

The Games  
Sector in Ireland:  
An Action plan  
for Growth



## Minister's Foreword

I welcome this report that sets out, for the first time, Ireland's potential in the video and electronic games sector. As a pioneering sector within the wider digital economy, the games sector is dynamic, innovative and exciting. Global growth, particularly in online and mobile games, is phenomenal and Ireland is well positioned to service international demand.

What is apparent is that Ireland already has a number of strengths on which we can build success for the future and that will differentiate its offering internationally. We have a strong track record in software engineering, in wireless and internet technologies, in global customer relationship management, localisation and analytics. The games sector has already seen some success. Employment has increased five-fold since 2004, and over 25 new players, both foreign and Irish, have set up here over recent years.

Talented, highly skilled people with the ability to work across cultures will be central to Ireland's distinctive offering - setting us apart as a location of choice for games companies to achieve growth and success in global markets. The actions in this report aim to ensure that we build on our existing capabilities, enhance the interaction between industry and education, and prepare our children for the digital workplace of the future.

This report sets out the need for an anticipatory, agile and responsive approach that is cognisant of the real-time nature of the games sector - and of the wider digital economy. It lays out a clear plan for action to put Ireland on the map as a global games hub for the 21<sup>st</sup> century. We need the commitment and energy of innovative enterprises to achieve our potential. The Government and the enterprise development agencies will work to ensure a competitive and supportive environment in which to build success.

A handwritten signature in black ink that reads "Richard Bruton". The signature is written in a cursive, slightly slanted style.

**Richard Bruton**

**Minister for Jobs, Enterprise and Innovation**



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## Executive Summary

The games sector<sup>1</sup> is dynamic, creative, exciting and pervasive. It is one of the fastest growing segments within the wider entertainment and media sector globally. The explosion in online activity and the social media revolution are driving phenomenal growth for the online games and mobile games segments in particular. These segments have a value of US\$24.8 billion today and forecast compound annual growth rates of 14.9 percent and 11 percent respectively over the 2011-2015 period. The overall games sector is expected to grow from US\$59.3 bn today to US\$82.4bn in 2015, a compound annual growth rate of 8.2 percent<sup>2</sup>.

Companies within the sector are looking at new ways to engage a broader range of consumers and improve the user experience, are innovating with new business models and experimenting with emerging technologies. New players are entering the market and the entire value chain is transforming.

*'Games were once a single player experience, available as a product sold at retail to typically 'niche' gamers, usually male. Today's games have become more social and have entered the living room'*

*Ian Livingstone, quoted in NESTA, Next Gen, 2010*

Ireland has benefited from this dynamic and global growth. Employment has increased five-fold since 2004 with over 2,000 directly employed today. This number underplays the complementary linkages that the games sector has with other related activities such as animation, film, consumer-internet and e-learning. A number of Irish companies have been successful on the international stage and many of the biggest global players are based here.

It is opportune to build on the momentum that has gathered and to put Ireland firmly on the map as a global games hub for the 21<sup>st</sup> Century. However, future success is not a given. Many countries have embraced aggressive strategies - seeing the games sector as a significant contributor to their economic growth.

In Ireland, a step-change in terms of policy and decisive action is needed. This will mean a new way of thinking within enterprise policy. It will need an anticipatory and responsive approach that is cognisant of the real-time nature of the games sector.

The games sector is a pioneer within the broader consumer-internet and emerging digital economy. It represents a key building block of the Irish digital ecosystem, that fuses together creativity, technology and consumer engagement. By taking a more in-depth analysis of how the games sector is likely to evolve, and the potential for Ireland, we gain more tangible insights into the future needs of the digital economy.

In this way, the effective implementation of the actions will have a considerably wider impact than for the games sector alone, in that it will also facilitate the accelerated growth of enterprises operating within the wider digital economy.

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<sup>1</sup> Throughout this report the term 'games sector' or 'games industry' is used to represent the interactive games industry - not including remote/online gambling.

<sup>2</sup> PWC Global Media and Entertainment Outlook 2011-2014, 2011. Mobile includes mobile phones, smart phones, tablets (e.g. i-pad) and other devices such as i-Touch (excludes portable game consoles).

The ambition is that, by 2015 Ireland's games sector will be recognised internationally as:

*A dynamic and internationally connected hub of  
innovative games development and advanced game servicing  
harnessing creative talent, technological prowess and  
a unique ability to understand the customer,  
to deliver sustained growth within the most progressive and digitally  
advanced business environment*

*"A Global Games Hub for the 21<sup>st</sup> Century"*

Ireland has the potential to increase employment in core games companies to 4,500 by 2014.

This is a conservative figure - games can be a catalyst for growth in a host of other inter-related activities in the digital economy including social networks, search engines, animation film & video and e-learning.

Agency assisted firms in these related sectors and activities employ approximately 11,500 today<sup>3</sup>. Although it is challenging to forecast the employment growth potential for this wider cohort that may result from growth in the games sector, it is safe to say that there will be increasing inter-linkages and convergence over coming years.

This games strategy and action plan has been developed by Forfás, working closely with the enterprise development agencies<sup>4</sup>. It has been informed by insights from games companies and other relevant stakeholders as well as PWC international expertise.

## Change is the Norm

The transformative shift towards digital distribution and online and mobile gaming means that more people, across a broader demographic are playing and accessing games. They access games increasingly in a more casual, 'bite-sized', and socially connected way, and through a wider range of devices.

This change is reflected in a considerably altered value chain. Less than five years ago, the primary set of activities associated with the production and consumption of games could be described in terms of a basic retail distribution model - from development of the game, publishing, through to monetisation by retail sales. Now game distribution and consumption is

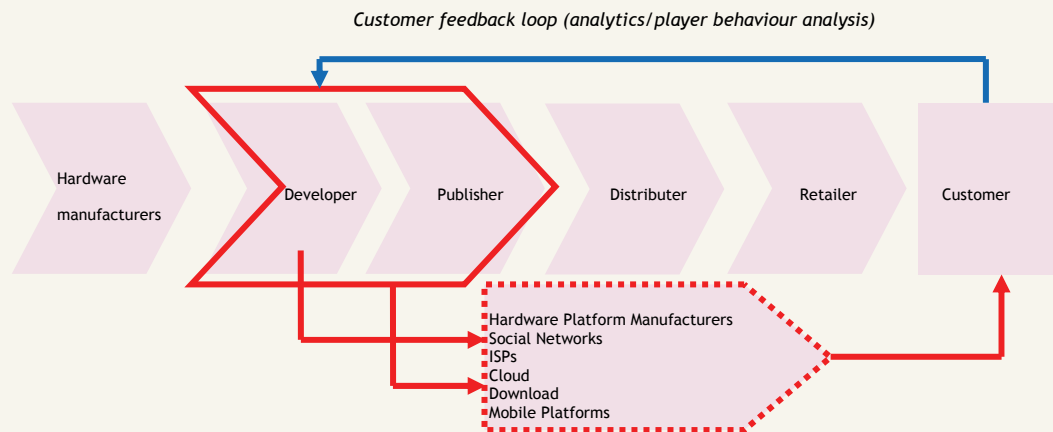
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<sup>3</sup> Forfás analysis of enterprise agency data, Enterprise Ireland, IDA Ireland, Shannon Development and Údarás Na Gaeltachta.

<sup>4</sup> IDA Ireland and Enterprise Ireland participated on the Project Working Group - Contributions were also received from Science Foundation Ireland, Discover Science and Engineering and the Irish Film Board.

fragmented across a variety of different platforms (Figure i). New channels to market have opened up and the importance of the connection with the customer has intensified<sup>5</sup>.

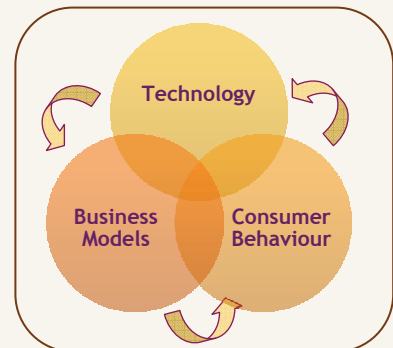
Figure (i) Emerging Games Value Chain



### Drivers of Change

The dynamic of the sector and phenomenal pace of change is driven by three inextricably interlinked factors, each with equal status and each impacting upon the other: consumer behaviour; technology advances; and business models. This makes it challenging to forecast the next ‘big thing’ or disruptive force in the sector.

Companies themselves need to be continuously horizon scanning, looking not only to what known competitors are doing, but also to where the next disruption or opportunity might arise.



### Consumer Behaviour

The consumer is a crucial source of innovation for the games sector. Game development is undertaken iteratively, with continuous improvement based on in-game analysis of gamer activity (telemetry data) and direct feedback from users.

The strategic importance of the consumer and their demand for personalised and enhanced user experience is evident in how games are evolving. Many games are now designed to offer interactive game-play, virtual goods for purchase, and mechanisms for personalising content. Online social networks such as Facebook stimulated the design and phenomenal take-up of casual games. Consumer behaviour also continues to drive the industry towards the ‘game as

<sup>5</sup> A platform is the manner in which the end user can access games - including access via consoles, online browser, mobile smartphones and tablets, social media platforms, PC, and streaming.



a service' model with seamless transfer of game play across devices and platforms, facilitated by technology advances.

Capturing customer feedback is ever more crucial for firms. They also need to develop the ability to analyse and predict user behaviour and to use this knowledge effectively in a more agile games development and innovation process.

### **Technology Advances**

Technology advances, often disruptive in nature, play a critical role in driving growth and transformation of the industry:

- Generating new devices (smart phones, tablets, next generation consoles);
- Providing greater processing power and display quality (3D, HD<sup>6</sup> etc);
- Enabling new publication/access channels including social media, browser games, micro applications and cloud gaming;
- Enhancing interoperability and bandwidth optimisation; and
- Enhancing game play and game design sophistication including artificial intelligence, personalisation, multi-player experiences.

As sophistication in game design and capabilities has increased, development costs have escalated for console and PC games in particular<sup>7</sup>. In contrast to this, the casual games developed for new mobile devices and social networks tend to be relatively simpler to design and cheaper to produce - lowering the barrier to entry for smaller independent developers.

### **New Business Models**

As the online gaming audience has grown, new customer metrics driven business models have emerged in the drive to maximise potential revenues. Monetisation strategies such as: freemium<sup>8</sup>, microtransactions, virtual goods, advertising, try and buy, and various combinations and hybrids of these seek to generate revenue streams. They also aim to incentivise sustained user engagement and grow the customer base. Correctly gauging customer preferences and potential purchasing patterns is critical to success, regardless of the size of firm.

The games industry also offers advertising and marketing channels for other sectors, with access to lucrative demographic cohorts. Partnerships and alliances, and the licensing of brands and IP are increasingly important in this context.

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<sup>6</sup> High Definition.

<sup>7</sup> *The Money Game, Project Finance and Games Development in the UK*, NESTA, 2010 (see Appendix 1 for estimated costs of producing games for various platforms).

<sup>8</sup> Freemium - offering a game free of charge while charging a premium for advanced features, functionality, or related products and services.

### Implications for the Games Sector

This combination of ever-changing and inter-linked factors has created considerable turbulence *and* opportunity for the industry. It has:

- Brought new actors into the sector from different businesses who have bypassed existing previously dominant players. A new cohort of intermediaries is now involved in publishing and distribution that were previously unconnected to the industry<sup>9</sup>;
- Seen intensive global merger and acquisition, M&A, activity with firms continually jostling for position to capture the next market disruptor;
- Seen the emergence of strategic partnerships across different sectors including the film industry, sports organisations and advertising in the drive to maximise customer engagement and revenues;
- Reduced the barrier to entry for game developers, who can have rapid success, but also rapid demise in a crowded market where a development studio is perceived to be only as good as its last game;
- Created an ongoing challenge to optimise revenue generation and the need for continued innovation in monetisation strategies;
- Driven a more service oriented business model underlining the importance of cultivating and maintaining a close relationship with the customer and has put increased value on consumer behaviour analysis;
- Put a premium on creative ideas, concepts and technology, driving increased competition globally for talent; and
- Continued to create new market opportunities - for example, serious games<sup>10</sup>, on-demand gaming and user generated content.

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<sup>9</sup> E.g. Facebook (social media platform), Google (Android mobile operating system); Yahoo, MSN, Pogo.com (internet and game portals); and Onlive, Gaikai (cloud enabled video stream games on demand).

<sup>10</sup> Serious games are developed to convey information or develop the skills of the user in a range of serious contexts, such as education risk management, problem recognition, risk management, or teamwork.

## The Games Sector in Ireland Today

The games sector in Ireland is experiencing strong growth. It is thriving on an internationally acknowledged track record and expertise in software development and localisation, multilingual customer service, data centres/hosting, an abundance of creative talent and a vibrant entrepreneurial culture.

Ireland has produced companies that have achieved global recognition including Havok, Demonware and Jolt - and with them, a cohort of entrepreneurs that have gone on to drive new games industry ventures. Recent investments in Ireland by some of the sector's major global players such as EA Bioware, Activision Blizzard, Big Fish Games and Zynga have increased the breadth of activity considerably, and boosted employment numbers significantly. Much has happened since 2005 and during the 2009-2010 period alone, more than 25 new names appeared on the Irish landscape.

There is also a growing level of relevant expertise amongst the research community specialising in areas such as graphics, visualisation, sensors, artificial intelligence, game engines, data mining and serious games.

Core games companies are those directly involved in the production of games and employment in this cohort increased five-fold since 2004<sup>11</sup> to over 2,000 today. The main growth area to date has been in online games servicing activities, including customer support, community management, localisation and headquarter operations<sup>12</sup>. Ireland is well positioned to take advantage of the continued expansion of global markets - particularly in online and mobile segments - with the potential to increase employment to 4,500 in core games companies by 2014. A focus solely on these underestimates the impact of the sector across a much broader range of inter-related activities, and on the potential for international players currently 'on the edge' to become more directly involved in games activities in Ireland.

The broader footprint involves a range of creative/content inputs via animation, tv/film production, advertising, education etc., and use of integral supporting services and infrastructures such as data hosting, ISPs & search engines, as well as outsourced payments, billing, localisation, information security etc. (Figure ii)<sup>13</sup>. Current employment and sales associated with enterprise agency-assisted firms in these related sectors in Ireland amounted to approximately 11,500 in 2010<sup>14</sup>. Although it is difficult to ascertain how much of this activity can be said to be games related today, there is definitely potential for mutual growth over time.

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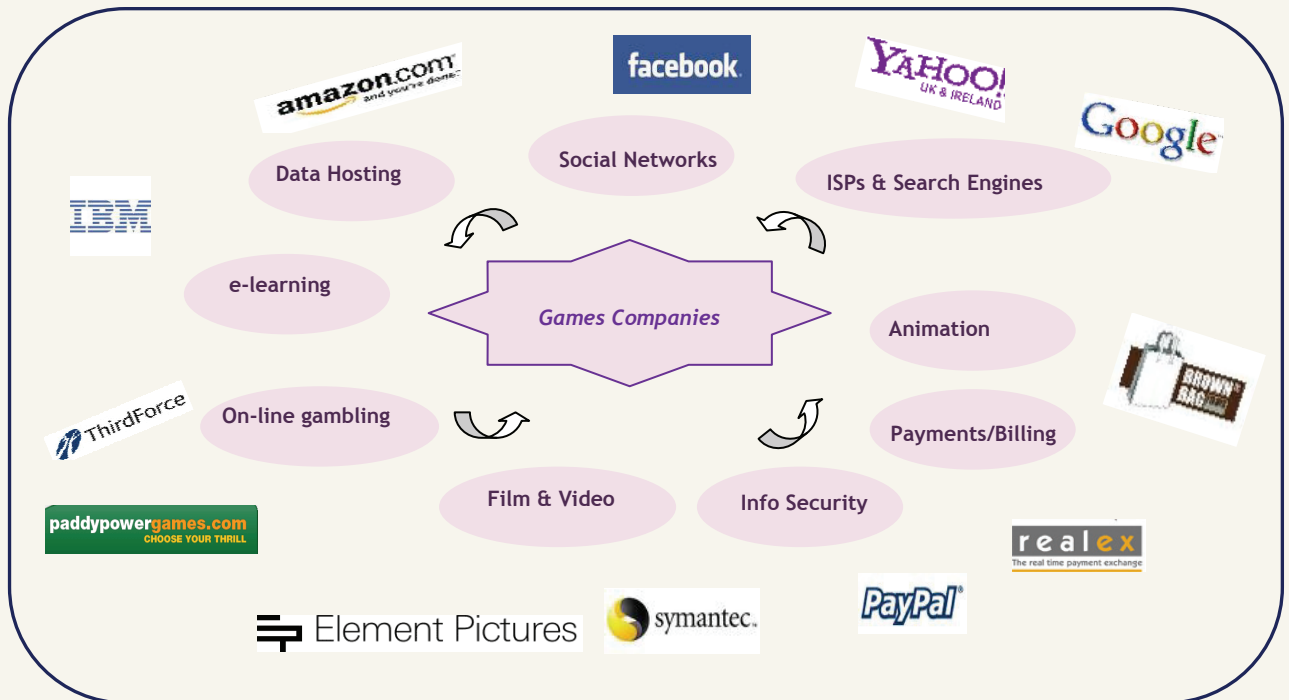
<sup>11</sup> *Electronic Games Study*, Forfás, 2004 (unpublished).

<sup>12</sup> A further 1,000 are currently employed in the online gambling area.

<sup>13</sup> See also: Audiovisual Strategy Steering Group, 2011, *Creative Capital: Building Ireland's Audiovisual Creative Economy*, a report prepared for the Minister for Arts, Heritage and the Gaeltacht by the Audiovisual Strategic Review Steering Group - April 2011.

<sup>14</sup> Forfás analysis of enterprise agency data, Enterprise Ireland, IDA Ireland, Shannon Development and Údarás na Gaeltachta.

Figure (ii) Games Companies and the Broader Ecosystem (selected company examples)



## Ireland's Opportunities for Growth

The rapid and ongoing transition of the games sector towards digital and online distribution provides unique insights into the emerging digital economy. It is an excellent demonstrator of the Living Lab of the Digital Economy<sup>15</sup>. In many ways it is leading the charge and shaping economic and societal norms of the future, influencing the behaviour of firms well beyond the sector itself.

By identifying and realising the opportunities in the games sector, Ireland can shape a business environment that will serve a much broader range of sectors and activities that operate in the digitised 21<sup>st</sup> century. A more anticipatory response by the policy system is needed in this digital age, and in what is a dynamic, competitive and unpredictable space.

The main opportunity areas for the development and growth of the games sector in Ireland are focused primarily<sup>16</sup> on digitally distributed and online game segments and are:

### *The Living Lab of the Digital Economy*

*Disruption is the norm... confluence of creative, technical and commercial... centrality of the customer in driving innovation...rapid adaption and response in a fluid environment...the coming of age of generation Y in the 'digital' workplace.. Small can be big - rapidly.....*

<sup>15</sup> The phrase 'living lab' is drawn from *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, De Prato et al, EC Joint Research Centre & Institute for Prospective Technological Studies, 2010.

<sup>16</sup> Although the more immediate potential has been identified in these segments, the strategy is not intended to exclude opportunities for investment in areas such as game development for console etc.

- Creative game development;
- Advanced game servicing;
- Enabling software and technology solutions; and
- IP exploitation and online publishing.

## Creative Development

Creative development is the beating heart of the sector - and where most economic value is generated. There is high demand globally for development talent, new ideas, saleable content and intellectual property (IP).

*For new entrants the real challenge is in progressing from a single successful game to a successful business in a crowded and intensely competitive market*

Although the tendency is for game development studios to remain rooted to where the original team first formed, larger games companies have adopted a ‘hub and spoke’ approach and establish and/or acquire a number of studios in different locations in the quest for new innovative concepts, experienced teams of developers or particular unique geographic or cultural aspects. Today, it is relatively easy for small independent studios to break into the market and self-publish.

Although growing, the reality is that the extent of games development in Ireland remains relatively small today when compared to other countries<sup>17</sup>. There is considerable potential for growth (including specific aspects such as localisation), and indeed an imperative to develop this core activity for Ireland to underpin a credible proposition as a games hub for the 21<sup>st</sup> Century.

Growth can be realised by developing the indigenous game development base, by attracting more small/medium scale development studios (including entrepreneurs) from overseas, and by establishing game development teams within some of the global games companies who have already located other functions in Ireland.

Ireland benefits from the creative and technical pedigree that already exists across activities that include localisation, software development, animation and e-learning as well as game development. The relative youth and enthusiasm of the game development cohort can also be an advantage and stimulus for a greater number of start-ups.

There are also considerable challenges to be addressed, both in the immediate and in the longer term - particularly in the areas of skills and talent attraction. It is a combination of skills and experience that will make a difference, encompassing business and commercial know how together with creative and technical expertise. Teams need to be well integrated, internationally connected and open to partnerships and alliances.

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<sup>17</sup> Unlike the UK for example, Ireland does not have a legacy of established larger scale production studios. Publisher-owned studios employ around one-half of the UK’s game development workforce, *The Money Game: Project Finance and Games Development in the UK*, NESTA, February 2010.

### Advanced Game Servicing

As outlined earlier, the connection for the games company with the customer is critical. From the very beginning, that tight connection and understanding of consumer behaviours and preferences will enhance the games development process, will stimulate consumer loyalty and drive future revenues. The customer support function within the games sector is quite different from that in other sectors. It requires people who understand the game, who ‘talk the gamer talk’ to the consumer, who understand cultural preferences, converse in the local language, and in turn provide informed feedback to the games developer. It requires people who can interpret a vast array of data, who understand what makes for a compelling user experience, and can develop or utilise leading-edge analytical tools.

*Today's customer support  
..... tomorrow's sales team*

Ireland can become a location of choice for games companies at the forefront of sophisticated models of customer engagement and community management. Ireland already has some of the biggest names in the games and other sectors operating multi-lingual customer management and support functions, serving international markets from here, and has developed deep competencies in data mining and analytics.

### Enabling Software and Technology Solutions

Ireland has cultivated a strong international reputation as a developer of enabling software and technology solutions across a range of sectors. The Irish games sector itself has contributed to this reputation with the highly renowned Havok and Demonware emerging in the middleware space. The games sector relies and thrives on technology.

Ireland’s software developers have achieved strong domain knowledge in vertical markets including telecoms, financial services, lifesciences and e-learning. Deepening domain knowledge and expertise in a games industry context can put Ireland in a position of strength globally as the digital economy develops further<sup>18</sup>.

Key areas of activity will include:

- Cloud based business models;
- Platform innovation; and
- Player/customer behaviour analytics and data mining.

#### *A Truly Multi-Disciplinary Sector*

*Video games depend on people being able to develop complex technical systems, and technology drives them towards ever-greater technological feats.*

*However, the technologies they develop are but a means to deliver the creative content that thrills and moves audiences. They need artists, animators, storytellers and designers as a result.*

*To stay at the top of the game in their fast-moving competitive markets, these industries need multidisciplinary teams combining the best of STEM and art skills.*

Source: NESTA, 2011, “Next Gen: Transforming the UK into the world’s leading talent hub for the video games and visual effects industries”

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<sup>18</sup> Enterprise Ireland’s *Strategy for the Development of the Indigenous Irish Software Sector 2009-2013* has advocated a cluster based approach: ‘concentrating resources on highly attractive market sectors will generate growth through the development of critical mass in terms of market knowledge, skills and awareness’ p. 17.

Developing a connected games and wider digital media cluster, including the academic research and development base, will be an essential part of building the environment for further growth in these areas.

Continued promotion of STEM disciplines (science, technology, engineering and mathematics) throughout the education system is of crucial importance. Havok, one of Ireland's key successes in games was the brainchild of Physics graduates from TCD.

### **IP Exploitation and Online Publishing**

The games industry is an IP rich industry. IP is created in the course of game development itself. The transfer and trading of content, brands and virtual goods generated from other sources such as film, sports, music and other industries is also an integral part of game development and deployment. This IP rich content is used to enhance user experiences and facilitate personalisation within game play, maximise engagement and ultimately to generate revenue. Leveraging value from IP has become an increasingly important element of online business models in particular.

As with other segments of the digital content industry, exploitation of these intangible assets involves a range of activities to facilitate their movement and use - including: inter-company trading of IP, brand management, digital asset management, franchising, legal management including activities such as defending IP, monitoring registered rights, renewing patents, maintaining licenses etc.

Ireland is already an attractive location for holding and exploiting IP. As the games industry develops, further opportunities will arise for Ireland around the trade and exchange of both direct games related IP and indirect IP.

### **Other Areas of Opportunity**

In addition to the above niche areas, Ireland will continue to compete for the attraction of international business services centres and headquarter operations for games companies.

Rapid growth of the games industry in Asia also offers the potential for Ireland and Irish based companies to be the launch pad into US and European markets - and also offers a significant growth market for exports from Ireland.

## Actions for Accelerated Growth

While there are considerable opportunities for growth in the Irish games sector, it cannot be assumed that growth will just happen. There is intense, and often aggressive, competition globally. Action is needed now to address barriers and to accelerate potential if Ireland is to take advantage of the global growth phenomenon in the games sector.

The digital economy (and games sector within that) is quite different from the physical world of goods and indeed, even from the intangible world of services. The pace at which it operates means disruption is the norm and inherent uncertainty is the reality in which firms work.

From an enterprise policy perspective, an ambitious and decisive step change is required to deliver a more anticipatory, integrated and responsive regime - and to create a dynamic interaction between firms, academia and the government system.

