in the Nintendo Wii, before smart phones, and other capabilities. Consoles are heavily subsidised, which makes them accessible to most families and institutions in ways that the PC has not been,<sup>24</sup> and they are products that are clearly associated with play, sociality and the domestic sphere, in contrast to the PC. On the other hand, the proprietary systems, the structure of the games-only market has increased the cost of access for developers, the value chain and limited channels for reaching the market.

## **2.5 The Value Chain**

In addition to the **consumer hardware vendors**, it is important to understand the value chain in videogames, to appreciate the complexity of the industry and the players who could contribute to DGEI development or support. The conventional **value chain** is broadly divided into developers, publishers and distributors, including retailers. We will see that this conventional chain model is changing with new technologies and specialisation to be more of a complex value network. Nonetheless it is worth describing the activities of these groups of actors

A **digital games developer** is a company that invents and develops digital games, and in some cases develops the necessary software to run the videogames. A digital games

---

<sup>24</sup> In the UK over 90% of children in families of all social groups own at least one video game console, which Children aged 5-15 from AB households are more likely to use the internet at home (89% v. 69% for children from DE households). (Ofcom 2011). See also Ulicsak et al 2009

developer may specialize in a specific console, or may develop for a variety of platforms including the PC or the mobile platforms.<sup>25</sup> It can also specialise in certain types of games.

The production of videogames, as is the case with most information, digital and creative content goods (prototypes), is characterised by high fixed costs and low marginal costs. The initial financial investment to develop the product is extremely high, and the risk is high too. Few developers can independently finance projects that may take 2-3 years to reach the market. This creates an important role in the value chain for publishers, who can provide pre-financing. In return, they generally obtain IPR over the games to the long-term detriment of the developers.

Developers are usually studios, with multidisciplinary teams including various sorts of software engineers, graphic designers, animators, games designers, data analysts, project managers and business managers.<sup>26</sup> These companies are small and numerous. In Europe, a large population of these highly creative small development studios is found mainly in the UK, France, Germany, the Nordic countries and, to a lesser extent, Spain. Taking into account the specific relation of developers to publishers, and the existence of independent<sup>27</sup> developer companies, some developers publish their own games and therefore can be regarded as publishers and developers. This is, for example, the case for the majority of the Norwegian developers.<sup>28</sup>

Being small and often young, such companies are confronted with a variety of additional managerial issues, typical of Small and Medium-sized Enterprises (SMEs), which put a lot of pressure on the managers' business skills. They consist of: unbalanced budgets and deal-flow, dependence on major customers, absence of real marketing, uncontrolled growth needs, recruitment issues, project size escalating, supplier management (need for outsourcing or syndication), etc. These issues affect the quality of life and work of developers, and the continuity of contracts.<sup>29</sup> However, game development is an attractive field of work, especially for passionate gamers – combining creative work with cutting edge technology and the chance of big hits in the market. Employment can be found in well-resourced international studios, or in start-ups producing innovative or 'alternative' games, or supplying the casual games market.

While the largest developers are non-European, with the exception of Ubisoft, a list of the 'top 100' leisure games developers in the "Develop 100" list based on critical reception of products<sup>30</sup> includes 23 European companies from the UK (9), Sweden (3), Finland (2), Denmark(2), France, Norway, Spain, Germany, Slovakia, Czech Republic, Austria, with the USA and Japan dominating. Leading European games companies are considerable businesses. For example, Bigpoint GmbH a Germany developer, publisher and distributor of free online games has approximately 700 staff. Ankama, France's largest independent

---

<sup>25</sup> In this case, the availability of platform-independent middleware is a key factor in reducing development costs and allowing multi-platform development.

<sup>26</sup> See, for example, SNJV (2012) *Référentiel des métiers du secteur du jeu vidéo* – Syndicat National du Jeu Vidéo - 1ere édition Octobre 2012 [www.snjv.org](http://www.snjv.org)

<sup>27</sup> Independent companies aim to maintain and grow their business without having to develop games on demand from publishers.

<sup>28</sup> See in: Norwegian Ministry of Culture and Church Affairs, 2008. Video games. Report 14 (2007-2008) to the Storting (Norwegian parliament.).

<sup>29</sup> See Kerr, A. (2011). 'The Culture of Gamework'. Chapter in M. Deuze (Ed.), *Managing Media Work*. Thousand Oaks, CA: Sage publications.

<sup>30</sup> For an updated list ranking the top 100 developers – Develop 100 List see: [www.develop100.com](http://www.develop100.com)

online developer-publisher (FR) has an estimated 460 employees.<sup>31</sup> Despite these larger firms, the rankings, in particular at national level, show high volatility, reflecting the ups-and downs of a young and cyclical industry. Although the figures are dated, in France, it was estimated that in January 2007 there were some 114 studios employing all together some 2,500 staff. The large majority of these studios had fewer than 15 staff members each. Their small size, under-capitalisation and the production cycle itself seem to have contributed to a high company replacement rate in this sector.<sup>32</sup> The "Nordic" games industry employs 3,700 people working for some 260 registered companies. However, it is expected that employee numbers will reach 7,000 by 2015, and 20,000 by 2020. The Nordic games industry is supported by the Nordic Games Program,<sup>33</sup> and national and regional programmes.

A **digital games publisher** is a company that publishes games that it either develops internally (the major publishers generally vertically-integrate many development studios) or has ordered from an external developer. The publisher is responsible for licensing the rights and the concept on which the game is grounded, for handling the marketing and often even the distribution. Publishers play a key role in financing the often lengthy and risky games development process, and the equally expensive marketing effort. While the gatekeeper role is played by several hardware platform owners, publishers rarely specialise in only one platform, they opt for platform diversification. This has its costs because of the incompatibility of hardware platforms, due to software code base or user interface. The high failure rate of games generally means that large publishers, like major film studios, are conservative, preferring franchises, tie-ins with major movies, and integrating tightly into promotional culture of the mass market and commerce.<sup>34</sup> This raises the importance of partner **IP providers** in success of the games business.

Table 4 lists the top 20 videogames publishers, ranked in 2010 according to their revenues.<sup>35</sup>

---

<sup>31</sup> Source: ICO Partners 2011 quoted in Game Development and Digital Growth, European Games Developer Federation (EGDF) 2011.

<sup>32</sup> Interview of an author of "L'innovation et la R&D dans l'industrie française du jeu vidéo", 2007. IDATE

<sup>33</sup> <http://www.norden.org/en/nordic-council-of-ministers/councils-of-ministers/the-nordic-council-of-ministers-for-culture-mr-k/institutions-and-co-operative-bodies/co-operation-body/nordic-game-program/the-nordic-game-program-development-support>

<sup>34</sup> Dyer-Witthford, N, Sharman, Z (2005) The Political Economy of Canada's Video and Computer Game Industry, Canadian Journal of Communication Vol 30, No 2 (2005) <http://www.cjc-online.ca/index.php/journal/article/view/1575/1728>

<sup>35</sup> See Game Developer, October 2009. At: [http://www.gamasutra.com/php-bin/news\\_index.php?story=25506](http://www.gamasutra.com/php-bin/news_index.php?story=25506). The ranking, following the Wikipedia note, is established on the basis of overall score in six factors: annual turnover, number of releases, average review score, quality of producers, reliability of milestone payments and the quality of staff pay and perks. Note that this is not a ranking by revenue.

**Table 4: Top Game Publishers**

Name of Publisher	Country	2010 Position
Nintendo	JP	1
Electronic Arts	US	2
Activision Blizzard	US	3
Ubisoft	FR	4
Take-Two Interactive	US	5
Sony Computer Entertainment	JP	6
ZeniMax Media	US	7
THQ	US	8
Square Enix	JP	9
Microsoft	US	10
Konami	JP	11
Sega	JP	12
Capcom	JP	13
MTV Games	US	14
Namco Bandai	JP	15
Warner Bros. Interactive	US	16
Namco	US	17
Valve	FR	18
Atlus	JP	19
Zynga	US	20

Source: Figures from EGDA

This list demonstrates quite clearly that US and Japanese companies lead in the publishing stage of the digital games value chain. Among the world top 20 publishers, there is only one European firm: Ubisoft France. Atari, also in France, dropped off the list in 2010. The added value of games developed in Europe, including control of IP is therefore generally controlled by foreign players, who can, and do, transfer development operations to countries with more favourable cost regimes. This is a rather clear indication that Europe needs to grasp emerging opportunities to better position itself and its industry if it wants to reap the benefits of the videogames business.<sup>36</sup>

**Digital games distributors** traditionally handle the marketing and distribution of the physical products of the games industry: they handle the packaging and transport, organise the infrastructure for distribution, and sometimes even provide user support. Together with the retailers, they cover the physical logistics of the distribution chain. Though they are not the publishers themselves, they are usually specialised distributors for digital games (and often other digital products). In particular, as large publishers are primarily interested in promoting their own games, independent game companies find small specialised distributors for their titles.

Finally, **retailers**, which sell directly to consumers. Retailers are usually chains dealing in general electronic goods, multimedia shops and specialist shops but increasingly

---

<sup>36</sup> Europe hosts another major video games editor that does not appear directly in the above ranking as it combined with Square Enix, eighth in the ranking recently. Headquartered in London, UK, EIDOS has a valuable portfolio of intellectual property including: Tomb Raider™, Hitman™, Deus Ex™, Championship Manager™ and Just Cause™. Eidos is a wholly-owned subsidiary of Square Enix Holdings Co. and Eidos Montréal. Video games represent the major part of Square Enix revenues with estimated 250 Million Euros revenues for the fiscal year 2010.

videogames can be easily found in ordinary distribution stores such as FNAC, Wal-Mart, the Metro group or Carrefour, and of course through generalist online retailers. Some of these retailers are playing the role of distributors and contacting videogames publishers directly.

As hinted above, this established value chain is changing.<sup>37</sup> The roles and position of distributors, retailers, publishers, developers, and technology and platform actors are changing, which has impacts on business models, types of products and services and the innovation process.

The rise of digital distribution, while still a minority part of overall distribution, is growing fast, and changing the balance of power of the actors involved. A growing number of new actors, online distributors, have emerged, who will position themselves in the videogames value chain as videogames go progressively online and mobile. Some developers, such as Valve software,<sup>38</sup> have developed proprietary online distribution platforms. Dedicated publisher/distributors are also growing in this area, while the social networking systems allow developers to reach end users directly. These new online service providers often combine the distribution system and the game platform monetization and marketing.

This removal of some distribution steps has changed the business model. Instead the model being based on high-value and high-priced packaged products with high marketing and distribution costs for one-off sale, there are now online and mobile models that bring developers closer to consumers, where the initial prices are low or even free. These sales are complemented by new forms of income such as in-game goods, virtual currencies, subscription fees, frequent upgrades ("Freemium") etc. An important innovation is the inclusion of advertising in games, and the repurposing of games as a media channel, making players in **advertising and communications** important actors in adding value to the games sector. These innovations are discussed in the following sections.

On the services side, games are seldom developed by individual firms, but involve outsourcing to specialist **production service** providers, which provide animation, testing, localisation, porting to other platforms. These services are crucial to ensure quality products that reach all consumers.<sup>39</sup>

On the technology side, while European players are not present in the hardware consoles and handhelds market, there are a number of other technological and system components where European players are present. The simplistic model of hardware and finished game products masks an ecosystem of software layers and components, such as middleware – the 'games engines' – and specialised technology and content for sound, rendering, graphics etc. The development of games also requires high-level tools and applications for developers, a business area in a period of growth. Finally, technology companies can provide the platforms for distribution to developers and publishers to run themselves, rather than offering them as services.

This reflects the changing specialisation of the industry in services, technology, testing, and marketing and distribution, away from the model described by Feijóo et al (2010). In this richer ecosystem, Europe has an enviable range of actors, and opportunities to improve its position, particularly in growing online and mobile game developers, middleware,

---

<sup>37</sup> For example Secor (2009)

<sup>38</sup> <http://www.valvesoftware.com>

<sup>39</sup> See Secor (2009)

monetization platforms and tools for game developers, production services and commercial partners for IP and advertising, where there is considerable potential for growth.

#### **Implications for DGEI**

For DGEI, these technologies and platforms are important resources, as they allow developers without in-house technologies to produce games that match leisure-games quality.

### **2.6 Online Gaming emerges**

A major change that the digital games industry is undergoing is the move to exploit the internet itself as a gaming platform, a move collectively defined as online gaming.

These online games can be segmented as single player (multi-player), connected remotely or by local network. Multiplayer computer gaming has its roots in the earliest days of multi-user mainframe computers, where users played against each other or collectively in simple game 'environments', a phenomena which developed on networked computers as Massively multi-player online games (MMOGs). Much of the analysis of multi-player games focuses on the 'social' aspect of gaming, where play with and against other people with all the complex motivations and interactions this entails, offers much space for interpretation and innovation.

End users connect from a PC or console-based client, or a mobile handset, to physical servers which provide virtual games network platforms. The games can be self contained, or can be integrated with other browser-based services most notably social network systems ('social gaming').

The analysis of the contemporary online games world is rather complex, as the simple distinctions of earlier generations of games no longer holding true: the game platforms, audiences, business models and intermediaries are changing.

At a technical level, one categorization distinguishes *client-based* online gaming, where the end user installs (and generally buys) a specific programme that provides the interface and interactions with the game servers, from *browser-based* gaming, where games can be downloaded and played within the standard browser. Gaming can be single player or multi-player. The market in both these types of games is considerable and growing, and is demanding in terms of innovation in technology, service delivery and business models. This change is stressing the existing industry and is opening many opportunities for new entrants. MMOGs can be very expensive AAA games: Halo3 for the Xbox cost an estimated US\$ 30 million in development and marketing and reached 10 million players. Browser games, however, are much cheaper, with leading developer Zynga's game Texas Hold'em costing less than US\$ 1 million to reach a similar audience.<sup>40</sup>

Access to and uptake of online gaming is related to Internet penetration, so calculations of market size and potential impact have to be based on available data. Nonetheless, in many European countries, regular Internet access is relatively high (50-95%), on average 92% for 16-24 year olds, making this form of gaming widely accessible.<sup>41</sup>

---

<sup>40</sup> Figures estimated by Lightspeed Venture Partners estimated (Liew et al., 2008). Marketing costs of gaining audience share for online games may have increased as competition increases.

<sup>41</sup> See for example Eurostat (2011) Eurostat Statistics in Focus, Industry, trade and services 2011/66.

## **Implications for DGEI**

Online gaming is bringing an online social dimension to digital games, which is of clear relevance to DGEI in applications seeking to increase participation and build social capital. The uptake of these types of games creates new expectations from players, new models and technologies for development, and new business models where users play for free with paid-for additions, reducing initial barriers to use considerably. Thus the 'social' multiplayer nature of games opens up avenues for social interaction and participation for certain excluded groups, which are not provided by stand-alone games.

### **2.6.1 Online client-based gaming – the MMOG**

Massively Multiplayer Online Games (MMOGs) like World of Warcraft, Runescape and Eve Online are sophisticated graphical environments unique in their scale, and a major growth area in digital gaming. They represent a step change in technology, business model and the idea of a game, and have introduced important new elements of digital gaming. Unlike other virtual environments, MMOG introduce game rules, and unlike conventional games, they are persistent (i.e. when a player logs out the game continues to exist). The most popular MMOGs have millions of players globally. They are very profitable for firms that have made the transition to the service model that characterises the MMOG.

Play in MMOGs is also much more sophisticated. Many leading games require collaborative efforts, with players worldwide forming 'Guilds' of up to a hundred people, that study, train and play together for many hours a week. The leadership skills of guild leaders are impressive and they coordinate the actual game play through multiple out-of-game media channels.

The development of such games requires huge efforts and impressive teams, and the most advanced techniques are applied. Unlike stand-alone games, where a developer team moves on to a new project at the end of the development cycle, MMOGs required dedicated teams to maintain them live, to deal with bugs, develop the plots' scenarios and levels, and keep the subscribing players in the game. It also requires new expertise to maintain a round-the-clock computer system with millions of users. As a result online game companies are at the leading edge of the online service business in general.

### **2.6.2 Social and browser gaming**

One of the features of browser-based games, and those available through social networking sites, is the visibility and access to potential users. These games are often rather simple, and there is a huge variety, and a constant supply of new variations. The platforms make casual single player gaming and multiplayer community gaming very accessible. Facebook-based games constitute an example of the popularity and reach of these games. AppData, an independent traffic tracking service, monitors traffic trends for more than 75,000 Facebook applications of this type. In 2010, games dominated app use on Facebook (Table 5Table 5), some attracting extraordinary numbers of users, e.g. over 75 million users of Farmville. Since the boom of 2009-2010, some suggest the use of social games is declining, at least as a percentage of total users of Facebook (25%, in 2012 down from 50% in 2010).<sup>42</sup> Outstanding individual companies include Zynga, with a reported 137,311,250 MAU (Monthly Average Users, Jan 2013, down from over 250m MAU in June 2012), Appdata) across its game portfolio, and \$317 million revenue for 3Q

---

<sup>42</sup> Especially HIS Screen digest, 1Q 2012.



2012 (though posting a loss). Zynga has reportedly provided Facebook with 15% of its total revenue so far in 2012 (down from 19% in 2011).

**Table 5: Games on Facebook applications top 30 leader board June 2012**

Rank	Name	Monthly Active Users (MAU)
3.	Texas Hold'em Poker	34,000,000
5.	CityVille	30,800,000
10.	Bubble Safari	23,100,000
11.	Draw Something	23,100,000
13.	FarmVille	21,600,000
16.	Bubble Witch Saga	20,000,000
17.	CastleVille	19,900,000
19.	21 questions	19,100,000
21.	Angry Birds Friends	17,200,000
22.	Diamond Dash	17,200,000
23.	Hidden Chronicles	16,800,000
25.	Words With Friends	16,500,000
29.	The Sims Social	15,400,000
30.	Tetris Battle	15,300,000

Source: Appdata June 2012

Unfortunately in this field, there is limited data on the number of producers, users, and revenues (from in-game transactions, upgrades and advertising etc), which makes it very difficult to conduct a simple analysis of prospects. For client-based online gaming, there is more data, since much of this works as a paid-for business. Much of the client-based online gaming builds on mainstream console and PC game designs, with big budget games requiring major marketing and support facilities.

A key feature of all these games is a shift away from a product-based to a service-based business model. The games are no longer run on a player's hardware, but on the servers of the game provider, which is often the developer. The developer must not only create the game, but also maintain, patch, up-date and evolve the game platform and content to keep customers. Revenues can be earned from customers during game play, through the purchase of in-game goods and services,<sup>43</sup> using micropayments in the game platform, rather than upfront sales of game software and hardware through external systems, and from selling in-game advertising. This collapses the existing business value chain in other parts of the videogame industry. It also requires new technical and business competence, thus creating new opportunities, particularly for firms that specialise in running online platforms, which provide customer support, security, fraud and privacy, payment

---

<sup>43</sup> This has also opened up employment and entrepreneurial opportunities for 'gold-farming', players who can earn in-game goods with their time and skill and sell them for real money in internal markets. This has opened up opportunities for business, such as in China where there is a thriving industry on the back of online games, but one which raises a range of regulatory issues. E.g. Heeks (2008).

mechanisms, virtual currencies, social media, marketing and managing advertising placement that individual developers cannot deliver.

Central to both online sectors are new business models which replace the older single payment models, and even modify the subscription models of MMOGs, towards free-to-play.

#### **Implications for DGEI**

This section demonstrates that the online gaming field is producing significant innovation. On the one hand, it brings digital games to new markets with social and casual online games, and on the other, it deepens and enriches the digital game experience and genres. The business models, new technologies and interfaces all enrich the palette of games and game use that is relevant to DGEI – this benefits the development and distribution of special-purpose games, and it availability of commercial games that can be used to support empowerment.

### **2.7 New Handhelds and Mobile Gaming: State of Affairs and Challenges Ahead<sup>44</sup>**

While Nintendo was almost unchallenged for over a decade in the market for handheld games, which in Europe and North America were largely used by a juvenile audience, the development and mass market adoption of handheld devices, originally conceived for completely different purposes – i.e. mobile phones and tablet computers, has completely revolutionized the industry and the market for digital games in a portable, personal format. This new market is widely referred to as 'mobile' gaming, though some (such as IDATE 2012) call it 'wireless' gaming.

The contemporary mobile game market has evolved rapidly from early embedded games and mobile operator walled gardens, with multiple platforms and a fragmented market to the market pioneered by Nokia but created by Apple with the development of the iPhone (late 2007) and the App store. Apple essentially introduced a novel general purpose handheld platform with a variety of network connections, and a powerful distribution and publishing mechanism to facilitate revenue collection and control of intellectual property. Apple also broke the control of the mobile operators over the end-user terminal. The combination of new possibilities in the handset (touch screen, motion sensor, precise location system, enhanced display, large storage capacity, high-quality audio, and embedded camera) and the ubiquitous connection to the network allowed many innovations, including application stores, playing online while on the move, multi-player games, playing across several media using social networks, games linked with device motion, augmented reality and location-based gaming.

The years 2007 and 2008 brought significant innovations in business models to the market with experimentation by mobile operators and games developers. Since 2008, the model has become stable, with strong mobile-only games developers (often acquired by major games publishing houses), and a rapidly growing market and proliferation of innovative and creative products. Browsing from mobile devices and downloading from application stores are becoming the standard way to consume mobile games, with many games offered in basic version for free, and full version for a few Euros. With the diffusion of handsets and the increasing affordability of mobile data plans, the mobile platform reaches wider

---

<sup>44</sup> This section is in part drawn from a recent analysis conducted by Feijoo C., et al. and to be published in Feijoo,C., et al. Mobile gaming: Industry challenges and policy implications. Telecommunications Policy (2012), doi:10.1016/j.telpol.2011.12.004.

demographics than ever. Figures for 2011 suggest that smartphone adoption in some European Countries is around the 50% level, and reaching 25% for lower income householders.<sup>45</sup> This growth offers considerable opportunity for the adaptation of existing games and the development of new types of games. The arrival of the tablet format has amplified this. Mobile devices have now become the fastest growing gaming platform. In addition to this broad market base, mobile games can make intensive use of the competitive advantages of the mobile-phone platform, such as complete ubiquity (availability at any time and anyplace), the highest level of personalisation (while maintaining close contact with social networks), and, looking into the future, context awareness (with location as a current and main example). Therefore, the mobile gaming scenario is no longer that of a delayed or modest extension of console or PC games. Rather, mobile gaming is a distinct user experience with a number of unexplored avenues (Feijoo et al, 2012).

As to the numbers of people playing on mobiles and tablets, comScore figures for the three months ending Feb 2012 suggest that in five major European markets 42% of smartphone users played a game at least once a month.<sup>46</sup> This is confirmed by another recent web panel survey of US and UK markets by Information Solutions Group (2012),<sup>47</sup> which reports mobile phone (all types) and tablet game playing by over 60% of mobile phone owners, including 44% playing the in the last month. While the largest age group of players is 25-34, the average age is 44.7 years. The gender breakdown is almost 50-50 men-women. Free games drive play, but 37% of surveyed paid for upgrades to games. The same survey charts the rise of tablet games.

The structure of the industry has been explored by Feijoo et al (2012). Figure 2 highlights the activities in the software games industries that are independent of mobile games (white boxes), the elements that are directly connected to or necessary for mobile games (pale grey boxes) and the new – and generally non-existent – activities that may be required for next-generation mobile games (dark grey boxes).

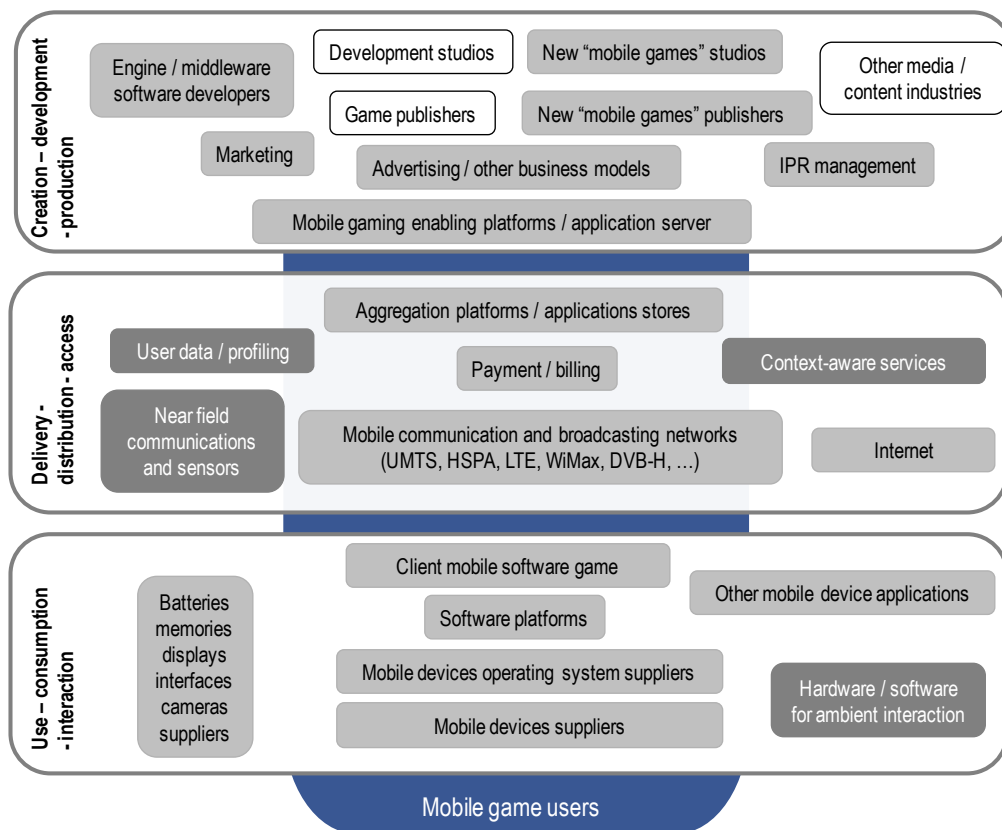
---

<sup>45</sup> comScore MobiLens E4 and E5 studies published in comScore (2012) CONNECTED EUROPE How smartphones and tablets are shifting media consumption.

<sup>46</sup> European Mobile Gaming Gets Social: Rise in Smartphone Adoption Drives Increase in Mobile Gaming and Social Play April 26, 2012. Online survey covered FR, UK, DE, ES, IT (46.4 million smartphone users representing 42% of the 'EUS' audience).

<sup>47</sup> Popcap Games Mobile Gaming research, Information Solutions Group – 2012, April-May 2012.

**Figure 2: Structure and Main Activities in the Mobile Games Ecosystem**



In comparing the structure of the mobile games industry with other games sectors, the lower market relevance of games publishers –the key players in other gaming platforms– is counter balanced by the role of mobile operators, mobile operating system vendors, handset suppliers and application store providers.

From the perspectives of developers and publishers, putting a mobile game onto the market has, in the past, involved more steps than other gaming platforms. However this complexity is being rapidly simplified with the dominance of Android and Apple smartphone platforms or App stores, and tools and services for multiplatform publishing and billing. While the Apple platform and portal is nominally closed, publishing is generally fast, and similar to the more open Google Android Market. Some mobile operators (e.g. China Mobile) and mobile phone vendors (e.g. Nokia) have app stores too. While these portals provide rapid access to a huge market, they do take a percentage of any sales.

From the perspective of developers, new platforms and application stores have had a considerable impact. Unlike traditional console games, the costs for a game to run on a mobile phone will seldom rise above €1 million, and are generally several orders of magnitude less, considerably lowering entry barriers for mobile games which has helped spawn a proliferation of small mobile-game developers in a way that recalls the early days of videogames development. Consolidation of OS platforms and cross-platform tools are also making it much easier to port between the few dominant platforms. Furthermore, the enhanced competition among games in any of these platforms makes marketing and advertising more relevant and shifts the market power from developers to publishers and platform owners. At the same time, it also makes direct access to consumers much easier.

However, the vast supply of games makes for acute competition and difficulties of visibility,<sup>48</sup> leading to the emergence of new firms specialising in marketing mobile games.

Regarding the location of *mobile* game developers, anecdotal evidence compiled by Feijoo et al. (2012) shows that mobile gaming is truly a multi national domain, with companies from several countries providing content. The evidence also shows signs of consolidation, with some companies appearing consistently across the rankings (Electronic Arts and Gameloft are the main examples) and others being the target of acquisitions by entertainment-oriented players, such as established game developers and publishers looking for strong development teams and portfolios. At the same time, there are some small companies and even highly successful individual developers (e.g. Team17, Firemintor, Lupis Labs are notorious examples in the Android platform), which supports the suggestion of low entry barriers.

With respect to business models for mobile gaming, according to Feijoo et al (2012) there continues to be uncertainty as to the most successful business models for mobile games. Feijoo et al suggests that the traditional mobile industry focuses on generating revenue from mobile gaming (and many other applications) as an additional (and secondary) source while content-entertainment industries are attempting to use the mobile channel as a supplementary source of revenue with regard to other gaming platforms. However, this analysis is already becoming out dated: pure-play mobile gaming firms are emerging for whom this is the primary business. Platform providers such as Apple and Google, have different interests to pure content or mobile business, and new mobile and social-media platform businesses are opening completely new business opportunities.

Game publishers (that is, content providers) are translating the existing business models of the software games industry into the mobile domain: retailing (pay-as-you-go), premium retailing, the freemium model (the game with basic functionalities is free, with payments made for additional levels, features etc), and subscription (basically, for gaming online). For instance, according to Apple, games dominated the premium (that is, fee-based) iPhone applications in 2010, representing eight of the AppStore's top ten bestsellers. However, games only represented four of the top ten free applications.

Two more recent additions to business models in the domain are advergaming, the combination of advertising and gaming (to produce games which reinforce brand or introduce new products), and 'value-added applications', or in-game purchase of virtual goods and functionality via micropayment, now common on in many online and browser games. These are also combined, where game players earn in game credits from interacting with branded elements, or 'micro-adver-games' are included in other media. Ways of delivering this revenue effectively are starting to be developed, with firms such as the German company Sponsorpay developing the business model for mobile and social games.

The business models for the other main types of players - operators, suppliers and application store owners - rely on their market power in the mobile ecosystem to arrive at some form of shared revenues with the games publisher or to benefit from their position in the ecosystem (billing or customer relationships, for instance).

---

<sup>48</sup> e.g. Williams (2012) "iPhone game marketing costs keep rising to "insane" levels, Games Industry International, THU 12 JUL 2012.

From this brief overview, it can be concluded that the conditions necessary for the continuing growth of the mobile gaming industry are currently in place. However, a number of challenges remain for this growth to occur on a larger scale. Additionally, new developments and disruptions could modify the market situation.

Two new elements to the gaming and to business models are emerging through the mobile platform: the cross-media usage of social networks and the leverage of 'context', primarily location and presence of other players. Mobile multi-player games are social network gaming. Social networks add two additional possibilities to the gaming concept: building a community around the game (which could extend far beyond it) and viral distribution. The integration of the most popular online social networks, such as Facebook, into the mobile phone and the emergence of purely mobile social networks, such as Twitter, contribute to the combination of mobile gaming and social networks. However it is the recent emergence of highly successful social gaming platforms that is perhaps shaping the next step of digital gaming. Companies like GREE (JP), DeNA (JP) and Zynga (US) have developed highly successful platforms for social gaming that integrate messaging, monetisation and gamification of games. GREE,<sup>49</sup> one of six big Japanese social gaming platforms is expanding rapidly into global networks, while Zynga claim 290 million users and 22 million mobile users a day, and are opening their platform to smaller developers to make their games accessible and used in the Zynga network.<sup>50</sup> These companies are expanding rapidly, and facing many issues such as fraud, privacy and security.

To sum up, three factors particularly contribute to mobile gaming development:

- 1) Broadband mobile data networks have become increasingly available and affordable.
- 2) Usable and affordable smart-phones and other smart devices are rapidly becoming the standard across many national markets.
- 3) The presence of app stores and gaming platforms that provide easy access to games and game playing direct from smartphones.

Furthermore, the mobile platform offers a number of features that are well suited to the massive adoption of gaming, including wide demographics, its status as the only truly interactive platform available in many developing countries, ubiquity (anytime, anyplace), casual usage, the ability to be both personal and capable of maintaining close links with social networks, and its ability to supply content and applications adapted to the context of the user. In the medium term, however, mobile gaming will confront the main challenges of increasing acceptance by users and overcoming the image of being a simple time-filler.

In terms of challenges, one that must be overcome, to increase adoption by at least part of the population are those related to privacy, trust and consumer protection, as confirmed by surveys (EuroBarometer, 2011). These factors may not be different from the case of other Internet-based services, but they may be more intense due to the personal nature of users' relationships with their mobile devices, and the ability to track location. There is also the need to address the challenges of acceptable standards for mobile advertising and performance guarantees.

The second main challenge is to develop solid business models, and organise the value network to create sustainable business, and develop new revenue streams exploiting

---

<sup>49</sup> <http://developer.gree.net/sp/globalplatform/>

<sup>50</sup> Zynga unleashes API, gaming social network, Gigacom, Jun. 26, 2012.  
<http://gigaom.com/2012/06/26/zynga-unleashes-api-gaming-social-network/>

traditional pay-as-you-go, online gaming subscription or premium versions, the possibilities of advertising, advergames and other products and services purchased in, for or through games.

## **2.8 Summary**

The global digital games market was estimated at US\$ 55 billion and is expected to grow to over US\$ 70 billion by 2013, exceptional figures in media and entertainment, and indeed in any industry. While traditional segments are temporarily diminishing, the growth in mobile and online gaming is more than compensating, and continued penetration of home internet and mobile broadband will strengthen this trend. A new audience for digital games are also being attracted by these developments.

With a view to policy options, the videogames market and its business sectors are of considerable interest to innovation and economic policy in Europe. This interest is likely to be strengthened by a key aspect of this industry: i.e. its capability to succeed through investments in the development and introduction of novel technologies and service models. Later on, other industries could benefit, through service model and technology transfer. However, though more and more studies are trying to calculate the dimensions of the games industry, the lack of official data is clearly a constraint to the appraisal of its potentials and to the understanding of its dynamics.

The European industry faces the challenge of change and foreign competitors. While particular national and regional policy makers in Europe are supporting the games industry, European policy makers need to consider the potential contribution of the industry to both economic and cultural policy, and spillover effects to other industries. In addition, as discussed next, there is the possibility of exploiting games in non-entertainment sectors.

### **3. The Non-leisure Digital Games Market: "Serious Games" and "Gamification"<sup>51</sup>**

While the leisure games market and industry undoubtedly provides the basis for widespread digital game playing and culture, and the genres, platforms and tools available to develop games, it is the growing development and use of special-purpose games for a whole range of 'serious' uses that is expected to provide an important input into the use of Digital Games for Social Inclusion. While the leisure game industry produces games that can be used in education, or rehabilitation or made accessible to people currently unable to enjoy gaming, special-purpose games – designed and tailored to support empowerment of people in particular situations or with particular conditions – are not going to be developed by this industry as it is currently constituted. The 'serious games' and 'gamification' industries may thus provide the source of these techniques and products.

'Serious games'<sup>52</sup> is being used increasingly as a catch-all term to include games and use of game technology for education and training, and military simulation software for training and planning, which both have a much longer history than the term, alongside emerging markets in health, wellbeing, advertising and communication and various non-formal education fields. Since the coining of the term in 2003 with the Serious Games Initiative in the US, there has been an ongoing debate about the definition and scope of the term. Susi et al (2007) highlight the tensions between those that stress the use of technologies of game production – such as development of virtual worlds with no game or play elements, and those that insist that a serious game must include at least some sort of 'game' element. So to are there debates over whether 'serious' games are by their nature, not fun, or whether the precise value is that they bring the 'fun', playfulness and intrinsically motivating elements of game play to activities with an instrumental outcomes. There are those, such as representatives of the mainstream game industry, who prefer the term 'applied' gaming, as if to distinguish it from a more 'pure' entertainment gaming. Other terms in common use include Digital Game-based learning, Games with an Impact,<sup>53</sup> Games for Good, Games for Change, and Games with a Purpose<sup>54</sup> to name but a few.

However none of these terms have captured the imagination so much as the term 'Gamification', a sufficiently vague concept that has served to reinvigorating some of the serious game work, which may be too serious, focusing on how to exploit the gameplay elements of digital games in applications that are not digital games, but in practice are frequently based in online services and mobile apps. It may be presumptuous to link 'Gamification', which might be considered the application of game techniques in non-game situations and 'Serious games. In 2012 Gamification ideas, long used in weight-loss and child motivation, are attracting considerable interest from consultants and policy makers

---

<sup>51</sup> In this section we highlight and discuss some of the key issues arising from analysis of the IDATE Market Reports on Serious Games (1st edition 2008, 2nd edition 2010 and 3rd edition 2011), plus data and analysis from IPTS work.

<sup>52</sup> Objections are raised to the term on the basis that 'games cannot be serious', or that 'all games and play are serious'. Some prefer the term applied games and gaming. Some firms are dropping the term game because of the negative connotations. No term is satisfactory, but 'serious' is currently a useful label. For a discussion see 'The Leisure of Serious Games: A Dialogue' by Geoffrey M. Rockwell, Kevin Kee, 2011, Game Studies volume 11 issue 2: [http://gamestudies.org/1102/articles/geoffrey\\_rockwell\\_kevin\\_kee](http://gamestudies.org/1102/articles/geoffrey_rockwell_kevin_kee)

<sup>53</sup> E.g. The Center for Games with an Impact <http://gamesandimpact.org/>

<sup>54</sup> GWAP website <http://www.gwap.com/> "When you play a game at Gwap, you aren't just having fun. You're helping the world become a better place"



linked to ideas of 'nudging', and it is not immediately clear whether those with the expertise to develop gamification are game designers or have any relationship with digital games development, and whether the tools of gamification can be considered part of 'serious games and gaming'. However discussion of gamification often end up addressing 'serious games',<sup>55</sup> and proponents of 'serious games' are starting to appropriate the term to promote their own work. As Escribano (2012) suggests, conventional and low key use of game approaches has taken a technological turn.<sup>56</sup> One of the key popularisers of the idea, game designer Jane McGonigal, explicitly developed the idea in developing an online tool with game-based techniques to promote personal empowerment, using the resilience approach.<sup>57</sup> Clearly, the current trend of gamification is closely linked to the potential of ICTs, and the rich tools of digital gaming, and the popularity of the gamification idea focuses attention more clearly on the game like motivational elements of 'serious gaming' rather than the technological elements.