### The actions focus on six key areas

1	<b>Developing an International Cluster</b>	Stimulating connectedness between related sectors, nationally and internationally
2	<b>Enhancing Skills and Experience</b>	Addressing short term needs and building a continuous feed-stock of creative, technological and commercial capabilities
3	<b>Accelerating Growth in Creative Content Development</b>	Attracting and developing the talent pool - creating the dynamic environment
4	<b>Building International Visibility</b>	Raising Ireland's visibility as a vibrant location for the games sector
5	<b>Driving Research, Development &amp; Innovation (RD&amp;I)</b>	Enhancing innovation in the games sector
6	<b>Delivering Next Generation Broadband</b>	Underpinning future growth



# 1. Developing an International Cluster

## A Dynamic Approach

The fragmented composition of the games sector globally, coupled with the increased co-dependence across multiple actors presents a challenge for all companies involved. Ireland can differentiate itself as a vibrant and well connected games cluster in this global context - taking advantage of its small size to address the need for enhanced interaction between multiple actors - including industry (both nationally and internationally), the agencies and the Department of Jobs, Enterprise and Innovation, and other relevant government departments.

The establishment of a dedicated Cluster Development Team (CDT), driven by industry, would be a significant statement in itself of Government commitment to accelerate the potential of the games sector. The CDT should be limited in size to between eight and ten participants, balanced between industry and government representatives/enterprise development agencies.

### 1.1 Dedicated Games Cluster Development Team

- Establish, for a period of two years, a dedicated Cluster Development Team for the games sector, to:
  - Drive co-ordinated implementation of the actions in this report;
  - Maintain a rolling agenda for implementation - engaging with relevant government departments - to deliver a dynamic, anticipatory and integrated approach to identifying and implementing additional policy interventions as the sector evolves; and
  - Encourage mutually beneficial relationships amongst the games and related digital content industries.

*(Department of Jobs, Enterprise and Innovation, Industry, Enterprise Agencies - Forfás, IDA Ireland, Enterprise Ireland & SFI)*

## Leveraging our Talent and Expertise

A key focus of the Cluster Development Team (CDT) will be to build tangible links between the indigenous and multinational games companies in Ireland, such that on the one hand indigenous games companies can demonstrate their capabilities, understand the corporate view of the games industry and build relationships, while on the other, multinationals can derive the benefits of new creative inputs.

### 1.2 Talent Exchange initiative

- Develop and implement an industry-led initiative which would facilitate the short-term exchange of talent between companies of different sizes in different sectors (including games, animation and other digital media companies). The 'exchange' of talent may take the form of a single inter-firm placement (for example a multinational company, providing mentor or technical support to a start-up development studio) or the establishment of an 'incubator desk' within a multinational games company that would facilitate mutual learning.

*(CDT)*

## 2. Enhancing Skills and Experience

The multi-disciplinary nature of game production is such that it draws from a wide range of disciplines including physics, computer sciences, maths and art as well as business, commercial and marketing acuity for the digital arena.

A passion for games can be the differentiator for attaining employment in the games sector - at the same time, many of the skills needs are also relevant to the wider digital economy. Many of the actions identified will have a broader impact in this regard.

It is an absolute imperative that action is taken to ensure that Ireland has access to the range of skills and capabilities required to build an internationally renowned games sector here. The global arena is intensely competitive as other countries seek to attract and develop the requisite talent.

Although for the most part, games companies are finding the skills and talent they require in Ireland and/or successfully attracting people from overseas, there are specific challenges - that if not addressed, could act as barriers to the future growth and evolution of the sector here:

### Addressing Short Term Needs

- Certain roles are harder to fill currently - partly due to the relative youth of the sector here. These roles include, for example, experienced lead producers and designers, project managers and business analysts, and specialist ICT roles. In the short-term, these positions are more likely to be filled through recruitment overseas.
- There is an ongoing requirement for multilingual capability/native language speakers with cultural awareness in customer support, community management and localisation. Many of these will be recruited from overseas, some at entry level which fall below the salary threshold under the current work permit scheme.

### Developing Industry Aware Graduates

- As the industry grows, there will be continued demand for appropriately skilled graduates not only with the requisite core technical and creative competencies, but also with softer skills in project management, multidisciplinary teamworking and commercial awareness<sup>19</sup>. Because of the dynamic of the sector, it is challenging to ensure that undergraduate courses continue to deliver graduates that are industry aware. There are also general concerns about the ability of the current supply of ICT and STEM graduates to meet future demand.

### Facilitating Long Term Growth

- Continuous innovation and transformation within the industry creates new skills requirements on an on-going basis, and as a consequence, an imperative for individuals within the industry to constantly upgrade their skills.

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<sup>19</sup> The *Springboard* initiative should help to increase graduate output levels in ICT related courses in the short-medium term. Springboard offers jobseekers the option to take up a part-time course in higher education and training, free-of-charge. Over 200 courses are available in higher education colleges around the country, at Levels 6-9 on the National Framework of Qualifications.

A focus on addressing immediate recruitment pinch-points is needed as well as a medium term view to ensure there is a strong pipeline of talent available to the sector.

## Addressing Short Terms Needs

### Attraction of Required Key Skills from Abroad

Highly mobile individuals weigh up the attractiveness of alternative locations when making decisions about where to work and live. In the first instance, Ireland needs to ensure international competitiveness in terms of the labour tax wedge<sup>20</sup> which is important in attracting and retaining highly skilled and internationally mobile workers. In Ireland this has risen for all income categories assessed by the OECD since 2008. This has been cited as a barrier by some companies across a range of sectors. Mirroring the OECD's tax hierarchy, any additional taxation changes made should be in terms of broadening the base. The development agencies have also recommended that action be taken in relation to the Special Assignment Relief Programme (SARP)<sup>21</sup>.

#### 2.1 Maintaining a Competitive Tax Wedge

- No further increases in the labour tax wedge should be introduced and when feasible reduce marginal rates of tax below 50 percent to retain Ireland's attractiveness for international talent.

#### 2.2 Special Assignment Relief Program (SARP)

- The Department of Finance should explore the reasons for the low take up of the SARP relief, and determine how it could be better promoted, or whether there are alternative tax policy options which would be better placed to ensure that Ireland can compete internationally to attract mobile highly skilled workers.

*(Department of Finance)*

### Addressing Immediate Skills Recruitment Challenges

Labour market measures including Springboard, a refocusing of the Graduate Conversion Programme, Skillnets and the new Internship Programme can contribute toward addressing immediate specific skills shortages - particularly as they pertain to technologies - including, C++, C#, Python, etc. Foreign language fluency skills with cultural awareness are required for customer support and community management activities.

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<sup>20</sup> Income taxes, employer PRSI and payroll taxes drive a 'wedge' between the cost of hiring an individual and the actual take home pay of that individual.

<sup>21</sup> SARP is a general instrument but highly relevant for the games industry. It applies where an individual is sent by a foreign employer to work in Ireland, and provides that no income tax applies to 50 percent of a gross salary in excess of €100,000, subject to it being less than the amount being remitted to Ireland from that employment. The employee claims the refund by filing an annual tax return.

Attracting people with skills in related areas to re-train for a career in the games sector can be a useful means to bring talented and experienced people into the sector in the short-term.

Investment by firms in on-going training and development is key so that they maintain agility and keep abreast of new developments in technologies and business processes. Availability of cost competitive, relevant and easily accessible continuing professional development programmes is very important in this context and demand will increase as the industry grows. Industry has a role to play in defining specific needs and in working with relevant training providers to develop appropriate and relevant courses.

### 2.3 High Level ICT Skills

- Progress the measures contained in the forthcoming Action Plan to Address High Level ICT Skills Recruitment Needs as a matter of priority, particularly as they pertain to technology skills requirements relevant to the games sector.

*(Department of Education and Skills, HEA, Skillnets)*

### 2.4 Skills Conversion Courses

- Ensure that the review currently underway of the HEA Graduate Skills Conversion Programme takes into account the needs of the games industry.

*(Department of Education and Skills, HEA, Higher Education Institutes and Industry)*

### 2.5 Continuing Professional Development

- Promote a coordinated and industry informed approach to continuous professional development for the games industry, utilising both public and private higher education and training providers as appropriate.

*(CDT)*

## Developing Industry Aware Graduates

It is critical that third level courses continuously keep pace with the rapid change in the games and broader digital media sector, including enabling technologies and business models, and are providing graduates with the requisite skills for careers in these sectors.

### 2.6 Increased HEI/Industry Collaboration

- Increase levels of collaboration between industry and HEIs/training providers in the design and modification of courses, including the development and extended use of flexible internships as a key element of education and training for the games and digital media sector.

*(Industry and Higher Education Institutes)*

## 2.7 A Hothouse Initiative

- Develop and introduce a pilot game development and publishing ‘hothouse’ initiative that would form an elective portion of undergraduate and PLC courses as an alternative option to formal industry placements/internships.

The initiative would bring together, in multi-disciplinary teams, students from games, multimedia and animation courses (from a range of participating PLC and third level colleges) to work together on a game development project for a defined period. The ‘hothouse’ would provide early exposure to multidiscipline team dynamics and team working and develop commercial awareness. Each of the teams would receive mentor support from industry practitioners.

*(Industry and Higher Education Institutes)*

## Facilitating Long Term Growth

### Raising Awareness and Stimulating Interest in STEM

Growth in the games industry and the wider digital economy over the longer term will require a flow of appropriately skilled graduates. Increasing the STEM skills pipeline through increased levels of take-up of these subjects at secondary and third level is a crucial aspect and is already the focus of Government<sup>22</sup>.

There is also a national objective to increase awareness of the range of opportunities arising for individuals that graduate with core competences in these disciplines. The games industry could be used as one such example, increasing awareness of the wide range of career options based on STEM disciplines, the creative and social sciences, and business disciplines.

At primary and secondary levels, there is potential for industry to proactively engage with schools to promote early exposure to, and understanding about the skills and capabilities behind games and digital media production. A virtuous circle can be put in motion where games help draw young people into maths, physics and computer science, and improve their learning outcomes. Initiatives in this area should enlarge the talent pool for sectors operating in the digital era in the future.

## 2.8 Promote Games as a Career Option

- Through a collaborative approach, and working with other relevant bodies (e.g. ICT Ireland) organise games industry roadshows and graduate fairs to: stimulate interest in careers within the games industry; promote a greater understanding of the sector as a professional and highly skilled sector; and highlight opportunities for entrepreneurship.

*(CDT, Higher Education Institutes)*

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<sup>22</sup> Through the EGFSN, and the Discover Science & Engineering initiative.

## 2.9 Promote Awareness at Primary and Secondary School

- Develop and implement a series of initiatives at primary and secondary level that can take advantage of the ‘cool’ characteristics of the games sector that would stimulate greater interest in the STEM subjects given their direct relevance to the games and digital content sectors, and that would promote a greater understanding of the sector as a professional, highly skilled sector.

*(Discover Science & Engineering, with Industry)*

## Game Based Learning

The application of games in a learning context, in particular the serious games genre, as an effective means of developing skills and enhancing motivation for learning is an emerging area within the games and e-learning sectors<sup>23</sup>. The developing expertise within Ireland in this field should be employed within the Irish education system, both to drive innovation and to generate positive learning outcomes.

## 2.10 Game Based Learning

- Consider the introduction of game-based learning to the primary and secondary school curriculum to develop team work and problem solving abilities, and at the same time create a test bed within the Irish education system for innovative ‘serious games’ developers and e-learning companies based in Ireland.

*(T4 Technology Subjects Supports Services)*

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<sup>23</sup> *The Video Gaming Industry Outlook: Gaming Segment Analysis, Key Stakeholders, New Challenges and Future Developments*, Business Insights, 2011, NESTA; overview at [http://www.nesta.org.uk/events/assets/features/serious\\_games\\_1](http://www.nesta.org.uk/events/assets/features/serious_games_1); and the US STEM Video Games Challenge at <http://www.whitehouse.gov/blog/2011/04/04/winning-future-stem-video-games>.

### 3. Accelerating Growth in Creative Content Development

#### Incentivising Content Development

There is a wide range of attractive business supports available in Ireland to help companies to establish and grow their businesses - all of which are accessible to games companies. What is somewhat different is that games companies regularly initiate new projects, develop innovative concepts and creative content throughout their business lifecycle.

A question arises as to Ireland's ability to accelerate growth by providing incentives specifically for creative concept and content development - which currently falls outside of the EU Research, Development and Innovation guidelines (RD&I that involves technological advance and uncertainty is eligible).

This is a question not only for Ireland - it also arises in a broader European context operating within existing EU State Aid guidelines<sup>24</sup>. As the digitised creative economy becomes more of a reality, further analysis may be warranted at EU level in relation to incentivising future enterprise growth in this context<sup>25</sup>.

The need for action is relevant in the intensely competitive global landscape for attracting mobile investment and stimulating growth of indigenous firms. Many countries offer incentives specifically designed to support the creative content development element of games development.

#### *The Competitive Environment Globally for Content Development*

*Many countries in the world have adopted funding measures and/or tax incentives and successfully stimulate their local computer game industry. Outside of Europe, we find policies of massive support in: Canada, US, Japan, South Korea, China and Australia. The results are European talents are developing very well ... outside of Europe. Currently in other regions of the world, developers have access to capital support that acknowledges the knowledge based and/or creative economies and further incubates these sectors. It is hard for EU based developers to compete under these circumstances'*

*EGDF Statement on EC Green Paper Unlocking the Potential of Cultural and Creative Industries 2010*

#### 3.1 Incentivising Creative Content Development

- Determine the scope, rationale and benefit of introducing a new horizontal financial instrument to incentivise creative concept and content development to enhance Ireland's attractiveness for investment and indigenous growth in games development<sup>26</sup>.

*(Department of Jobs, Enterprise and Innovation, Department of Finance)*

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<sup>24</sup> EU State Aids aim to ensure that companies compete on equal terms throughout the EU and as such do not permit state support with purely industrial objectives for specific sectors - *State Aid Scoreboard - Report on State Aid Contribution to Europe 2020 Strategy*, Spring 2011 Update, COM 356 final, 2011.

<sup>25</sup> See also ongoing EU consultation on *Assessing State Aid for Films and Other Audiovisual Works*. The consultation may raise interesting alignments with the games sector, particularly in the context of a changing digital era and increasing convergence between and across sectors.

<sup>26</sup> Examples of incentives in other countries include: Tax Credit introduced by France for the creation of video games, 354/Ec,2008 - Commission Decision on State Aid C47/06 (ex N 648/05) and the Tax Credit for MultiMedia Production introduced by Quebec.

## Financial Supports for Games Companies

In the more immediate term action can be taken to further enhance the existing financial support and funding environment for games companies. Getting an online game development and publishing business established involves a unique approach. An iterative development cycle with early market testing and capturing a customer base is critical. This challenges standard approaches to funding (early stage seed funds or venture capital (VC) where decisions to invest are typically based on more traditional business plans, incorporating more defined financial and revenue generation projections. Enterprise Ireland's recently introduced Competitive Start Fund aims to address this issue.

Small indigenous companies also cite frustrations at the apparent lack of knowledge within the Irish based VCs about the characteristics particular to the games industry and its associated business models; yet there are also issues around the lack of awareness amongst games industry start-ups about the requirements of VCs. Mutual awareness will increase over time as the sector matures, however proactive engagement between the actors can be encouraged in the short-term.

### 3.2 Enterprise Ireland Competitive Start Fund

- Carry out an early review of the EI Competitive Start Fund within the context of the Forfás Evaluation Framework to inform any necessary adjustments that would enhance effectiveness and facilitate an expansion of the model.

*(Enterprise Ireland, Forfás)*

### 3.3 Enhance Mutual Understanding of Games Industry and VC Perspectives

- Initiate active engagement between the VC community in Ireland and internationally with indigenous games development and technology companies so as to enhance mutual understanding of requirements amongst both parties.

*(Enterprise Ireland and Industry)*

## Bridging the Experience Gap

Small teams involved in games development may have an abundance of technical and creative capability but often lack the commercial/marketing expertise to sustain and scale their businesses. Undergraduate courses have a role to play in this respect but there is also a need to ensure that start-ups can access knowledge and advice from experienced games industry practitioners in Ireland or overseas as they develop their business. The willingness of Irish expatriates to give something back has already been demonstrated through existing Enterprise Ireland initiatives and communicated through other channels such as the Global Irish Economic Forum (Farmleigh).

### 3.4 International Advisory Panel

- Based on the existing Enterprise Ireland model, establish a games sector specific advisory panel drawing from experienced industry practitioners in Ireland and overseas who would assist with the development and scaling of indigenous start-ups - through for example: business mentoring, brokering introductions, advising on sales/marketing, approaching VCs etc.

*(Enterprise Ireland and Industry)*



## 4. Building International Visibility

For Ireland to achieve its ambition as a *Global Games Hub for the 21<sup>st</sup> Century*, a coordinated marketing proposition specific to the games sector needs to be developed and vigorously communicated on the international stage.

### 4.1 Coordinated Promotion

- Continue to develop and promote a marketing proposition for the games sector in Ireland under the *Innovation Ireland* brand, through a strong cohesive approach involving the enterprise agencies, industry and other relevant bodies such as the Irish Film Board and Culture Ireland.

*(CDT, Irish Film Board, Culture Ireland)*

### 4.2 Host International Games Events in Ireland

- Develop a series of themed international games events to promote Ireland as a gaming hub and further develop links between the industry in Ireland and other games hubs internationally. Thematic areas would include: Creative Content, Analytics, Community Management, Information Security, Cloud Gaming.

*(CDT)*

## 5. R&D and Innovation

### R&D and Innovation Supports

The games industry is pushing the boundaries of technology and business strategies. There is a need to ensure that Ireland's R&D supports incentivise innovation within Irish based firms in the sector. A large part of this is about raising awareness within industry about existing supports (the R&D tax credit & R&D funds) and how they apply to the games sector. There is also a need to make sure they are fit for purpose as the sector evolves.

The sector needs also to take advantage of the substantial progress that has been made in building up Ireland's research, innovation and knowledge transfer infrastructures over recent years. There is a considerable amount of research activity underway in Ireland's academic research community that is directly relevant to the sector, including artificial intelligence, sensor technologies and user interfaces, behaviour analytics, information security, business models, multilingual digital content management, games engines etc.

### 5.1 Increase Awareness

- Develop an enterprise guide to accessing R&D supports (R&D Tax Credit, R&D Fund etc.) to include examples specific to the games industry.
- Convene an R&D supports workshop to promote awareness about available R&D supports and to share knowledge about research of relevance to the games industry.

*(Enterprise Agencies, Revenue Commissioners and Industry)*

### 5.2 Role of the Social Sciences in Games Industry RD&I

- In the medium term, review the extent to which social sciences play a role in games industry RD&I - both currently and potentially as the sector evolves. If and when deemed appropriate, make the necessary changes to qualifying criteria associated with the R&D Tax Credit to include relevant social sciences as eligible fields of science in R&D activity<sup>27</sup>.

*(CDT, Revenue Commissioners and Department of Jobs, Enterprise & Innovation)*

- The development of case studies should be progressed to clearly demonstrate the various aspects of RD&I activities within the games industry.

*(Industry, Enterprise Agencies)*

### 5.3 Promoting Academic - Games Industry Engagement and Collaboration

- Continue to promote engagement between academic researchers in Ireland and the games industry, through networking events and other promotional activities.

*(Science Foundation Ireland, Enterprise Agencies, Higher Education Institutes and Industry)*

## Copyright

Notwithstanding the ongoing need for reform in a rapidly changing environment, much of which will be initiated at EU level, there is general satisfaction with the level of protection offered by the present Irish copyright legislation<sup>28</sup>. A Copyright Review Committee has been established by the Department of Jobs, Enterprise and Innovation to examine the current Copyright legislative framework in Ireland and is expected to report by the end of 2011. The actions here reflect key recommendations within the IDA Ireland submission to the Committee following consultation with a range of stakeholders in July 2011.

### 5.4 Address Inefficiencies and Costs of Litigation

- Conduct a review of the Rules of the Superior Courts to identify measures that can reduce costs and inefficiencies associated with copyright and other forms of civil litigation, including the adoption of specific civil procedure rules for dealing with IP disputes.
- Consider establishing an IP specialist court with Circuit Court jurisdiction to hear small to medium IP claims.

*(Department of Justice and Equality, Department of Jobs, Enterprise and Innovation)*

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<sup>27</sup> Any changes to the R&D Tax Credit can only be considered in the context of their broad application to all sectors. Any proposed alteration would therefore need to be cognisant of the potential cost, clarity of application, and the benefits accruing.

<sup>28</sup> Forfás company interviews and IDA discussion forum 'Innovation Through Copyright' (July 2011).

## 5.5 Promote Reform of Copyright Law at EU Level

- Support the European Commission's proposals to create a pan-European collective licensing regime for online services.

Promote and/or initiate debate at an EU level in relation to the following issues with a view to assessing whether EU action is needed to create greater legal certainty/harmonisation in these areas: non-consumptive uses of copyright works; user generated content; fair use doctrine.

- Request the European Commissioner for Research, Science and Innovation to co-ordinate an EU level response on the issues identified through the relevant Commission Departments - DGs Internal Market/Competition/Information Society & Media.

*(Department of Jobs, Enterprise and Innovation)*

## 6. Infrastructures - Broadband

The games industry is rapidly moving online and to the 'Cloud', both in terms of content delivery and business processes, underlining the importance of broadband, and the rollout of next generation networks. Within this sector (and the digital content sector generally) small teams can often operate in global networks at an early stage of their development. Activities such as community based management should be able to operate from anywhere in Ireland to service a global customer base. Latency becomes a key consideration as content evolves to be more graphically rich and bandwidth hungry<sup>29</sup>.

Ireland benefits from its competitive international broadband connections - and it is important that Ireland ensures that it remains competitive in light of future global developments. For example, in the context of Cloud Computing - which is directly relevant for the games sector - there may be a need in the longer-term to enhance our direct Tier 1 telecoms connections to mainland Europe.

In the national context, Ireland continues to lag other EU countries and those which we compete for trade and investment in the provision of widely available, competitively priced advanced broadband services to homes and businesses. The policy actions taken and investment made to date are necessary but are not yet sufficient to ensure the widespread availability of world class advanced broadband services within a timescale that will allow Ireland to catch up with competitor countries. From the perspective of promoting Ireland as a *Games Hub for the 21st Century* with a dynamic and fully integrated cluster, this needs to be addressed as a matter of priority. In this regard, Forfás welcomes the establishment of the Next Generation Broadband Taskforce and its focus on identifying industry, private and public investment plans.

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<sup>29</sup> Latency refers to the speed of response of the system to the user (e.g. video lag).

### 6.1 Next Generation Networks (NGN)

The forthcoming Forfás Report *Ireland's Advanced Broadband Performance and Policy Priorities*, sets out the suite of actions required to address barriers to investment, focused on areas of pro-investment regulation, infrastructure planning and investment, and demand stimulation.

These actions need to be progressed as a matter of priority.

*(Department of Communications, Energy and Natural Resources and Broadband Providers)*

## Conclusion

The transition to a digital economy continues apace. The phenomenon of the internet, mobile media and social networking has led to the development of a range of services including location based services, digital content, media services and personalised services. There are likely to be others, not yet in vogue that will be created by innovative firms responding to and/or pre-empting customers' changing demands<sup>30</sup>. The games sector is an exemplar of the potential growth and of the ways in which companies will do business in the digital era. As a transformative force within the emerging digital economy, the games industry is also valuable as a driver of new economic and societal norms.

The games sector is dynamic, creative, exciting and pervasive and presents considerable opportunities for Ireland - as growth in the games sector is likely to stimulate growth in increasingly inter-connected sectors including film and video, animation, enabling ICTs, and a host of internet related services and activities.

This report demonstrates that decisive action is needed together with a new way of thinking within enterprise policy. An anticipatory, agile and responsive approach is needed that is cognisant of the real-time nature of the games sector - and of the wider digital economy.

For some, the potential employment in the games sector may appear to be rather low - but in year on year percentage terms it is significant. What is also particularly relevant is that the timely and effective implementation of the actions set out here will facilitate accelerated growth, not only for the games sector, but also for a much broader cohort of sectors and activities operating in the digital economy.

Ireland can now grasp this opportunity to fully embrace the digital era and adjust its thinking, policies and systems - distinguishing its competitiveness offering with one of the most progressive and digitally advanced business environments in the 21<sup>st</sup> Century to stimulate enterprise growth and employment.

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<sup>30</sup> *Making it Happen, Growing Enterprise for Ireland*, Forfás 2010.



# Chapter 1: Introduction

## Purpose of this Report

This report sets out the opportunities for further growth for the games sector in Ireland over the coming 2-3 years. It takes into consideration the rapid evolution of the games sector globally, as well as Ireland's fast progress in this sector over a very short period. It identifies crucial actions needed to underpin and accelerate growth. This games strategy has been developed by Forfás, working closely with the enterprise development agencies<sup>31</sup>. It has been informed by insights from games companies and other relevant stakeholders as well as PWC international expertise.

## Structure of the Report

Chapter 2 provides an overview of key trends and drivers of change in the games sector globally. Chapter 3 profiles the sector in Ireland and Chapter 4 sets out an overview of the supporting business environment - noting both key strengths and challenges within the global context. Chapter 5 outlines a vision for the games sector and identifies the main opportunities for future growth in Ireland. Finally, Chapter 6 identifies specific actions to accelerate the sector's development in Ireland over the next 2-3 years and to provide a foundation for longer term growth. The remainder of this chapter sets out a definition of the games industry, provides some information about game genres and outlines the game development process.

## A Definition

The games sector comprises the range of business activities associated with the production, distribution and consumption of electronic or video games. This includes:

- The various elements that contribute directly to the game development value chain; including hardware platform/console manufacturing, creative and technical development, publishing, distribution through a variety of channels (including online, mobile, cloud, download and traditional retail), customer engagement and community management;
- The growing range of generally outsourced support services that include information security, data hosting, billing services, advertising and marketing, piracy protection; and
- The wider games sector ecosystem which provides critical enablers such as skills, research capability, legislative & regulatory frameworks (including the intellectual property regime), telecommunications infrastructure and services, financing and fiscal environment etc.