We will use the term **'serious games' and 'gamification' industries** a collective term for organisations researching, producing products, conducting research and providing services related to digital games for a variety of client sectors, since these are currently the most commonly used terms, even if contested. Sometimes this will be referred to just as the *serious game industry*, since this is the term used in most of the literature in recent years. While there are firms from the leisure-game sector operating in this area, and researchers developing technologies, techniques and analysis, it is as yet a fragmented and emergent industry and market. There is as yet no clearly functioning market in many sectors, with defined product and service qualities, competing suppliers and active users. Some markets are better defined, such as e-learning and advertising but even in this area the quality and supply of digital games is still patching and of variable quality.

Nonetheless, there is an increasing (self) recognition of the sector, or at least the recognition of the value of a common 'brand' such as serious gaming. While there is a strong industrial component in North America and in East Asia, there is growing activity in Europe, much of it based on research efforts and networks, where efforts are being focused on exploring, demonstrating and developing the potential to apply advanced game development techniques in a whole variety of non-leisure contexts. Common tools are required, for example in producing 3D interactive environments, and many of the techniques for producing engaging and motivation games can be common across use sectors. Inputs and services, such as animation, graphics, testing etc can be provided by firms serving the leisure-game market. However, there are also considerable sub-sector differences, with widely differing the knowledge and resources demand to satisfy customers. Games for wellbeing and healthcare require very different knowledge and access to markets than do games for school education or for advertising and mass market communication. The establishment of codified knowledge, the integration of game-focus knowledge with domain focused knowledge remains a challenge and fertile area for exploitation.

---

<sup>55</sup> For example <http://www.reuters.com/article/2012/06/26/us-pharma-games-idUSBRE85P0IW20120626>

<sup>56</sup> Flavio Escribano (2012) Gamification as the Post-Modern Phalanstère - Is the Gamification Playing With Us or Are We Playing With Gamification? In Zackariasson Peter and Timothy L. Wilson (Eds.) *The Video Game Industry: Formation, Present State, and Future*. New York: Routledge.

<sup>57</sup> See the website of SuperBetter <https://www.superbetter.com/> and talk on TED [http://www.ted.com/talks/jane\\_mcgonigal\\_the\\_game\\_that\\_can\\_give\\_you\\_10\\_extra\\_years\\_of\\_life.html](http://www.ted.com/talks/jane_mcgonigal_the_game_that_can_give_you_10_extra_years_of_life.html)

In this report we have steered clear of describing specially-made games as 'serious games', but in terms of discussing the emerging market we will use the term serious games and gamification as defined above as short hand for a broad set of activities around bring technologies, techniques and practice of digital gaming to non-leisure activities and settings.

It is not quite clear that a 'serious games' and 'gamification' industry and market yet exists, although actors in the field are starting to organise themselves, setting up trade associations, conferences, and researchers have created networks researching serious games, two of which have been funded by the European Commission.

One of the few sources on an aggregated 'serious game' sector are the IDATE/LUDOSCIENCE industry reports from which the following figures are drawn. Alvarez et al (2012) estimated the global 'serious games' market at €1,500m in 2010, predominantly in North America (€1,050 million v. €330 million in Europe), and predict strong growth in North America compared to Europe, especially in the health sector, and in the heavily government financed defence sector. However it is the games for advertising sector that Alvarez et al (2012) estimate to be the largest (€300 million). The market consists of both consumer and business markets, but is predominantly to business, and to key accounts commissioning specially developed games.

The January 2012 IPTS workshop on DGEI highlighted the poor connections between the 'serious game' industry and the mainstream game industry. Large developers and publishers are generally not engaged in the 'serious' market, although some such as Valve software and some of the middleware tool builders are exploring the education market and support for educators.

### **3.1 Constituencies of Activity in Digital Games for Empowerment and Inclusion**

The ideas and actions for the use of digital games in non-leisure settings, and for empowerment and inclusion in particular are emerging from a number of identifiable constituencies of practitioners and researchers, and around particular driving concepts: Serious games, Game based learning, Gamification, Accessible gaming, meaningful play and Games for Good(Change). There are strong overlaps, but distinct practitioner and research communities can be observed.

#### **3.1.1 Serious games**

As indicated earlier, 'serious games' is a controversial term to be treated as a marketing idea or something with substantial meaning in defining a market and a distinct set of products, services, firms and approaches to addressing real-life issues. The field of serious games, with many conferences<sup>58</sup> a trade association<sup>59</sup> research networks such as the EC funded GALA network, journals,<sup>60</sup> prizes etc, addresses the development of special-purpose games and game-based products and services, and markets for these products. A relatively small number of specialist firms produce products for a growing market in a variety of segments such as the defence industry, games for health, eLearning and

---

<sup>58</sup> For example The Serious Game Summit, Serious Play Conference 2012, Games for Health, Games Beyond Entertainment Week, Mobile Serious Games Conference, etc.

<sup>59</sup> Serious Game Association <http://www.seriousgamesassociation.com/>

<sup>60</sup> E.g. Games for Health Journal <http://www.liebertpub.com/g4h>

communication/advertising games etc, each of which has its own dynamic. Despite some high quality products, the IPTS Expert Workshop repeatedly criticised the poor quality of many game-like products labelled as 'serious games' including those produced by researchers, which does not help the image of the approach, among the end users or videogames professionals. There are also a range of products offered as 'serious games', and which have no game-play elements, but exploit the technology of videogames, such as 3D engines where products have engaging the look and feel, and interaction possibilities of videogames. These nevertheless are one of the most important features of the serious game landscape. Much serious game activity is generated by the research community, where research focuses on new technologies, experimental implementation and measurement of impacts, especially in healthcare. In research, a much broader range of approaches is often captured under the rubric of serious games than just the production of specially-made games, such as attempting to understand how digital gaming practices can be harnessed and expanded for applied use. Finally the US government has adopted the rubric in its systematic addressing of serious games use and potential across departments and agencies.

### **3.1.2 Digital games-based learning and teaching**

While the elearning area of serious games focuses on the production of games for learning, the area of games based learning (GBL) and Digital Game-Based Learning and teaching explores all types of digital game use from the perspective of learners and teachers (Prensky 2008). It is largely focused on school-based education, with some work in other fields of Lifelong Learning (training). Debate continues over the ways that game-based learning works and should be pursued, emphasising or denigrating features such as 'fun' engagement or simulation (Susi *et al* 2007). Research and practice is focused on understanding use of games in pedagogy and didactics, building sound educational practices, and raising awareness and knowledge about use of digital games among education professionals. This is considerable interest in incorporating this research into digital game-based products in the eLearning industry for professional and educational markets.

### **3.1.3 Games for change/good**

The 'Activist' wing of serious games is less concerned with business, and more with social change or social benefit. It explores the use of games to raise awareness of political issues among the public or political leaders, build community participation, or support behaviour change on topics like energy consumption. Games can be 'serious' as in 'serious' cinema, addressing important social issues, or entertainment that engages people in constructive activities. There are series of conferences and organisations (e.g. Games for Change) and a movement dating back at least 10 years with participation from social enterprise, researchers, the third sector, and international development community.<sup>61</sup> Games for change explores gamification, pervasive and alternative reality games and 'serious' game products.

### **3.1.4 Meaningful play**

The meaningful play is a concept used in psychology and education, for example, to understand the role of learning through play, and has been introduced into the field of videogames by Salen and Zimmerman (2004) This has generated a field of critical thought

---

<sup>61</sup> Especially <http://www.gamesforchange.org/>

on digital games and game culture. At one level it highlights the interaction between player action and system outcome, but has been extended to explore individual and collective player behaviour in games (e.g. economic behaviour). Mainly restricted to academic researchers, the approach explore the value of digital games to individual and society, and the influence of digital games and game playing on non-gaming behaviour, cultural values and other activities of human life, such as work and education. It draws on emerging disciplines such as ludology.

### **3.1.5 Gamification**

Gamification (Bunchball white paper, 2010; Deterding, 2011) refers to applying game design elements to non-game activities often with the goal of engaging people more in these activities. As a concept it draws on marketing, media and behavioural studies, for example, related to health, wellness, but has been most exploited around online services attached to marketing with the proliferation of 'badges' and competitive elements. It is currently fashionable to explore the rather unknown areas of gamification of the workplace and of education. The focus of activity is largely around consultants drawn from a range of industries, an a certain degree of hype ("Gartner Says By 2015, More Than 50% of Organizations That Manage Innovation Processes")<sup>62</sup> and a few firms providing gamification services and platforms to support gamification of online services.<sup>63</sup> Gamification would seem to be a counterbalance to some of the serious game work, by focusing on the gameplay elements of games, rather than the 3D graphical simulations and virtual worlds.

### **3.1.6 Accessible games**

A growing area of interest in games is related to accessibility of digital games to disabled people who are restricted in their ability to play and enjoy digital games alone or with others. While primarily focused on young people, attention has been drawn to older people with age related disabilities for whom age can start to restrict their ability to play digital games.<sup>64</sup>

Each of these six domains described represents a community and set of ideas to be engaged the processes of developing digital games for empowerment and social inclusion. They are unlikely to be stable in the medium term. Gamification or Games with an Impact may become fashionable, and change the focus of activities and investment

## **3.2 The Emergence of Serious Games Research, Industry and Profession**

There are there are a huge variety of ways to classify 'serious gaming' (Susi et al 2007; Alvarez et al, 2010, 2012; Bleumers et al 2012), since it is a catch-all term to describe everything from 'fun' games designed for serious purposes, the use of gaming technology for serious purposes with no element of 'fun' or intrinsic motivation, and the use of gaming elements, without actual games (such as gamification). Borderline forms of digital interactive media that are often included, and are indeed central to some commercial serious game markets include Virtual Worlds and Simulations. Virtual worlds are computer-based environments with humans and non-humans represented by avatars, but without

---

<sup>62</sup> Gartner press release April 12, 2011 <http://www.gartner.com/it/page.jsp?id=1629214>

<sup>63</sup> See for example <http://gamification.org/>

<sup>64</sup> Robinson, E. and Walker,S (2012) Gaming On A Collision Course: Averting significant revenue loss by making games accessible to older Americans, The AbleGamers Foundation and 7-128 Software [http://www.ablegamers.org/publications/Gaming\\_on\\_a\\_Collision\\_Course-AGF-7128.pdf](http://www.ablegamers.org/publications/Gaming_on_a_Collision_Course-AGF-7128.pdf)

'game' elements such as objectives or levels designed in, but where play can be spontaneously initiated by users (Second Life or Minecraft are examples of these 'sandbox' environments). Simulations, or "simplified, dynamic, and accurate model[s] of reality" (Sauvé et al., 2007) are often used for goal based training or decision support. Again, these have few gameplay elements, but (perhaps) incorporate insights from game design into how to create effective, simple simulations that support learning and decision making. These can be considered serious games, as they may look like games, and operate with the tools used to create games such as 3D graphics engines (Susi et al 2007). Whatever the approach, serious games are generally meant to improve engagement and outcomes over existing ways of doing things, whether it be military training or selling shoes.

The use of non-digital games and play in education and training, and to promote social inclusion and identity is probably as old as humanity. The first digital serious game is often considered to be Army Battlezone, an abortive project headed by Atari in 1980, designed to use the Battlezone tank game for military training. In recent years, in addition to the high cost military simulations and virtual reality commissioned by the military, the US government and military have periodically looked towards game developers to create low-cost simulations that are both accurate and engaging. Game developers' experience with gameplay and game design made them prime candidates for developing these types of simulations which cost millions of dollars less than traditional simulations. Outside of the government, there is a growing interest in games for education, professional training, healthcare and wellness, politics and activism, advertising and public communication, etc.

The production of serious games or the development of serious gaming in a particular area of use depends on bringing together expertise from a range of disciplines, such as e-learning, computing, engineering, game interactive design, communication and expertise related to the domains of use. Collaborative work combining the skills of these disciplines to achieve a successful application of serious gaming is an un-formed domain of practice and skill, despite pockets of expertise existing in particular firms or teams. While games are being developed, a widespread criticism of many serious games, and one that was echoed at the IPTS expert workshop in 2012, is that many 'serious games' are of very poor quality, due to lack of expertise in game development and lack of resources. Games are added to existing products and platforms, such as e-learning materials but are of poor quality and uninspiring to those who they are meant to engage.

Key to successful games is the emergence of a set of expertises specifically related to game design: how to create and harness elements of game play, and bring together different media elements to produce compelling products. The 2012 IPTS Expert workshop identified a key problem of attracting professional game designers and students to work in serious games, since ambitions and motivation for these professionals and would-be professionals is in making a career in the dynamic and exciting entertainment game sector. Efforts to get these people to consider serious gaming as a legitimate field of work are only just beginning. Nonetheless it is starting, and game developing companies, particularly smaller ones, are starting to explore the potential of entering the serious game market. In this case the challenge is for game designers to learn how to work and apply their expertise in non-leisure game contexts.

The emerging market for supply of expertise and products for serious gaming is therefore fragmented and business models and interest uncertain. An additional, and fundamental difficulty, is that the demand side is not developed except in a few domains. While intermediary organisations like IT and telecoms companies or media commissioners are

spending on digital games as part of marketing and communication strategies, other end user organisations are only just start to be aware and have the interest to commission services. While in a few specific areas serious gaming may gain rapid traction, in many sectors there remains a number of years of experimentation, relationship and market building.

This dawning interest from end user organisations and sectors has only started as result of over 10 years of activism and experimentation by researchers, enthusiasts and investors. A key trigger was the founding in 2002, of the **Serious Games Initiative**<sup>65</sup> to support serious games projects and studies on a number of topics like healthcare, productivity, visualization, science, training and education. The Serious Games Initiative has been focused on uses for games in exploring management and leadership challenges facing the public sector. Part of its overall charter is to help forge productive links between the electronic game industry and projects involving the use of games in education, training, health, and public policy. Sawyer and Smith of the Serious Games Initiative outline the broad range and domains of application of Digital Games according to **industry sector** and **types of games** (Table 6): This sets out an agenda for how and where Digital Games could have a potential impact on various socially relevant issues and critical sectors ranging from Healthcare to Training and Education, defence and employment, but also civic and political engagement.

**Table 6: An Example Taxonomy of Serious Games**

	Games for Health	AdvergAMES	Games for Training	Games for Education	Games for Science and Research	Production	Games as Work
<b>Government &amp; NGO</b>	Public Health Education & Mass Casualty Response	Political Games	Employee Training	Inform Public	Data Collection / Planning	Strategic & Policy Planning	Public Diplomacy, Opinion Research
<b>Defense</b>	Rehabilitation & Wellness	Recruitment & Propaganda	Soldier/Support Training	School House Education	Wargames / planning	War planning & weapons research	Command & Control
<b>Healthcare</b>	Cybertherapy / Exergaming	Public Health Policy & Social Awareness Campaigns	Training Games for Health Professionals	Games for Patient Education and Disease Management	Visualization & Epidemiology	Biotech manufacturing & design	Public Health Response Planning & Logistics
<b>Marketing &amp; Communications</b>	Advertising Treatment	Advertising, marketing with games, product placement	Product Use	Product Information	Opinion Research	Machinima	Opinion Research
<b>Education</b>	Inform about diseases/risks	Social Issue Games	Train teachers / Train workforce skills	Learning	Computer Science & Recruitment	P2P Learning Constructivism Documentary?	Teaching Distance Learning
<b>Corporate</b>	Employee Health Information & Wellness	Customer Education & Awareness	Employee Training	Continuing Education & Certification	Advertising / visualization	Strategic Planning	Command & Control
<b>Industry</b>	Occupational Safety	Sales & Recruitment	Employee Training	Workforce Education	Process Optimization Simulation	Nano/Bio-tech Design	Command & Control

Source: Serious Games Taxonomy, Ben Sawyer and Peter Smith, February 2008, available at: <http://seriousgames.org>

<sup>65</sup> <http://seriousgames.org/>



While this taxonomy considers sectors and an emerging classification of types of 'serious game', it is useful to read along side another taxonomy, developed by the EC-funded IMAGINE project,<sup>66</sup> built more from a classification of genres and forms of digital game. An alternative is the taxonomy which suggests the different types of contexts and learning activity addressed above can be supported **by different game genres**, along with reference to evidence. It will be noted that 'serious games' in this classification is just one of the ways to use games in Game based learning.

**Table 7: GBL Taxonomy – from EC-funded IMAGINE Project**

Type	Basis for learning	Key games	Key texts
<b>Active games</b>	<ul style="list-style-type: none"> <li>Promotes physical activity</li> <li>Early learning skills (hand-eye, motor-skills)</li> </ul>	<i>Wii Sports</i> <i>Wii Fit</i>	-
<b>Alternate reality games</b>	<ul style="list-style-type: none"> <li>Embodied play experience</li> <li>Authentic real-world experience</li> <li>Social collaboration</li> </ul>	<i>Savannah</i> <i>Uncle Roy All Around You</i>	IGDA (2006) White Paper on Alternate Reality Games <sup>10</sup>
<b>Authoring games</b>	<ul style="list-style-type: none"> <li>Understanding of games' structure, production, effects and audiences</li> <li>Media literacy</li> </ul>	<i>Mission Maker</i> <i>Adventure Author</i>	Burn, A and Durran, J (2007) Media Literacy in Schools
<b>Creative games</b>	<ul style="list-style-type: none"> <li>Creative production</li> <li>Collaboration and sharing</li> </ul>	<i>Spore</i> <i>LittleBigPlanet</i>	-
<b>Epistemic games</b>	<ul style="list-style-type: none"> <li>Professional practice</li> <li>Workplace skills</li> </ul>	<i>Pandora</i> <i>Digital Zoo</i> <i>Urban Science</i>	Shaffer, DW (200) How Computer Games Help Children Learn
<b>Massively multiplayer online games</b>	<ul style="list-style-type: none"> <li>Distributed thinking</li> <li>Collaboration</li> </ul>	<i>World of Warcraft</i> <i>Everquest</i>	Taylor, TL (2006) Playing Between Worlds
<b>Military games</b>	<ul style="list-style-type: none"> <li>Authentic professional training</li> </ul>	<i>America's Army</i> <i>Full Spectrum Warrior</i>	Prensky, M (2002) Digital Game-Based Learning
<b>Mobile games</b>	<ul style="list-style-type: none"> <li>Authentic real-world contexts</li> <li>21<sup>st</sup> century skills</li> </ul>	<i>Virus</i> <i>Newtoon</i>	Klopfer, E (2008) Augmented Learning
<b>Persuasive games</b>	<ul style="list-style-type: none"> <li>Critical skills</li> <li>Critical reflection</li> </ul>	<i>Oil God</i> <i>Activism</i>	Bogost, I (2007) Persuasive games
<b>Role-playing games</b>	<ul style="list-style-type: none"> <li>Understanding character and identity</li> <li>Problem-solving</li> </ul>	<i>Deus Ex</i> <i>Tomb Raider</i>	Gee, JP (2004) What Video Games have to Teach Us
<b>Serious games</b>	<ul style="list-style-type: none"> <li>Managing real-world problems</li> <li>Manipulating real-world data sources</li> </ul>	<i>Global Conflict: Palestine</i> <i>Operation: Climate Control</i> <i>Ceduceus</i> <i>Supercharged!</i>	Derryberry, A (2006) Serious Games
<b>Simulations/ Microworlds</b>	<ul style="list-style-type: none"> <li>Management of complex systems</li> <li>Testing real-world ideas and scenarios</li> <li>Constructing ideas</li> </ul>	<i>SimCity</i> <i>The Sims</i> <i>Rollercoaster Tycoon</i>	Papert, S (1993) The Children's Machine
<b>Strategy games</b>	<ul style="list-style-type: none"> <li>Manipulating real-world scenarios</li> <li>Conjecturing and trialling</li> <li>Strategic thinking</li> </ul>	<i>Civilization</i> <i>Europa Universalis</i> <i>Knights of Honor</i> <i>Age of Empires</i>	Egenfeldt-Nielsen, S (2005) Beyond Edutainment

Modes of learning aligned with specific game genres

<sup>66</sup> IMAGINE (Increasing Mainstreaming of Games In Learning Policies) projects aimed at mainstreaming digital games in education *policy* <http://imaginegames.mdrprojects.com/>

Following Alvarez and Michaud (2008), Alvarez et al (2012) a simplified categorisation by the categorising the way that Serious Games address issues. **Communication: Message-based serious games**; **Narrow training serious games**: aimed to improve users' cognitive/motor skills; **Educational games** and **Simulation or 'serious play' serious games**.

It is clear there is no agreement on how to categorise serious games. The categories used include

1. **Sector** in which they are used,
2. **Issues** they address
3. **Means** that these are addressed by a game
4. **Type of game genre** or configuration used.

In this report we concentrate on the sector in which games are used (and sold), with a secondary focus on issues. The accompanying report on State of the art of DGEI focuses more specifically on a few relevant sectors and issues, and explores in more depth the means by which digital games support instrumental activities.

### **3.3 The Digital Serious Games and Gamification Market: Demand Sectors, Customers and Users**

Today, digital serious games are employed in a wide variety of sectors, and for a range of uses as identified by Sawyer and Smith. Alvarez et al 2012 note that games are being developed in the sectors of such as agriculture, culture, energy, social services, environmental protection, and training, specific sectors not appreciated by Sawyer and Smith, but then focus on defence, healthcare, formal education, corporate training, and information and communication as the key markets. Here we summarise activities in the main areas of production and use highlighted in the, 2012 report and in other work in the field: Defence, Education, Training and Recruitment, Information and Communication, Health and Wellness, Science, Culture and Activism.

#### **3.3.1 Defence**

The defence sector is one of the most important areas in terms of client investment and orders, for training products and recruitment products. An early example, *America's Army*, developed for the U.S. army and distributed free-of-charge over the internet as of 2002 as a recruitment tool is considered the first ever significant digital serious game, with over 17 million downloads recorded in 2004. Serious games are also used by the military in Europe, though less widely than in the USA. Games blur into professional simulations at the high end of the market, and at the low-end appear simple 2D game. Their value is recognised in training of recruits who may come with low literacy skills but high game playing skills. Simulations are used for medical training, training on complex equipment and battle simulation or personnel rehabilitation.<sup>67</sup> The US Department of Defence launched a US\$ 50 million 5 year programme of game development for recruit training in 2010. The amount of money invested in this sector makes it a key market for the development of

---

<sup>67</sup> See for example the work of the Human Factors Integration Defence Technology Centre at the University of Birmingham, UK <http://www.birmingham.ac.uk/Documents/college-eps/eece/research/SeriousGamesattheUniversityofBirmingham.pdf>



techniques and strong supply sector. Games are funded through public procurement and research grants.

### **3.3.2 Education**

The use of digital games in the education sector is one of the oldest applications of games. From the supply side, they can be developed as part of an educational publishing business, and more recently, the elearning industry. However, educational games, according to the report of the EC Engage project,<sup>68</sup> have always been "low budget, low tech, poor cousins of the computer game industry. Up until recently, very few commercial companies have provided good quality educational games. Historically, these games have been written by teachers and academics who wish to utilize the technology within their teaching, but usually do not have the skill, not the finance, to create a high quality product". This is changing with new expertise, tools and changing business models for distribution. Games in education can be replacements for text books and other media, or tools for game making and a more radical approach to teaching and learning. Serious uptake in the formal education sector however, depends on significant innovation in practices of formal schooling, and in the procurement and certification systems for education products. Procurement processes were cited by a range of contributors to the DGEI study as a significant barrier to adoption.

### **3.3.3 Training and recruitment in public and private sector**

Digital gaming is attracting strong interest in the field of professional training, an area already heavily committed to elearning. Alvarez et al (2012) estimates only 1% of total €52.6 billion elearning market is in digital games. Simulation Products are being custom made for professional training for managers, and game approaches developed basic training of employees (e.g. eSmart, a €2.2 million training tool for Macdonald's employees on Nintendo DS aimed at cutting training time in half for part time workers in Japanese restaurants<sup>69</sup>), and a growing market is helping supply firms develop portfolios of products and expertise to be customised to a growing market. Non-digital recruitment using games is also being shifted to Gamification and is also a hot topic and driving interest in corporations, not only related to training but also to **motivation at work**. Leading companies in this field include PIXELearning in the UK,<sup>70</sup> developing simulated environments and serious games for business education and U&I Learning,<sup>71</sup> specialising in eLearning for business formal and informal education based in Belgium. Recruitment is also going through games (Sitzmann, 2011). For example, the L'Oreal group are one of the highest profile employers to go down this route, with the **Reveal** business game<sup>72</sup> developed by TMPNEO.<sup>73</sup>

---

<sup>68</sup> European Network for Growing Activity in Game-based learning in Education project <http://www.engagelearning.eu>

<sup>69</sup> [SERIOUS GAMES MARKET](http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html) blog MAY 8, 2010 <http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html> (accessed 11-2012).

<sup>70</sup> <http://www.pixelearning.com/>

<sup>71</sup> <http://www.uni-learning.com>

<sup>72</sup> <http://www.loreal.com/en/www/html/careers/Meet-us/Business-Games.aspx> and <http://www.reveal-thegame.com/>

<sup>73</sup> [http://www.tmp.com/upload/library/2780\\_L'Oreal\\_Reveal\\_Case-Study\\_2010-04-07\\_APPROVED.pdf](http://www.tmp.com/upload/library/2780_L'Oreal_Reveal_Case-Study_2010-04-07_APPROVED.pdf)

### **3.3.4 Information and communications**

Games that 'convey a message', the majority of which are commissioned **adverts** (81% in 2010 according to Alvarez et al (2012) estimates), although **public-information campaigns**, **political advertising** in election years, and activist campaigning are a growing use of games (see below). Uses are also being found in **policy communication**, both from policy and to policy. Games are a core part of online and mobile advertising to children and young people, and this is one of the more developed markets.

### **3.3.5 Health and wellness**

Health education games also appeared in the early days of digital games, but, like many applications of technologies, it was military investment that kick started serious investment. The market is currently divided into products aimed at **wellness**, such as fitness or dieting, or **prevention** of ill health, products for **rehabilitation** (which overlaps with the previous section) and **products for professionals**, for example simulations for training. In the mainstream consumer market Nintendo has enjoyed considerable success with applications dedicated to 'brain training' and 'fitness'. According to a SharpBrains<sup>74</sup> study, the market for brain and fitness products was \$295M, in the USA alone in 2009. However there also important growth in specially-made games, and gamification aimed at consumer and professional markets, and there are an increasing number of controlled trials of game-based therapies in physical and mental health, and positive systematic reviews that will drive professional acceptance. Game interfaces such as Wii and Kinect have been seized upon as low cost alternatives to expensive professional equipment. Gamification of weight-loss and fitness are well established practices. Alvarez et al, (2012) predict this sector will be the domain of strongest growth, especially driven by US healthcare industry, and consumer wellness market, though wellness and health can be a complex and expensive market to serve, given presence of medical gamekeepers, and the costs of trials.

### **3.3.6 Culture**

Although this sector only accounts for a minor part of the serious gaming industry at present, strong growth is possible, particularly in the areas of cultural heritage, education and tourism, areas where mainstream media has traditionally played a strong role, education plays a key role, and audiences are large. The Nintendo DS is commonly used as a learning tool in museums and galleries in Japan<sup>75</sup> and multimedia gaming installations are a feature of many museums and galleries across the world. 'Serious' games in this area does not of course detract from the fact that all videogame are cultural products, and part of contemporary culture.

### **3.3.7 Science**

Games are being used in science in a number of ways, including science education, science communication, and in 'crowdsourced' and citizen led science, where game-like design and gamification is used to motivate non-scientists to collect and analyse data (e.g. search for astronomical features (GalaxyZoo<sup>76</sup>), decode protein structures (Foldit<sup>77</sup>), or collect

---

<sup>74</sup> Sharpbrains an "independent market research and innovation think tank tracking brain fitness and applied neuroplasticity research and marketplace." <http://www.sharpbrains.com/>

<sup>75</sup> <http://seriousgamesmarket.blogspot.com.es/2010/05/nintendo-gets-serious-about-serious.html> (accessed 11-2012)

<sup>76</sup> <http://www.galaxyzoo.org/>

<sup>77</sup> <http://fold.it/>

environmental data). Products here are generally developed through research budgets, but some are organised through generalist scientific publishers and public-interest broadcasters.

### **3.3.8      Activism and games for change**

This sector is unique in that it does not follow traditional economic models: titles are often produced with little or no financial backing and have the sole objective of putting across a particular message, or stimulating social action and/or collaboration. The Games for Change movement, embracing digital games, pervasive gaming, and gamification includes use of 30 second games to put over political messages, to long term gaming projects that engage and build communities. Games for change are also being explored in other areas of behaviour change – such as from raising awareness of energy use or stimulating competition between neighbours to reduce consumption.

### **3.3.9      Policy making and corporate planning**

A final area of activity is the development of games that support management, complex policy-making, and organizational decision-making. Simulations, building games, and role playing games can support thinking and decision making between multiple stakeholders, and training of people to work in this sort of activity. Examples include the game for large-scale urban projects Construct.it (TU-Delft University).<sup>78</sup>

For longer exploration of use of games in different application domains see State of the Art Report (Bleumers, 2012) DGEI Annex 1, section 2.3.

### **3.3.10     Users and customers**

Serious games are generally not sold to end users, but commissioned or supported by intermediaries. The biggest serious game clients at present are the American military and government, which have financed the most significant productions and are developing the industry as a whole. Other backers include political parties, businesses, public and private institutions and publishing houses. In the US, the games industry, through the Entertainment Software Association Foundation<sup>79</sup> also fund serious games, as part of Corporate Social Responsibility activities, and certainly also to try to improve the image of digital games in the eyes of politicians, the public, and potential regulators.

However there are end users, and it is useful to understand these by age group. Though those under 25 represent the most important target market, serious games are aimed at all generations. Following Alvarez et al (2012):

- **Under 15:** the presence of an adult or suitable framework is often required if serious games are to be used effectively by this group, though this is a highly game literate audience, an increasingly exposed to use of games in education.
- **Between 15 and 24:** this group expects the highest quality in terms of video games, with both big budget titles (AAA) and high quality Mobile and social as a benchmark.
- **Over 24:** within the 25-55 age group, the amount of time spent playing videogames gradually reduces with age. Above 55 however, the potential gaming

---

<sup>78</sup> <http://cps.tbm.tudelft.nl/node/248>

<sup>79</sup> <http://www.esafoundation.org/beneficiaries.asp>

audience starts to grow again, for two key reasons: people in this group have more free time available, and individual and social game playing is core activity of older people: it is way to stimulate intergenerational bonding, and games can be used explicitly to support wellness and rehabilitation.

### **3.4 Uncovering the Business Models and Value Chain of Digital Serious Games**

The serious game industry is polymorphous as it groups together all the niche areas and markets that employ videogames for objectives other than pure entertainment. For this reason the value chain is not as clear as for the conventional videogame industry which as has been pointed out is becoming more complex itself. Alvarez et al (2012), the IPTS Expert Workshop, and the DGEI State of the Art report (Bleumers, 2012) identified two main modes of production and connection between developers and users: a **product-based** approach and a **project-based** approach. The product approach applies where a developer creates a product that can be sold or distributed in a market, a more conventional value-chain model. The Project approach applies when a network or consortium of organisations work together to develop a product, service expertise and the use of the product or approach, usually by some of the partners. Value is brought by all actors, but direct financial gains only by a few. In addition, many serious games projects are situated in research contexts, so a final mode of development that can be identified is **the Research-led innovation and implementation** a type of project approach that includes development of digital games, but where a research agenda dominates, and the primary output may not be digital games used in practice, but research knowledge related to the application area, or technologies and techniques are tested in the project.

#### **3.4.1 Product-based approach**

Following the distinction made in De Prato (2010) about the Videogame industry, the value chain in the area of digital serious games is made up of the following three major groups:

**Developers:** produce the content of serious games, or tailor them. Currently, in the USA and Europe, these tend to be SMEs or very small enterprises/freelancers and are generally serious game "pure players". They do not usually have a video game background, but have worked in the promotion, development or publishing of professional software. They can also come from the animation, and general media production industry, elearning or even pharmaceuticals.

**Publishers:** cover the costs of publishing, marketing and packaging serious games, both for physical and electronic sales. This group also includes developers/publishers that produce their own titles internally. There are currently no serious game "pure player" publishers due to the diversity of applications. Intermediaries who play the role of publishers can be established players in elearning and education publishing, and healthcare systems and services.

**Distributors and Procurement:** digital serious games often do not follow traditional retailer-based distribution models. The principal customer of the game may act as distributor to final users: the American army and NSA for example distribute certain products directly to the public. Most titles are sold and distributed via the internet. Distribution in many sectors in the area of serious games is shaped by public and private procurement processes that distance the end user organisations from the process, making the procurement agencies the key distributing agents. Experts consulted for DGEI

highlighted the difficulties of breaking into procurement processes, especially for products and service like serious games that are novel and do not fit within existing evaluation schemes.

The relationship of developers and publishers to principal customers is captured by, Alvarez et al (2012) as three main segments:

- **A Business market (B2B)**– for example, training products (corporate, defence), professional health products
- **A direct to Consumer market (B2C)**, such as educational and wellness products
- **A Business to Consumer business, market (B2B2C)**, providing platforms and products for other organisations to supply a consumer market (public health, military recruitment)

Alvarez et al (2012) also find the following **delivery models** in the digital serious games market:

- **Free-of-charge distribution:** essentially based on web marketing, this approach employs all the various marketing strategies used online;
- **Semi-free-of-charge distribution: Using the freemium model**, characterized by bonus products, demoware, shareware and trialware, and virtual communities.
- **Commercial distribution:** made up of electronic and physical sales, as well as use in restricted areas.

However, for much of the industry, the delivery mode is not key issuing in reaching the market, since the games are developed on a *project basis* for particular clients.

### **3.4.2 Project approach**

While there are product-based markets, a large part of the serious game business is in the project market, with orders coming from key accounts. These are generally co-production projects, where the commissioning organisation can be exploring the use of digital games, and is developing their knowledge and practice in digital game use. Alvarez et al (2012) identify three modes of business.

The **order-based model** is where a client contracts a business of some kind (though not a private individual) to design and develop a serious game. This is then used exclusively by the client.

The **licence-based model** is where titles produced by any kind of publisher, company, independent, association or public or private institution (though not a private individual) are made available for a fee. The application is either a ready-to-use serious game (customized or non-customized), a piece of development software to produce a serious game, or a serious game integrated within another application or product.

The **consulting/training model** is where a public or private institution's designers/developers are trained in all the different stages of serious game and gaming development on-site. This can involve not only the development of a special-purpose game, but also the development of practices in which it can be used most effectively. These will often be done in partnerships with other public, research and private organisations.

The project mode of work dominates largely due to the emerging nature of the use of digital games, and the specialist nature of many of the applications. Each project is an experimental process, where the developers are learning about client needs and the potential for games in the particular application, and the customers are also exploring the potential of games, the impacts they can have, and how they can be deployed. This can be a long a risky social process, raising the barriers to entry by developers and user organisations. As with mainstream games, and any risky venture, intermediaries such as publishers or other organisations, including government, that can provide resource input, both financial and knowledge, and broker and manage innovation can support the process.

For the future, the IPTS Expert workshop emphasised that to build a sustainable business model a serious game developer must build reusable and scalable resources, and not enter into new projects with a blank slate. Multiple sales are required, or repeat use of a generic platform, a game engine, techniques, assets etc. generated in project based work. For as long as markets remain dominated by one-off experimental project, developers and publishers will be unable to develop sustainable business.

### **3.4.3 Research-led innovation and implementation**

A final model of development is **research-led innovation and implementation**, still one of the most significant forms of activity in the field, where partnerships of end user intermediaries, technology firms, games developers and other specialist organisations work to implement a game approach in a specific context. In this case the long term goal of research projects is not necessarily to achieve successful local implementation of a product, but extract scientific findings and transferable knowledge and technologies that can be reused by partner organisations in other situations. Public and private research funding organisations play a key role in this type of project. However research funding, and the leadership of research projects often fails to capitalise on the implementation and launch a sustainable product or businesses.

## **3.5 Market Actors**

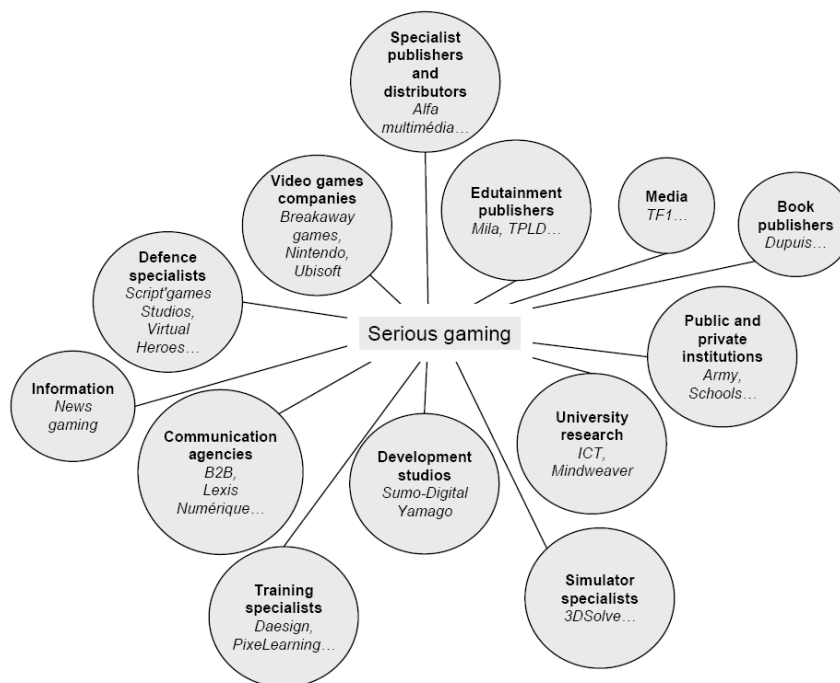
As mentioned above, the military and government are the two main serious game backers in the USA, largely as a result of the Small Business Act, which offers SMEs access to contracts worth between 2,500 and 100,000 USD – a large number of orders of this size are for serious games. This market should not obscure the role of industry and private institutions however, as these also commission serious games. The major video game companies have not positioned themselves on the serious game American market as yet.