The games sector is quintessentially digital economy. It is driven by the confluence of creative, technical and commercial capability, which is manifest in the composition of games

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<sup>31</sup> IDA Ireland and Enterprise Ireland participated on a cross agency working group - contributions were also received from Science Foundation Ireland and Discover Science and Engineering and the Irish Film Board.

companies, the partnerships and alliances formed, and increasingly in the capabilities of individuals. The industry exemplifies and is a part of the cross-media exploitation chain that includes many segments of the media, such as hardware and software industries or the motion picture and animated film industries<sup>32</sup>. It also extends beyond pure entertainment to more serious applications in the context of education and training, health, military etc.

As a transformative force within the emerging digital economy, the games industry is not only valuable from the point of view of its potential to create employment and wealth - it is also a driver of new economic and societal norms.

The games sector is highly fragmented along a number of dimensions - game genre<sup>33</sup>, type of end user devices and platforms, with publication channels and revenue models still emerging (Table 1.1). It is commonplace for games companies to target multiple platforms and genres in order to maximise and retain users.

**Table 1.1 Overview of Game Sector - Devices, Platforms & Revenue models\***

Platform	Game Format	Game Genre	Developers/Publishers	Platform Provider	Monetisation
<b>Console</b> (inc. handhelds, sensor & motion controllers)	Packaged with online content	Casual & hardcore with multiplayer functions, and online access	Nintendo Sony Electronic Arts Activision Blizzard Microsoft	Console manufacturers - Nintendo (DS, Wii), Sony (PS3), Microsoft (X360)	Packaged game retail price. Download pay for additional content. Online subscription to access multi-player features.
<b>Mobile</b> (Smartphones, tablets)	Game app downloaded and games accessed online	Casual, apps, social	Zynga Backflip Studios EA Mobile DeNA	Mobile operating systems - Apple (iOS), Google (Android) Social Networks (Mobage, Facebook)	Paid download, Free with premium content (freemium)
<b>Online</b> (accessed via PC, portable devices)	Browser, Social networks, Download, Cloud	Casual, MMO, Social, Cloud	Zynga PopCap BigFish Playfish Activision Blizzard Crowdstar	Social Networks (Facebook, Ren Ren, MySpace) Game Portals (Pogo.com)	Paid download, subscriptions, micro-transactions, electronic sell through, try-and-buy, virtual goods, lead generation, advertising, all you can eat, freemium
<b>PC</b>	Packaged, online	Hardcore, casual, MMO	EA Atari	PC, Laptop, Tablet manufacturers	Packaged retail price

\*Note - company names are included as key examples, the lists are not exhaustive.

<sup>32</sup> Cited in Deutsche Bank Research, *A Serious Business with Plenty to Play for*, August 2009.

<sup>33</sup> See Appendix 2 for an overview of broad game genres, and Appendix 3 for an overview of online game formats.

## Game Development - from Inception to Consumption

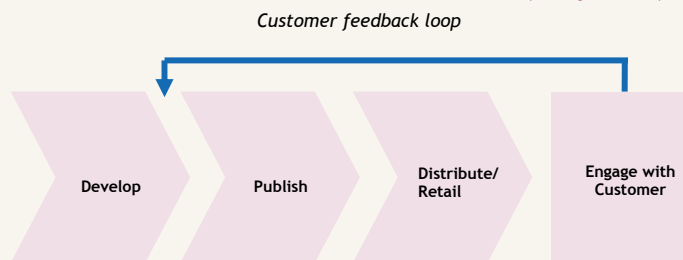
Much commentary about the games sector refers to its rapid evolution, particularly in terms of the changed route to customer via on-line and mobile gaming and within this, the explosion of casual and social gaming. Chapter 2 takes a closer look at how this value chain is evolving and the implications for firms. In this chapter we simply set out the stages of the game development process - which remain largely the same, despite the turbulence in the industry.

In basic terms, the main activities that constitute the game development process can be grouped as follows:

- a) Development/production;
- b) Publishing/commercialisation;
- c) Distribution; and
- d) Customer engagement.

These four stages are present regardless of game genre. The different activities may be carried out by a single firm (large or small), a range of different actors via outsourcing and other partnerships, or across discrete actors who subsequently engage in commercial arrangements; and there are differences in the level of financial, technical, human and time resources required to produce a game<sup>34</sup>.

**Figure 1.1 Games sector Value Chain of Activities (Simplified)**



### a) Development

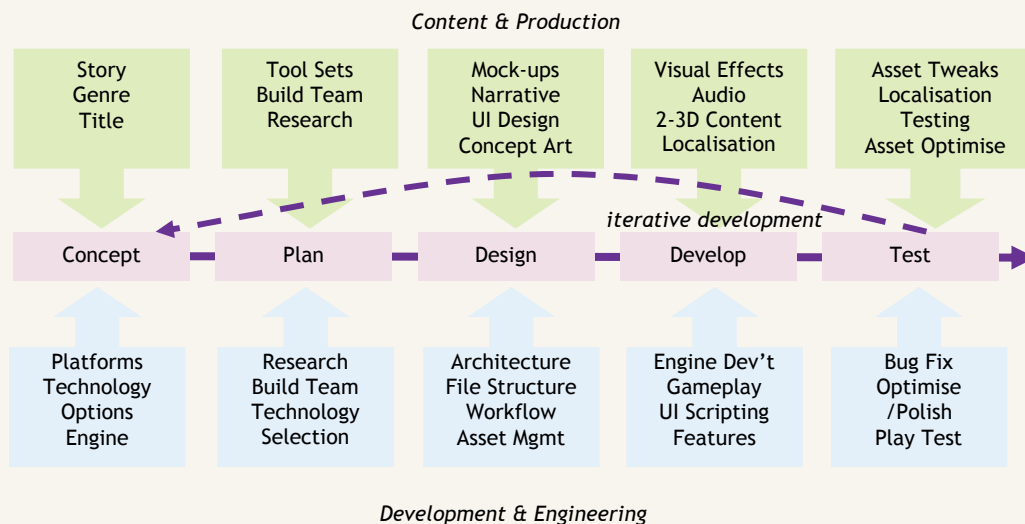
Game development is the ‘beating heart’ of the industry from which everything else derives. It is a multidisciplinary activity involving the merging of creative and technical talent to bring a concept to life. The typical approach is for the process to begin with the development of the concept for the game, before moving into the planning phase, the design phase, the

<sup>34</sup> For example, a packaged console game can cost in the range of £2 to £15 million and take between 15 and 30 months to produce, while a casual/mobile game will cost in the region of £25,000 to £120,000 and between 3 and 8 months to produce - see also Appendix 1. *The Money Game: Project Finance and Video Games Development in the UK*, NESTA Policy Briefing, February 2010, p10.



development phase and finally the test phase (Figure 1.2a). The development process is becoming more iterative, informed by user demands and behaviours.

**Figure 1.2(a) Games Sector Value Chain - Game Development**



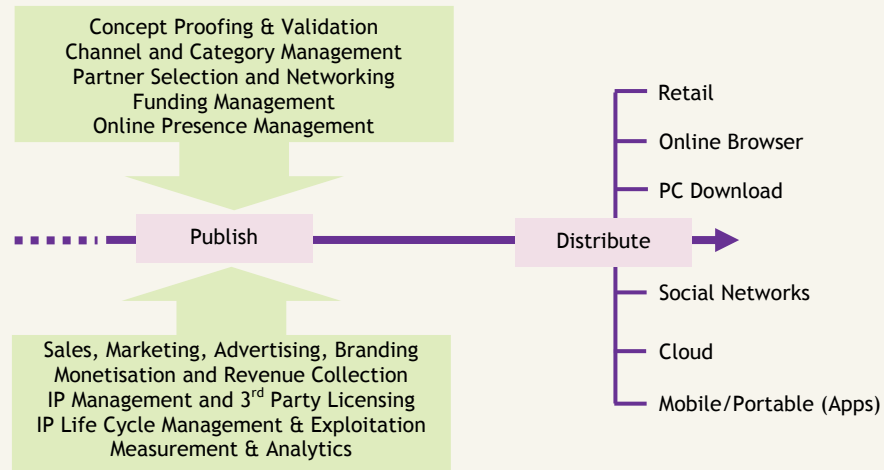
Source: Based on PWC research

**b) Publishing**

The publishing role is key to achieving success in what is an increasingly crowded market - and particularly so for casual and social games. Publishers/aggregators and hardware platform owners buy games from independent studios and/or develop games in-house. These firms continue to occupy a position of strength within the sector by virtue of their scale - however, it is a greatly changed landscape over more recent years.

Aspects of games publishing and commercialisation may be outsourced to third party providers, for example in the area of billing, data hosting, advertising and marketing, analytics and IP management.

Figure 1.2(b) Games Sector Value Chain - Publishing, Commercialisation and Distribution

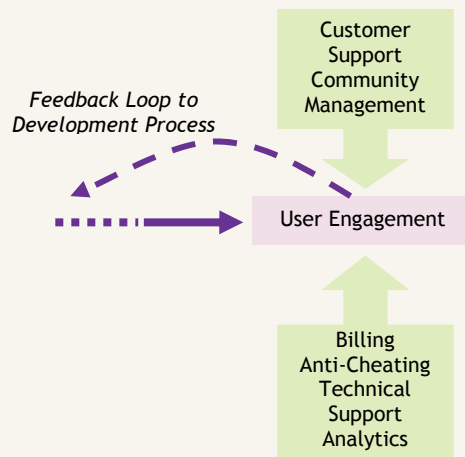


Source: Based on PWC research

**b) Distribution**

Although still important, the traditional retail channel for games is increasingly being bypassed by developers and publishers and supplanted in large measure with a range of other intermediaries who act as the virtual shop windows for online and mobile games. For packaged games, distribution involves marketing the games, handling, packaging and logistics. The function may be performed in-house, managed through collaboration with specialised distributors, or retailers may deal direct with publishers.

Figure 1.2(c) Games Sector Value Chain - Customer Engagement



Source: Based on PWC research

#### d) Customer Engagement

The role of customer engagement extends beyond the more well understood aspects of customer support that provide basic technical support on issues such as installing and running the game properly. Today, it involves moderating and managing the growing user community, assisting users through game play, strategy etc.

Although it is possible to outsource certain technical related customer support activity to achieve cost savings, most companies choose to retain the value-added customer support function in-house given its integral relationship with the game development process and its crucial importance in retaining and maximising user engagement and average revenue per paying user (ARPPU).

#### Skills and Competencies

It is apparent from the analysis of the value chain that the games sector is truly multi-disciplinary in nature. It involves a range of existing and new actors in the game development process through from inception to delivery in the marketplace. The way in which the industry functions involves agile innovation, partnerships and alliances, and new ways of reaching markets and realising revenues.

What is distinctive is the mix of skillsets required<sup>35</sup>. The inter-play of technological and creative skills is core to the development of the game, as is the analytical and psychological capabilities to understand, anticipate and respond to consumer behaviours. Business and commercial acumen is critical, particularly given the range of channels to market and consumer expectations for free products and services in an intensely competitive and increasingly mobile environment. Softer skills in project and production management, teamworking, digital marketing and outsource partnership management are vital to managing what is more often than not a virtual global operation - small firms can reach global markets at a much earlier stage of their development - and many are globally dispersed with relatively small teams. Innovative capacity and competence is a prerequisite for success, requiring competences in technologies, mathematics and sciences (particularly physics and perhaps moreso in the future, neurosciences) as well as the ability to embrace open-innovation involving end users and partners.

The games sector is a highly professional and highly skilled sector - driving innovation, societal change and economic growth.

#### *A Truly Multi-Disciplinary Sector*

*Video games depend on people being able to develop complex technical systems, and technology drives them towards ever-greater technological feats.*

*However, the technologies they develop are but a means to deliver the creative content that thrills and moves audiences. They need artists, animators, storytellers and designers as a result.*

*To stay at the top of the game in their fast-moving competitive markets, these industries need multidisciplinary teams combining the best of STEM and art skills.*

*Source: NESTA, 2011, "Next Gen: Transforming the UK into the world's leading talent hub for the video games and visual effects industries"*

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<sup>35</sup> See Appendix 4 for an overview of the range of skills and competencies required in the games industry.

## Chapter 2: Global Trends

### A Rapidly Growing Sector

The games sector is showing very healthy and rapid growth globally. It is one of the fastest growing segments of the broader entertainment and media landscape, with spending on games globally expected to increase by almost 50 percent over the 2011 to 2015 period, a compound annual growth rate of 8.2 percent<sup>36</sup>. Over the period 2006 to 2010 games industry revenues grew by over 60 percent. The online and mobile components collectively account for 42 percent of the total games market (or US\$ 24.8 billion).

The headline figures measuring rapid and continued growth in the games sector are a manifestation of a transformative shift in the industry towards online and mobile digital distribution. Online and mobile games will be the fastest-growing segments of the global games market over the 2011 to 2015 period, with compound annual increases of 14.9 percent and 11 percent respectively<sup>37</sup>. This shift has facilitated and is driving expanded games consumption across a broader demographic that is now accessing games across a wide range of devices and increasingly in a more casual, bite-sized, and socially connected way.

**Table 2.1 Forecast Global Game Revenues by Market Segment**

	2011 US\$m	2015 US\$m	2011-2015 CAGR %
Console Games	28,605	34,815	+4.4
Online Games	16,327	28,396	+14.9
Mobile/Wireless Games	8,492	12,684	+11.0
PC (Packaged) Games	3,794	3,574	-1.7
<b>TOTAL<sup>38</sup></b>	<b>59,293</b>	<b>82,436</b>	<b>+8.2</b>

Source: *Global Entertainment and Media Outlook 2011-2015*, PWC, 2011

By 2015 revenues from online and mobile segments collectively will have surpassed that of the currently dominant packaged console segment. Although the next generation of consoles will be coming on stream in the next 3-4 years and would expect to result in renewed growth

<sup>36</sup> *Global Entertainment and Media Outlook 2011-2015*, PWC, 2011. Data includes consumer spending on console (incl. handheld), PC games, online games and wireless/mobile games and games advertising. It excludes spending on hardware used for playing games.

<sup>37</sup> *Ibid.*

<sup>38</sup> Includes an additional advertising revenue category.

in this segment, it is likely that they will also face increased competition from online alternatives accessed through a range of more sophisticated personal devices.

### Geographic Markets

With revenues totalling US\$22.2 billion in 2010, Asia-Pacific is the largest market worldwide, and projected to be the fastest growing over the period to 2015. Here, online and wireless games constitute a larger share of total spending than in other regions and are having a greater influence on growth as a result. The next largest market is Europe Middle East and Africa (EMEA) with US\$16.9 billion, followed by North America with US\$15.2 billion and Latin America with US\$1.3 billion.

**Table 2.2 Global Games Spending by Region, Current (2010) and Forecast (2015)**

	2010 US\$m	2015 US\$m	2011-2015 CAGR %
Asia Pacific	22,160	38,737	11.8
EMEA	16,899	22,796	6.2
North America	15,203	19,081	4.6
Latin America	1,268	1,822	7.5
TOTAL <sup>39</sup>	55,530	82,436	8.2

Source: *Global Entertainment and Media Outlook 2011-2015*, PWC, 2011

It is important to note that the markets differ considerably from each other in terms of the demand for particular game types, and also in terms of playing habits. For example, the top 10 games sold in Japan is almost entirely different to the listing for Europe and the Americas<sup>40</sup>. Also, while monthly subscriptions are popular in North America and Europe, hour-based access is more popular in Asia (particularly Korea and China), where a large number of gamers play in game rooms and cyber cafes. Games companies seeking to capture market share in other geographic regions will often take an M&A route or enter into commercial partnering arrangements rather than adapt to considerably different cultures and associated consumer preferences<sup>41</sup>.

<sup>39</sup> Includes an additional advertising revenue category.

<sup>40</sup> Appendix 5.

<sup>41</sup> For example, Zynga has partnered with the major Chinese online gaming company Tencent to release its major title *Cityville* in that region. Tencent owns a range of platforms in China, including Pengyou and Q-zone.

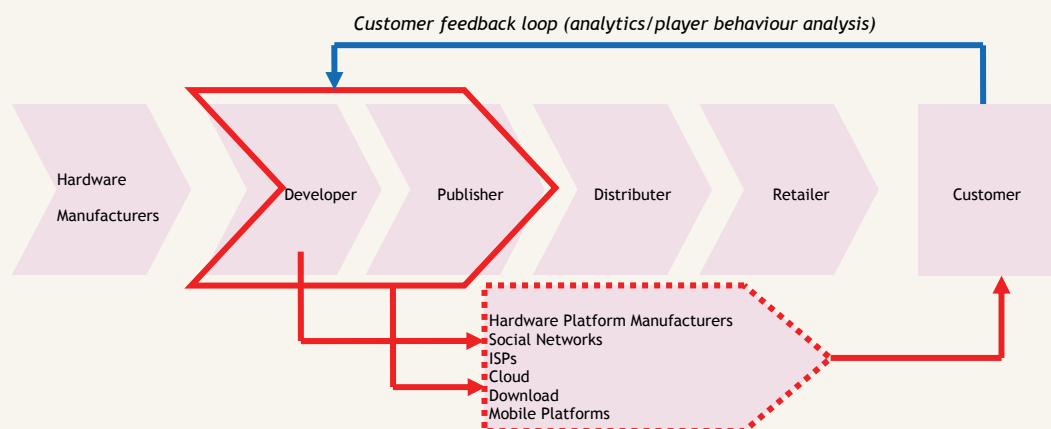
## An Evolving Value Chain

Less than five years ago, the primary set of activities associated with the production and eventual consumption of games could be described in terms of a basic retail distribution model - from development of the game, publishing, through to monetisation by retail sales. The same logic continues to apply - however the actors, their respective roles, and interaction dynamics between them have changed considerably and continue to change.

Probably the most dramatic adjustment to the traditional value chain has taken place due to the fragmentation of game distribution and consumption across a variety of different channels and platforms - essentially the manner in which the end user can access games (Figure 2.1). A growing and broader audience is now engaging in game play via consoles, online browser, mobile smartphones and tablets, social media platforms, PC download, and streaming, supported by cloud technology. This has brought a new cohort of intermediaries into the publishing and distribution space that were previously unconnected to the industry.

The traditional publishing and distribution roles and actors have given way to a new dynamic. Online, the publisher can act as distributor and retailer, while social networks, game and internet portals provide new virtual shop windows for both publishers and developers<sup>42</sup>.

Figure 2.1 Emerging Games Value Chain



With growing demand for casual and more simple bite-sized gaming experiences, which are cheaper and easier to produce, and with more direct routes to the customer now available, opportunities have opened up for small developers to enter and compete successfully in the games industry, albeit in an increasingly crowded market. Independent developers can also benefit from increasing demand for creative talent globally via relationships with larger game developer/publishers<sup>43</sup>.

<sup>42</sup> The model and dynamics vary according to game type, for example the traditional retail channel is still important for the console platforms in the promotion and discovery of new games, in particular the impulse purchase which may be difficult to replicate online.

<sup>43</sup> For example, Big Fish Games, a leading developer and publisher of online, mobile and downloadable casual games, currently has over 500 developer partners globally, <http://pressroom.bigfishgames.com/>.

The increasingly service oriented nature of the sector has seen the game development process itself grow progressively closer to the end user. Success within a highly competitive and crowded market is dependent on anticipating and meeting customer needs. The strategic importance of the customer support and engagement role has increased for all actors and has led to increasing levels of sophistication in gamer behaviour analytics and user engagement/community management. Development is undertaken iteratively, with continuous improvement based on telemetry data (in-game analysis of gamer activity) and direct feedback from users. This more agile process is now a critical success factor for game development, regardless of scale of operation, independent or otherwise. It also means that the relationships along the value chain from development through to publishing and user engagement are more closely inter-linked.

## Drivers of Change

The structure of the games sector is still fluid and continues to evolve. Indeed, future trends in the sector are notoriously difficult to predict and prone to disruption. A number of interrelated dynamics are at play which are driving change in the sector.

### Consumer Behaviour

The games sector has responded to changing consumer behaviour and preferences and relies heavily on the consumer as a source of innovation.

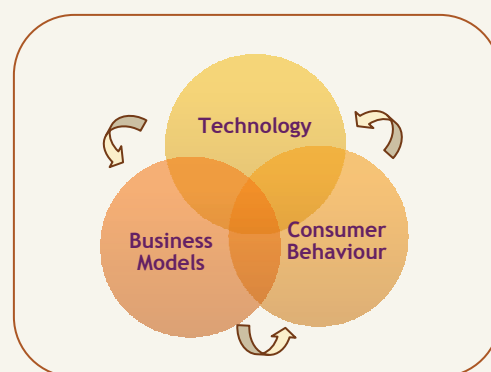
For example, the growth of online casual and social games is driven by their much broader appeal across a audience that now includes more adult women and an older demography generally. Compared with traditional console based games, online casual games are easier to play and access, require less time to play and are typically offered for free initially. Games developed for online social networks such as Facebook continue to experience tremendous take-up<sup>44</sup>, while the social media phenomenon has been quickly adopted in the more traditional game environments (console and MMO) where multiplayer engagement was not entirely new. The rapid adoption of smartphones has further grown the audience of casual players.

*'...through technology we'll be able to put full control of the game experience in the hand of the consumer; that they govern what we build, how we build it, what they play and how they play it [...] we get much better data now than we ever did before, through online connectivity, that allows us to fine-tune the experience to their demands.'*

Andrew Wilson, EA Sports in an interview with [gamesindustry.biz](http://gamesindustry.biz), July 2011

Other lifestyle themes have been key influencers in game development, for example, the growth of physical activity across all demography groups is captured by the Wii revolution. Increased demand for more personalised experiences has influenced game content and design and also offered new monetisation opportunities for the sector. Many companies have

Figure 2.2 Key Drivers of Change



<sup>44</sup> Zynga's *Cityville* and *Empires & Allies* social games top the monthly active users (MAU) rankings for Facebook applications with 79.7m and 44.9m MAUs respectively, while Zynga's games on Facebook have a combined MAU base of 260.9m (Source: Appdata.com).

adopted an interactive model in the game development process, allowing the gamer to modify the game according to their tastes and preferences - sometimes leading to a new game launch<sup>45</sup>. This open innovation approach helps to promote the game's popularity and cut down on development costs, effectively engaging gamers as their fourth party developers. Facilitated by online channels, capturing user feedback as well as understanding and predicting user behaviour, utilising sophisticated analytics, in a realtime context is not only possible but is taking on increasing importance within the industry generally.

Consumer preference continues to drive the industry towards the game as a service model and the possibility of seamless transfer of game play across devices and platforms, facilitated by technology advances including cloud computing - i.e. the notion of gameplay anytime, anywhere, any device.

### Technology Advances

Technology advances, often disruptive in nature, play a critical role in driving growth and transformation of the industry, generating:

- New devices with greater processing power, display quality and user interfaces including motion sensor controls, touch pads;
- New publication/access channels including social media, browser games, micro apps, cloud gaming;
- Enhanced game play and game design sophistication - graphics, artificial intelligence, personalisation, multi-player experiences, application of cognitive technologies, neuroscience & psychology;
- New middleware layers, including optimisation techniques/game engines and middleware components exploiting the graphical capabilities of hardware and software platforms, and enabling platform interoperability and portability;
- Sophisticated data collection and game behaviour analysis tools and methodologies to support metrics-driven content delivery; and
- New business models: payment methods, virtual markets, virtual currency.

The pace of technological change means that fast adaption is required of firms of all sizes, placing an on-going demand for new and upgraded skills and the creative ability to push new platforms, devices and game engines to the limits of their capabilities. In a highly competitive market, companies often have to refocus their development efforts to maintain or forge market share in the context of technological shifts; many seek to acquire or partner with other innovative companies to secure competitive advantage. The development of in-house proprietary technologies can also provide a lucrative revenue stream for games studios through the licensing of IP to other studios.

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<sup>45</sup> *The Video Game Industry Outlook, Business Insights, 2011.*



**Table 2.3 Previous Three Generations of Games and Console Representation**

Generation	1995-2001	2001-2006	2006-
Processing Speed	32-bit/64-bit	128-bit	256-bit
Consoles	Dreamcast Nintendo 64 Playstation Sega Saturn	GameCube Playstation 2 Xbox	Nintendo Wii Playstation 3 Xbox 360

Source: Deutsche Bank Securities Inc, 2010, *Interactive Entertainment: Extending Game Play to the Masses...Beyond the Console*, Global Markets Research

As technology facilitates and creates demand for greater sophistication in game design and capabilities, development costs have escalated - this is true for console games and retail PC games in particular<sup>46</sup>. In contrast to this, the casual games developed for new mobile devices and social networks tend to be relatively simpler to design and cheaper to produce - lowering the barrier to entry for smaller independent developers.

### New Business Models

As the online gaming audience has grown, boosted by a whole new cohort of social and casual game players, new customer metrics-driven business models have emerged in the drive to maximise potential revenues.

*A key challenge for online gaming is marrying consumer expectations for free access with the business imperative to generate revenue.*

The sector has been highly innovative within the consumer internet arena in terms of monetisation strategies. Approaches such as freemium, microtransactions, virtual goods, advertising, try and buy, and various combinations and hybrids of these, seek to grow the potential customer base, incentivise sustained user engagement, and ultimately generate revenue streams (Table 2.4). Correctly gauging customer preferences and potential purchasing patterns through in-game telemetry and analytics has become critically important in the online environment, regardless of size of firm.

As development costs increase and profit margins are squeezed for console games, increased migration to online game play and the provision of downloadable add-ons has opened up new monetisation opportunities alongside the traditional retail packaged model, for example, X-Box Live, Playstation Plus.

Gamestop's acquisition of games developer and publisher, Jolt Online, and online gaming aggregator, Kongregate, along with the continued development of its retail driven digital distribution model, illustrates how traditional PC and console game retailers are adjusting their business models to capture market share in digital gaming and offset the decline in PC packaged games and slowing console software sales.

The advent of online social and casual gaming has in itself offered alternative advertising and marketing channels for other sectors, particularly as it provides access to potentially lucrative

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<sup>46</sup> *The Money Game, Project Finance and Games Development in the UK*, NESTA, 2010.

demographic cohorts. Partnerships and alliances, and the licensing of brands and IP across the entertainment and media space and beyond are increasingly important in this context.