The European market is younger than that of the United States, and it is principally driven by the UK, Scandinavia, Germany and France. There is little political support in Europe to help develop the market, though there are a number of local and regional initiatives aimed at accelerating progress (discussed in more detail in final section). However, it is important to note the Pacte PME, the French "equivalent" of the Small Business Act, which came into force on 1 August 2006 and expected to have a similar effect in the long term. The French Government also introduced a programme to support research and development of serious games in 2008 (see Annex).

Though the publisher/developer business model may not be widely supported in Europe, the order-based model seems to show increasing development in the spheres of e-learning, industrial training, and advergaming. IDATE/LUDOSCIENCE suggest range of types of businesses involved in serious games (Alvarez and Michaud, 2008), but this 2008 map

(Table 8) does little to map structure or size of involvement of different players. For example public sector broadcasters probably have more involvement than large entertainment market videogame publishers. It also misses players such as health product companies, who have interests in game-based products for behaviour change in many areas of health and wellness

**Table 8: Suggested Overview of the Digital Serious Games Actors**



Source: IDATE

Source: Alvarez and Michaud 2008

Providing more structure, the Alvarez et al (2010) analysis suggests the digital serious games industry seems to be a sector populated by four groups of main players who have a common interest in investing which they classified as follows:

- **Traditional software sector players:** Here we find a classic value chain composed of a developer, a publisher, a distributor and a vendor. In the serious gaming sector, it is generally a single player that handles all four of these functions. This organization could change and shift to a situation where publishers specialize in healthcare or training or some other area. There are very few regular video game companies that are involved in serious games, so most of these companies are "pure" serious game players.
- **Promoters and investors** from the private, research and public sector that provide supply-side investment to develop capacity, products, tools and evidence to kick-start the nascent market. These include universities, public authorities, public and private research funders, schools or continuing education establishments, companies that manage their own in-house training, etc. They are contributing their expertise and/or monetary resources to serious games and are therefore the driving forces behind the sector's current momentum. For researchers, this sector is opening up a sizeable field of investigation that is capable of creating more direct gateways to businesses. University research therefore combines technological problems with concrete applications, with the support of private sector companies as part of collaborative R&D projects. In some cases, these projects are supported by existing

national schemes (the Small Business Act in the United States, ANR projects in France, for instance) or more recent dedicated programmes – one example being the call for serious game proposals that was issued by the French Ministry of the Economy in 2009. Serious games are thus both a lever for cooperation between research and enterprise and an outlet for applied technological innovation.

- **Intermediate players**, and especially marketing agencies and media companies, who are likely to either produce or commission a serious game. They can also be involved in the development side by becoming a serious game publisher in a particular segment, especially information, communication, training and teaching or instruction. Intermediate players, notably ISPs and consumer electronics manufacturers, are in a position to preinstall applications on the devices they sell or put into users' homes.
- **Other media companies** – Media companies are increasingly commissioning 360 degree programming, with TV, online and other interactive such as games. Aware from pure entertainment programming this can include the commissioning of games. In particular, this can include **public sector broadcasters**, such as BBC and Channel 4 in UK with a mandate to produce public-interest media in a whole range of education and public-interest topics, and are commissioning interactive material as part of the move away from pure television and radio.

In 2012 the 3<sup>rd</sup> edition of IDATE/LUDOSCIENCE, Alvarez et al (2012) also noted the emergence of **serious games executive producers** coordinating developers, content and solution vendors, and the **commissioning of projects and products from end users industries**.

### **3.6 Prospective Developments for Serious Gaming and a Serious Games Industry**

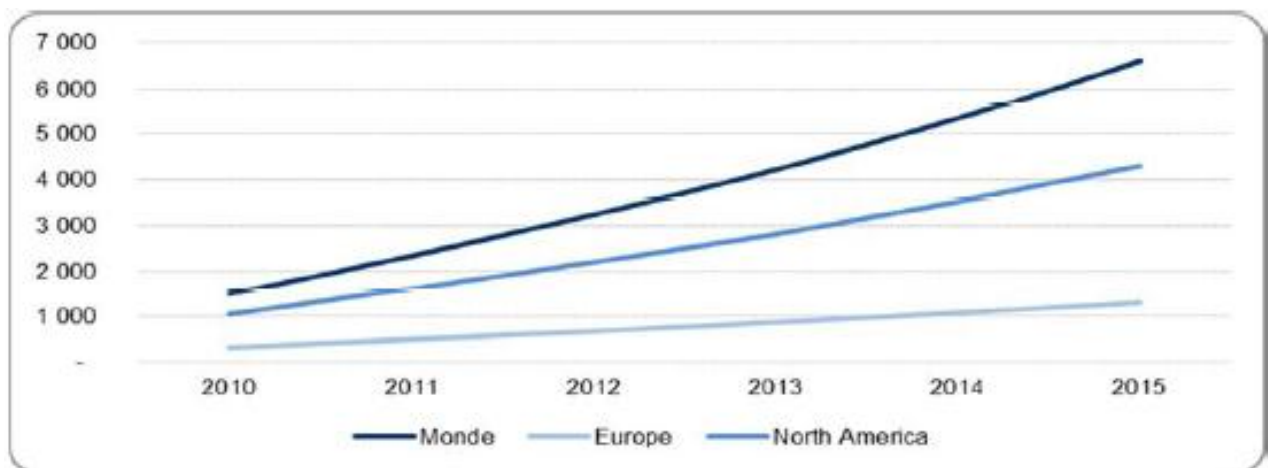
Currently estimates have been made for the develop of a 'serious games' sector, but not for growth and efficiency and effective benefits based on the use of digital gaming in application sectors such as healthcare, wellness or training. According to Alvarez et al (2010), the digital serious game sector is expected to grow significantly in the medium term, estimating that in 2010 it already generates a total €1.5 billion in revenue around the globe, and that by 2015 sales will be almost seven times what they are in 2010 – with an average annual growth rate of 47% between 2010 and 2015. The more recent analysis and estimate of the market (Alvarez et al 2012), shows that between 2009 and 2010, the volume of titles sold has declined by 33%. On the one hand this reduction may be due in part to an overestimation of the demand in the initial phase of market penetration, and the economic crisis. On the other hand, it should also be considered as an effect of the efforts of developers to focus more on the quality of their realization than the volume of applications sold.

In terms of volume of sales, all the target areas are affected by the decline in relative terms, while the areas of health and vocational training strengthen their presence and role in the market.

The evolution of business models for services underpinning the serious games, their increasing relevance and sustainability, the maturity of the offer and the clear expression of the users' needs, can explain in part this phenomenon. The nascent state of the market is characterised by continual development of business models.



**Figure 3: Evolution of the Digital Serious Games Market Worldwide 2010-2015 million EUR**



Source: Alvarez et al, 2012

According to Alvarez et al (2012), the worldwide turnover of the Digital Serious Games sector is expected to reach €2.35 billion for all segments combined for 2011. The United States alone will account for more than 70% of the income generated at global level. The potential for growth is significant, since the reference markets (health, training, education ...) are a combined worldwide turnover of about €5,000 billion.

Within the European context, France is one of the most dynamic players in the digital serious games market. This was especially driven by a promising economic landscape in the domain and government (see section on Policy) funding for serious games specific and digital games projects, at regional and national level. The overall revenue of the sector was estimated to reach €47 million in late 2011 and achieve the amount of €84 million by 2015.

However during 2009-2010 the market is estimated to have dropped by one third in part probably due to the effects of the financial and economic crisis, but also justifiable by the 'stabilisation' of the sector (and especially in the area of health and training) and the search for increased quality. Budgets for individual products increased significantly and smaller projects dropped. The sectors of health and training have also benefited from considerable stability due to strong roots in research, and high investment in R&D, particularly by the European Commission.

More specifically, integrating Alvarez et al (2012) with the analysis and findings of the IBBT review and the IPTS expert work there are three key aspects to be considered for the future development of the industry:

- **Publishing, distribution, procurement and platforms:** Where there are serious game products, then online distribution and use can follow and build on the platforms used in the mainstream media and games market, including the general purpose mobile platforms and social media systems. However the 'serious' use of games depends on market intermediaries and distribution platforms in particular markets of use, and the requirements for online platforms in domains of use where security, privacy are of much greater concern than in consumer markets. Distributions of products and services in healthcare and education typically depends on large contracts with approved suppliers and formal tendering processes that

might be out of the reach of many smaller developers and even publishers, especially in emerging markets. Methodologies for assessing game-based products are required, and these need to be formalised and implemented by procurement agencies.

- **Technology:** New technologies can be incorporated following the mainstream market, but the certain serious game markets, notably defence and health care, may also provide opportunities for new technology implementation, such as advanced AI, emotion recognition, etc.<sup>80</sup> One of the strengths of the serious game developers has been to adapt mainstream game interfaces, such as the Wii and Kinect, to serious applications, like rehabilitation, as cheaper alternatives to expensive specialist equipment.
- **Industry, skills and employment:** Serious games are starting to attract the attention of game developers and investor, as a market emerges that will provide revenue, repurposing existing assets and platforms. However the dynamics of the market may require considerable learning and building of new competences. Many further opportunities exist for employment of professional game designers in non-game organisations, supporting design and 'gamification' of practices and services, but the training needs to be in place to equip game developers to work in non-entertainment environments, interest them in doing this, Game-design and game-thinking education can also be introduced into a broader range of educational programmes, from interactive media, informatics, business administration and teacher training.

### **3.6.1 Supply of games-making tools and middleware**

The discussion so far has been in terms of the sector of demand, and the mode of production of games, without discussion of the means required. What is more the study of Digital Games in Empowerment and social inclusion highlights the role of game-making by end users and intermediaries as a mode of serious gaming. We also see serious games being developed on low budgets, and by relative novices. This requires a set of tools that can be used to implement the design of a game, and if relevant, distribute it. While graphics, sound and video can be created with generic tools, the creation of games requires a game engine, and authoring tools create to the game<sup>81</sup>. there are four main sources of tools for the creation of digital games that can be used by individuals and intermediaries, and novice developers:

1. commercial and open source tools for production of multimedia products, widely used to create 2D games (e.g. Multimedia Fusion, Stencyl, Gamemaker, often specifically designed for ease of use);
2. Specific 3D commercial game development tools for 2D or 3D games such as Unity3D, the Epic Games Unreal Development Kit (UDK), Torque;<sup>82</sup>
3. Programming development kits that focus on audio-visual content;

---

<sup>80</sup> See for example the DGEI cluster of projects funded by DG INFSO. <http://tardis.lip6.fr/dgei-clustering-meeting>

<sup>81</sup> <http://gamesined.wikispaces.com/Game+Creation+Tools> and <http://www.ambrosine.com/resource.html> for lists of tool for education and non-programmers.

<sup>82</sup> <http://www.garagegames.com/>

4. Special purpose tools for creating education games and simulations such as Thinking Worlds by Caspian;<sup>83</sup>
5. Special-purpose game and interactive media tools for children's education and training purposes, such as Scratch for PC (MIT), Kodu for Pc and Xbox (Microsoft) or some games that include game making within them e.g. Gamestar Mechanic.<sup>84</sup>

Of concern for the development of serious games and DGEI in particular are the availability, source, support and future of those tools. More tools in category 4 would strengthen both professional and intermediary game-production in particular sectors, reducing costs and training needs. These tools need not be only about manipulating media and game elements, but provide support on pedagogy, built in evaluation etc.

For game-making approaches some of the tools, such as Scratch, developed at the Lifelong Kindergarten Group at MIT Media Lab emerge from universities, and are freely available, with vibrant professional and user communities. Scratch has also been localised into many European languages. Microsoft's Kudo is free to use, has English and Spanish resources and a nascent 'Kudo cup'. On the professional tool side, the industry has embraced the educational context, and is starting to make advanced tools available, either free under non-commercial licence (e.g. UDK<sup>85</sup>), a low cost (e.g. Torque3D<sup>86</sup>) or through limited version and programmes of promotion to schools (Unity3d<sup>87</sup>, GAMESTUDIO<sup>88</sup>). These platforms have user and teacher support communities, but the majority in English language. Many commercial games provide 'modding' tools for the creation and sharing of user-created content for commercial games (see main Annex).

In addition of screen based digital games, game making approaches have gone beyond conventional digital games and incorporated robotics, building on platforms such as LEGO Mindstorms. LEGO and other Robotics competitions<sup>89</sup> are now widespread, and recognised as medium not only for education, but also for participation.<sup>90</sup> The availability of low cost open source electronic controllers such as Adriano and now super low cost computing devices such as the Raspberry Pi means that this approach is very advanced in terms of platforms from both open source and commercial players, and for children and adults.

### **Challenges ahead**

The players in the emerging digital serious games sector are currently addressing some major industrial challenges. The value chain is changing, especially in the upstream production layer, due to the introduction of high-quality production tools. Quality of production is also increasing thanks to the integration of specific domain-related skills in their teams and specific expertise from the videogame industry, and developing project management experience. Alvarez et al (2012) suggest that issues related to hosting platforms, distribution, marketing and deployment of digital serious games are being

---

<sup>83</sup> <http://www.thinkingworlds.com/>

<sup>84</sup> <http://gamestarmechanic.com/>

<sup>85</sup> <http://www.udk.com/licensing>

<sup>86</sup> <http://www.garagegames.com/products/torque-3d>

<sup>87</sup> <http://download.unity3d.com/education/>

<sup>88</sup> <http://www.conitec.net/english/gstudio/>

<sup>89</sup> E.g. <http://www.usfirst.org/roboticsprograms/frc> (US FIRST ROBOTICS) <http://fllopen.de/> FIRST® LEGO® League Open European Championship

<sup>90</sup> Natalie Rusk, Mitchel Resnick, Robbie Berg and Margaret Pezalla-Granlund (2008) New Pathways into Robotics: Strategies for Broadening Participation JOURNAL OF SCIENCE EDUCATION AND TECHNOLOGY Volume 17, Number 1 , 59-69, DOI: 10.1007/s10956-007-9082-2

tackled with the aim to structuring and 'pooling', at best in a standardized framework, downstream in the value chain.

Just like its parent the videogame industry (though the parent may deny the legitimacy of descent), digital serious games is a cross-platform industry. While currently products are in the main deployed on personal computers, it will certainly expand onto new generation consoles, and mobile and online platforms. Metrics used to optimize online gaming and maximize revenue can be used instead to evaluate use and behaviour and maximize impact. However this needs to be done in a much more scientific manner with goals of learning, behaviour change etc that go well beyond customer loyalty or repeat spending, and with considerable care over interpretation.

Within this highly and rapidly changing context, Alvarez et al (2012) identify key challenges to be addressed (summarised in Table 9), which are similar to the development of the interactive media industry as a whole, identified by UK Skills (2011): "Bringing technical and creative talent together; to understand each other's language and skill-sets, to explore new types of content development, business models, and [develop] legal and collaborative frameworks" (UK Skillet 2011). In other words, how to sustainably create good products and services that are useful and actually get used?

### ***1. Reshaping the gameplay for non-leisure applications***

While a strength of digital games is the ability to bring players slowly into the gameplay and train them in basic skills, slowing increasing and expanding them through different levels and tasks, many game genres, based in a generation of classic computer games assume players have knowledge of basic rules, aims and interaction (mechanics), and the support of a gaming community to master them. For new audiences, and to reach non-games, game designers have to take a lead from the casual game market, and simplify mechanics and gameplay. Close work with professionals in target sectors, and user-centre interaction design will be needed to address particular target groups and needs (e.g. people with particular pathology in the design of a therapeutic game).

### ***2. Automating a portion of the production process, particularly the integration of sector-specific elements***

Since collaboration between game designers and professionals in application domains is in its early days, the tools and production process is far from streamlined. Product and service teams in application areas have to integrate human and technical resources from the videogame industry into production of serious games. This will take time, and require development of individual teams, but also the development of a supply of people educated to work in these teams and modified or original tool sets from third party suppliers. Special purpose tools that facilitate game creation for particular sectors, embedding both game design expertise, management of media assets, evaluation tools, and pedagogical elements can improve the speed and quality of production, and reduce costs.

### ***3. Supply and integration of skills designers and technology specialists into teams using or developing serious games.***

Production of serious games requires multi-skills teams, with the key novel element is the inclusion of professionals with a range of skills relevant to game design, in particular related to game play design, programming and creation of visual and audio content for game platforms, and mastery of the new platforms and tools for game design and distribution. To bring these skills together with the application domain specific skills is

perhaps the key challenge of the industry. This requires trained graduates<sup>91</sup> not only prepared to design games for the entertainment sector, but willing and able to work in other roles – in interactive media design companies producing serious game, the health sector, in schools and vocational training and defence. There are obvious difficulties in this – many people work in game development technology or publishing because they love games – and could apply these skills in other areas of creative industry or engineering, but choose not to do so.

#### **4. Innovating business models**

Many questions over possible business models and pricing are still open. Drawing on Alvarez et al (2011), a number of key issues and trends are identified:

Different pricing and business models will apply to each sector of activity. For example:

- In the field of healthcare and therapeutic games, one important goal needs to be compliance with existing regulations governing the target market – the result being that a serious game would gain the, potentially exclusive, approval of national health authorities, and could be deployed by healthcare professionals with the financial support of public authorities.
- The teaching and learning sector may rely more on the non-exclusive licensing model when acquiring a serious game and offering it to the public, without using a service to train future trainers.

Each target category corresponds to several pricing and business models. They will depend on the nature of the target, i.e. whether it is a business or an association, an institution, a citizen, an Internet user, a consumer, a professional, etc.

- On the whole, the pricing model used for a serious game aimed at the general public, whether consumers or citizens, is one of free or freemium. The business model will be based on sponsoring, advertising, subsidies and self-financing and user fees.
- In most cases, the pricing model used for a serious game aimed at a public or private establishment will be based on a fee-based service that includes the acquisition of a licence and/or a service for training users in the game and/or a game support and update service and/or a service for keeping track of and processing players' results and scores. The business model employed for the production of the serious game is a flat-fee contract and/or revenue sharing if several partners are involved.
- The more technologically sophisticated the application, the more difficult it is to play, the more complex it is to configure and the more it requires real-time monitoring, the more the licensing model appears to apply, combined with training and a support service for use of the serious game.

---

<sup>91</sup> In the UK 60% of workers in Creative Media have a degree or equivalent level 4 qualification compared with 36% of the population of working age across the economy. Skillset (2008) Creative Media Workforce Survey.

## **5. Opening markets by shaping procurement**

To sell into markets where procurement processes are formalised and centralised, these processes need to be opened up to digital games and digital games suppliers. Processes of quality control and standardisation need put in place, and pathways for procurement of digital game products and services made explicit. For example, classification of a game as an ICT product that can only be purchased from an approved ICT supplier introduces a gatekeeper that may not be appropriate for the product. Public procurement can also be used to support innovation<sup>92</sup> and could be looked at as a way of support the development of a serious game supply industry in specific public-funded sectors.

## **6. Structuring serious game production and expertise by target sector.**

The question raised at the beginning is whether there is a 'serious games industry' that can be identified and has common challenges, dynamics an identity. One trend against this is the that game development and use will become part of mainstream product and service supply in each of the application domains, so value chains will be structured around developers who are specialized in designing education applications, publishers specialized in healthcare products, etc. Of all of them, the way the business communications and consumer information segment is organized will probably most closely resemble the traditional video game sector, with those involved having more "generic" professional skills. In other sectors, expertise may be more embedded in user organisations, where local customisation, training and practice are important.

## **7. Persuading reluctant users**

While some large corporations and organizations are really starting to incorporate serious games as a training, information and communication tool, many of them still need to be persuaded of their usefulness. A key challenge is convincing small and medium enterprises (SME), which would help expand the client base for serious game developers considerably.

Several things could help bring potential clients around:

- significant demonstrations of successful use in model situations, including robust evaluations
- recommendations from businesses, and especially large companies and organizations;
- support from public authorities, and especially fiscal incentives for companies that use serious games for training their employees, for instance, or the creation of long-running collaborative R&D programmes, the establishment of serious game development funds, games commissioned by public authorities, etc.;
- local and regional government involvement in creating a serious game-friendly environment for the sectors that are potential users as part of smart regional specialisation.
- more clear structuring of serious game target sectors into clusters.

---

<sup>92</sup> Bodewes et al (20??) Exploring Public Procurement as a Strategic Innovation Policy mix, EU-Project OMC-PTP

## **8. Investing in all connected platforms**

Serious games are currently confined mainly to computers and, to a lesser degree, mobile phones. However with the rapid uptake of mobile platforms, including tablets this is likely to change. Games for behaviour change may be more appropriate on personal mobile devices, and tablets suit many situations where a PC is not appropriate. While many applications aimed at business users will continue to be hosted on a computer, but other technically powerful platforms, such as home consoles or touchscreen tablets, could serve as complementary options, and may even over take, depending on the application. For applications aimed at the general public, serious games will quickly make their way to new platforms in the coming years, smart phones, tablets, connected televisions, integration of social media and incorporation of other electronic devices related to ehealth and wellness. Developers need the tools and skills to produce for these new platforms.

## **9. Implementing and exploiting new technologies**

One of the reasons for the emergence of 'serious games' is the advanced technologies, including accelerometers, gyroscopes, gesture recognition, and 3D graphics now available to the consumer market through specialist games devices, and many of which also feature on mainstream mobile platforms. While specific new hardware and software technologies can be developed for serious games devices, it is the ability to piggy back on mainstream systems that differentiate part of the 'serious games' sector from firms developing specialist high-cost equipment for small markets. Nonetheless, serious game research is also pioneering technologies such as facial recognition, combined with voice recognition to achieve emotional feedback. This function opens up a broad field of potential serious applications in the area of inter-personal skills (see for example EC-FP7-funded projects TARDIS and ASC-Inclusion). Serious games also need to tap into the emerging social gaming, and online gaming platforms and practices. The value of specialised serious games firms, and firms that cover both serious and entertainment games is that they transfer competence from one domain to the other.

However there are challenges to serious games that are not faced by the entertainment sector, which only has to concern itself with making the best of technology available, and wowing audiences with the next generation of AI or graphics. Serious game makers have to address specific needs and requirements of particular uses – be it training surgeons or providing tools for autistic children which may limit approaches based on existing digital game technology. In addition some of the simple types of approaches which work well in entertainment will not be sufficient a serious game will often have to reflect reality very precisely, and be much more sensitive and adaptive to players. Serious games have to be much more cautious with sensitive data entertainment service providers (rather than 'just' personal identify data and credit card details). Games that produce and use sensitive evaluation data may have to be interoperable and compatible (in privacy etc) with Information systems in the contexts they are use, schools or primary health care. IDATE/LUDOSCIENCE interviews suggest that this is one way that the 'serious game industry' may start to differentiate itself from the videogame industry, but this is also a challenge for developers not used to this type of environment).

**Table 9: Challenges and Actions for the Serious Games Industry**

Challenge	Example Potential stakeholder actions
Reshaping the game-play for non-leisure applications	Simplify, using models from casual games design User-centred design with professionals from application domain.
Automating the production processes	Integration and customisation of conventional game design tools
Supply and integration of skills designers and technology specialists	Build multi-disciplinary teams Train games development professionals for serious game development Develop expertise in managing serious game teams and projects
<b>Innovating business models</b>	Develop specific business models appropriate for each sector and target users
<b>Shaping Procurement</b>	Address issues within procurement processes to make serious game adoption easier, thus creating attractive markets.
Structuring serious games industry by target sector	Support evolution towards organisation of firms and expertise that meets the needs of users.
Persuading reluctant users	Provide convincing evidence and demonstrations Convince SMEs to invest in use of DGs Invest in R&D Build structured local business environments as part of smart specialisation policy
Investing in all platforms	Do not limit development to the PC and browser platforms, but build serious games for platforms such as mobile phones, tablets, TV and specialised ehealth systems
Implementing and Exploiting New technologies	Exploit novel technologies being made available on latest gaming platforms Develop and implement new technologies for specific user needs that are not available on game platforms

Source: based on Alvarez et al 2012 with author development

### 3.7 Summary

Serious games and gamification is an innovative sector, with growth potential, but still in a formative stage. The potential benefits from use application of serious games, and for growth of a sector producing employment, but facing challenges that individual firms cannot address without difficult would appear to offer range of opportunities for policy to support industry open markets and fund research. While the knowledge base and skill-sets are starting to emerge, with at least 10 years of research, there is a long way to go to develop, systematise and codify and disseminate knowledge about use of games in the diversity of applications considered. Business is growing, but there is low awareness among potential customers, few bridges between developers and potential users, fragmented markets and few connections between the videogame industry and areas of non-leisure application.

The serious game industry represents an innovative business sector establishing itself with new knowledge, successful firms and a growing market among public and private customers. Major shifts in state-funded use environments, such as from 'health' to 'wellness', and towards more personalised education, open up these markets to the advantages of serious games, although these processes are very slow.



However the serious game industry is nascent and it is not clear that activities in different application sectors link to form one industry. Long term sustainable business models are not yet established in the sector. The whole field of serious games is only just emerging, and although there can be some early successes there is a long way to go to create a robust practice and industry.

The inclusion of specialised game developer firms and professionals in development projects allows the exploitation of leisure game technologies and systems in applied markets, but the serious game industry and research has poor links with the mainstream game industry, and only in a few areas such as elearning are firms combining work for leisure and non-leisure market. However a few Digital Games companies are starting to operate in both industries. The ability to do this offers opportunity for diversification and strengthening of the interactive media industry with the game industry's specialisation.

On the demand side, attitudes, institutions and practices of application domains need considerable support to develop, from basic research through to standardisation and building communities of practices, and eventually, creation of markets in digital game products and services.

#### 4. Relationship between the European Mainstream Videogame Industry and the Emerging Serious Games Industry

An important question for European policy in relation to serious games is their relationship with the mainstream videogame industry, and whether interest in one should necessarily involve consideration of the other.

In general, the mainstream videogame industry and existing professionals are not currently showing interest in 'serious uses'. The return on investment is seen as too low compared with established entertainment markets for both developers and publishers, and it is often repeated that games developers have few ambitions to work outside the 'pure' games sector.

However, the videogame industry is certainly of relevance to any successful growth in serious games development in Europe. It can be argued that a strong interactive media industry, focused on videogames, but also on online media and emerging mobile and social network service sectors, is necessary to ensure dynamism and innovation in Europe in this sector. This innovation and economic strength will spill over to the 'serious games' industry(ies). Entertainment games represent much higher value business than serious games, with the resulting higher rates of investment and innovation.

The current perceived disinterest of entertainment games publishers, developers and other market actors is a result of the current small size of serious games markets, and the considerable differentiation of lead users, such as training (defence or corporate) from more familiar consumer markets in. However supporting diversification to serious games may help some companies such as smaller developers, if they have resources to build the expertise and relationships, but might be a distraction from the more general support from the industry as a whole, which is pursuing a still growing, if not consistently profitable, entertainment market

If we consider the role of a specifically European videogame industry in the future of any 'serious games' industries, then the following observations can be helpful in understanding potential in this area. These observations have not been verified, nor were they the object of the DGEI research, but have nonetheless emerged during the development of this work as necessary for understanding the future of DGEI. Many of these issues are similar to those for the more specific DGEI domain.

A strong European mainstream videogame industry could deliver:

1. The **Middleware tools** crucial for low cost, high quality game production. It may not be necessary that these be European, as it is not clear that any advantages would come from negotiations to support serious game features with European owned firms over third country firms, and anyway these are likely to be developed in the context of global demand. Some firms might produce specialist products for the 'serious' sector.

2. **Distribution**, especially Web platforms, which boost some of the ways games can reach users. Some benefit may come from European players who can be partners in research and implementation in national markets

3. **Developers**, who can use their expertise to develop games and services in non-entertainment sectors. Given the project-nature of most serious game developer, European developers are necessary for this.

4. **Publishers.** Game publishers may provide the branding for reach some markets in serious games (Nintendo, with its role as hardware vendor etc), but are not generally interested in non-consumer sectors, given low return on investment and uncertain markets. However publishers can play a role in raising awareness (and have an interest), and perhaps through supporting research, and providing skills, and making COTS games available more terms suitable for certain application areas. Strong European game publishers could help develop a more European focus in market development and innovation, as occurs in Japan, China or Korea.

5. **Production service providers.** These firms will support serious game production, particular when developers have less in-house competence, when budgets reach appropriate levels. Some of this can be outsourced globally expect for localisation services, which are likely to be based in Europe.

6. **Relationships with IP providers.** Europe is strong in this area, and these are likely to be key player producing locally relevant products, and strong global products, particularly in cultural sector, education etc.

7. **Educators.** Universities produce graduates in specialised course to work in the games industry as developers. Graduates must see career options as developers in Europe to be attracted to learn the skills, otherwise the programmes will fold. Without these programmes, it is much harder to train the developers of serious games.

8. **Researchers.** Researchers are leading the cross-over between videogame and 'serious' games in many research fields, and there are likely to be common teams and research groups that work on both. To keep these teams active and innovative it is essential that they have strong links to the mainstream entertainment videogame industry. This will ensure a flow of people, ideas and technologies from high value entertainment markets to the serious applications.

9. **Innovation** The videogame industry is diverse and dynamic and for the most part innovative in producing new technologies, game genres, and cultural products and memes. Without this dynamism, the serious game industry is in a much weaker position. These new ideas and products need to be create in European studios to feed into the community of developers and the audience

10. **Audience and awareness.** While the games industry has in many ways created the negative images of games thorough the directions it has taken in the past, it has also opened up new markets in recent year, bringing new ideas of what games are, how they are played, and who plays them. Attitudes and experiences of games for the majority of the population are unlikely to be driven through 'serious games' (although there will be a part that is). Without the familiarity expectations, skills of potential users of serious games will not be in place.

11. **Leadership.** A strong European videogame industry could provide strong leadership to all game sectors, encouraging people to enter game development, raise the cultural and economic value of the sector and awareness of the contribution of the games to the economy and European culture.

The serious game industry faces a number of challenges, as outlined above. The mainstream videogame industry can play a role in meeting some of these, especially: Automating the production processes; Supply and integration of skills designers and technology specialists; Innovating business models; Shaping Procurement; Persuading reluctant users; Investing in all platforms and Implementing and Exploiting new technologies.

## 5. Relevance to Digital Games for Empowerment and Inclusion

These two chapters have sought to capture the current state of play of the video game and serious game industry and markets. The role of the analysis is to assess what the contribution of the videogame industry and serious games industry could be to the use of digital games for social inclusion and empowerment, and how policy makers and other stakeholder should consider engaging with the actors involved in both entertainment and non-entertainment sectors. The form, pace of development and impact of DGEI will be strongly shaped (though not determined) by activities of actors in these fields, and the choice policy makers make in engaging them in pursuance of public policy agendas

While at first glance it might appear that DGEI is the same as 'serious games', there are two differences. First the serious games industry and market is much broader than the areas targeted by empowerment and Inclusion. Second the empirical analysis of actual use of games-based approaches set out in the IBBT state-of-the-art report highlights three main approaches to use of digital games to support empowerment and social inclusion: use of commercial off-the-shelf games, use of special purpose games and game making approaches. Drawn narrowly, the serious games industry covers the supply of special purpose games, but drawn broadly, the sector can also provide the expertise, services and research to the other two approaches.

Analysis of the challenges faced in developing the supply and use of special purpose games, and of games-based approaches in general, the IBBT state-of-the-art report, and the summary report on the potential of DGEI indicate the following challenges: low awareness, and negative stereotypes of games use among intermediaries, decision makers and policy makers; lack of production and distribution capacity; lack of skills in development and use; the need to empower intermediaries to use games-based approaches; low quality and poor sustainability of DGEI projects and teams; many gaps in knowledge and the need for research, and the lack of impact assessment tools to understand value.

The following discussion addresses the way that particular actors, sets of actors and the entire industry could play a role in developing DGEI, and the conditions in which this might occur.

### 5.1 The Relevance of the Videogame Industry to DGEI

As indicated above, serious games are not seen as important to most of the mainstream industry. If this is the case for a growing commercial sector such as training and advertising, then DGEI applications, largely funded by the public sector and the third sector, working in small and specialised markets are even less attractive. However, just as it was possible to identify the contributions of the videogame industry to the 'serious games' sector, we argue that the videogame industry provides, or could provide, a range of **indirect inputs and direct inputs to the development and use of DGEI**. Thus, the future trajectory of the industry and market for entertainment games will have an impact on the future of DGEI.

These **indirect inputs** not targeted at DGEI uses include the shaping the audience for game products and services, changing the image and awareness of games, development and diffusion of new platforms, devices and delivery systems, supply of games that can be used in DGEI practices, development of new games genres, business models for creation and distribution of games, training games developers, and creating tools for creation of products and services and running on-line environments. These could reduce the costs of

production of DGEI products, raising the quality of production, and facilitate both distribution and new and sustainable business models in this market (Table 10). As discussed in the previous chapter, the entertainment products of the videogame industry can be used directly for DGEI uses, without the industry having to consider this at all in their activities. The high quality, cutting edge and up-to-date entertainment games that engage people through narrative, play, visualisation and social interaction are a valuable output of the industry. More specifically the videogame industry has a long tradition of education games, or fun games with educational content, primarily targeted at the children and their parents. These can be used in DGEI applications, for example in schools.

**Table 10: Indirect Benefits of Videogame Industry to Production of Special-purpose DGEI Products**

Indirect support to DGEI	Value to DGEI
Reduce costs development and higher quality through open gaming platforms and cross platform tools and middleware	These can reduce costs of entry to development and ongoing production and business costs for development DGEI products which typically have low budgets.
Increased quality and reduced cost of production via casual game formats	Games industry develops and popularises 'casual gaming' formats with tools and costs of development considerably lower than conventional games,
Sustainable businesses in DGEI facilitated through new business models and easier distribution to users	Changing value chains and infrastructures create new forms of distribution direct to mobile and through browsers, and integration of games with social media platforms, and micropayment systems, and increasingly open platforms of online play and digital distribution offer low cost ways to access games, and to deliver game products and services.
New user-device technologies brought at low (user) cost to mass market.	Hardware developers, particular in console and handhelds are able to introduce new types of interface technology to the market that can be important for a range of 'serious' game applications and user groups. The same applies to software game-engines. Inclusion of new type of sensor or 'AI' in a mass market device can reduce the cost and increase the market penetration to an extraordinary degree compared with specially produced devices for limited markets.

There are other ways that the games industry may play a more **direct role** in DGEI. These include:

- a) publishers developing consumer markets and business markets for games with elements of personal or community development;
- b) SMEs diversifying into non-leisure markets as a way of exploiting assets and balancing risks and taking advantage of new emerging markets;
- c) Support from industry for games development/business education (supplying tools, trainers, curricula, mentoring etc);
- d) support for changing the image of games with direct education of decision makers and the public;

- e) making products and services more easily available in DGEI markets;
- f) and other CSR activities.<sup>93</sup>

Some firms, notably market leader Nintendo, have opened up an important new market in digital games with an explicit 'empowerment' element. Many new players were brought into the market during the 2000s, with products such as Wii Fit, Wii Sports, and 'Brain Training' which appealed to people wanting to have fun, but with some additional positive personal benefits, both psychological and physiological. Despite equivocal evidence on the actual effectiveness of some of these products (Nouchi et al, 2012), the success demonstrates market demand, and a whole slew of profitable entertainment games with positive value, such as dance and music games have followed. The leadership demonstrated by companies like market leader Nintendo, and to a lesser degree Microsoft, could be shown by other firms such as the publishers. They could encourage more investment in the sector and the production of products that could be used in support of empowerment.

With such high competition in the entertainment market, with unpredictable commercial success, firms from across the videogame eco-system, and particularly developers, are starting to look to the emerging markets in advertising, communication, healthcare, and 'gamification'. These could be potential markets for their established skills and platforms, particularly when these existing assets could be used to generate new income for marginal investment. However, skills and techniques for entertainment products need to be integrated with specific application domain knowledge. This means that professional designers and businesses must be encouraged to work outside their traditional areas of interest, develop new techniques and knowledge, and learn to work in teams with professionals in the application domain.

Finally, the issue of the **image of videogames** is an area in which the videogame industry can be engaged directly and indirectly. The widespread negative attitudes towards the value of games,<sup>94</sup> as an isolating and 'anti-social' activity is of course contradicted by the widespread purchase and use, and popular recognition that at least 'face to face' videogame playing can be a deeply social activity that brings friends and family together (e.g. McGonigal, 2011). The negative image partly comes from the fact that some of the industry has targeted the 'hardcore' market of young males, depicting themes popular with this group. The efforts of the games industry to change this image by campaigning have largely failed. However, the diversification in audience and the high visibility of other games genres and casual gaming is likely to support at least a partial change in image. There is scope for mutual reinforcement of positive images of entertainment videogames and DGEI, such as reinforcing the value of videogames as cultural products and industry, and the videogame industry supporting the use of videogames in DGEI.

Despite some motivation for firms in the games industry to engage with DGEI directly, firms may require some persuasion to become more involved in DGEI activities, and policy makers and practitioners should seek as a priority to engage the industry at all levels.

---

<sup>93</sup> The ability of games companies, including the large publishers, to engage in Corporate Social Responsibility, is dependent on the economic state of the industry, which is currently not that strong. Much of this is channelled through industry associations and collaborations with academic organisations.