**Table 2.4 Monetisation Models**

Model	Description	Example
<b>Retail Sale</b>	Packaged PC and console games sold in retail outlets	Gamestop
<b>Digital Sale</b>	Online downloads onto gaming devices monetised by means of direct purchase or subscription-based plans	3rd party publishers (THQ, EA, Ubisoft), aggregators (Direct2Drive, GameTap, Knogregate), independent developer/publishers
<b>Micro-Transactions &amp; Virtual Goods<sup>47</sup></b>	Purchase of additional ‘powers’, features, and items for characters (incl. branded virtual objects) to enhance gaming experience. Forms a central part of the freemium model i.e the basic game is offered free but players are encouraged to purchase additional premium content through individual transactions	Pet Society (Playfish) Farmville (Zynga)
<b>Subscription</b>	Users pay a monthly or annual subscription fee, which in addition to games, gains access to exclusive content, video, magazines, discounts on other products	MMOGs such as World of Warcraft (Activision/Blizzard) On-Live on-demand gaming Sony PlayStation Plus
<b>In-Game Advertising</b>	Companies place their advertisements inside the games as either products or as banners and billboards and monetised via ‘pay-per-click’ or ‘pay-per-number’ models	McDonalds’ ad as a banner within Farmville (Zynga)
<b>Advergaming</b>	Promotion of a product, brand, theme or cause through a game, i.e. the advertisement is the game itself	US Army game America’s Army aimed at increasing recruitment
<b>Episodic games</b>	Games are offered as a series of episodes or a complete season pack, similar to TV serials	MMOGs such as Guild Wars (ArenaNet) Single-player games such as Sam & Max (Telltale Games)

Source: Based on an overview of major monetisation models in *The Video Gaming Industry Outlook*, Business Insights, 2011

The discussion of changing business models within the games industry is not just about how the game developer or publisher generates revenue. As the industry rapidly progresses to online and mobile channels a host of other actors have entered the fray, with some occupying

<sup>47</sup> In 2010, one out of every five online gamers bought virtual goods - total revenues globally from virtual goods reached \$7.3 billion in 2010, *The Video Games Industry Outlook*, Business Insights, 2011.

new positions of power within the games value chain, including Facebook and Apple. For example, within the mobile space, emerging business models embrace a range of players, including, operators, hardware and software suppliers, application stores (App Stores)<sup>48</sup>. With social games, there are at least three types of company that make direct revenues from social gaming interaction: the developers and distributors, the social network platforms, and the payment/virtual currency providers<sup>49</sup>.

## Future Direction

In a context of rapid and often disruptive change, there is a great deal of uncertainty about the future configuration of the games industry, and both commentators and the industry alike are rarely prescriptive about its future direction over the longer term. Most would agree about its potential for further growth, but there is less clarity about who will be in the driving seat as regards the major industry players. It is possible however to identify a number of likely growth areas and where potential challenges will arise for the industry in the short to medium term.

### Emerging Sectors & Technologies

#### Continued Evolution of Digital Distribution:

The shift towards digital distribution is far from complete and with the support of enabling technologies the trend towards games as a service will continue apace. The concept of on-demand gaming will become more ubiquitous as the potential offered by cloud computing is optimised. The impact will be particularly felt within the console segment as games can be played through an internet browser or TV without having to purchase specific hardware, and at a cheaper cost through subscription or pay-as-you-play models<sup>50</sup>.

Ongoing expansion of smartphone and tablet mobile device penetration will result in continued growth in the online and mobile segment and further broadening of the gaming demographic as more individuals effectively carry a portable gaming device with them at all times<sup>51</sup>. Currently, Apple's platform (iOS) dominates the mobile gaming apps market, however, Google's Android became the world's most popular operating system at the end of 2010<sup>52</sup>. The integration of the most popular internet social networks, such as Facebook, in the mobile domain and the emergence of purely mobile social networks (e.g. Twitter) will assist growth in mobile social gaming<sup>53</sup>.

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<sup>48</sup> Appendix 6 provides a more detailed overview of revenue models.

<sup>49</sup> *The Future of Social Gaming*, Business Insights, 2011.

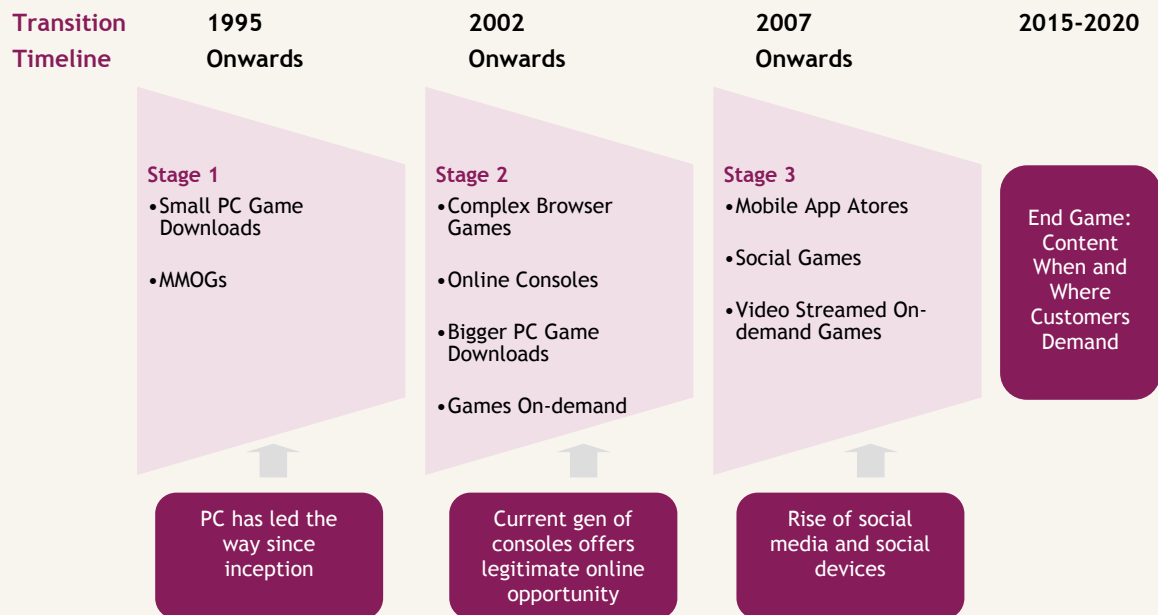
<sup>50</sup> Emerging players in on-demand gaming include: OnLive (US), Gaikai (US), Otoy (Canada), G-cluster (Japan), Playcast Media (Israel), *The Video Game Industry Outlook*, Business Insights, 2011.

<sup>51</sup> Smartphone penetration globally will have grown from 2 percent in 2003 to over 25 percent in 2012 according to Deutsche Bank estimates, *Interactive Entertainment*, Deutsche Bank, 2010.

<sup>52</sup> *The Video Game Industry Outlook*, Business Insights, 2011.

<sup>53</sup> *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, EC Joint Research Centre & Institute for Prospective Technological Studies (De Prato et al), 2010.

Figure 2.3 Fifteen Years into the Digital Transition



Source: Screen Digest, 2010

### Serious Games

Although normally associated with entertainment and leisure, games are increasingly becoming tools to achieve serious objectives such as education, technical training, and collaborative problem solving<sup>54</sup>. The serious games market was estimated to be worth around US\$1.7 billion in 2010 and is expected to grow to US\$2 billion by 2014<sup>55</sup>.

*'Fortune 500 companies like Nestle, Boeing and BMW are realising the potential of what gaming technology can do for them, whether it is as a sales tool, a marketing piece or serious training...companies can save a lot of money by having employees train in the virtual world rather than the real world'*

*Emmy Jonassen, Nestle marketing manager, interview with France24, April 2010*

### User Generated Content (UGC)

Currently, there are many games and game apps which allow the player to make their own input by designing new features, character, levels etc., tapping in to increased demand for personalisation of the gaming experience. Games companies benefit from UGC through the infusion of fresh ideas, increased demand and even saving on development costs<sup>56</sup>.

<sup>54</sup> A comprehensive overview of serious game applications is available at [http://www.nesta.org.uk/events/assets/features/serious\\_games\\_1](http://www.nesta.org.uk/events/assets/features/serious_games_1).

<sup>55</sup> *The Video Game Industry Outlook*, Business Insights, 2011.

<sup>56</sup> *Ibid.*

## Innovation in Technologies

Amongst the technological advances expected to transform game play over the short to medium term are:

- Further development of motion sensors (including eye tracking<sup>57</sup>), building on the innovations introduced by Microsoft (Kinect), Sony (Playstation Move) and Nintendo (Wii) and extending to a broader range of devices including smartphones and tablets. The next generation of game consoles is expected to be introduced by 2015 or earlier<sup>58</sup>;
- The further use of context in gaming, that is, leveraging the rich sensing capabilities in mobile devices as well as cognitive technologies. Often referred to as mobile augmented reality (MAR) - information from the virtual world is linked to/or superimposed on the physical world and/or users' own bio-parameters. Location-based mobile games (LBMGs) are an example of how MAR has been employed within games<sup>59</sup>;
- Continued development and roll-out of 3D gaming. Current generation consoles are already capable of supporting 3D capability;
- Wider deployment of HTML5, which is a new version of the HTML web development standard - it has superior graphics and application support capability that will facilitate increased development of browser games and drive the direct to consumer model; and
- Further development and roll-out of the connected TV currently in the form of set-top boxes such as Apple TV or Google TV and integrated home entertainment systems such as Samsung's Internet TV.

The emergence of new platforms and devices tends to have a knock-on effect in stimulating further innovation in game design, graphics and middleware, networks functionality and business models.

It is also evident that innovation in games production and distribution provides outcomes that can be successfully deployed in other sectors. Game engines have been used in architecture producing virtual models. Chips originally designed for the PlayStation 3 are powering servers

*'This fall, the Chinese National University of Defense Technology announced that it had created the world's fastest supercomputer, Tianhe-1A, which clocks in at 2.5 petaflops (or 2,500 trillion operations) per second. This is the shape of the world to come—but not in the way you might think.*

*Powering the Tianhe-1A are some three million processing cores from Nvidia, the Silicon Valley company that has sold hundreds of millions of graphics chips for videogames. That's right—every time someone fires up a videogame like Call of Duty or World of Warcraft, the state of the art in technology advances. Hug a geek today.'*

*'How videogames are changing the economy', Wall Street Journal, 3<sup>rd</sup> January 2011*

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<sup>57</sup> Longer term, the notion of thought-controlled game play may become a reality - the world's first thought-controlled gaming headset was launched in December 2009 by a US-Australian company, Emotiv, *Ibid*.

<sup>58</sup> *Global Entertainment and Media Outlook 2011-2015*, PWC, 2011.

<sup>59</sup> *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, EC Joint Research Centre & Institute for Prospective Technological Studies (De Prato et al), 2010.

that process and display large amounts of data in drug discovery and research. New processes, technologies and business models deployed in digital distribution and community engagement are finding applications in other sectors as they move activities online. The games industry is also at the forefront of user-led innovation<sup>60</sup>.

There is an ongoing trend towards media convergence as a variety of technologies and markets coalesce in different ways - for example: films based on games; the concept of an interactive movie; use of game characters in books, cartoons and comics; games used to promote music albums; and the relationship between games and advertising and marketing in general<sup>61</sup>.

### Sector Challenges

A number of challenges face the sector as it evolves, some of which have relevance for certain segments more than others.

#### Rising Costs of Development<sup>62</sup>

As technology developments push greater levels of sophistication in graphics and game play, and expectations rise on the part of gamers, average development costs have been increasing particularly within the console segment. Whereas previous generation consoles required around 100 developers and one year to develop a game, the present console games demand up to 150 developers and almost two years preparation. This trend has had the effect of driving some players out of the industry, while for those remaining, there is a greater imperative to create and maintain a few blockbuster titles. There is a notable shift towards what has been termed a title-driven model, where the top 25 most successful titles account for nearly 50 percent of total sales in a year. With the cost of failure potentially devastating, many companies have diversified their businesses and sought market share within the casual online and mobile segments.

#### Fragmentation / 'Platformisation' within the Mobile Games Market<sup>63</sup>

The mobile games market is still in an early stage of competition, focused on platform control. There is continued heterogeneity and fragmentation within the mobile ecosystem. This is manifest in the operating systems, applications, content players, location-based services associated with mobile devices, the supporting infrastructure, and other aspects, such as, billing, aggregation, content and applications management, etc. Until market forces determine winners and losers, there will be challenges for mobile game developers in benefiting from economies of scale and dealing with transaction costs involved as a consequence.

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<sup>60</sup> *Level Up - Building a Stronger Games Sector*, NESTA, Policy Briefing LU/31, December 2008.

<sup>61</sup> *The Video Game Industry Outlook*, Business Insights, 2011.

<sup>62</sup> Based on Business Insights commentary, *ibid*.

<sup>63</sup> *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, EC Joint Research Centre & Institute for Prospective Technological Studies (De Prato et al), 2010.

## Information Security and Privacy

Data privacy and online information security are growing concerns for online gamers and those purchasing online. There are three main concerns around privacy and online security:

- **Data breaches:** Over the last number of months there have been major security breaches leading to leakages of personal information such as name, address, phone number and in some instances credit card details<sup>64</sup>. Such data breaches create concern among the wider internet consumer base and could have severe implications all firms providing services online in regaining the trust of customers<sup>65</sup>.
- **Identity theft:** Individuals are placing an enormous amount of personal information on the internet. This can create problems with identity theft.
- **Filter bubble**<sup>66</sup>: The filter bubble is emerging as a privacy issue. It is the method by which the engines create personal and different information for everyone based on location, past internet activity, online friends. This could have implications for games and internet companies as the trend towards personalisation of content continues.

Privacy rights and legislation vary across countries. A game company with customers in different locations will have to ensure its data privacy terms are aligned with all relevant countries' legislation. This can present as a major burden for game companies. For game companies, outsourcing data hosting and management may help in that the onus is on the data hosting company which can in some way hedge against potential negative impact on the game company.

## Copyright

The fundamental issue regarding copyright is balance. On the one hand, it is about protecting copyright owners, thus maintaining the incentive to create and innovate, and on the other, facilitating other players to re-utilise copyright works, thus incentivising commercialisation and further innovative activity. A recent review of the UK regime notes the ongoing development and innovation in digital technologies, and contends that the full shape and impact is actually unknowable at this point<sup>67</sup>. In this fluid context an adaptable and flexible regime is required.

While not fully harmonised across Member States, the EU Directives establish certain minimum levels of protection that must be implemented into the laws of each Member State. The European Commission has identified a number of copyright issues that it is reviewing in the context of promoting innovation and creativity within a true Single Market for intellectual

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<sup>64</sup> Sony Playstation's security breach affected up to 77 million users and cost the company upwards of €177m. Forbes associated press, <http://www.forbes.com/sites/parmyolson/2011/06/16/cyber-attacks-you-cant-make-this-stuff-up/>, by Brian Spector.

<sup>65</sup> *The Video Game Industry Outlook*, Business Insights, 2011.

<sup>66</sup> Eli Pariser - <http://www.thefilterbubble.com/about-eli>.

<sup>67</sup> *Digital Opportunity: A Review of Intellectual Property and Growth*, Hargreaves, 2011, p15.

property<sup>68</sup>. A key issue is that of fragmentation in terms of cross-border licensing, which gives rise to high transaction costs and militates against the development of digital content services, especially for SMEs. More fundamentally, the EC review is seeking to ensure that the IP framework (that includes copyright law) is effective in supporting the development of e-commerce and digital industries generally. A detailed work programme has been developed to begin addressing specific areas over the 2011-2012 time-period, including: orphan works, multi-territorial collective management of copyright, user generated content, a European copyright code, review of the IPR Enforcement Directive<sup>69</sup>.

### Mobile Network Capacity

Extended availability of a suitable broadband connection is a necessary prerequisite to the continued expansion of online and mobile gaming, including the deployment of mobile cloud gaming, which will be important in terms of balancing the processing power between mobile devices and the network. At the end of 2010, broadband penetration on average in OECD countries stood at just under 25 per 100 inhabitants, having risen from 4.7 per 100 in 2002 - this upward trend is undoubtedly going to increase over time<sup>70</sup>.

Increases in demand are expected to dramatically raise the level of data being transmitted over mobile networks. Capacity is expected to be equal to demand in mid-2013<sup>71</sup>. The result of this expected demand is that major hold-ups and congestion on the network will occur.

The constant upgrading of mobile internet through, for example, the release of 4G technology, will increase capacity by a large extent. However, there are concerns that this may still not meet demand<sup>72</sup>.

## Conclusions and Implications

The overriding theme in any analysis of the games sector is that of continuing uncertainty and change, and there is an inherent challenge in forecasting what and where the next disruptive force will come. One commentary has gone as far as to describe the industry currently as a battlefield<sup>73</sup>. To summarise, turbulence within the industry has:

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<sup>68</sup> *A Single Market for Intellectual Property Rights: Boosting Creativity and Innovation to Provide Economic Growth, High Quality Jobs and First Class Products and Services in Europe*, European Commission, COM 287, 2011.

<sup>69</sup> *Ibid.*

<sup>70</sup> OECD Broadband Portal, date last updated 23<sup>rd</sup> June 2011.

<sup>71</sup> New Scientist, *Jammed; the Impending Wireless Crunch could Stop your Cellphone in its Tracks*, 30 October 2010, pg 45.

<sup>72</sup> *4G Capacity Gains*, RealWireless, 2011, Report for Ofcom, issued 27<sup>th</sup> January 2011, see: <http://stakeholders.ofcom.org.uk/binaries/research/technology-research/2011/4g/4GCapacityGainsFinalReport.pdf>.

<sup>73</sup> *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, EC Joint Research Centre & Institute for Prospective Technological Studies (De Prato et al), 2010.



- Brought new actors into the sector from different businesses who have bypassed existing previously dominant players. A new cohort of intermediaries is now involved in publishing and distribution that were previously unconnected to the industry<sup>74</sup>;
- Seen intensive global M&A activity with firms continually jostling for position to capture the next market disruptor;
- Seen the emergence of strategic partnerships across different sectors, including film industry, animation, sports organisations, advertising, in the drive to maximise customer engagement and revenues;
- Reduced the barrier to entry for game developers, who can have rapid success, but also rapid demise in a crowded market where a development studio is perceived to be only as good as its last game;
- Created a continued challenge to optimise revenue generation and the need for continued innovation in monetisation strategies;
- Driven a more service oriented business model underlining the importance of cultivating and maintaining a close relationship with the customer and has put increased value on consumer behaviour analysis;
- Put a premium on creative ideas, concepts and technology, driving increased competition globally for talent; and
- Continued to create new market opportunities - for example, serious games, on-demand gaming and user generated content.

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<sup>74</sup> For example: Facebook (social media platform), Google (Android mobile operating system); Yahoo, MSN, Pogo.com (internet and game portals); and Onlive, Gaikai (cloud enabled video stream games on demand).

## Chapter 3: The Games Sector in Ireland

### Enterprise Profile

The games sector in Ireland has produced companies that have achieved global recognition - including Havok, Demonware and Jolt. The more recent addition of a number of foreign owned companies, including some major global players (e.g. EA Bioware, Activision Blizzard, Big Fish Games, and Zynga) has increased the breadth of activity considerably, and brought about greater levels of international visibility of the sector in Ireland. Alongside, there is a growing level of games development expertise amongst the research community specialising in areas such as graphics, visualisation, imaging, sensors, artificial intelligence, game engines and serious games.

Employment in core games companies, that is, those directly involved in the production of games, has increased five-fold since 2004 and employs over 2,000 today. This number considerably underplays the complementary linkages that the games sector has with other related activities such as animation, film, consumer-internet and e-learning.

Recent growth in employment has resulted in the main from foreign direct investment. Although smaller in scale in terms of employment impact, at least 20 new Irish start-ups have emerged within the last two and a half years including, for example: Open Emotion Studios, SuperFunPlay Games, Swrve, OmniMotion Technology.

The pace of growth has been greatly facilitated by Ireland's strengths in related areas including: a strong track record in multi-lingual customer relationship management and support; a proven location for headquarter activities; strengths in software engineering, development and localisation; and the light house effect of serial entrepreneurs who are pursuing new opportunities in the digital era.

#### Redwind Software

*Redwind Software is an independent games and software development studio based in Dublin, and with an office in Los Angeles. Redwind specializes in iOS development, Microsoft .NET technologies and SQL server solutions. They are actively engaged in development for webOS, Android and Microsoft's Windows Phone 7 platform.*

[www.redwindsoftware.com](http://www.redwindsoftware.com)

#### PopCap Games

*PopCap Games is a global leader in casual gaming. The PopCap Games studio in Dublin undertakes activities across the game development value chain, including: game development, localisation, IT, cloud, business development, HR etc.. The Irish operation is a centre of excellence for Smartphone game development.*

[www.popcap.com](http://www.popcap.com)

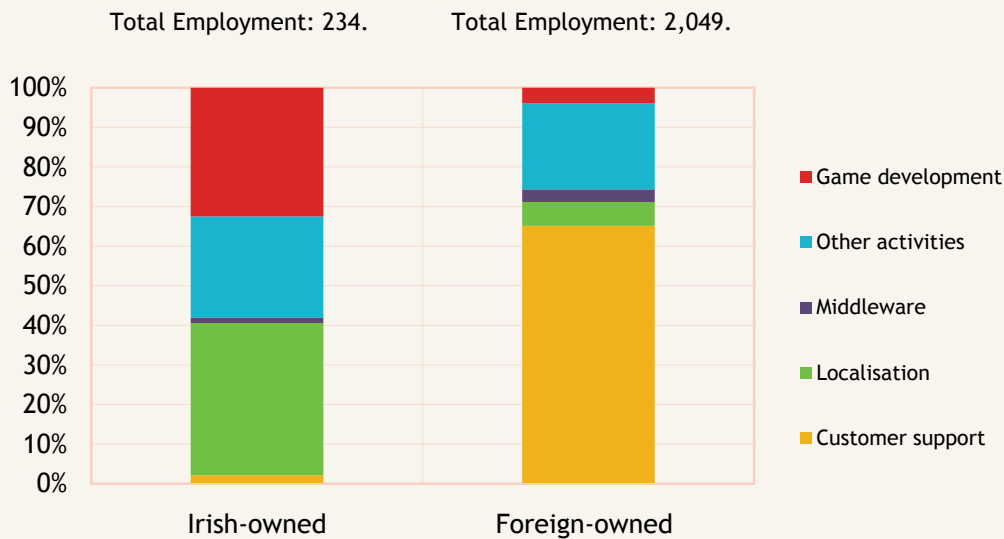
The relative youth of the games industry in Ireland is an advantage, as much of the activity is positioned within the current growth segments globally.

In employment terms, the bulk of employment currently is with foreign owned games companies (almost 90 percent). The majority of these firms are involved in game servicing activities, including customer/technical support, community management, localisation and various headquarter related functions. The majority of indigenous companies are involved in development related activities where the typical size of firm is micro<sup>75</sup>. The employment profile of the

<sup>75</sup> Less than 10 people employed.

indigenous cohort reflects that orientation towards the development end of the value chain (Figure 3.1).

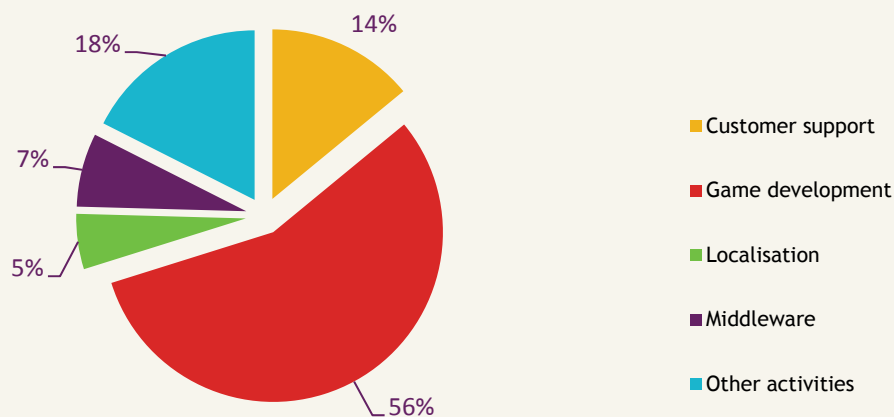
**Figure 3.1 Total Employment by Main Activity, 2011**



Source: Forfás Analysis

The base of game companies in Ireland captures many aspects of the games value chain (Figure 3.2). There is potential for greater engagement and mutual sharing of knowledge within what is not yet a mature, or very well connected, community at present.

**Figure 3.2 Proportion of Companies in Ireland by Main Function, 2011<sup>76</sup>**



Source: Forfás Analysis

<sup>76</sup> Companies may be involved in a number of different value chain activities, only the main function is reflected here.

### Game Development

The vast majority of Irish-owned companies undertake game development as their primary function (for example, Nevermind Games, Neurosynergy Games, Seoige Technology, Eirplay Games, Front Square etc), equating to just over 30 percent of total Irish-owned game company employment. Only four percent of overall foreign-owned company employment is in development studios such as PopCap Games, 2 Paper Dolls, and Jolt Online. Most Irish-based game development studios create games for the mobile platform, including iOS and the Android operating system.

### Customer Support

Just over 14 percent of all game companies have customer support as a primary function. These mostly foreign-owned companies (such as Activision Blizzard, Big Fish Games, Zynga, and GALA Networks) employ almost 60 percent of all those employed in game companies. In Ireland this function encompasses the customer and technical support functions, and in many cases, community management, business/ data analysis and other business development functions. The majority of new investments and jobs created in the games sector over the past two years in Ireland have been in customer support/community management, and localisation activities, for example, ZeniMax, Riot Games, Zynga, EA/Bioware. Customers

#### Big Fish Games

*BigFish Games Cork operation, serves as its European Headquarters. Activities focus on multilingual game testing, customer support and product localisation. BigFish Games translate their products into multiple languages from the Cork office. The facility also has other functional responsibilities incl.: marketing and e-commerce ; engineering/IT - downloadable game management; production & interaction with small game studios. BigFish Games international develop a selection of interactive games that can be accessed online anytime, anywhere on a PC, Mac, mobile phone, or tablet.*

[www.bigfishgames.com/](http://www.bigfishgames.com/)

#### Serious Games - Front Square

*Front Square is a Dublin based start-up that uses social media technology in the form of games to help companies improve performance through their operations and their people. The company teaches people to understand processes and how to fix problems for themselves and its game based approach creates strong workforce engagement. The company seeks to change the way that companies undertake Lean transformations through the synergy of the social media experience and the world of Lean Six Sigma.*

[www.frontsquare.com/](http://www.frontsquare.com/)

from all over the world are serviced from Ireland and the main language markets are: English, Russian, French, German, Polish, Italian, Spanish, Brazilian Portuguese, Portuguese, Indonesian, Turkish, Korean, Norwegian, Dutch, Danish, Swedish, Finnish, and Japanese.

#### Localisation

Localisation has been an area of rapid growth and is the primary function of five percent of all game companies in Ireland. In most cases localisation may not be the main function of a company in terms of employment but one of many interlinked functions, with customer support and data analysis, for example, Big Fish Games, EA/Bioware. Companies mainly focused on localisation are both Irish owned and foreign, and include: Keywords International, Microsoft Game Studios and Activision. Localisation experts in Ireland transform games, in terms of language and cultural fit, so that they can be made available in different countries; and they manage internationally dispersed localisation teams.

## Middleware

Middleware development represents seven percent of the total number of companies in Ireland and three percent of employment. While small in scale, Ireland has an internationally recognised reputation in middleware development with organically-grown companies such as Havok and Demonware.

## Other Activities

Other activities comprise companies undertaking retail, publishing, security, analytic and aggregator functions within the games sector. Companies in these areas include Gamestop, Ideal Binary, Playfirst, Warface, Swrve, Selatra, Zamano, etc. These activities represent the main function of 18 percent of all game companies in Ireland and are made up of both Irish and foreign owned companies.

## Analytics - Swrve

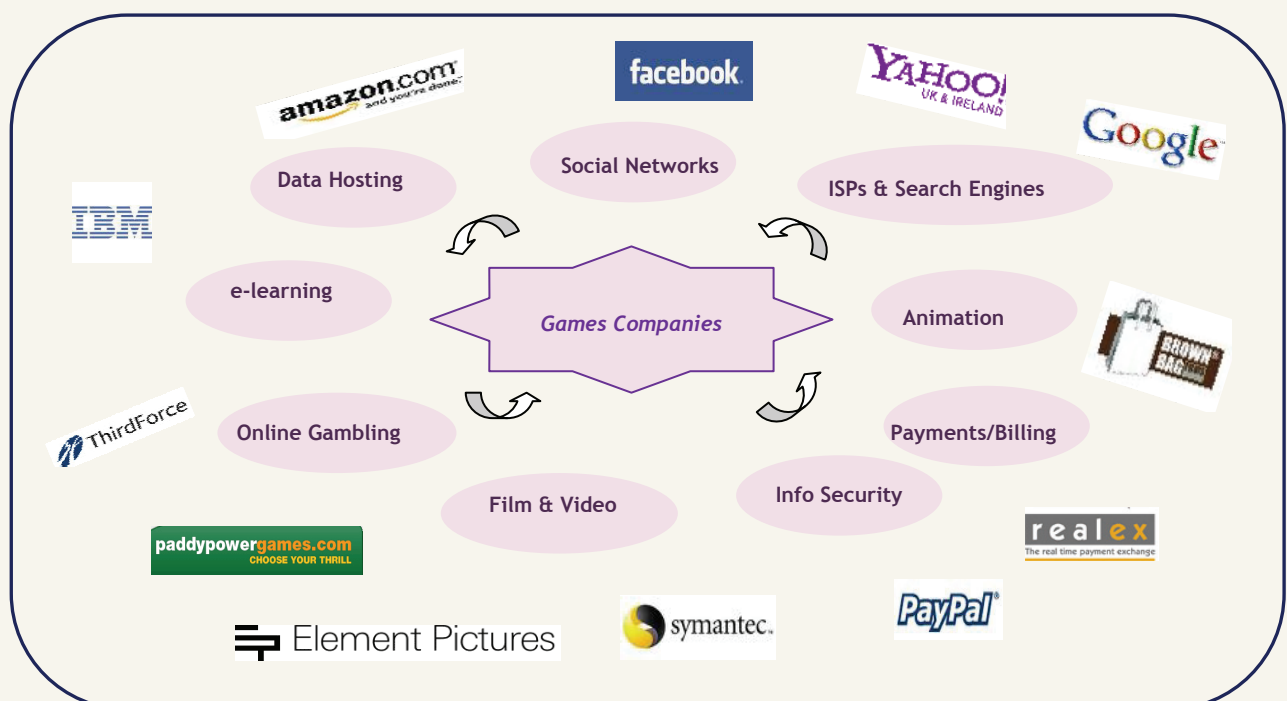
*Swrve, a new Dublin-based start-up, develops technology that helps predict and influence player behaviour to make games more engaging and more valuable. Targeted primarily at developers, self-publishers and publishers, the technology informs the game manager on potential new designs and how to maximize revenue and allows design, product and marketing teams continually test and adjust their games. Swrve is focused on the provision of actionable data. Swrve also has an office in Silicon Valley.*

[www.swrve.com](http://www.swrve.com)

## The Broader Games Sector Footprint

As well as the cohort of companies directly involved in the production and servicing of games, the industry has a broader footprint, through its requirement of key supporting services and infrastructure including: social networks; online platform providers and internet portals; data and web hosting; payments management; localisation; customer/tech support; information security; and a range of potential creative inputs including animation, TV/film production, and content creation (Figure 3.3).

Figure 3.3 Games Companies and the Broader Ecosystem (selected company examples)



The sector also makes its presence felt in other market segments such as education, e-learning, healthcare, film production, advertising, and the music industry.

In Ireland, this wider footprint currently includes companies such as Google and Yahoo (internet based services, and mobile operating system in the case of Google's Android); Facebook (social network platform for games, and virtual currency provider - Facebook Credits); Paypal and Realex (internet based payment processing); Brown Bag, Caboom and Cartoon Saloon (animation); Skillsoft and Thirdforce (e-learning); and Symantec and McAfee (information security). Employment associated with enterprise agency-assisted firms in these related sectors in Ireland amounted to approximately 11,500 in 2010<sup>77</sup>. Although it is difficult to ascertain how much of this activity can be said to be games related today, there is potential for mutual growth over time.

### Remote Gambling

In tandem with the growth of the games industry, remote gambling - i.e. betting - has enjoyed accelerated growth in recent years, facilitated by online and mobile platforms and billing/payment systems as well as creative digital content. Although remote gambling is not a focus of this report, it is worth mentioning given the considerable commonality between the two sectors. For example, the way in which business models are evolving is similar - driven by technological developments - as are the skillsets required in areas such as online servicing, customer support and content development.

The remote gambling market globally is worth almost US\$23 billion (2010) and expected to be worth about US\$30 billion by 2015, a total increase of almost 34 percent<sup>78</sup>. Ireland has a small number of sizeable online and electronic gambling support operations, currently employing c.1,000 people in Ireland.

A review of gambling regulation is currently underway within the Department of Justice and Equality. A revised gambling code would introduce certainty and would help to generate further activity in Ireland, including investment from overseas. The Department of Justice review will develop proposals for a revised gambling code based on three key considerations:

- That young people and the vulnerable are protected;
- That gambling should in all respects be fairly and openly conducted; and
- That gambling is kept free of crime<sup>79</sup>.

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<sup>77</sup> Forfás analysis of enterprise agency data, Enterprise Ireland, IDA Ireland, Shannon Development and Údarás na Gaeltachta - employment creation supported through IFB initiatives is not included.

<sup>78</sup> H2 Gambling Capital, 2011, <http://www.h2gc.com/> Growth of online gambling has been particularly remarkable considering many forms of online gambling are currently prohibited in some of the biggest markets, including the US, China and Japan - any relaxation of these laws could see substantial further growth.

<sup>79</sup> *Options for Regulating Gambling*, Department of Justice and Law Reform, 2010. Draft legislation is expected to be brought to Government early in 2012.



## Chapter 4: The Supporting Environment and Key Challenges

### Introduction

The future growth and economic contribution of the games sector in Ireland will rely on a supportive business environment. As the sector evolves so too must the business environment. Key elements of the games ecosystem are: the funding environment and development supports; education and skills availability; the regulatory and legal frameworks that support IP and copyright protection and exploitation; advanced broadband infrastructures; research and development capabilities and capacity; and vibrant industry networks (Appendix 7). The list reads very much like the usual suspects on one level, but the dynamic and characteristics of the games sector and the wider digital economy place very different demands on the system.

The games sector in Ireland is still at a nascent stage and is poised for accelerated growth. Because of its small scale currently, and because it sits within a much broader digital media and entertainment industry, there is a challenge in achieving sufficient focus on its needs at this critical juncture in its development.

The following sections set out the current position in Ireland and outlines concerns raised by companies and considerations for the future. These considerations have informed the actions outlined in Chapter 6 in the context of intense global competition and the specific growth opportunity areas set out in the next chapter.

### The Funding Environment and Direct Supports for Games

Ireland offers a compelling proposition in relation to the overall funding environment and direct financial incentives available to support enterprise development including: the 12.5 percent corporate tax rate; a flexible and generous R&D tax credit; a range of direct and soft supports to assist firms at start-up and scaling, and with R&D projects; and a favourable tax environment for holding and exploiting IP<sup>80</sup>.

Particular issues have been highlighted through consultation with the games industry however and these are outlined below.

#### R&D Tax Credit and Grants

The R&D tax credit scheme<sup>81</sup> is focused on stimulating R&D activity and is available to all sectors subject to certain criteria being satisfied. The R&D activity must: represent scientific or technological advancement; involve the resolution of uncertainty; and be systematic in approach.

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<sup>80</sup> These supports are available to all eligible firms regardless of sector.

<sup>81</sup> *Revenue Guidelines for Research and Development Tax Credit*, Department of Finance, February 2011.



Concerns have been raised by firms regarding the scheme's fit with the characteristics of the games development process in particular, which is increasingly interactive and open-ended. Companies, therefore find it challenging to satisfactorily document R&D activity as a defined and systematic process. Companies have also queried the apparent ineligibility of the creative content and concept development aspects of game development that involve considerable investment of time and multi-disciplinary expertise, and on which the success of a game hinges<sup>82</sup>.

A related issue is the current exclusion of research in the social sciences<sup>83</sup>, arts and humanities from consideration as science and technology for the purposes of the R&D tax credit. Ireland is not unusual in this respect, for example the same applies in the UK R&D tax credit scheme<sup>84</sup>, and there are indeed challenges associated with defining an advancement in this broad area. The games industry relies increasingly on leveraging social networks, deploying virtual currency and on understanding and analysing consumer behaviour and preferences. It is experimenting with context; and games are increasingly finding applications in areas such as education, health and wellbeing. In this regard, research in areas such as psychology, pedagogy, behavioural sciences, and economics are crucial. This is a consideration not only for the games sector but for the broader digital media area.

Issues that arise with respect to the R&D tax credit (concerning content creation, concept development) discussed above also arise in relation to the R&D grant schemes. In the same way, further consideration will need to be given to ensure that the objectives of the schemes can be achieved in relation to the games sector.

*'As in all other sectors of society, the research and development aspect of creativity and creation needs to become stronger. If Europe wants to stay at the cutting edge, further interactions between different artistic and creative disciplines, (sub)sectors, economic fields and points in the production chain are needed. A more intensive, systematic and wide-ranging collaboration between the arts, academic and scientific institutions should be promoted, as well as private-public initiatives to support artist-led experimentation'.*

*Source: Unlocking the Potential of Cultural and Creative Industries, EC Green Paper*

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<sup>82</sup> Although content development per se is not excluded, it is likely not to meet one of the essential criteria, that of scientific or technological advancement, and could be said to be part of the normal operations of a games company.

<sup>83</sup> Social sciences includes economics, business management and behavioural sciences.

<sup>84</sup> Details of the UK scheme are available at: <http://www.hmrc.gov.uk/ct/forms-rates/claims/randd.htm#10>.

### Seed and Venture Capital Funding

Ireland's venture capital environment has developed considerably over recent years and Enterprise Ireland continues to work with stakeholders to increase the availability of VC funds in the Irish market<sup>85</sup>. Early stage angel funding is promoted through the Halo Business Angels Partnership programme.

While in general, the picture is a positive one, there are some challenges for games start-ups, particularly those involved in game development targeting online and mobile platforms and adopting a direct to consumer approach. These internet based games start-ups need to get early market traction and validate their product-market fit as a route to establishing a viable business with growth potential. Although requiring relatively low levels of initial investment, these start-ups are typically young teams, often bereft of resources, and have little business experience - their key asset is technical and creative ability. With this profile, these start-ups have found it difficult to secure financing and get to a stage where they can make a compelling business case for further investment.

Enterprise Ireland has recently initiated a targeted Competitive Start Fund to address this issue (Box 4.1) and it has been very well received within the games industry, including the fact that industry practitioners were involved in the evaluation of proposals.

#### Box 4.1 Competitive Start Fund (Enterprise Ireland)

A pilot Internet and Games Competitive Start Fund specifically designed to support new web based business start ups was launched by Enterprise Ireland in 2010. The initiative recognised that the entrepreneur attempting an internet start-up is different to the traditional start-up, being typically younger, less experienced and with less financial resources; while the nature of the web is such that an internet based business model can facilitate fast market traction and rapid growth with fewer resources and often a very small team. The Fund aims to help such eligible companies to develop their product-market fit, with real customer validation, and to develop and launch their product for global trial.

The pilot Fund targeted early stage companies with a turnover of less than €100,000 per annum and provided equity funding of up to €50,000 to 10 internet and games related businesses. Enterprise Ireland has continued the scheme in 2011 targeting companies across Internet, Games, Telecoms, SaaS, Cloud Computing & Enterprise Software. It is expected that over 50 companies will benefit from the 2011 call.

Beyond these first steps, the games sector presents certain features that make corporate investments a relatively risky proposition for many financiers compared with other sectors. They include high levels of uncertainty about consumer demand, reliance on creative talent that is often not commercially motivated and the intangible IP-based nature of their output. Most studios lack the scale to adopt a portfolio strategy, that is, to run several projects simultaneously to help mitigate the effect of these risks<sup>86</sup>.

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<sup>85</sup> The 2007-2012 Seed and Venture Capital Scheme was launched to improve access to finance for SMEs and to further develop the Seed and Venture Capital Industry in Ireland. A total of €600m is under management in Enterprise Ireland supported SVC funds. The Innovation Fund Ireland seeks to increase the availability of risk capital for early-stage and high-growth companies, <http://www.enterprise-ireland.com/en/Invest-in-Emerging-Companies/Investors/Innovation-Fund-Ireland/>.

<sup>86</sup> *The Money Game, Project Finance and Games Development in the UK*, NESTA Policy Briefing, 2010.

On the other hand, games companies have contended that the VC industry in Ireland does not understand and/or has little experience with the nature of a game development business and the different business models and monetisation strategies employed. Given the comparative youth of the games industry and the relatively recent expansion of VC activity in Ireland, there is a need to increase mutual awareness. Over time, further analysis will be needed to ascertain if there is an issue for games companies seeking crucial second round funding in order to grow their business.

### Business Development & Mentor Supports

Through County Enterprise Boards (CEBs), Business Innovation Centres (BICs) and Enterprise Ireland there is a strong offering to early stage companies generally in the area of business mentoring. While the models are well tried and tested, due to the stage of development of the games industry in Ireland, sourcing experienced games industry practitioners to provide relevant mentor support is more challenging. Progress is being made in this regard, through for example, Enterprise Ireland's *iGap* programme (Box 4.2).

#### Box 4.2 Internet Growth Acceleration Programme (iGAP)

Enterprise Ireland's *iGAP* programme is an intensive six month management development programme aimed at high potential internet/games companies. The programme covers fundamental topics integral to building a global internet/games business utilising practical learnings from world-class serial entrepreneur facilitators. An implementation coach supports the participating companies as they complete programme milestones. Ongoing support is also available from Irish internet entrepreneurs from the Internet Growth Alliance who will act as high level business advisers.

Enterprise Ireland will run its third *iGAP* in October 2011 and a number of games companies will participate.

## Skills and Education

The games sector demands a range of skills across the creative, technical and commercial domains - this essentially defines the character of the sector<sup>87</sup>. Against the background of global trends outlined earlier, a number of considerations arise:

- The sector's dynamism requires that companies and individuals involved must constantly renew and update their skillsets<sup>88</sup>;
- Success for independent developers and publishers relies not only on creative and technical inputs but on an ability to manage and resource business development and marketing aspects;
- A strong foundation in STEM disciplines is extremely important in games development;
- There is global demand for experienced and talented individuals in games development and they are an extremely mobile cohort internationally; and

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<sup>87</sup> Appendix 4 provides an overview of key skills required within the games industry today.

<sup>88</sup> Digital Broadband Content: the Online Computer and Video Game Industry, OECD, 2005; *Next Gen: Transforming the UK into the World's Leading Talent Hub for the Video Games and Visual Effects Industries*, NESTA, 2011.

- So-called soft skills are in high demand within the multidisciplinary environment of the games sector, including project management capability, team-working, problem solving, and communication skills<sup>89</sup>.

Ireland has a strong track record in a number of the high quality skills required by the sector, including customer technical support, software engineering, and the creative arts. There has been considerable growth in the provision of digital media and games related courses at post Leaving Cert (PLC), undergraduate and postgraduate levels, from which a sizeable number of graduates have begun to emerge on an annual basis<sup>90</sup>. Continuing professional development courses are provided by both the public and private sector although are currently limited due to low levels of demand<sup>91</sup>.

There has been growing demand for skills in the areas of customer support, community management, localisation, quality assurance (QA) - with an emphasis on multilingual capability. Feedback from companies indicates that for the most part, they have been able to source the requisite skills and Ireland has continued to prove attractive to mobile international talent in this area<sup>92</sup>.

However, there are some challenges in meeting current and future skills supply in the Irish context. In the short term:

- Companies who are in growth mode within a highly competitive environment need to be able to recruit experienced personnel to lead projects. The relative youth of the sector in Ireland means there is a scarcity of people with 5-10 years experience in the sector. This is particularly relevant for senior level game development roles in design and production and also specialist roles in middleware, for example, data warehousing/business intelligence analysts, real time server engineers, capacity planning analysts - all heavily maths dependent - and can only be resolved in the short-term through attracting skills from overseas. There is a shortage and intense competition globally for high grade talent in these areas.
- Within game servicing activities, sourcing relevant industry experienced project managers and business analysts requires considerable effort and companies have often broadened the search for these key positions internationally.
- Technology graduates recruited by games development companies need to have core software development skills as well as exposure to a variety of programming languages necessary for porting games across different and emerging platforms and devices, coupled with softer skills in teamworking and commercial awareness. Prospective entrepreneurs in the industry need commercial and management skills and the ability to build and work effectively in a multi-disciplinary team, as well as creative and

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<sup>89</sup> *Next Gen: Transforming the UK into the World's Leading Talent Hub for the Video Games and Visual Effects Industries*, NESTA, 2011, and Forfás company interviews.

<sup>90</sup> HEA statistics show that 336 graduates emerged from games, digital and multi-media courses in 2009, Forfás calculations. A selection of the undergraduate and postgraduate courses on offer within the HEIs is contained in Appendix 8.

<sup>91</sup> Including CPD courses at DIT in Computer Games and in Digital Imaging, and Pulse College at Windmill Lane - a private provider offering short-term technical and conversion courses.

<sup>92</sup> The calibre of the games companies in Ireland has been a particular incentive in this respect where they are seen as gateways to a career in the games industry with some of the biggest global players.

technical capabilities. Some companies have expressed concerns about the industry relevance of certain third level programmes in this context. Deeper and more extensive engagement between the HEIs and the games industry will be required to ensure needs are met.

- Both companies and HEIs have highlighted the importance of industry internships; however there is a challenge in meeting the need given the relatively small base of companies in Ireland. Creative alternatives may be required in the short term to ensure undergraduate students are fully prepared for the working environment within the games sector.
- Continuous innovation and transformation within the sector creates new skills requirements on an on-going basis, and as a consequence, an imperative for individuals within the industry to constantly upgrade their skills.

Longer term, the industry will require a good flow of appropriately skilled graduates. This will require a flexible and responsive third level education system that can continue to adjust as the global games industry evolves.

More fundamentally, there is a need to increase levels of understanding about the actual skills required in the games industry and the digital economy generally. Research in the UK has clearly identified a lack of understanding amongst parents, career guidance teachers and students about the links between key STEM skillsets (especially maths and physics) and the pursuit of a career in the games industry<sup>93</sup>. Previous research in the Irish context on perceptions around career opportunities in computing and technology indicates that a similar situation may prevail in Ireland<sup>94</sup>.

Increasing the STEM skills pipeline through secondary and third level is already the focus of Government (through the EGFSN and the Discover Science & Engineering initiative). There is an opportunity for greater involvement of the games industry in these initiatives.

## Research, Development and Innovation Capabilities

Substantial progress has been made in building up Ireland's research, innovation and knowledge transfer infrastructures over recent years. Such investment not only delivers benefits in driving innovation and competitiveness within Irish based firms and generating new enterprise, it also helps to build a reservoir of highly skilled individuals at the leading edge of new technology and new thinking.

The games sector is fuelled by innovation - with the consumer an increasingly important player in a more open environment. The sector is also a

*A highly creative and innovative sector, few industries rely on sustained innovation as much as video games, with new hardware, software, user interfaces and content driving the sector's growth... With outcomes that can be applied in the broader economy, the technologies developed by video games studios are being successfully deployed in other sectors.*

*Level Up - Building a Stronger Games Sector, NESTA, 2008*

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<sup>93</sup> *Next Gen: Transforming the UK into the World's Leading Talent Hub for the Video Games and Visual Effects Industries*, NESTA, 2011.

<sup>94</sup> *Career Opportunities in Computing & Technology in Ireland: Research Study into a Communications Campaign*, HEA & DSE, 2009.

pioneer for innovation within the digital arena generally. The nature of the games sector is such that much innovation draws increasingly from real time engagement with users in the online environment. Research and development carried out in the academic environment also plays a key role however. For example, companies such as Havok (realtime physics and animation software) and Demonware (online software and services for games), have their origins in TCD based research.

Ireland’s academic research base is active in a range of areas of relevance to games and the wider digital economy. Some of the key areas are captured in Table 4.2. While much of the activity does involve collaboration with industry, there is little engagement as yet with Irish based games companies.

**Table 4.2 Academic Research in Ireland of Relevance to the Games Sector (some examples)**

Research Theme	Research Institute/Group
User Interface	CLARITY (Sensor technologies) - UCD
Game Development & Middleware	4C (Artificial Intelligence) - UCC GV2 (Graphics, Simulation) - TCD Systems Dynamics Research (Game engines) - NUIG
Localisation	CNGL (Multilingual digital content management) - DCU
User Experience/Behaviour Analytics	CLIQUE (Digital social networks) - Graphic & Network Analysis, SFI Strategic Research Cluster, UCD & DERI DERI (Semantic information mining) - NUIG ICHEC (Data mining) - NUIG 4C (Data mining) - UCC
Business Models	FMC2 - Financial Mathematics and Computation, SFI Strategic Research Cluster MACSI - UL
Gamification & Serious Games	GameCORE (Development of serious games) - IT Carlow Game Based Learning (Game based learning/serious games) - WIT GV2 - TCD
Information Security	Claude Shannon Institute (Information security) - UCD
Communications Networks	FAME - Federated, Autonomic Management of End-to-End Communication Services, SFI Strategic Research Cluster - WIT CTVR - National Telecommunications SFI Strategic Research Cluster LERO - Software Engineering Research Centre - UL

There are some emerging areas of strength that could help to position Ireland as a leading innovator in key growth areas (Box 4.3). It is important that the community of researchers and enterprise are well informed about mutual areas of interest which may arise across various sub-disciplines reflecting continuing convergence across digital sectors.

### Box 4.3 Emerging Research Strengths in Ireland of Relevance to the Games Sector

#### 1. Data Mining and Analytics

**Clique** funded by Science Foundation Ireland (SFI) is focused on graph and network analysis and visualisation. The main industry partners are IBM, Ildiro Technologies and Norkom Technologies. Main academic partners are UCD and DERI at NUI Galway along with collaborating academics around the world. The research at Clique could potentially have impact on the analytics function of games companies.

Source: Clique website: <http://www.cliquecluster.org/>

**CLARITY**, based in UCD and funded by SFI, focuses on the intersection between two research areas - adaptive sensing and information discovery - to develop innovative new technologies in areas such as personal health, digital media and management of the environment. By successfully bridging the physical-digital divide CLARITY aims to produce a new generation of smarter, more proactive, information services. These will include, for example, innovative social and interactive media services to take advantage of emerging opportunities in the digital media sector. CLARITY has a number of academic partners, including: UCD, DCU and Tyndall.

Source: CLARITY website: <http://www.clarity-centre.org/>

#### 2. Localisation - 'Adapting Digital Content to Culture, Locale and Linguistic Environment'

The **Centre for Next Generation Localisation (CNGL)**, based in DCU, is an Academia-Industry partnership with over 100 researchers developing novel technologies addressing the key localisation challenges of volume, access and personalisation. The objective is to revolutionise localisation via breakthroughs in automation, composition and integration, focusing on: integrated machine translation technology; speech-based interfaces and more personalised speech output; multilingual digital content management for personalised multilingual content access and delivery; and localisation workflows and system integration.