<sup>94</sup> Bösche, Kattner (2011) Fear of (Serious) Digital Games and Game-Based Learning?: Causes, Consequences and a Possible Countermeasure, [International Journal of Game-Based Learning](#), 1:3 1-15

## **5.2 Relevance of the Serious Games Industry to DGEI**

The serious games 'industry' and research community is crucial to the success of DGEI for a number of reasons, not least because many of the application of serious games are precisely in empowerment and inclusion. However the development of digital games-based approaches for empowerment and inclusion should not be seen as just a sub-sector of the serious games industry or as markets for commercial products and services. The application of digital games to empowerment and inclusion depends on developing not only products, education and research, but practice in using games developed among the intermediaries of social inclusion, in both the public and third sectors. These intermediaries may call on industrial suppliers for products and services. Realistically, this professional practice will develop in parallel and in partnership with a 'serious games' industry that specialises in the needs of intermediaries and end users. The practice of innovation usually entails constant movement of people and ideas between practice environments and (Williams et al 2002) support roles in industry, research or policy, and this is unlikely to be different in relation to games use.

A thriving serious games industry, supplying commercial markets, will provide the ecosystem of supply and support needed for DGEI, with operating teams or networks of developers with tools, development and distribution platforms, services such as training, customisation and localisation, research and development of techniques and design methodologies, and knowledge of good practice in producing effective interventions that produce impact effectively. A serious games industry will include publishers who may invest in opening up new markets for services that support DGEI.

As well as the production and service side of serious games, the research in academia and enterprise can encourage the development of a scientific approach to application of games, to complement the arts and entertainment approach of the videogame industry. This can include specific knowledge related to learning, wellness etc, but also the transfer of knowledge in more communication and marketing areas where serious games are being developed.

The serious games sector can promote the adaptation of games technologies to applied sectors by mastering the new interfaces and games engines, and repurposing them for specific problems identified in application areas.

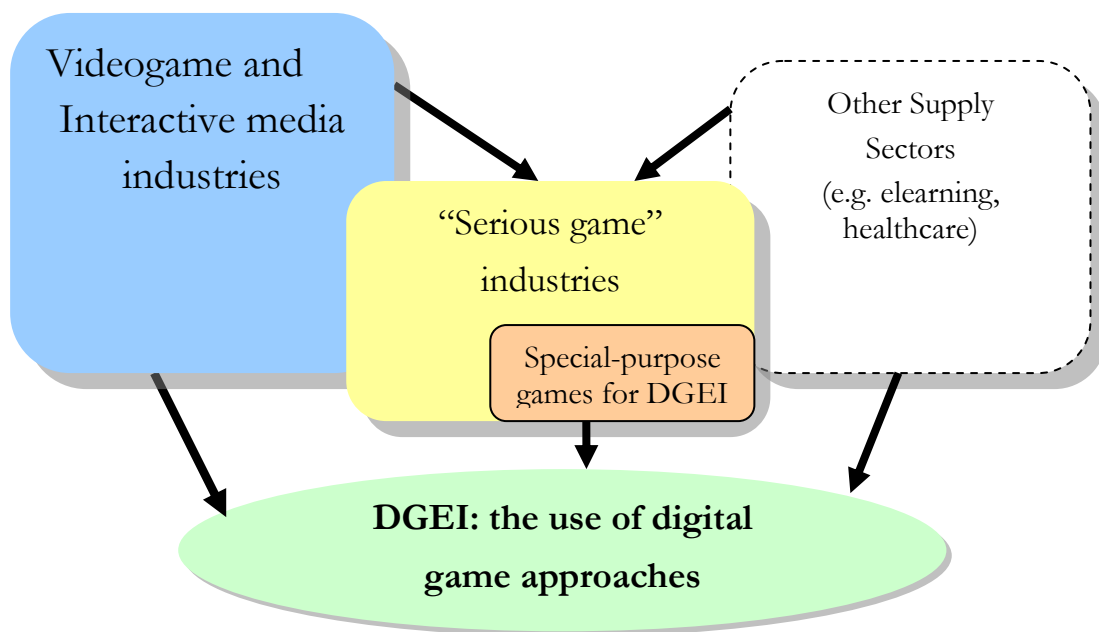
DGEI requires the development of teams and professionals and managers who know how to create serious games products: a broader serious games market will sustain these teams and build the experience they need to work on DGEI type projects. Serious games education can prepare students in many disciplines to use games techniques in their own fields, as well as preparing specialists in games design to work in non-entertainment fields.

Finally, without a 'mainstream' serious games and gamification industry that is sustainable and delivering high quality effective products to commercial sectors like defence or training, it is unlikely that the use of digital games for inclusion and empowerment is really going to have a chance of developing. Failure in these markets would indicate that the products and services were actually not that effective or economic to develop. Policy and other stakeholders must clearly consider the connection between the support for an emerging serious game industry and the development of DGEI practice among social inclusion intermediaries.

### 5.3 Summary

The previous sections have argued that the development and use of DGEI is influenced strongly by the supply of knowledge, products, skills and services from both the emerging 'serious games' industries, and from the diverse videogame industry. What is more, these two sets of actors are not independent: the future of the serious games industry depends in many ways on the future shape of the videogame industry (Figure 4). This has implications for policy actions in support of DGEI, and indicates the importance of joining up policy and policy-making processes related to the videogames and serious games industries and DGEI use.

**Figure 4: Relationship between Videogames, "Serious Games Industries" and DGEI Use**







## 6. Policy Activities in Leisure Games and Serious Games Domains

### 6.1 Dimensions of Policy Activity related to Digital Games

The leisure games and the serious games industries have both been subject to a range of policy actions, largely through funding for research, but also through purchase, regulation and industry support. Five main areas of policy action can be identified, which are discussed below, with particular reference to activities of the European Commission:

**Table 11: Policy Support for Videogames and Serious Games**

Support area	Types of actions
Support to the videogame industry	Support to industry in the form of tax credits Programmes of education and training of professions to work in digital games production. Regional and National policies to provide multi-dimensional structural support to the videogame industry.
Research and development	Funding of basic and applied research on digital games and all related technologies. Funding for research on digital game culture
Support for serious and applied games industry and use	Funding of development and innovation of digital games in a range of applied sectors including social inclusion. Funding and supporting use of digital games in education. Funding of 'serious games' and simulations especially for and by the military. Public procurement of games to stimulate innovation and industry
Regulation	Regulation of content Regulation of consumer markets
Leadership	Championing the digital games industry Leading the development and use of digital games approaches in applied domains.

#### 6.1.1 Support to the videogame industry

National programmes of support for the commercial industry have led to controversy and divisions within the industry. In Europe, the French government has been building a series of supports for the games industry since 2003, with the Ecole Nationale du Jeu et des Médias Interactifs Numériques (ENJMIN), a pre-production fund (Fonds d'Aide au Jeu vidéo (FAJV) ) and the Research and Innovation Network in Audiovisual and Multimedia (RIAM). In 2008, France proposed a tax credit system of 20% on development costs of a videogame with 'cultural content', on the basis of supporting the games industry as part of the cultural industry.<sup>95</sup> This was justified largely as a move to keep a games development industry in France, since the principal French publisher Ubisoft was shifting production to Canada. Canadian provinces, notably Quebec had initiated systematic but more aggressive, policies to build the games industry and attract inward investment in a number of provinces.<sup>96</sup>

<sup>95</sup> For a discussion see Kerr A. 2009, Levels of Complexity: Cultural Diversity, Politics and Digital Games, Breaking New Ground: Innovation in Games, Play, Practice and Theory, London: Brunel University, September, 2009 Gruber, EIB.

<sup>96</sup> See for example THE FACTS: Canada's fearsome growth, and power, Rob Crossley, 27th January 2011, **develop.** <http://www.develop-online.net/news/36870/THE-FACTS-Canadas-fearsome-growth-and-power> which suggests that the 600% growth in the Quebec industry is due to employee tax breaks, and

However this French proposal was considered a protectionist measure by parts of the games industry - global publishers that chose to define themselves as part of the software industry, rather than cultural industry, an industry under which the credit would be illegal.<sup>97</sup> Nevertheless it was supported by the European Games Developer Federation (EGDF) which sees European developers (as opposed to international publishers) threatened by competitors in other countries that receive greater levels of policy support. The European Commission ruled in favour of the French measure in 2007, and it was introduced in 2008, and subsequently extended to 2017 in 2012 (see Case on French policy support in main DGEI report). This support is estimated to be worth €45 million a year. The measures of Canada and France have been widely blamed in the UK, (which had been the major centre of European games development), for videogames production moving to France and Canada. After successfully campaigning in the UK, TIGA, a UK games industry trade body obtained a similar UK concession<sup>98</sup> in 2011, which took the form of Small Firms R&D Tax Credit, worth an estimated €7 million/year to the industry. TIGA continues to negotiate support.<sup>99</sup>

However these high profile interventions should not distract us from the range of regional, national or supra-national level programmes Europe has to support the digital games industry (e.g. Sweden,<sup>100</sup> Scotland,<sup>101</sup> Finland<sup>102</sup>), and the richness of these measures. This mirrors not only the Canadian programmes, where businesses are supported with a business skills training program, market intelligence, marketing and promotional support, an investor network, an emerging technology funding, and up to 90% tax credit on development expenses,<sup>103</sup> but also structural support developed in China, Singapore, Korea and elsewhere.<sup>104</sup> As an example, *The Skene – Games Refuelled* programme in Finland, run by TEKES, the Finnish Funding Agency for Technology and Innovation has been in place since 2000 providing several million euros/year for entertainment games, gamification projects, non-entertainment products and tools and technology development. This programme funds development of new operational and business models; cross media concepts and formats, digital distribution models and games research; national and international networking, events and training; research and analysis; and visibility and promotion in international arena.

---

education programmes, with operating costs 24% lower than Europe, and 20% lower than the US. More general discussion of Canadian policy and outcomes see Dyer-Witthford, N, Sharman, Z (2005) *The Political Economy of Canada's Video and Computer Game Industry*, Canadian Journal of Communication Vol 30, No 2, and a business review, Secor (2011) *Canada's Entertainment Software Industry In 2011: A Report Prepared For The Entertainment Software Association Of Canada*, Secor Consulting Inc, Toronto. [http://www.theesa.ca/wp-content/uploads/2011/08/SECOR\\_ESAC\\_report\\_eng\\_2011.pdf](http://www.theesa.ca/wp-content/uploads/2011/08/SECOR_ESAC_report_eng_2011.pdf)

<sup>97</sup> For example the Association for UK Interactive Entertainment (UKIE)

<sup>98</sup> <http://www.tiga.org/policy-and-public-affairs>

<sup>99</sup> For a more critical discussion of the debates over industry support see Kerr, A. (Forthcoming).

<sup>100</sup> <http://www.swedishgamesindustry.com/education.aspx>

<sup>101</sup> House of Commons Scottish Affairs Committee (2011) *Video games industry in Scotland*, House of Commons, London: The Stationery Office Limited  
<http://www.publications.parliament.uk/pa/cm201011/cmselect/cmsscota/500/500i.pdf> (accessed 09-2012)

<sup>102</sup> <http://www.tekes.fi/programmes/Skene> The *Skene – Games Refueled* programme launched by TEKES, the Finnish Funding Agency for Technology and Innovation has been in place since 2000 providing several million euros/year for entertainment games, gamification projects, non-entertainment products and tool and technology development.

<sup>103</sup> Lyman (2009) *Videogame Industry Policy: a very brief overview*. Presentation by Nordicity. <http://www.nordicity.com/presentation/Vortex%20BootCamp%20-%20Games%20Industry%20Policy.pdf>

<sup>104</sup> See for example Kerr and (Crawley 2011).

National governments also provide funding for tertiary level education for the games industry in a range of games development disciplines, providing a supply of trained graduates, and a focus for research activities.

At a European level, the games and audiovisual industries have also been supported through the EU MEDIA 2007 programme. However digital games are the poor relations of 'real' works, and meant to *complement an audiovisual work*. Provisions, in the 2011 programme, are "aimed at independent European companies whose main object and activity is audiovisual production and/or the production of interactive works, games development (or similar)" on Internet; PC; Console; Handheld device; Interactive television", "to encourage greater multiplatform creation and collaboration between the audiovisual sector and developers of games and interactive content. It seeks to promote digital content presenting substantial interactivity, originality, creativity and innovation against existing works with European commercial potential. It focuses on supporting those interactive works that are *specifically developed to complement an audiovisual work* (animation, creative documentary or a drama). The audiovisual works in question are the same as those that are targeted for 'Single Project and Slate Funding' support. The maximum grant available under development support for Interactive Works is €150,000 (Guidelines Call for Proposals 22/2011).<sup>105</sup> For future programmes, however, it is expected that the MEDIA programme will support interactive works as stand alone works in their own right.

At a European level, systematic support for the games industry as a part of an overall strategy to develop the European Software industry or media industry has not been a significant part of explicit policy, though this has been recognised as a need within parts of the Commission. There is certainly potential in terms of supporting skills development, including identification of skills gaps and needs.<sup>106</sup> Other types of support might include action to support research, facilitate technology transfer, the development of middleware, industry standards, international export support and access to capital as part of programmes on ICT for competitiveness and industry.

### **6.1.2 Research and development**

National governments in many countries fund research into games technologies, technologies and culture. In European countries, this includes direct funding and grants to specialised centres for research on videogame (e.g. Centre for Computer Games Research,<sup>107</sup> ITU, DK; Centre for the Study of Digital Games and Play (GAP),<sup>108</sup> Utrecht University, NL) and on serious games specifically (such as the TU-Delft for Serious Gaming,<sup>109</sup> NL; The Serious Games Institute,<sup>110</sup> UK), funding of research programmes and networks (Nordic Games Research Network<sup>111</sup>) and indirect funding of networks such as the Digital Games Research Association (DiGRA).<sup>112</sup>

The European Commission has funded a range of projects in the field of digital games research, development and deployment, though without clear policy direction. The European

---

<sup>105</sup> [http://ec.europa.eu/culture/media/programme/producer/develop/interactive/index\\_en.htm](http://ec.europa.eu/culture/media/programme/producer/develop/interactive/index_en.htm)

<sup>106</sup> [http://ec.europa.eu/enterprise/sectors/ict/e-skills/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/ict/e-skills/index_en.htm)

<sup>107</sup> <http://game.itu.dk/>

<sup>108</sup> <http://www.gamesandplay.org/>

<sup>109</sup> <http://cps.tbm.tudelft.nl/>

<sup>110</sup> <http://www.seriousgamesinstitute.co.uk/>

<sup>111</sup> <http://www.ngrn.dk/>

<sup>112</sup> <http://www.digra.org/> Digra is an international professional society dedicated to advance the study of digital games, and to foster the development of research practices and standards in the field.

Commission has funded over 75 projects directly on games since the early 2000s, primarily through the Lifelong Learning Programme and ICT Framework programmes.<sup>113</sup> Most of the digital games projects are related to 'serious uses' of digital games, primarily in education and training, but a range of generic technology development has also been supported (e.g. network technologies).

### **6.1.3 Support for serious games use and industry**

In the field of serious games, national governments are starting to explore ways of funding research, development and innovation. The French serious game programme of 2008 stands out as the principal major European investment, but not the only one, as the Finnish example shows.

The European Commission has been particularly active in the area of serious games, particularly related to deployment in education and training, but so far has focused less on supporting the supply industry.

It is not clear whether public procurement of games has been used as a pre-competitive tool to support innovation and the industry. However, public procurement rules, such as the US Small Business Act have de facto led to many serious game projects being given to small businesses, thus stimulating the sector. This has partly occurred though through defence budgets, purchasing serious games and simulations for training and for recruitment injecting considerable public funds into the industry, both in the USA and elsewhere. In this case however, the government is simply a customer, and is not implementing a policy to support industry growth.

### **6.1.4 Regulation**

The most controversial issue related to videogames is the question of protection of minors, and the regulation of content. This debate plays closely to the debate over the effects of violence in videogames, and to a lesser extent sexual content, criminality and other controversial behaviours.<sup>114</sup> More recently, with the development of online gaming, 'internet addiction' has become part of the debate. It is within this context that positive impacts and benefits of videogames have been largely discussed. In many countries, there has been political debate, and formal policy processes to decide on regulation. Some countries including the US, have mandatory rating systems, run by media regulators.<sup>115</sup> In most of Europe, a voluntary rating system, the Pan European Game Information (PEGI)<sup>116</sup> of 5 age categories and 8 content descriptions has been developed by the Interactive Software Federation of Europe (ISFE). It was adopted by the industry in 2003.

An area where the Commission (DG JUST) has competence related to digital games is in consumer protection and the single market. Part 4.4 of the [European Consumer Agenda](#)<sup>117</sup> addresses ways to improve the protection of consumers using digital content (Guidelines on

---

<sup>113</sup> See list available on IPTS website as a DGEI deliverable.

<sup>114</sup> See for example Bösch, Kattner (2011) Fear of (Serious) Digital Games and Game-Based Learning?: Causes, Consequences and a Possible Countermeasure, [International Journal of Game-Based Learning](#), 1:3 1-15.

<sup>115</sup> For a US industry perspective see the ESA <http://www.theesa.com/policy/scotus.asp>

<sup>116</sup> <http://www.pegi.info/>

<sup>117</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0225:FIN:EN:PDF>

information obligations of traders/content providers; Guidelines on the Unfair Commercial Practices Directive.<sup>118)</sup>

### **6.1.5 Leadership**

Leadership at a political level has generally not been a feature of the digital games or the serious games industries. There have often been negative messages and images related to digital games, despite a number of national programmes to support the industry. However, the US has recently (2011) appointed a senior policy analyst in the White House Office for Science and Technology Policy, Constance Steinkuehler Squire,<sup>119</sup> to advise on policy related to games and learning/impact, and to promote sharing of serious games knowledge, resources and assets across 33 Federal agencies and four White House offices through the Federal Game Guild (2011).<sup>120</sup> High profile initiatives like the President's Council on Fitness, Sports and Nutrition<sup>121</sup> promote digital games for healthy lifestyles, and Obama's 'Educate to Innovate'<sup>122</sup> campaign promotes interactive games as a way to improve education outcomes.

## **6.2 Is there a Future Role for Policy in relation to Games Industries and DGEI?**

Future policy to boost the games and serious games industry will be grounded in existing actions and debates. However, the growth in serious games markets, the changes to the videogames markets, support for these industries in third countries, and the emerging potential of DGEI opens up a number of policy opportunities.

Based on the evidence from this report, and findings of the DGEI state-of-play report, rationales for potential policy intervention fall into three broad categories:

- Growth and jobs: The positive consequences for employment and growth derived from attracting, rewarding and sustaining innovation in the digital gaming field in general, including spill-over or technology and business innovation to other industries;
- Inclusion and culture: The cultural and consumer aspects of digital games, especially in terms of users' empowerment and social inclusion; and
- Public service effectiveness: The contributions from digital gaming to the provision of public services, such as education, health and social welfare.

In addition, empowerment and inclusion activities are largely funded by the public purse, to address social policy challenges such as unemployment, poverty, chronic illness, poor housing, etc. For many of these uses digital games will only be developed and deployed with public investment and promises of public markets. Policy makers must decide whether the existing evidence for use of digital games in the private, public and third sectors is compelling, and the particular early experiments and demonstrations of digital games use in areas of empowerment and inclusion show effectiveness and feasibility. If this is the case, then policy makers can find ways to address the challenges of both the supply and demand side.

---

<sup>118</sup> [http://ec.europa.eu/justice/consumer-marketing/files/ucp\\_guidance\\_en.pdf](http://ec.europa.eu/justice/consumer-marketing/files/ucp_guidance_en.pdf)

<sup>119</sup> <http://website.education.wisc.edu/steinkuehler/blog/>

<sup>120</sup> <http://www.howto.gov/training/classes/gamification>

<sup>121</sup> <http://www.fitness.gov/>

<sup>122</sup> <http://www.whitehouse.gov/issues/education/educate-innovate>

The following options can be considered.

### **6.2.1 Policy options for the serious games and gamification industry.**

The following policy opportunities and actions can be associated with the future of the serious games industry. This discussion emerged as a side output from the DGEI project research and consultation, which focused primarily on education, health and wellness, activism and public policy. Here, the discussion and recommendations often considered more general challenges and recommendations for action concerning the entire serious games sector.

#### ***Application domain policy: education, health and public health, etc***

The potential of the serious games industry to provide innovative and cost-effective solutions in domains where public governance, funding and delivery dominate, such as health, defence, education and training depends on policy actions to support a) use b) finance and c) procurement. Without developing widespread use, providing resources to obtain and encourage use, and the removal of barriers to procurement, then it is not possible to build sustainable supply businesses that can supply the public sector and third sector.

Potential actions include

- 1) Public support via **R&D funding for demonstrators and evaluation** to underpin best practice and quality;
- 2) **Support to intermediary users** and end-user organisations to adopt and thus encourage use,
- 3) Putting in place measures (such as guidelines, standards) to ensure **privacy and security and good practice** in domains of sensitive activity;
- 4) Address with problems in **procurement and standards** could be important in developing both knowledge, supply and demand.

An alternative path to developing the supply of games-based products may also be to **support a 'social' market, open-source and user development**, in circumstance when it is unlikely public budgets will support commercial business that produce effective innovation and affordable supply. However this would still require support for development of tools and sharing of good practice.

#### ***Policy opportunities for growth and jobs***

On the basis of existing activities and potential for growth specific policy to support an emerging serious games industry needs careful consideration. The world market is currently estimated at €2.35 billion, with steady growth in very large markets such as education and healthcare. This figure does not include the potential multiplying effects of growth and jobs from the use of the products and services of the industry in other sectors, from improved productivity, to innovation, etc. Policy could follow for serious game policies of USA, Korea or France, or include serious games within a broader games industry policy (e.g. Finland). It would have to address the issues identified above, as well as the more generic business and research support an emerging sector requires. This could be facilitated, for example, by regional industry specialisation policy focused on particular domains of use, or multi-sector regional centres of excellence across Europe.

**Two strategies** could be followed:

- to **stimulate industry development in sectors of high growth** such as training for military and corporate markets, or marketing and communication with European and expert potential. This would both strengthen the sector itself, and improve the quality of products available to European firms (e.g. training, marketing).
- to **facilitate the development of an industry supplying sectors such as education, health or policy support**, where the public sector is the primary client or gatekeeper, and where public intervention could be justified in creating suppliers of products for health, public education uses if a market would not otherwise emerge. There is also an argument to support private business, such as SMEs, to adopt tools that address their training needs when this will help boost growth and jobs.

Types of policy targeting the particular issues identified above might include actions for skills development, including identification of skills gaps and needs, research funding, support for SMEs, facilitation of technology transfer, the development of middleware, development of standards and testing facilities, funding for transversal tools, infrastructures and standards that address issues of privacy and security, international export support and access to capital as part of programmes on ICT for competitiveness and industry. This would have to be balanced with effective demand-side intervention in these areas (see below).

However, the policy intervention for a 'serious' game sector should also be seen in the perspective of policy towards the entire video game sector, which is currently much larger, and offers considerable scope for growth if offered the support available in other regions. Many synergies may be found between stimulating a diverse industry that operates in several markets, with common skill base and service businesses, and the exploitation of technologies (such as middleware), platforms, etc., across sectors as demand increases.

### **Research policy**

There are a great many knowledge gaps that need to be addressed in order to as part of an industrial or an application domain policy. Pre-comparative research is needed to explore and develop new techniques that can be taken into products and services. Overall, though it is no longer in its infancy, research into the generic exploitation of games and games techniques still has a long way to go. There is also considerable scope for supporting research on designing of games-based approaches for specific target groups or problems. This must be multidisciplinary, bringing together domain experts and games experts. Networks are needed both within application domains (e.g. public health, education), and across domains including design, pedagogy, behaviour change etc. Research can develop tools and technologies to create games-based products. Research is also needed to better understand how and when games approaches can be appropriately used, by understanding better the practices and culture of games use in different communities of users and intermediaries. Research is needed to provide reliable evaluation of games-based approaches, both in the laboratory and as the basis of standardised tools and tests for use in practice. Testing and experimentation facilities are needed to support domain-specific research and industry developers to verify and evaluate products and conceptual approaches. These areas of research need to be multi-disciplinary, and funded accordingly.

Specific studies into how to encourage innovation and use of serious games may also be needed. These would include analysis of markets, business strategies, skill needs, and studies of the effectiveness and direction of policy interventions. Finally, research should take place *in practice, to scale*, and over time periods that are long enough to develop and embed new practices and explore radical new approaches. Games-based methods often do



not simply slot into existing practices and institutional structures, and it can take several years and multiple cycles of use and reinvention to identify both good and poor practice and identify impacts with sound methodologies.

In terms of addressing the challenges of DGEI, research not only creates new knowledge and techniques that can be turned into good practice and tools to use, but also produces high profile scientific evidence that can change attitudes and raise awareness of the value of DGEI for professionals and the public.

### ***Skills policy***

The development of serious games industry, and use, cannot take place without the widespread development of skills so that people can both develop and use games-based approaches effectively. Expansion and improvement in education and training in games development skills is necessary to increase the supply and use of serious games, and their embedding in practice. On the supply side, people with the range of skills to develop digital games and gaming are still in short supply, and mainly found in the commercial videogame industry. Ways need to be found to increase supply of skilled people in DGEI, and also to interest those with expertise in the various aspects of games development to apply this to non-entertainment games. A particular investment has to be made in people with the multi-disciplinary skills needed for 'scientific' use of games, for example in the pedagogical and in working and managing the multi-disciplinary teams necessary to produce effective use of game-based approaches.

A first step could be to more clearly identify skills that are needed, and are lacking, and work with industry and education to establish the best ways to develop these.

### ***Serious game and DGEI policy in the context of general policy to support create and cultural industries, and the videogame industry in particular***

Policy also needs to consider the link between a vision of serious games success and the success and growth of other sectors, for example in eLearning, in creative and cultural media in general, or, as has been discussed in this document, the videogame industry. If the videogame development industry is convincingly understood as a leading innovator in growth and jobs in the creative sector, and the industry itself is likely to develop and build markets in non-entertainment sectors, this justifies support to the videogames sector, especially if the European industry as a whole is disadvantaged by policies in third countries. As the industry lobby group, EGDF points out, the current and growing world markets for entertainment videogames is an order of magnitude higher than serious games, and a policy to support the games industry that is focused only on 'serious games' is probably not going to ensure the long-term survival and growth of a leading European games development sector. The choice of policy support should be negotiated with the industry. However, if the videogame development industry is not considered crucial to the development of products and services in the non-entertainment sector, and indeed it is likely that the potential of this application will be underdeveloped, then specific independent policy to stimulate innovation and growth is required to develop activities in these sectors. In this case, 'serious games' policy should focus on R&D, projects and firms working in the various application sectors, demand side actions and support for market building and knowledge transfer.

## **7. Conclusions**

This report has brought together for the first time some of the information we need to understand the industries that supply products and services that can be used to make digital games work to support empowerment and social inclusion. The entertainment videogame industry is part of an industry which brings advanced ICT tools to the mass market that can be used for 'serious' ends, and there is an emerging domain of research and commercial activity exploring the products, tools and techniques of digital games and in many cases successfully implementing them.

Analytically, and for policy, we need a clearer view and better data on the 'serious games industry' in general. In particular, we need to know how it can serve the goals of public policy, and individuals in need of support. We know little about the dynamics of each serious games sector, how it could be supported, and the potential direct or indirect economic value of these markets. Stakeholders need to do a great deal of work: this includes policy to bring in new research, raise standards, increase human capacity to create and use games, sustain games-producing organisations, fund exploratory projects and adoption, and develop robust evidence of effectiveness that helps suppliers and users make decisions to adopt. Furthermore, successful innovation in this area will require new practices and relationships to be developed by actors involved in the development of new products, and in the use of digital games. Finally, intervention may be necessary to support the emergence of markets with standards, working intermediaries, and an active demand side.



## 8. References

### 8.1 Key references

As indicated in the introduction, this draft Background paper builds on the following main reports:

- Alvarez, J and Michaud, L. (2008), Serious Games: Advergaming, edugaming, training and more, IDATE (1<sup>st</sup> Edition).
- Alvarez, J., Djaouti, D, Michaud, L. (2010), Serious Games: Training & Teaching - Healthcare - Defence & security - Information & Communication, IDATE, June 2010 (2<sup>nd</sup> Edition).
- Alvarez, J., Alvarez , V, Djaouti, D, Michaud, L (2012), Serious Games: Issues, Offer And Market: Education, Training, Health Care, Information & Communication, Defence (3rd Edition).
- Bleumers, L., Anissa All, Ilse Mariën, Dana Schurmans, Jan Van Looy, An Jacobs, Koen Willaert, Frederik De Grove, James Stewart (ed) (2012), State of Play of Digital Games for Empowerment and Inclusion: Opportunities and Challenges, IPTS Technical Note (Forthcoming).
- De Prato, G, C. Feijóo, D. Nepelski, M. Bogdanowicz, J.P. Simon (2010), JRC-IPTS Report: Born Digital / Grown Digital Assessing the Future Competitiveness of the EU Videogame Software Industry, Authors: (November 2010), available at: <http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=3759>
- Feijoo C. Gómez-Barroso J-L, Aguado J-M, Ramos S (2012), Mobile gaming: Industry challenges and policy implications. Telecommunications Policy doi:10.1016/j.telpol.2011.12.004.
- Misuraca, G., Stewart, J., and Centeno, C. (2011), Preliminary analysis and overview of literature and practice of the domain (JRC-IPTS Draft Working paper, 2011, not published).

### 8.2 Other references

- Behrmann , M (2001) Game Development and Digital Growth, European Games Developer Federation (EGDF)
- Bodewes et al (2009) Exploring Public Procurement as a Strategic Innovation Policy mix, EU-Project OMC-PTP [http://www.technopolis-group.com/resources/downloads/reports/public\\_procurement.pdf](http://www.technopolis-group.com/resources/downloads/reports/public_procurement.pdf)
- Crandall, Robert W. and Sidak, Gregory Gregory (2006) Video Games: Serious Business for America's Economy. Entertainment Software Association Report, . Available at SSRN: <http://ssrn.com/abstract=969728>
- Crawford, C (2003). *Chris Crawford on Game Design*. New Riders.
- comScore (2012) CONNECTED EUROPE How smartphones and tablets are shifting media consumption. comScore, Jan 2012 [http://www.comscore.com/Insights/Presentations\\_and\\_Whitepapers](http://www.comscore.com/Insights/Presentations_and_Whitepapers) (accessed 10-2012)
- comScore (2012) European Mobile Gaming Gets Social: Rise in Smartphone Adoption Drives Increase in Mobile Gaming and Social Play April 26, 2012

[http://www.comscore.com/Insights/Press\\_Releases/2012/4/European\\_Mobile\\_Gaming\\_Gets\\_Social](http://www.comscore.com/Insights/Press_Releases/2012/4/European_Mobile_Gaming_Gets_Social)

- De Prato, Giuditta; Simon, Jean Paul (2011) : Paving the way to eservices: Innovation through online games, 22nd European Regional Conference of the International Telecommunications Society (ITS2011), Budapest, 18 - 21 September, (2011), Innovative ICT Applications - Emerging Regulatory, Economic and Policy Issues, <http://hdl.handle.net/10419/52209>
- Dyer-Witheyford, N, Sharman, Z (2005), The Political Economy of Canada's Video and Computer Game Industry, Canadian Journal of Communication Vol 30, No 2 (2005) <http://www.cjc-online.ca/index.php/journal/article/view/1575/1728>
- Heeks, R (2008), Current Analysis and Future Research Agenda on "Gold Farming": Real-World Production in Developing Countries for the Virtual Economies of Online Games, Development Informatics Working Paper Series, University of Manchester. [http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di\\_wp3\\_2.pdf](http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/documents/di_wp3_2.pdf) (accessed 09-2012).
- House of Commons Scottish Affairs Committee (2011), Videogame industry in Scotland, House of Commons, London: The Stationery Office Limited <http://www.publications.parliament.uk/pa/cm201011/cmselect/cmsscota/500/500i.pdf> (accessed 09-2012)
- Escribano, E (2012), Gamification as the Post-Modern Phalanstère - Is the Gamification Playing With Us or Are We Playing With Gamification? In Zackariasson Peter and Timothy L. Wilson (Eds.) The Video Game Industry: Formation, Present State, and Future. New York: Routledge.
- Eurostat (2011), Eurostat Statistics in Focus, Industry, trade and services 2011/66 [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-SF-11-066/EN/KS-SF-11-066-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-11-066/EN/KS-SF-11-066-EN.PDF) (accessed 10- 2012).
- IDATE (2012), World Videogame market report 2012, IDATE.
- Information Solutions Group (2012) Popcap Games Mobile Gaming research, Information Solutions Group <http://www.infosolutionsgroup.com/popcapmobile2012.pdf> (accessed 10-2012).
- Kerr, A. (2006), *The Business and Culture of Digital Games: Gamework / Gameplay*. London: Sage.
- Kerr, A. (2011), 'The Culture of Gamework'. Chapter in M. Deuze (Ed.), *Managing Media Work*. Thousand Oaks, CA: Sage publications.
- Kerr, A. and Cawley, A. (2011), 'The spatialisation of the digital games industry: Lessons from Ireland' International Journal of Cultural Policy. [http://eprints.nuim.ie/2904/1/pre-pub\\_IJCP\\_Spatialisation\\_and\\_Irish\\_Games\\_Industry\\_11b.pdf](http://eprints.nuim.ie/2904/1/pre-pub_IJCP_Spatialisation_and_Irish_Games_Industry_11b.pdf)
- Kerr, A. (Forthcoming), "Space Wars: The Politics of Games Production in Europe." *Gaming Globally*, Nina Huntemann and Ben Aslinger (Eds.), Critical Media Studies: Palgrave.

- Liew Jeremy, Pischevar Shervin, Chen Siqi, Pincus Mark, and Christenson Johan (2008), Games 2.0: Why the Future of Games Looks More Like Zombies and Scrabulous and Less Like Halo 3, presentation at Web 2.0 EXPO Conference, 22-25 April 2008, Moscone West, San Francisco, available online at: <http://www.web2expo.com/webexsf2008/public/schedule/detail/2268> (last accessed on 12 March 2010).
- O'Donnell, C. (2012), This is Not a Software Industry, in Zackariasson Peter and Timothy L. Wilson (Eds.) *The Video Game Industry: Formation, Present State, and Future*. New York: Routledge.
- PriceWaterhouseCoopers (2009), Global Entertainment and Media Outlook 2009-2013, 10th Annual Edition, PriceWaterhouseCoopers.
- PriceWaterhouseCoopers (2011), Global Entertainment and Media Outlook 2011-2015, PriceWaterhouseCoopers.
- Norwegian Ministry of Culture and Church Affairs (2008), Video games. Report 14 (2007-2008) to the Storting (Norwegian parliament).
- Ofcom (2011), UK children's media literacy, Ofcom.
- SNJV (2012), Référentiel des métiers du secteur du jeu vidéo – Syndicat National du Jeu Vidéo – 1ere édition Octobre 2012 [www.snjv.org](http://www.snjv.org)
- Rusk N, Mitchel Resnick, Robbie Berg and Margaret Pezalla-Granlund (2008), New Pathways into Robotics: Strategies for Broadening Participation, *Journal Of Science Education And Technology* Volume 17, Number 1 , 59-69, DOI: 10.1007/s10956-007-9082-2.
- Salen, K. & Zimmerman, E. (2004), *Rules of Play. Game Design Fundamentals*. MIT Press: Cambridge.
- Secor (2011), Canada's Entertainment Software Industry In 2011: A Report Prepared For The Entertainment Software Association Of Canada, Secor Consulting Inc, Toronto. [http://www.theesa.ca/wp-content/uploads/2011/08/SECOR\\_ESAC\\_report\\_eng\\_2011.pdf](http://www.theesa.ca/wp-content/uploads/2011/08/SECOR_ESAC_report_eng_2011.pdf) (accessed 10-2012)
- SKILLSET (2010a), Computer Games Sector – Labour Market Intelligence Digest. London, Skillset.
- SKILLSET (2010b), Creative Media and the Use and Limitations of Official Data Sources – an overview. London, Skillset.
- Susi, T., Johannesson, M. and Backlund, P. (2007), Serious Games - An overview. Technical report, HS-IKI-TR-07-001, University of Skövde.
- Turkle, S (1995), *Life on the Screen: Identity in the Age of the Internet* , Simon & Schuster.
- Ulicsak, M, M. Wright, S. Cranmer, (2009), Gaming in families, A literature review, Futurelab, [http://archive.futurelab.org.uk/resources/documents/lit\\_reviews/Gaming\\_in\\_Families\\_review.pdf](http://archive.futurelab.org.uk/resources/documents/lit_reviews/Gaming_in_Families_review.pdf) (accessed 09-2012).
- Williams Dmitri (2002), A Structural Analysis of Market Competition in the U.S. Home Video Game Industry. *International Journal on Media Management*, 4(1), p. 41-54.
- Zackariasson Peter and Timothy L. Wilson (Eds.) (2012), *The Video Game Industry: Formation, Present State, and Future*. New York: Routledge.



European Commission

EUR 25910 – Joint Research Centre – Institute for Prospective Technological Studies

Title: The Industry and Policy Context for Digital Games for Empowerment and Inclusion: Market Analysis, Future Prospects and Key Challenges in Videogames, Serious Games and Gamification

Authors: James Stewart and Gianluca Misuraca

Luxembourg: Publications Office of the European Union

2013 – 83 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-29263-7 (pdf)

doi:10.2791/88361

#### Abstract

The effective use of digital games for empowerment and social inclusion (DGEI) of people and communities at risk of exclusion will be shaped by, and may influence the development of a range of sectors that supply products, services, technology and research. The principal industries that would appear to be implicated are the 'videogames' industry, and an emerging 'serious games' industry. The videogames industry is an ecosystem of developers, publishers and other service providers drawn from the interactive media, software and broader ICT industry that services the mainstream leisure market in games. The 'serious games' industry is a rather fragmented and growing network of firms, users, research and policy makers from a variety of sectors. These actors are trying to develop knowledge, products, services and a market for the use of digital games and products inspired by digital games for a range of non-leisure applications. This report provides a summary of the state of play of these industries, their trajectories and the challenges they face. It also analyses the contribution these actors could make to exploiting digital games for empowerment and social inclusion. Finally, it explores existing policy towards activities in these industries and markets, and draws conclusions as to the future policy relevance of engaging with them to support innovation and uptake of effective digital game-based approaches to empowerment and social inclusion.



As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.



ISBN 978-92-79-29263-7



9 789279 292637