Source: CNGL website: [www.cngl.ie](http://www.cngl.ie)

#### 3. Graphics & Simulation

The **Graphics Vision and Visualisation Group (GV2)** in TCD undertakes research in image/video and audio processing and analysis; perception and graphics; real-time rendering and animation; custom and multi-core hardware architectures; and image annotation and text illustration. The Metropolis project which began in 2007 is an interdisciplinary project combining computer graphics, engineering and cognitive neuroscience research, in which researchers have created a simulated lifelike city where real people are able to move around and experience total immersion in a computer generated Virtual Dublin.

Source: GV2 website: <http://gv2.cs.tcd.ie/>

#### 4. Games for Serious Applications

There is a collaborative research project underway in TCD and QUB to develop a games system designed to improve physical and mental well being in older adults. Barriers to healthy ageing include declines in both physical (e.g. postural control) and mental processes (e.g. cognitive decline). As these processes are interconnected one of the main objectives of this project is to develop intervention programmes that train the body and the brain at the same time and are adapted to the needs of older adults. The objective is to create a approach that will result in a new and engaging way for older adults to master new gaming based skills that will improve physical and mental well being.

Source: TCD website: <http://www.tcd.ie/>

## IP Related Regulatory and Legal Frameworks

As an IP<sup>95</sup> rich industry, a strong IP framework is a critically important growth enabler for the games sector. Ireland is competitive internationally as a location for the generation and exchange of IP.

In the area of copyright, which is of particular relevance to the games sector, there is general satisfaction with the level of protection offered by the present Irish legislation<sup>96</sup>.

The principal legislative instrument in Ireland is the *Copyright and Related Rights Act, 2000*. Ireland is also subject to various EU Directives and international treaty obligations that impose restrictions on the ability of the Irish government to legislate independently in the field of copyright law<sup>97</sup>.

The European Commission is undertaking a review of copyright in the context of promoting innovation and creativity within a true Single Market for IP<sup>98</sup>. It will be important for Ireland to actively participate in the shaping of future EU copyright policy so as to ensure that the potential of the digital economy to generate investment, innovation and growth in areas such as the games industry is facilitated.

Although generally satisfied, firms identify a number of aspects of the Irish regime that are of concern including a need to streamline civil procedures and reduce litigation costs, a particular concern for small businesses. A Copyright Review Committee has been established by DJEI. A consultation process is currently underway and the Committee is expected to report by the end of 2011.

*Ireland is an attractive location for holding and exploiting IP:*

- *Corporation tax rate of 12.5%;*
- *A favourable R&D tax credit;*
- *Exemption from stamp duty on sale, transfer, disposition of IP;*
- *Capital Allowances on IP;*
- *Certain withholding tax exemptions with respect to royalty payments and dividends ; and*
- *Ireland's IP Protection Laws.*

## Broadband - Next Generation Networks

Broadband telecoms infrastructure is a key enabler of the digital content industries, including games, where high bandwidth and low latency is required for the development, distribution and widespread use of digital content, applications and business models. Operational norms within the sector involve virtual teams - with individuals and offices geographically dispersed, and many working from small offices and/or the home. This is true for both large and small firms and means that availability of and access to competitively priced high speed broadband

<sup>95</sup> IP and IP rights relate to patents, copyright, design rights and trade marks. Trade in IP accounts for five percent of world trade, *Digital Opportunity: A Review of Intellectual Property and Growth*, Hargreaves, Ian, 2011.

<sup>96</sup> Forfás company interviews and IDA discussion forum 'Innovation through Copyright', July 2011.

<sup>97</sup> A full listing of relevant Irish and EU legislative frameworks relating to IP is available at: <http://www.djei.ie/science/ipr/legislation.htm>.

<sup>98</sup> *A Single Market for Intellectual Property Rights: Boosting Creativity and Innovation to Provide Economic Growth, High Quality Jobs and First Class Products and Services in Europe*, European Commission, COM 287, 2011.



is critical. Issues relating to latency become particularly apparent where the games content is more graphically enhanced and as inter-active game-play becomes more pervasive. Ireland currently lags behind many of its international counterparts in terms of next generation networks (NGN) and services<sup>99</sup>.

## Industry Networks

Networking is of utmost importance to the games sector. Small companies with specialist skills in development, animation, audio production etc., are often reliant on service contracts from other companies. The central importance of innovation and technological development within the sector, including the potential for convergence, also underlines the importance of collaboration. The games community is still forming however and as a result is not yet well connected internally - nor is it effectively linked to firms operating in other related sectors and activities.

Networking opportunities for industry stakeholders arise through various events and workshops, for the most part facilitated by the enterprise agencies (Enterprise Ireland, IDA Ireland, and Science Foundation Ireland), however these are somewhat sporadic. There are some industry led initiatives that facilitate networking amongst industry players in Ireland and also represent the interests of their members in seeking to influence government policy:

- The Interactive Games Association of Ireland (IGAI) was formally established in 2011.
- Gamedevelopers.ie launched in 2003, is a vibrant on-line forum, networking and information resource for the Irish game development community.
- Broader based industry groupings such as ICT Ireland, Engineers Ireland, the Irish Software Association and the Irish Internet Association are also of relevance to the games sector and have some games companies amongst their membership.

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<sup>99</sup> *Ireland's Advanced Broadband Performance and Policy Priorities*, Forfás 2011 (forthcoming).

## Chapter 5: Ireland's Opportunity

### Games Sector - the Living Lab of the Digital Economy

The rapid and ongoing transition of the games industry towards digital and online distribution is providing unique insights into the emerging Living Lab<sup>100</sup> of the digital economy. In many ways the sector is leading the charge and shaping economic and societal norms of the future, influencing the behaviour of firms well beyond the industry itself:

<i>Disruption is the Norm</i>	The sheer pace of change within the industry is remarkable - disruption is the norm, whether through technological advances, consumer behaviour or the shifting dynamics within the landscape of key players.
<i>Confluence of the Creative, the Technical and the Commercial</i>	The confluence of creative, technical and commercial expertise is at the core of the sector, and is manifest in the composition of firms, the partnerships and alliances formed, and increasingly in the capabilities of individuals.
<i>Consumer Driven Innovation</i>	The iterative development cycle, characterised by proactive engagement with the consumer/customer from an early stage, is a critical imperative for success in a highly competitive and hits-based sector.
<i>Small can be Big - Rapidly</i>	The notion that small can rapidly become big has been proven time and again within the games sector.
<i>Rapid Adaption and Response in a Fluid Environment</i>	Traditional business fundamentals have been replaced with new business models and monetisation strategies, creating and exploiting a myriad of potential revenue streams and driving collaboration, partnerships and alliances.
<i>The Coming of Age of 'Generation Y'</i>	The vibrant culture and the way in which people work in the games sector reflects the changing dynamic evident in the digital workplace - with people employing social media, distributed working and open innovation as the norm.

The games sector demonstrates a very different operating context for firms in the digital age. This demands a different and more anticipatory response by the policy system - touching all aspects: enterprise supports, cluster building, nurturing required skillsets, regulation, infrastructures etc. Ireland has taken bold steps in the past when the opportunity in international financial services was recognised and the IFSC Clearing House Group was established. Other countries have made similar strategic decisions to position themselves for new opportunity - for example the Medicon Valley Alliance, a cluster organisation for life sciences in Sweden and Denmark.

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<sup>100</sup>The phrase 'living lab' is drawn from *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Games Software Industry*, De Prato et al, EC Joint Research Centre & Institute for Prospective Technological Studies, 2010.

A decisive and bold step is now required to ensure that Ireland is correctly positioned to capture the opportunities arising within the rapidly evolving games industry and the broader digital economy.

## Realising Opportunities for Growth

Ireland needs to build on the momentum that has gathered over the last 3-4 years that has seen it emerge as a location of choice for on-line gaming activities. By 2015 Ireland's games sector can be recognised internationally as:

*A dynamic and internationally connected hub of innovative games development and advanced game servicing harnessing creative talent, technological prowess and a unique ability to understand the customer, to deliver sustained growth within the most progressive and digitally advanced business environment*

*"A Global Games Hub for the 21<sup>st</sup> Century"*

Ireland has the potential to increase employment in core games companies to 4,500 by 2014.

This is a conservative figure - games can be a catalyst for growth in a host of other inter-related activities in the digital economy including social networks, search engines, animation film & video and e-learning.

Agency assisted firms in these related sectors and activities employ approximately 11,500 today<sup>101</sup>. Although it is challenging to forecast the employment growth potential for this wider cohort that may result from growth in the games sector, it is safe to say that there will be increasing inter-linkages and convergence over coming years.

The main opportunity areas for the development and growth of the games sector in Ireland are focused in particular<sup>102</sup> on digitally distributed and online game segments and are:

- Creative game development;
- Advanced game servicing;
- Enabling software and technology solutions; and
- IP exploitation and online publishing.

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<sup>101</sup>Forfás analysis of enterprise agency data, Enterprise Ireland, IDA Ireland, Shannon Development and Údarás Na Gaeltachta , 2011.

<sup>102</sup>IDA Ireland and Enterprise Ireland participated on the Project Working Group - Contributions were also received from Science Foundation Ireland, Discover Science and Engineering and the Irish Film Board.

### Creative Game Development

Creative Development is the beating heart of the industry - and where most economic value is generated. The evolution of a game from a product to a service offering has led to an iterative approach being adopted, involving continuous improvement based on early and on-going feedback from the consumer.

There is high demand globally for development talent, new ideas, saleable content and intellectual property. A broader audience and variety of platforms has created opportunities for small independent studios to break into the market and self-publish. Although the tendency is for game development studios to remain rooted to where the original team first formed, larger games companies have adopted a hub and spoke approach and establish and/or acquire a number of studios in different locations in the quest for innovative concepts, experienced teams of developers or particular unique geographic or cultural aspects.

The extent of games development in Ireland although growing, remains relatively small compared to other countries<sup>103</sup>. There is opportunity to grow the base of creative development in a number of ways:

- Capturing the new dynamic in game development, fuelled by the global shift in the games industry towards digital distribution online, where small indigenous companies are enabled and supported to self publish and distribute internationally;
- Realising potential for increased development activity within the existing base of foreign games companies already located in Ireland, including those whose primary mandate to date has been in other aspects of the games value chain (for example, community management);
- Attracting small to medium sized development studios from overseas who are seeking development talent and a supportive environment to scale their business internationally; and
- Attracting and supporting early stage start-up companies/entrepreneurs with high growth potential from overseas.

Ireland benefits from the creative and technical pedigree that already exists across activities that include software development, localisation, animation and e-learning as well as game development. The relative youth and enthusiasm of the game development cohort can also be an advantage and stimulus for a greater number of start-ups.

There are also considerable challenges to be addressed, both in the immediate term and in the longer term - particularly in the areas of skills and talent attraction. It is a combination of skills and experience that will make a difference, encompassing business and commercial know how together with creative and technical expertise. Teams need to be well integrated, internationally connected and open to partnerships and alliances.

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<sup>103</sup>Unlike the UK for example, Ireland does not have a legacy of established larger scale production studios. Publisher-owned studios employ around one-half of the UK's game development workforce, *The Money Game: Project Finance and Games Development in the UK*, NESTA, February 2010.

## Advanced Game Servicing

Typically, the customer care aspect of any product or service is regarded as a cost to the firm. However, the games industry is demonstrating that in the new digital economy, companies are structuring their business models within a 'real-time' environment that is dependent on a very close relationship with the consumer.

*Today's customer support  
- tomorrow's sales team*

From the very beginning, that tight connection and understanding of consumer behaviours and preferences will enhance the games development process, will stimulate consumer loyalty and drive future revenues. The customer support function within the games sector is quite different from that in other sectors. It requires people who understand the game, who can 'talk the gamer talk' to the consumer, who understand cultural preferences, converse in the local language, and in turn provide informed feedback to the games developer. It requires people who can interpret a vast array of data, who understand what makes for a compelling user experience, and who can develop or utilise leading-edge analytical tools.

At the cutting edge of customer engagement for online games, Ireland is already developing a distinct offering, and can drive the more sophisticated models of customer support and community management that will be required within a fiercely competitive industry.

## Enabling Software and Technology Solutions

Ireland has cultivated a strong international reputation as a developer of enabling software and technology solutions. The Irish games sector itself has contributed to this reputation with the highly renowned Havok and Demonware emerging in the middleware space. The games sector relies and thrives on technology. As it continues to evolve, it is demanding more in terms of platform interoperability, bandwidth, game sophistication and functionality, revenue generation strategies and collection methods, game behaviour intelligence etc.

Ireland's software developers have to date achieved strong domain knowledge in vertical markets and sectors, including telecoms, financial services, e-learning and lifesciences. Deepening domain knowledge and expertise in a games industry context, can put Ireland in a position of strength globally as the digital economy develops further<sup>104</sup>.

Key areas of activity will include:

- Cloud based business models;
- Platform innovation; and
- Player/customer behaviour analytics and data mining.

Developing a connected games and wider digital media cluster, including the academic research and development base, will be an essential part of building the environment for further growth in these areas.

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<sup>104</sup>Enterprise Ireland's *Strategy for the Development of the Indigenous Irish Software Sector 2009-2013* has advocated a cluster based approach: 'concentrating resources on highly attractive market sectors will generate growth through the development of critical mass in terms of market knowledge, skills and awareness' p. 17.

### Online Publishing, Monetisation and IP Exploitation

The games industry is an IP rich industry. IP is created in the course of game development itself. The transfer and trading of content, brands and virtual goods generated from other sources such as film, sports, music and other industries is an integral part of game development and deployment. This IP rich content is used to enhance user experiences and facilitate personalisation within game play, maximise engagement and ultimately to generate revenue. Leveraging value from IP has become an increasingly important element of online business models in particular.

As with other segments of the digital content industry, exploitation of these intangible assets involves a range of activities to facilitate their movement and use - including: inter-company trading of IP, brand management, digital asset management, franchising, legal management defending IP, monitoring registered rights, renewing patents, maintaining licenses etc..

Ireland is already an attractive location for holding and exploiting IP. As the games industry develops, further opportunities will arise for Ireland around the trade and exchange of both direct games related IP, for example game design, concepts and code, and indirect IP, for example virtual goods, game player data and social network behaviour information.

### Other Areas of Opportunity

In addition to the above niche areas, Ireland will continue to compete for the attraction of international business operations services centres and headquarter operations for games companies.

Rapid growth of the games industry in Asia also offers the potential for Ireland and Irish based companies to be the launchpad into US and European markets - and also offers a significant growth market for exports from Ireland.

## Intense Global Competition

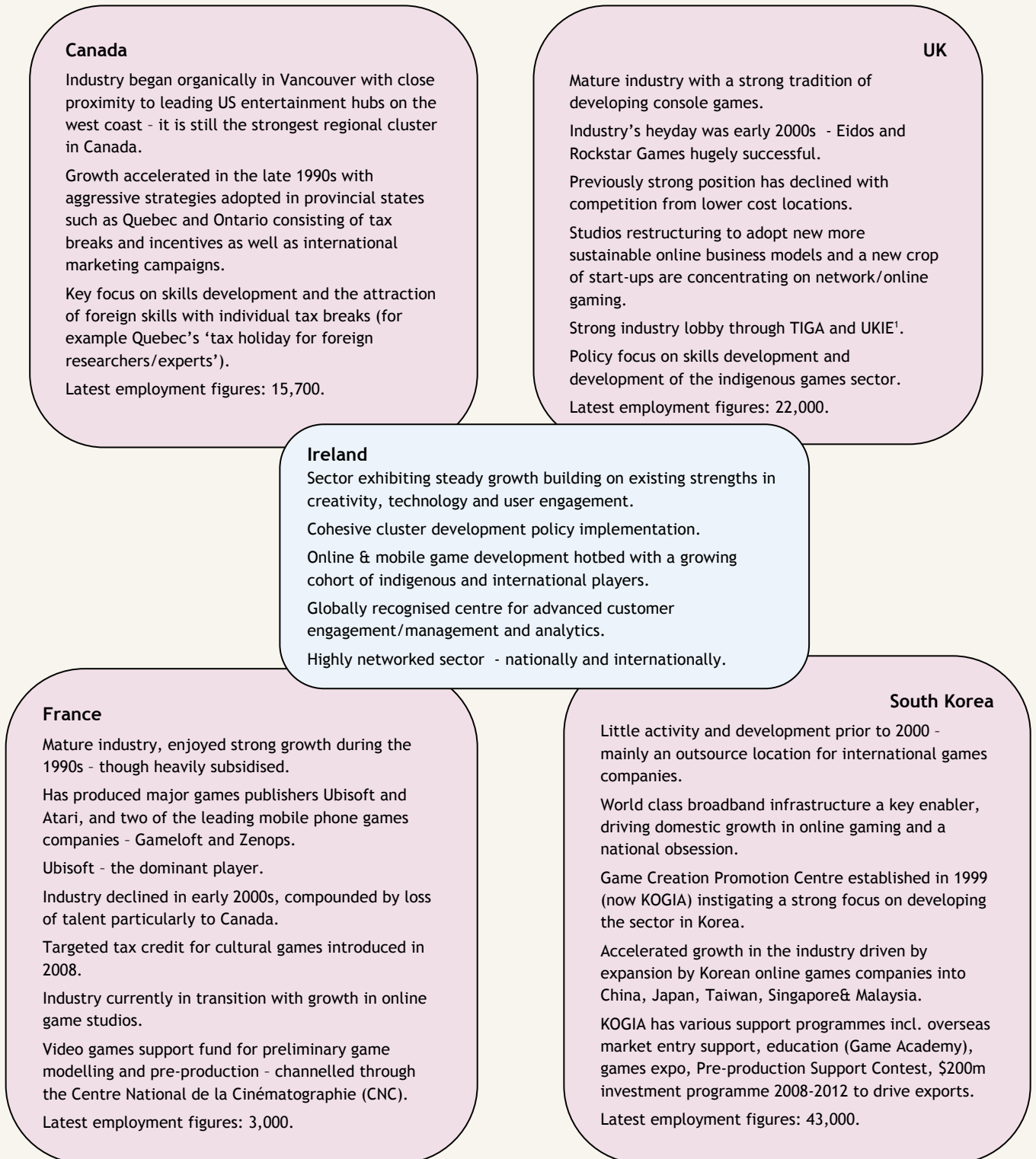
As a small open economy, reliant on exports and trade, Ireland always needs to be aware of the global competitive context. Amongst the key challenges that the Irish sector faces are:

- The market for development talent in the industry is a global one, and talented individuals in the industry are highly mobile. There is a challenge for Ireland's as yet nascent industry to attract and retain mobile talent to drive future growth.
- Growing the base of indigenous development studios and developer-publishers in an increasingly crowded market. There will be breakthroughs, but also many failures - which the system needs to acknowledge and allow for. Making the transition from a successful game to a successful and sustainable business is a key challenge.
- The business models associated with expanding digital distribution are still immature and taking shape. Global players in online and social games are still relatively young companies and as they mature and face new competitive pressures, decisions about how and where to develop games, manage customer support and user communities will be guided by new imperatives and greater understanding about where greatest value can be appropriated. Ireland may be the solution today, and can continue to be in the future - but only if the right steps are taken to keep abreast of global industry trends and evolving company needs.

- Other countries have recognised the crucial importance of developing a vibrant creative games sector and have adopted quite aggressive strategies in order to maintain and grow development activity. Ireland will continue to face competition from countries outside the EU in particular who have strong sector based incentives in place to attract new start-ups, talented individuals and internationally mobile investment projects.

It is important that Ireland provides a distinctive value proposition both for the growth and development of new games & related start-up companies as well as attracting mobile investment. Figure 5.1 below places Ireland's games sector proposition alongside some international examples.

Figure 5.1 Ireland's Value Proposition for the Games Sector<sup>105</sup>



<sup>105</sup>Source: Various - refer to Bibliography - Global Competition References.





## Chapter 6: Actions for Accelerated Growth

### Actions for Accelerated Growth

While there are considerable opportunities for growth in the Irish games sector, it cannot be assumed that growth will just happen. There is intense, and often aggressive, competition globally. Action is needed now to address barriers and to accelerate potential if Ireland is to take advantage of the global growth phenomenon in the games sector.

The digital economy (and games sector within that) is quite different from the physical world of goods and indeed, even from the intangible world of services. The pace at which it operates means disruption is the norm and inherent uncertainty is the reality in which firms work.

From an enterprise policy perspective, an ambitious and decisive step change is required to deliver a more anticipatory, integrated and responsive regime - and to create a dynamic interaction between firms, academia and the government system.

The actions focus on six key areas

1	<b>Developing an International Cluster</b>	Stimulating connectedness between related sectors, nationally and internationally
2	<b>Enhancing Skills and Experience</b>	Addressing short term needs and building a continuous feed-stock of creative, technological and commercial capabilities
3	<b>Accelerating Growth in Creative Content Development</b>	Attracting and developing the talent pool - creating the dynamic environment
4	<b>Building International Visibility</b>	Raising Ireland's visibility as a vibrant location for the games sector
5	<b>Driving Research, Development &amp; Innovation (RD&amp;I)</b>	Enhancing innovation in the games sector
6	<b>Delivering Next Generation Broadband</b>	Underpinning future growth

### 1. Developing an International Cluster

#### A Dynamic Approach

The fragmented composition of the games sector globally, coupled with the increased co-dependence across multiple actors presents a challenge for all companies involved. Ireland can differentiate itself as a vibrant and well connected games cluster in this global context - taking advantage of its small size to address the need for enhanced interaction between multiple actors - including industry (both nationally and internationally), the agencies and the Department of Jobs, Enterprise and Innovation, and other relevant government departments.

The establishment of a dedicated Cluster Development Team (CDT), driven by industry, would be a significant statement in itself of Government commitment to accelerate the potential of the games sector. The CDT should be limited in size to between eight and ten participants, balanced between industry and government representatives/enterprise development agencies.

### 1.1 Dedicated Games Cluster Development Team

- Establish, for a period of two years, a dedicated Cluster Development Team for the games sector, to:
  - drive co-ordinated implementation of the actions in this report;
  - maintain a rolling agenda for implementation - engaging with relevant government departments - to deliver a dynamic, anticipatory and integrated approach to identifying and implementing additional policy interventions as the sector evolves; and
  - encourage mutually beneficial relationships amongst the games and related digital content industries.

*(Department of Jobs, Enterprise and Innovation, Industry, Enterprise Agencies - Forfás, IDA Ireland, Enterprise Ireland & SFI)*

### Leveraging our Talent and Expertise

A key focus of the Cluster Development Team (CDT) will be to build tangible links between the indigenous and multinational games companies in Ireland, such that on the one hand indigenous games companies can demonstrate their capabilities, understand the corporate view of the games industry and build relationships, while on the other, multinationals can derive the benefits of new creative inputs.

### 1.2 Talent Exchange Initiative

- Develop and implement an industry-led initiative which would facilitate the short-term exchange of talent between companies of different sizes in different sectors (including games, animation and other digital media companies). The exchange of talent may take the form of a single inter-firm placement (for example a multinational company providing mentor or technical support to a start-up development studio) or the establishment of an incubator desk within a multinational games company that would facilitate mutual learning.

*(CDT)*

## 2. Enhancing Skills and Experience

The multi-disciplinary nature of game production is such that it draws from a wide range of disciplines including physics, computer sciences, maths and art as well as business, commercial and marketing acuity for the digital arena.

A passion for games can be the differentiator for attaining employment in the games sector - at the same time, many of the skills needs are also relevant to the wider digital economy. Many of the actions identified will have a broader impact in this regard.

It is an absolute imperative that action is taken to ensure that Ireland has access to the range of skills and capabilities required to build an internationally renowned games sector here. The global arena is intensely competitive as other countries seek to attract and develop the requisite talent.

Although for the most part, games companies are finding the skills and talent they require in Ireland and/or successfully attracting people from overseas, there are specific challenges - that if not addressed, could act as barriers to the future growth and evolution of the sector here:

### Addressing Short Term Needs

- Certain roles are harder to fill currently - partly due to the relative youth of the sector here. These roles include, for example, experienced lead producers and designers, project managers and business analysts, and specialist ICT roles. In the short-term, these positions are more likely to be filled through recruitment overseas.
- There is an ongoing requirement for multilingual capability/native language speakers with cultural awareness in customer support, community management and localisation. Many of these will be recruited from overseas, some at entry level which fall below the salary threshold under the current work permit scheme.

### Developing Industry Aware Graduates

- As the industry grows, there will be continued demand for appropriately skilled graduates not only with the requisite core technical and creative competencies, but also with softer skills in project management, multidisciplinary teamworking and commercial awareness<sup>106</sup>. Because of the dynamic of the sector, it is challenging to ensure that undergraduate courses continue to deliver graduates that are industry aware. There are also general concerns about the ability of the current supply of ICT and STEM graduates to meet future demand.

### Facilitating Long Term Growth

- Continuous innovation and transformation within the industry creates new skills requirements on an on-going basis, and as a consequence, an imperative for individuals within the industry to constantly upgrade their skills.

A focus on addressing immediate recruitment pinch-points is needed as well as a medium term view to ensure there is a strong pipeline of talent available to the sector.

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<sup>106</sup>The Springboard initiative should help to increase graduate output levels in ICT related courses in the short-medium term. Springboard offers jobseekers the option to take up a part-time course in higher education and training, free-of-charge. Over 200 courses are available in higher education colleges around the country, at Levels 6-9 on the National Framework of Qualifications.

## Addressing Short Terms Needs

### Attraction of Required Key Skills from Abroad

Highly mobile individuals weigh up the attractiveness of alternative locations when making decisions about where to work and live. In the first instance, Ireland needs to ensure international competitiveness in terms of the labour tax wedge<sup>107</sup> which is important in attracting and retaining highly skilled and internationally mobile workers. In Ireland this has risen for all income categories assessed by the OECD since 2008. This has been cited as a barrier by some companies across a range of sectors. Mirroring the OECD's tax hierarchy, any additional taxation changes made should be in terms of broadening the base. The development agencies have also recommended that action be taken in relation to the Special Assignment Relief Programme (SARP)<sup>108</sup>.

#### 2.1 Maintaining a Competitive Tax Wedge

- No further increases in the labour tax wedge should be introduced and when feasible reduce marginal rates of tax below 50 percent to retain Ireland's attractiveness for international talent.

#### 2.2 Special Assignment Relief Program (SARP)

- The Department of Finance should explore the reasons for the low take up of the SARP relief, and determine how it could be better promoted; or whether there are alternative tax policy options which would be better placed to ensure that Ireland can compete internationally to attract mobile highly skilled workers.

*(Department of Finance)*

### Addressing Immediate Skills Recruitment Challenges

Labour market measures including Springboard, a refocusing of the Graduate Conversion Programme, Skillnets and the new Internship Programme can contribute toward addressing immediate specific skills shortages - particularly as they pertain to technologies - including, C++, C#, Python, etc. Foreign language fluency skills with cultural awareness are required for customer support and community management activities.

Attracting people with skills in related areas to re-train for a career in the games sector can be a useful means to bring talented and experienced people into the sector in the short-term.

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<sup>107</sup>Income taxes, employer PRSI and payroll taxes drive a 'wedge' between the cost of hiring an individual and the actual take home pay of that individual.

<sup>108</sup>SARP is a general instrument but highly relevant for the games industry. It applies where an individual is sent by a foreign employer to work in Ireland, and provides that no income tax applies to 50 percent of a gross salary in excess of €100,000, subject to it being less than the amount being remitted to Ireland from that employment. The employee claims the refund by filing an annual tax return.

Investment by firms in on-going training and development is key so that they maintain agility and keep abreast of new developments in technologies and business processes. Availability of cost competitive, relevant and easily accessible continuing professional development programmes is very important in this context and demand will increase as the industry grows. Industry has a role to play in defining specific needs and in working with relevant training providers to develop appropriate and relevant courses.

### 2.3 High Level ICT Skills

- Progress the measures contained in the forthcoming Action Plan to Address High Level ICT Skills Recruitment Needs as a matter of priority, particularly as they pertain to technology skills requirements relevant to the games sector.

*(Department of Education and Skills, HEA, Skillnets)*

### 2.4 Skills Conversion Courses

- Ensure that the review currently underway of the HEA Graduate Skills Conversion Programme takes into account the needs of the games industry.

*(Department of Education and Skills, HEA, Higher Education Institutes and Industry)*

### 2.5 Continuing Professional Development

- Promote a coordinated and industry informed approach to continuous professional development for the games industry, utilising both public and private higher education and training providers as appropriate.

*(CDT)*

## Developing Industry Aware Graduates

It is critical that third level courses continuously keep pace with the rapid change in the games and broader digital media sector, including enabling technologies and business models, and are providing graduates with the requisite skills for careers in these sectors.

### 2.6 Increased HEI/Industry Collaboration

- Increase levels of collaboration between industry and HEIs/Training providers in the design and modification of courses, including the development and extended use of flexible internships as a key element of education and training for the games and digital media sector.

*(Industry and Higher Education Institutes)*

## 2.7 A Hothouse Initiative

- Develop and introduce a pilot game development and publishing hothouse initiative that would form an elective portion of undergraduate and PLC courses as an alternative option to formal industry placements/internships.

The initiative would bring together, in multi-disciplinary teams, students from games, multimedia and animation courses (from a range of participating PLC and third level colleges) to work together on a game development project for a defined period. The 'hothouse' would provide early exposure to multidiscipline team dynamics and team working and develop commercial awareness. Each of the teams would receive mentor support from industry practitioners.

*(Industry and Higher Education Institutes )*

## Facilitating Long Term Growth

### Raising Awareness and Stimulating Interest in STEM

Growth in the games industry and the wider digital economy over the longer term will require a flow of appropriately skilled graduates. Increasing the STEM skills pipeline through increased levels of take-up of these subjects at secondary and third level is a crucial aspect and is already the focus of Government<sup>109</sup>.

There is also a national objective to increase awareness of the range of opportunities arising for individuals that graduate with core competences in these disciplines. The games industry could be used as one such example, increasing awareness of the wide range of career options based on STEM disciplines, the creative and social sciences, and business disciplines.

At primary and secondary levels, there is potential for industry to proactively engage with schools to promote early exposure to, and understanding about the skills and capabilities behind games and digital media production. A virtuous circle can be put in motion where games help draw young people into maths, physics and computer science, and improve their learning outcomes. Initiatives in this area should enlarge the talent pool for sectors operating in the digital era in the future.

## 2.8 Promote Games as a Career Option

- Through a collaborative approach, and working with other relevant bodies (e.g. ICT Ireland) organise games industry roadshows and graduate fairs to: stimulate interest in careers within the games industry; promote a greater understanding of the sector as a professional and highly skilled sector; and highlight opportunities for entrepreneurship.

*(CDT, Higher Education Institutes)*

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<sup>109</sup> Through the EGFSN, and the Discover Science & Engineering initiative.

## 2.9 Promote Awareness at Primary and Secondary School

- Develop and implement a series of initiatives at primary and secondary level that can take advantage of the ‘cool’ characteristics of the games sector that would stimulate greater interest in the STEM subjects given their direct relevance to the games and digital content sectors, and that would promote a greater understanding of the sector as a professional, highly skilled sector.

*(Discover Science & Engineering, with Industry)*

## Game Based Learning

The application of games in a learning context, in particular the serious games genre, as an effective means of developing skills and enhancing motivation for learning, is an emerging area within the games and e-learning sectors<sup>110</sup>. The developing expertise within Ireland in this field should be employed within the Irish education system, both to drive innovation and to generate positive learning outcomes.

## 2.10 Game Based Learning

- Consider the introduction of game-based learning to the primary and secondary school curriculum to develop team work and problem solving abilities, and at the same time create a test bed within the Irish education system for innovative ‘serious games’ developers and e-learning companies based in Ireland.

*(T4 Technology Subjects Supports Services)*

# 3. Accelerating Growth in Creative Content Development

## Incentivising Content Development

There is a wide range of attractive business supports and incentives available in Ireland to help companies to establish and grow their businesses - all of which are accessible to games companies. What is somewhat different is that games companies regularly initiate new projects, develop innovative concepts and creative content throughout their business lifecycle.

A question arises as to Ireland’s ability to accelerate growth by providing incentives specifically for *creative concept and content development* - which currently falls outside of the EU Research, Development and Innovation guidelines (RD&I that involves technological advance and uncertainty *is* eligible).

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<sup>110</sup>The Video Gaming Industry Outlook: Gaming Segment Analysis, Key Stakeholders, New Challenges and Future Developments, Business Insights, 2011, NESTA overview at [http://www.nesta.org.uk/events/assets/features/serious\\_games\\_1](http://www.nesta.org.uk/events/assets/features/serious_games_1) and the US STEM Video Games Challenge at <http://www.whitehouse.gov/blog/2011/04/04/winning-future-stem-video-games>.



This is a question not only for Ireland - it also arises in a broader European context operating within existing EU State Aid guidelines<sup>111</sup>. As the digitised creative economy becomes more of a reality, further analysis may be warranted at EU level in relation to incentivising future enterprise growth in this context<sup>112</sup>.

The need for action is relevant in the intensely competitive global landscape for attracting mobile investment and stimulating growth of indigenous firms. Many countries offer incentives specifically designed to support the creative content development element of games development.

### *The Competitive Environment Globally for Content Development*

*Many countries in the world have adopted funding measures and/or tax incentives and successfully stimulate their local computer game industry. Outside of Europe, we find policies of massive support in: Canada, US, Japan, South Korea, China and Australia. The results are European talents are developing very well ... outside of Europe. Currently in other regions of the world, developers have access to capital support that acknowledges the knowledge based and/or creative economies and further incubates these sectors. It is hard for EU based developers to compete under these circumstances'*

*EGDF Statement on EC Green Paper Unlocking the potential of cultural and creative industries, 2010*

#### **3.1 Incentivising Creative Content Development**

- Determine the scope, rationale and benefit of introducing a new horizontal financial instrument to incentivise creative concept and content development to enhance Ireland's attractiveness for investment and indigenous growth in games development<sup>113</sup>.

*(Department of Jobs, Enterprise and Innovation, Department of Finance)*

### **Financial Supports for Games Companies**

In the more immediate term action can be taken to further enhance the existing financial support and funding environment for games companies. Getting an online game development and publishing business established involves a unique approach. An iterative development cycle with early market testing and capturing a customer base is critical. This challenges standard approaches to funding (early stage seed funds or venture capital (VC) where decisions to invest are typically based on more traditional business plans, incorporating more defined financial and revenue generation projections. Enterprise Ireland's recently introduced Competitive Start Fund aims to address this issue and is a welcome initiative.

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<sup>111</sup>EU State Aids aim to ensure that companies compete on equal terms throughout the EU and as such do not permit state support with purely industrial objectives for specific sectors - *State Aid Scoreboard - Report on State Aid Contribution to Europe 2020 Strategy*, Spring 2011 Update, COM 356 final, 2011.

<sup>112</sup>See also ongoing EU consultation on *Assessing State Aid for Films and Other Audiovisual Works*. The consultation may raise interesting alignments with the games sector, particularly in the context of a changing digital era and increasing convergence between and across sectors.

<sup>113</sup>Examples of incentives in other countries include: Tax Credit introduced by France for the creation of video games, 354/Ec,2008 - Commission Decision on State Aid C47/06 (ex N 648/05) and the Tax Credit for MultiMedia Production introduced by Quebec.

Small indigenous companies also cite frustrations at the apparent lack of knowledge within the Irish based VCs about the characteristics particular to the games industry and its associated business models; yet there are also issues around the lack of awareness amongst games industry start-ups about the requirements of VCs. Mutual awareness will increase over time as the sector matures, however proactive engagement between the actors can be encouraged in the short-term.

### 3.2 Enterprise Ireland Competitive Start Fund

- Carry out an early review of the EI Competitive Start Fund within the context of the Forfás Evaluation Framework to inform any necessary adjustments that would enhance effectiveness and facilitate an expansion of the model.

*(Enterprise Ireland, Forfás)*

### 3.3 Enhance Mutual Understanding of Games Industry and VC Perspectives

- Initiate active engagement between the VC community in Ireland and internationally with indigenous games development and technology companies so as to enhance mutual understanding of requirements amongst both parties.

*(Enterprise Ireland and Industry)*

### Bridging the Experience Gap

Small teams involved in games development may have an abundance of technical and creative capability but often lack the commercial/marketing expertise to sustain and scale their businesses. Undergraduate courses have a role to play in this respect but there is also a need to ensure that start-ups can access knowledge and advice from experienced games industry practitioners in Ireland or overseas as they develop their business. The willingness of Irish expatriates to give something back has already been demonstrated through existing Enterprise Ireland initiatives and communicated through other channels such as the Global Irish Economic Forum (Farmleigh).

### 3.4 International Advisory Panel

- Based on the existing Enterprise Ireland model, establish a games sector specific advisory panel drawing from experienced industry practitioners in Ireland and overseas who would assist with the development and scaling of indigenous start-ups - through for example: business mentoring, brokering introductions, advising on sales/marketing, approaching VCs etc.

*(Enterprise Ireland and Industry)*

## 4. Building International Visibility

For Ireland to achieve its ambition as a *Global Games Hub for the 21<sup>st</sup> Century*, a coordinated marketing proposition specific to the games sector needs to be developed and vigorously communicated on the international stage.

### 4.1 Coordinated Promotion

- Continue to develop and promote a marketing proposition for the games sector in Ireland under the *Innovation Ireland* brand, through a strong cohesive approach involving the enterprise agencies, industry and other relevant bodies such as the Irish Film Board and Culture Ireland.

*(CDT, Irish Film Board, Culture Ireland)*

### 4.2 Host International Games Events in Ireland

- Develop a series of themed international games events to promote Ireland as a gaming hub and further develop links between the industry in Ireland and other games hubs internationally. Thematic areas would include: Creative Content, Analytics, Community Management, Information Security, Cloud Gaming.

*(CDT)*

## 5. R&D and Innovation

### R&D Innovation Supports

The games industry is pushing the boundaries of technology and business strategies. There is a need to ensure that Ireland's R&D supports incentivise innovation within Irish based firms in the sector. A large part of this is about raising awareness within industry about existing supports (the R&D tax credit & R&D funds) and how they apply to the games sector. There is also a need to make sure they are fit for purpose as the sector evolves.

The sector needs also to take advantage of the substantial progress that has been made in building up Ireland's research, innovation and knowledge transfer infrastructures over recent years. There is a considerable amount of research activity underway in Ireland's academic research community that is directly relevant to the sector, including artificial intelligence, sensor technologies and user interfaces, behaviour analytics, information security, business models, multilingual digital content management, games engines etc.

### 5.1 Increase Awareness

- Develop an enterprise guide to accessing R&D supports (R&D Tax Credit, R&D Fund etc) to include examples specific to the games industry.
- Convene an R&D supports workshop to promote awareness about available R&D supports and to share knowledge about research of relevance to the games industry.

*(Enterprise Agencies, Revenue Commissioners and Industry)*

## 5.2 Role of the Social Sciences in Games Industry RD&I

- In the medium term, review the extent to which social sciences play a role in games industry RD&I - both currently and potentially as the sector evolves. If and when deemed appropriate, make the necessary changes to qualifying criteria associated with the R&D Tax Credit to include relevant social sciences as eligible fields of science in R&D activity<sup>114</sup>

*(CDT, Revenue Commissioners and Department of Jobs, Enterprise & Innovation)*

- The development of case studies should be progressed to clearly demonstrate the various aspects of RD&I activities within the games industry.

*(Industry, Enterprise Agencies)*

## 5.3 Promoting Academic - Games Industry Engagement and Collaboration

- Continue to promote engagement between academic researchers in Ireland and the games industry, through networking events and other promotional activities.

*(Science Foundation Ireland, Enterprise Agencies, Higher Education Institutes and Industry)*

## Copyright

Notwithstanding the ongoing need for reform in a rapidly changing environment, much of which will be initiated at EU level, there is general satisfaction with the level of protection offered by the present Irish copyright legislation<sup>115</sup>. A Copyright Review Committee has been established by DJEI to examine the current Copyright legislative framework in Ireland and is expected to report by the end of 2011. The actions here reflect key recommendations within the IDA Ireland submission to the Committee following consultation with a range of stakeholders in July 2011.

## 5.4 Address Inefficiencies and Costs of Litigation

- Conduct a review of the Rules of the Superior Courts to identify measures that can reduce costs and inefficiencies associated with copyright and other forms of civil litigation, including the adoption of specific civil procedure rules for dealing with IP disputes.
- Consider establishing an IP specialist court with Circuit Court jurisdiction to hear small to medium IP claims.

*(Department of Justice and Equality, Department of Jobs, Enterprise & Innovation)*

<sup>114</sup>Any changes to the R&D Tax Credit can only be considered in the context of their broad application to all sectors. Any proposed alteration would therefore need to be cognisant of the potential cost, clarity of application, and the benefits accruing.

<sup>115</sup>Forfás company interviews and IDA discussion forum 'Innovation Through Copyright', July 2011.

## 5.5 Promote Reform of Copyright Law at EU Level

- Support the European Commission's proposals to create a pan-European collective licensing regime for online services.

Promote and/or initiate debate at an EU level in relation to the following issues with a view to assessing whether EU action is needed to create greater legal certainty/harmonisation in these areas: non-consumptive uses of copyright works; user generated content; fair use doctrine.

- Request the European Commissioner for Research, Science and Innovation to co-ordinate an EU level response on the issues identified through the relevant Commission Departments - DGs Internal Market/Competition/Information Society & Media.

*(Department of Jobs, Enterprise & Innovation)*

## 6. Infrastructures - Broadband

The games industry is rapidly moving online and to the Cloud, both in terms of content delivery and business processes, underlining the importance of broadband and the rollout of next generation networks. Within this sector (and the digital content sector generally) small teams can often operate in global networks at an early stage of their development. Activities such as community based management should be able to operate from anywhere in Ireland to service a global customer base. Latency becomes a key consideration as content evolves to be more graphically rich and bandwidth hungry<sup>116</sup>.

Ireland benefits from its competitive international broadband connections - and it is important that Ireland ensures that it remains competitive in light of future global developments. For example, in the context of Cloud Computing - which is directly relevant for the games sector - there may be a need in the longer term to enhance our direct Tier 1 telecoms connections to mainland Europe.

In the national context, Ireland continues to lag other EU countries and those which we compete for trade and investment in the provision of widely available, competitively priced advanced broadband services to homes and businesses. The policy actions taken and investment made to date are necessary but are not yet sufficient to ensure the widespread availability of world class advanced broadband services within a timescale that will allow Ireland to catch up with competitor countries. From the perspective of promoting Ireland as a *Games Hub for the 21<sup>st</sup> Century* with a dynamic and fully integrated cluster, this needs to be addressed as a matter of priority. In this regard, Forfás welcomes the establishment of the Next Generation Broadband Taskforce and its focus on identifying industry, private and public investment plans.

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<sup>116</sup>Latency refers to the speed of response of the system to the user (e.g. video lag).

### 6.1 Next Generation Networks(NGN)

The forthcoming Forfás Report *Ireland's Advanced Broadband Performance and Policy Priorities*, sets out the suite of actions required to address barriers to investment, focused on areas of pro-investment regulation, infrastructure planning and investment, and demand stimulation.

These actions need to be progressed as a matter of priority.

*(Department of Energy, Communications and Natural Resources and Broadband Providers)*

## Conclusion

The transition to a digital economy continues apace. The phenomenon of the internet, mobile media and social networking has led to the development of a range of services including location based services, digital content, media services, and personalised services. There are likely to be others, not yet in vogue that will be created by innovative firms responding to and/or pre-empting customers' changing demands<sup>117</sup>. The games sector is an exemplar of the potential growth and of the ways in which companies will do business in the digital era. As a transformative force within the emerging digital economy, the games industry is also valuable as a driver of new economic and societal norms.

The games sector is dynamic, creative, exciting and pervasive and presents considerable opportunities for Ireland - as growth in the games sector is likely to stimulate growth in increasingly inter-connected sectors including film and video, animation, enabling ICTs, and a host of internet related services and activities.

This report demonstrates that decisive action is needed together with a new way of thinking within enterprise policy. An anticipatory, agile and responsive approach is needed that is cognisant of the real-time nature of the games sector - and of the wider digital economy.

For some, the potential employment in the games sector may appear to be rather low - but in year on year percentage terms it is significant. What is also particularly relevant is that the timely and effective implementation of the actions set out here will facilitate accelerated growth, not only for the games sector, but also for a much broader cohort of sectors and activities operating in the digital economy.

Ireland can now grasp this opportunity to fully embrace the digital era and adjust its thinking, policies and systems - distinguishing its competitiveness offering with one of the most progressive and digitally advanced business environments in the 21<sup>st</sup> Century to stimulate enterprise growth and employment.

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<sup>117</sup>*Making it Happen, Growing Enterprise for Ireland*, Forfás 2010.

## Action Plan

An anticipatory, agile and responsive approach is needed that is cognisant of the real-time nature of the games sector - and of the wider digital economy. The following sets out an initial plan of action based on the recommendations outlined in the report.

Immediate: action that should be taken within three months.

Short-term: action being taken with the intention of full implementation of less than a year

Medium-term: action being taken with the intention of full implementation of one to two years

Long-term: action being taken with the intention of full implementation of over two years.

Ref	Action	Lead Responsibility	Indicative Exchequer Cost	Timeline
<b>Developing an International Cluster</b>				
1.1	Establish dedicated cluster development team	DJEI	Low	Immediate
1.2	Develop and implement an industry-led short term talent exchange between companies	CDT	Zero	Immediate
<b>Enhancing Skills and Experience</b>				
2.1	Maintain a competitive tax wedge	Department of Finance	Low	Short
2.2	Review the Special Assignment Relief Programme and/or alternative tax policy options	Department of Finance	Low	Medium
2.3	Progress the measures in the forthcoming Action Plan to Address High Level ICT Skills Recruitment Needs	Department of Education & Skills	Low	Medium
2.4	Ensure the HEA Skills Conversion Programme Review is cognisant of the needs of the game sector	Department of Education & Skills	Zero	Short
2.5	Promote a coordinated approach to CPD	CDT	Zero	Long
2.6	Increase HEI/industry collaboration in design and modification of courses	Industry, HEIs	Zero	Medium
2.7	Introduce a pilot game development/publishing Hothouse Initiative for undergraduate & PLC courses	Industry, HEIs	Low	Medium
2.8	Promote games as a career option through roadshows/fairs, working collaboratively with other relevant bodies (e.g. ICT Ireland)	CDT	Low	Medium
2.9	Promote awareness at primary & secondary school	Discover, Science & Engineering	Zero	Short

## FORFÁS THE GAMES SECTOR IN IRELAND: AN ACTION PLAN FOR GROWTH

Ref	Action	Lead Responsibility	Indicative Exchequer Cost	Timeline
2.10	Consider introduction of game-based learning in schools	T4 Technology Subjects Supports Services	Low	Long
<b>Accelerating Growth in Creative Content Development</b>				
3.1	Determine the scope, rationale and benefit of introducing a new financial instrument/ relief to incentivise creative content development	DJEI	Medium	Medium
3.2	Review & expand the EI Competitive Start Fund	Enterprise Ireland	Low	Short
3.3	Enhance mutual understanding of games industry & VC perspectives	Enterprise Ireland	Zero	Medium
3.4	Establish a games specific International Advisory Panel	Enterprise Ireland	Low	Immediate
<b>Building International Visibility</b>				
4.1	Develop & promote a coordinated marketing proposition for the sector	CDT	Low	Immediate
4.2	Host international games events in Ireland	CDT	Low	Ongoing
<b>Driving R&amp;D and Innovation</b>				
5.1	Increase awareness of R&D supports - guide & workshop	Enterprise agencies	Low	Immediate
5.2	Review the role of social sciences in games industry RD&I	CDT	Low	Long
5.3	Promote academic /games industry engagement & collaboration in research	SFI	Low	Medium
5.4	Address inefficiencies & costs of litigation in relation to copyright	Department of Justice & Equality	Low	Medium
5.5	Promote reform of copyright law at EU level	DJEI	Zero	Immediate
<b>Delivering Next Generation Broadband</b>				
6.1	Facilitate the availability of & access to competitively priced next generation broadband network	DCENR & Broadband providers	High	Immediate



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## Appendix 1

### Game Development Costs (£ Sterling) and Timescales

Market Segment	Average Development Costs	Average Development Time	Business Model
Off-the-shelf console (Wii, Xbox360, PS3) and handheld (PSP)	£2m - £15m (console) £250,000 - £600,000 (handheld)	15-30 months (console) 6-12 Months (handheld)	Sale at retail.
Digitally distributed console (Xbox Live, PlayStation Network)	£60,000 - £250,000	4-8 months	Digital download-to-own.
Smartphone (Casual)	£50,000 - £200,000	3-8 months	Digital download-to-own. Micro-transactions and sale of virtual items.
Mobile phone (Casual)	£25,000 - £120,000	3-6 months	Digital download-to-own.
Off-the-shelf PC	£500,000 - £10m	9-24 months	Sale at retail, Digital download-to-own.
Massively Online PC	£2m - £50m	12-24 months	Subscription, Free with paid premium services, Online advertising, Micro-transactions, Virtual objects.
Casual PC	£25,000 - £100,000	3-9 months	Subscription, Free with paid premium services, Online advertising, Micro-transactions, Virtual objects.

Source: Adapted from *The Money Game: Project Finance and Video Games Development in the UK*, NESTA Policy Briefing, February 2010, p10

## Appendix 2

### Overview of Game Types or Genres<sup>118</sup>

Genre	Description	Example
Action	Challenging in terms of reflexes (hand-eye coordination) and skill	Mortal Kombat (Warner Bros) Gran Turismo (Sony/Polyphony Digital) Reckless Racing (EA)
Adventure	The player controls an animated character through adventures and mysteries	Amazing Adventures (PopCap) Mirror's Edge (EA) Captain America (Sega)
Arcade	Derived from traditional arcade slot machines, some are skill games which give very skilful gamers the chance to win prizes	Bejewelled (PopCap) Dreamcast (Sega)
Role Playing (RPGs)	Similar to adventure games - with a stronger focus on continuous development of the character during the game. Includes the sub category of massive multiplayer online role-playing games (MMORPGs) where often several thousand gamers interact simultaneously	Everquest (Sony) World of Warcraft (Activision/Blizzard) Final Fantasy (Square Enix)
Shooter Games	A sub-group of 'action' games involving anti-terror missions or fantasy adventures. Includes First Person Shooter (FPS), Third Person Shooters (TPS)	Grand Theft Auto (Rockstar Games) Call of Duty Modern Warfare (Activision) Medal of Honor (EA)
Simulation Games	Reproduce conditions of the physical world in areas such as motorsport, submarine, tank combat etc. Also useful in context of training in sensitive/hazardous occupations: pilots, physicians	Flight Simulator (Microsoft) The Sims (EA) Steel Battalion (Capcom)
Sports Games	Transposition of sports' typical actions onto the features of the end user device; includes high profile games/competitions & personalities	FIFA Ultimate Team (EA) Tiger Woods PGA Tour (EA) Virtua Tennis (Sega)
Strategy Games	Objective is to make profitable use of virtual resources provided within the game to achieve certain aims/accomplish the mission assigned	Battleship (EA) Command & Conquer (EA/Victory Games) Path to Success (Big Fish)
Serious Games	Seek to teach information and skills like problem recognition, risk management and teamwork	World Without Oil (ITVS/Electric Shadows) Tower of Babel (ARGuing) MindHabits (MindHabits)
Advergaming	Games developed for advertising purposes	DinoHunters (Kumo Reality Games)

Source: Adapted from Deutsche Bank Research, *A Serious Business with Plenty to Play for*, Economics 72, August 2009 and various games company websites

<sup>118</sup>The boundaries between certain game genres are blurred as the market evolves - for example, 'simulated settlement' (Farmville) or 'brain training' games.

## Appendix 3

### Online Game Formats

There are a number of different types of games that can be accessed online: massive multi-player online (MMO - encompassing role playing, first-person shooter and real-time strategy); casual (including puzzle, hidden object, adventure, strategy, arcade & action, word & trivia, card, board and Mahjong); social; download, cloud. Online games can be accessed from most platforms.

#### MMOs

MMOs can primarily be divided into subscription-based and free-to-play. While subscription-based games primarily rely on a monthly subscription for a large proportion of their revenues, free-to-play games are monetized using virtual goods. While most MMOs are traditionally subscription based, the trend of late has been towards using hybrid monetization models that involve subscriptions, virtual goods/micro-transactions, pay-to-play features, and to a smaller extent, advertising.

Key players in the MMO space are: Activision/Blizzard, Square Enix and Electronic Arts.

#### Casual Games

Targeted at mass audiences, casual games differ from traditional console-based games due to their easy game play and simple rules. They can be played in short bursts and require little time to learn or special skills to play and as a result, appeal to broader audiences, including women and the older demographic. Unlike traditional hardcore games, casual games do not require sophisticated hardware to play and are distributed using ubiquitous direct-to-consumer publishing channels including websites, social networks, internet-connected consoles, and mobile phones. Revenue models are more aligned towards online advertising revenues and microtransactions such as virtual goods.

Key companies in the casual games space are: PopCap Games; Digital Chocolate; and Pogo.

#### Social Games

Social games are casual games that are published on social networks. What differentiates social games is the opportunity to interact with other players/friends both during the game and after. The viral dimension offered by social networks has especially helped to increase both the number of social gamers and their engagement. Game play has also helped in the growth of social networking as it is an activity that is entertaining and can be socialised. Therefore a symbiotic relationship exists between the two. Revenue is generated from three sources: virtual goods; offer based advertising and traditional online advertising. Over the past year key publishers have been moving towards unified virtual currencies. A common virtual currency (such as the recently introduced Facebook Credits) can be used across applications/games and would help increase the adoption of virtual currencies by making micro-transactions easier.

Key players in the social games space are: Zynga, Playfish and Crowdstar.

### Cloud Gaming

Cloud computing has facilitated the emergence of cloud gaming. Instead of purchasing games online and then downloading them to one's computer, the new service maintains the processing of the games on its servers and enables users to play the games without downloading them. Games are treated as a service with the business model being either a subscription or a rental that targets non-traditional demographics, a growing trend in the market. The service will not replace a high-end PC or console for the core gamer but it will add more casual gamers to the market.

Main cloud game providers are: Electronic Arts, Ubisoft, Take Two.

### Direct Game Download

The direct game download method has been gaining traction with users, especially with the proliferation of broadband speeds in the home. These digital distribution companies provide game and application developers with a streamlined process to deliver content to its users, whether for a controlled pre-launch beta or for full publishing of a title.

Main direct game download providers are: Steam, Direct2Drive, iPhone app store, Android app store.

Source: Deutsche Bank Securities Inc, 2010, *Interactive Entertainment: Extending Game Play to the Masses...Beyond the Console*, Global Markets Research



## Appendix 4

### Skills profile for the Core Games Sector

#### General Themes Across all Roles:

- Teamwork is essential as the work is generally with multidisciplinary and multicultural teams. Broad knowledge of the work of these teams essential. Experience working in a team environment, ideally using agile and Scrum methodologies.
- Solid written and verbal communication skills, with ability to communicate with a variety of people, often remotely (Engineers, developers, QA, Producers, Designers, and non-technical coworkers).
- Previous games development/customer service experience.
- Passion for games.
- Project management skills.

#### Selected Key Roles and Associated Indicative Skills/Experience Required in Core Game Development Companies:

General Area	Selection of Job Titles	Indicative Skills/Experience
<b>Design</b>	Storytellers Games designer Lead designer Design director Level designer Scripter designer Producer Project Manager	Degree in Arts, Humanities, visual arts/design required in most jobs, Computer Science degree for scripter  Excellent creative thinking and innovation skills necessary, as designers are key influencers of games ideas and concepts.  Excellent communication and writing skills needed, desktop publishing skills also necessary.  Working experience generally required in games design and development, including a good knowledge of all aspects of the game production pipeline and game dynamics.  Strong knowledge in game mechanics and player psychology/behaviour.
<b>Art, Animation and Graphics</b>	Technical artist Concept artist User interface designer Modeller Narrator Producer Project Manager	Third level degree in Art, Animation, Design or a related field for all except UI designer sometimes requires Computer Science degree  Working experience conceptualising and developing game assets, art/animation for games based on written specifications.  Experience with software packages for 2D and computer graphics: Photoshop, Flash and other design-oriented programs.  3D skills including experience with 3D Studio, Maya.  Knowledge of scripting languages an advantage.  An ability to take different ideas on board with a view to finding the best solution possible to any problem.  Understanding of game play dynamics and an avid gamer.

**Selected Key Roles and Associated Indicative Skills/Experience Required in Core Game Development Companies (ctd):**

General Area	Selection of Job Titles	Indicative Skills/Experience
<p><b>Develop</b></p>	<p>Engineers - graphics, 3D software (Python, C++, Web apps, iOS games), network, Linux systems, platform, capacity, service reliability, scalability, audio, UI scripting,                      Programmers - tools, console, technology                      Producer                      Project Manager</p>	<p>Degree in Computer Science/ Engineering or equivalent.                      Professional development experience required in games or online entertainment area.                      Strong skills &amp; knowledge in maths and physics.                      Strong skills and experience working with multiple programming and front/backend scripting languages gained through general interest/on-the-job experience, e.g. C++, C#, Shader languages, , multi-core, CELL, LUA, Perl, Ruby, Javascript, HTML, Actionscript, CSS, Java, XSLT, Erlang, Scala.                      Strong Python skills is of particular importance. In addition, experience with web frameworks e.g. Django, Pylons, Ruby on Rails, Node.js .                      Experience with Linux/Unix operating systems.                      Experience in developing &amp; deploying on a variety of relevant game platforms, e.g. iOS, cloud infrastructure.                      Experience using the following is required in some cases: programming interfaces (e.g. OpenGL, OpenGL ES ); web services (e.g. XML-RPC- or REST-based); control systems (e.g. Perforce, SVN); relational databases (e.g. SQL, NoSQL, MySQL).                      Experience developing and scripting in game engines such as UE3, Crysis and Unity.                      Thorough knowledge of software design concepts, 3D graphics and 3D maths.                      Excellent debugging and optimization skills.                      Excellent ability to work between different technologies and new platforms.</p>
<p><b>Project Management &amp; Managers - generally involved in planning &amp; general operations across stages of development &amp; publishing</b></p>	<p>General management                      Producer                      Project manager                      Technical director                      Discipline leads                      Production management                      Head of studio</p>	<p>Familiar with all functional areas.                      Ability to apply Scrum and agile frameworks to management techniques.                      Ideally have a technical/development background.                      Business, project management, skills vital.                      Budgeting, resourcing skills necessary.                      Communication and interpersonal skills necessary.                      Possess strong leadership and management skills with the ability to motivate others and provide clear direction, as well as manage career growth.                      Passion for games.</p>

**Selected key roles and associated indicative skills/experience required in support services, localisation areas:**

General Area	Selection of Job Titles	Indicative Skills/Experience
<b>Test &amp; Localisation</b>	<p>QA tester</p> <p>Localisation tester</p> <p>Producer</p> <p>Project Manager</p>	<p>Relevant experience in related field an advantage.</p> <p>Experience of Software Localization in a QA Tester role an advantage.</p> <p>Passion for games, and experience &amp; understanding of playing games.</p> <p>Fluency in language required for localisation testers - excellent spelling &amp; grammar.</p> <p>Attention to detail and motivation.</p> <p>The ability to write accurate, unambiguous, and concise documentation in English.</p> <p>Good PC knowledge &amp; proficient knowledge of MS Office suite of products.</p>
<b>User Engagement, Customer Support &amp; Community Management - generally have roles during and post-development</b>	<p>Customer service representatives</p> <p>Game support</p> <p>Community manager</p> <p>Business analyst - crossover with other areas such as marketing, design, etc.</p>	<p>Language skills (<i>current languages serviced from Ireland: Russian, French, German, Polish, English, Italian, Spanish, Brazilian Portuguese, Portuguese, Indonesian, Turkish, Korean, Norwegian, Dutch, Danish, Swedish, Finnish, Japanese etc</i>).</p> <p>For all roles passion / knowledge of gaming.</p> <p>Passion for people and desire to solve problems.</p> <p>Community roles - Solid understanding of new media, social networking, and new community tools &amp; techniques. Involved in at least one social media platform.</p> <p>Strong knowledge of player behaviour/psychology.</p> <p>For analytic roles, strong maths skills required along with communications skills for reporting.</p>

**Other Roles Within the Sector**

HR Accounts & legal, Business branding and marketing, Customer retention, Web developers and management Cloud/ PHP engineers - publishing, Business development & sales personnel.

## Appendix 5

### Top 10 Global Console and PC Games, 23 July 2011

#### Americas (North & South):

Rank	Platform	Game	Number of Units Sold
1	X360	NCAA Football 12	117,651
2	PS3	NCAA Football 12	87,477
3	Wii	Just Dance 2	41,371
4	Wii	Mario Kart Wii	34,795
5	Wii	Zumba Fitness	30,869
6	Wii	Wii Sports Resort	28,906
7	X360	Call of Juarez: The Cartel	27,282
8	X360	Kinect Adventures!	27,115
9	3DS	The Legend of Zelda: Ocarina o...	26,589
10	PS3	God of War III	26,559

#### Japan:

Rank	Platform	Game	Number of Units Sold
1	Wii	Minna no Rhythm Tengoku	121,043
2	PSP	Sengoku Basara: Chronicle Heroes	79,966
3	PS3	Jikkyou Powerful Pro Yakyuu 2011	37,371
4	Wii	Inazuma Eleven Strikers	36,157
5	PS3	No More Heroes: Red Zone	33,260
6	PSP	Taiko no Tatsujin Portable DX	31,086
7	PSP	Jikkyou Powerful Pro Yakyuu 2011	30,864
8	DS	Nora to Koku no Koubou: Kiri n...	23,514
9	Wii	Wii Sports Resort	19,201
10	PS3	Alice: Madness Returns	19,003

#### EMEA (Europe, Middle East, Africa & Asia):

Rank	Platform	Game	Number of Units Sold
1	Wii	Zumba Fitness	42,441
2	DS	Pokémon Black / White Version	35,225
3	Wii	Wii Sports Resort	30,871
4	Wii	Mario Kart Wii	29,859
5	Wii	Wii Sports	21,779
6	PS3	Call of Duty: Black Ops	18,524
7	Wii	Wii Fit Plus	16,792
8	3DS	The Legend of Zelda: Ocarina o...	16,027
9	X360	Call of Juarez: The Cartel	15,138
10	PS3	Call of Juarez: The Cartel	14,600

Source: <http://www.vgchartz.com>

## Appendix 6

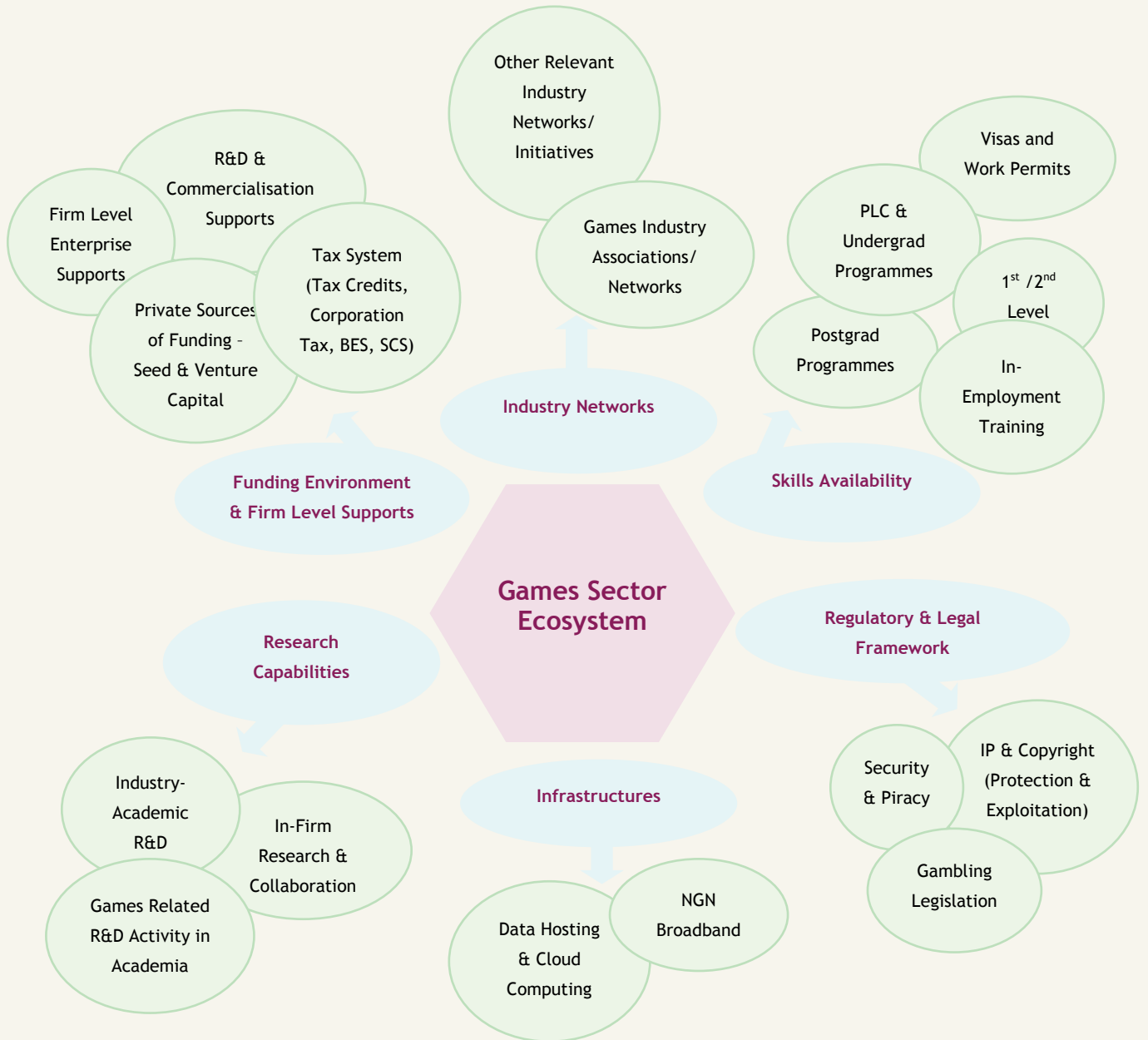
### Actual and Potential Revenue Models for Main Types of Players in the Mobile Gaming Market

Player	Main Revenue Models	Secondary Revenue Models	Additional Revenue Options
<b>Game Developers and Publishers</b>	Retailing (pay-as-you-go) Premium retailing (basic functionality free) Subscription	Advertising in general Advertising linked with some product placement Sponsorship Merchandising User profiling - marketing information Packaged with the mobile device Packaged with the (voice, data) services of the mobile operator	Value-added applications Packaged with some product or service not related with mobile ICTs Maintained by user community (not a commercial revenue model) Public service (not a commercial revenue model)
<b>Mobile Operators</b>	Connectivity fee (indirect revenues) Retailing (sharing revenues) Subscription (sharing revenues) Packaged with operator's services Wholesale provision	Advertising Brokerage Billing services User profiling - marketing information	Branding Value-added applications
<b>Hardware and Software Suppliers for Mobile Devices</b>	Retailing (sharing revenues) Subscription (sharing revenues) Packaged with the device or software License fees / royalties for usage of platform (development kit)	Advertising User profiling - marketing information	Branding Value-added applications
<b>Application Stores</b>	Retailing (sharing revenues) Premium retailing (sharing revenues) User profiling - marketing information License fees / royalties for usage of platform (development kit)	Advertising Brokerage Billing services User profiling - marketing information	Branding Value-added applications Maintained by user community (not a commercial revenue model)

Source: *Born Digital/Grown Digital: Assessing the Future Competitiveness of the EU Video Games Software Industry*, EC JRC Scientific and Technical Report (De Prato et al), 2010

## Appendix 7

### The Games Industry Business Environment



## Appendix 8

### Selection of PLC, Undergraduate and Postgraduate Courses in Games Development, Digital Media and Animation

#### Undergraduate

##### Games

- Athlone IT - BSc Software Design (Games Development)
- Institute of Technology Carlow - BSc Computer Games Development
- Dundalk IT - BSc Computing in Games Development
- University of Limerick - BSc Multimedia and Computer Games Development
- Letterkenny IT - BSc Computer Games Development
- NUI Maynooth - BSc Multimedia, Mobile and Web Development
- IT Sligo - BSc Computing - Games Development
- Tipperary Institute - BSc Computing - Games Design and Development
- Institute of Technology Tralee - BSc Computing with Games Development

##### Multimedia

- Cork IT - Multimedia
- NUI Maynooth - BSc Multimedia, Mobile and Web Development
- NUI Maynooth - BA Multimedia
- Dundalk IT - BA Communications in Creative Multimedia
- Limerick IT - BSc Multimedia, Programming and Design
- DCU - BSc Multimedia
- Letterkenny IT - BSc Multimedia and Digital Entertainment Technology
- Tipperary Institute - BSc Information Technology - Creative Multimedia
- Institute of Technology Tralee - BA Interactive Multimedia
- Institute of Technology Tralee - BSc Computing with Multimedia
- NUIM - BA Digital Media
- IT Blanchardstown - Creative Digital Media
- Waterford IT - BSc Multimedia Applications Development
- IADT - Computing in Multimedia Programming
- IADT - BSc Computing Multimedia Systems/Web Design

##### Animation

- IADT - BA Animation
- TI - Information Technology - Digital Animation

##### Design

- National College for Art and Design
- IADT - BA Modelmaking, Design and Digital Effects
- University of Limerick - BEng Computer Aided Engineering and Design
- University of Limerick - BSc Digital Media Design
- UL - BSc Music, Media and Performance Technology
- Institute of Technology Tralee - BSc Computing with Interactive Web Development
- Letterkenny IT - BA Graphic Design

##### Film/Media

- NUI Galway - BA Connect with Film Studies

- Dublin Business School - BA Film and Media
- Dundalk IT - BA Video and Film
- DIT - BA Media Arts
- Waterford IT - BSc Entertainment Systems
- NUI Maynooth - BA Media Studies
- NUI Maynooth - BA Digital Media

#### Education

- Galway, Mayo IT - BSc Design and Technology Education

#### Engineering

- DCU - BEng Digital Media Engineering
- IADT - Bachelor of Engineering in Audio Visual Media Technology
- NUI Maynooth - BEng Electronic Engineering with Computers
- NUI Galway - BE Electronic & Computer Engineering

#### Computer Science

- UCC - BSc Computer Science
- UCD - BSc Computer Science
- NUI Galway - BSc Computer Science & Information Technology
- TCD - BA Computer Science
- NUI Maynooth - Computer Science through Music Technology

#### Postgraduate Courses

- TCD - MSc Interactive Entertainment Technology
- TCD - MSc interactive Digital Media
- TCD - MSc Music and media technologies
- TCD - Structured PhD in Digital Arts and Humanities
- TCD - BSc Information Systems
- TCD - MSc Computer Science
- DIT - MA Digital Media Technologies
- DIT - MSc Digital Games
- UL - MA/MSc Interactive Media
- UCC - MSc Computer Science
- UCC - MSc Interactive Media
- UCD - MSc Computer Science
- NUI Galway - MA Digital Media
- NUI Galway - MSc Software Design and Development



# Appendix 9

## Stakeholder Consultations

ACT Venture Capital  
 Activision Blizzard (CA USA)  
 Activision Blizzard (Cork)  
 Activision Blizzard (Dublin)  
 Ballyfermot College of Further Education  
 Big Fish Games  
 Calico Media  
 Cellplay Networks  
 Demonware  
 Dublin Business Innovation Centre  
 Dun Laoghaire Institute of Art, Design & Technology  
 Dylan Collins  
 EA Bioware  
 EA Mobile (London)  
 Enterprise Ireland  
 Facebook  
 Front Square Solutions  
 Game Investors Consulting (UK)  
 Google  
 IDA Ireland  
 Interactive Games Association of Ireland  
 Irish Film Board  
 Jolt Online

Microsoft  
 NDRC - National Digital Research Centre  
 NESTA - National Endowment for Science, Technology and the Arts (UK)  
 Nevermind Games  
 NUI Maynooth  
 Omnimation Technology  
 Osborne Clark (UK)  
 Open Emotion  
 Other Ventures  
 PopCap Games  
 Redwind Software  
 Riot Games  
 Science Foundation Ireland  
 Selatra  
 Shanda (China)  
 Square Enix (London)  
 Swrve  
 TCD  
 Temple Bar Cultural Trust  
 Tribal City  
 Yazzgoth (Arena Engine)  
 Zynga

### Project Working Group

Emmanuel Dowdall      IDA Ireland  
 Maria Ginnity          Forfás  
 Colm MacFhionnlaioich      Enterprise Ireland














Maeve McConnon      IDA Ireland  
 Ray Walsh              Enterprise Ireland

### Forfás Research & Analysis

Adrienne Costello  
 Céline McHugh

## Appendix 10

### Forfás Board Members

			
<b>Eoin O'Driscoll</b> Chairman, Forfás Chairman, Southwestern	<b>Martin Shanahan</b> Chief Executive, Forfás	<b>Simon Barry</b> Chief Economist ROI, Ulster Bank Capital Markets	<b>Bob Brannock</b> President, European Operations, Genworth Financial
			
<b>Timothy Dullea</b> Former Chief Executive Officer, Tipperary Co-op	<b>Sean Gorman</b> Secretary General, Department of Enterprise, Jobs and Innovation	<b>Miriam Magner Flynn</b> Managing Director, Career Decisions	<b>William O'Brien</b> Chief Executive, Wm O'Brien Plant Hire Ltd
			
<b>Barry O'Leary</b> Chief Executive Officer, IDA Ireland	<b>Paul O'Toole</b> Director General, FÁS	<b>Frank Ryan</b> Chief Executive Officer, Enterprise Ireland	<b>Dr Don Thornhill</b> Business Adviser and Company Director
			
<b>Michael O'Leary</b> Secretary to the Board			

# Appendix 11

## Recent Publications

<b>Ireland's Competitiveness Scorecard 2011</b> National Competitiveness Council	September 2011
<b>Research and Development Funding and Performance in the State Sector 2009 - 2010</b> Forfás	August 2011
<b>Monitoring Ireland's Skills Supply 2011 - Trends in Education and Training Outputs</b> Expert Group on Future Skills Needs	August 2011
<b>Developing a Green Enterprise</b> Forfás	July 2011
<b>National Skills Bulletin 2011</b> Expert Group on Future Skills Needs	July 2011
<b>Forfás Annual Report 2010</b> Forfás	June 2011
<b>Costs of Doing Business in Ireland 2011</b> National Competitiveness Council	June 2011
<b>Annual Employment Survey 2010</b> Forfás	May 2011
<b>Response from Ireland to the European Commission Green Paper: Framework for Research and Innovation Funding</b> Advisory Science Council, Forfás, DJEI	May 2011
<b>The Expert Group on Future Skills Needs Statement of Activity 2010</b> EGFSN	May 2011
<b>Business Expenditure on R&amp;D 2009/2010</b> Forfás, CSO	April 2011
<b>Developing Recognition of Prior Learning</b> EGFSN	April 2011
<b>Vacancy Overview 2010</b> EGFSN	March 2011
<b>Statement on Competitiveness Priorities</b> NCC	March 2011
<b>Analysis of Ireland's Innovation Performance</b> Forfás	March 2011

<p><b>Progress Report on the implementation of the recommendations of the report of the High Level Group on Green Enterprise</b></p> <p>Forfás, DETI</p>	<p>March 2011</p>
<p><b>Staying the Course</b></p> <p>Advisory Council for Science, Technology and Innovation</p>	<p>January 2011</p>
<p><b>Research strengths in Ireland: a bibliometric study of the public research base - Extension Report: Public Research Organisations</b></p> <p>Forfás, HEA</p>	<p>December 2010</p>
<p><b>The Higher Education R&amp;D Survey 2008</b></p> <p>Forfás</p>	<p>December 2010</p>
<p><b>Profile of Public Research Activity in Ireland, 1998-2006</b></p> <p>Forfás, HEA</p>	<p>December 2010</p>
<p><b>Research and Development Activity of Irish Based Enterprise</b></p> <p>Forfás, HEA</p>	<p>December 2010</p>
<p><b>Research and Development Activity of Irish Based Enterprise - Vol 2: Data</b></p> <p>Forfás, HEA</p>	<p>December 2010</p>
<p><b>Ireland's Priorities in FP8</b></p> <p>Forfás</p>	<p>December 2010</p>
<p><b>Annual Competitiveness Report 2010 Volume 2: Ireland's Competitiveness Challenge</b></p> <p>National Competitiveness Council</p>	<p>November 2010</p>
<p><b>Future Skills Needs of Enterprise within the Green Economy in Ireland</b></p> <p>EGFSN</p>	<p>November 2010</p>
<p><b>An Enterprise Perspective on the Universal Social Contribution</b></p> <p>Forfás</p>	<p>November 2010</p>
<p><b>Review of Labour Cost Competitiveness</b></p> <p>Forfás</p>	<p>November 2010</p>
<p><b>Annual Business Survey of Economic Impact 2009</b></p> <p>Forfás</p>	<p>November 2010</p>
<p><b>Enterprise Statistics at a Glance 2010</b></p> <p>Forfás</p>	<p>November 2010</p>
<p><b>Categorisation of State Expenditure on R&amp;D</b></p> <p>Forfás</p>	<p>November 2010</p>



The publications of Forfás and the advisory groups to which it provides research support are available at [www.forfas.ie](http://www.forfas.ie)

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