'Live Life to the Power of PS2'

Locating the digital games industry in the new media environment

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Introduction

'During the third week of May, E3... becomes the epicenter of the interactive entertainment universe. More than 62,000 retailers, developers, investors, distributors and media representatives from across the U.S. and over 100 other countries come together for a three-day interactive entertainment extravaganza.'[1]

1 E3 Expo. Available at: http://www.e3expo.com

The digital games industry is a global entertainment business stretching from Tokyo to San Francisco to London. In May each year, game developers from around the world meet in Los Angeles to pitch their ideas to publishers, sneak a preview of other games and do licensing deals with hardware companies and Hollywood studios. The show has much in common with Melia and Cannes: it has all the glitz, the hype and the stars. The main difference is that the stars are non-human, the digital game producers are relatively unknown and this form of popular culture has been largely ignored by established university media programmes and media researchers.

A survey of the main communications and social science journals by this author in 2000 found only a handful of articles relating to digital games and most of them focused on the negative psychological and health implications of game playing. By contrast, there are numerous popular books, magazines and e-zines passionately written by the producers and consumers of digital games. The lack of attention within academe to this significant sub-cultural field led to the establishment of the present research project based at STeM (Centre for Society, Technology and Media), Dublin City University, to examine the production and consumption of digital games in Ireland. This paper examines the origins, players and context in which digital games developed. It outlines the main characteristics of the digital games industry, locating it both economically and geographically in the wider media landscape and points to some opportunities and challenges for Ireland.

Games in Society & game characteristics

In the English language the terms play and game, though not synonymous, signify pastimes which take place outside of work. Play is defined as to 'occupy oneself in a game or other recreational activity' while a game is 'a form of play or sport, especially a competitive one organised with rules (and) penalties (Hawkins, 1987).' Games might therefore be defined as a subset of play but with more defined rules, goals and results. Playing with toys can take place both in the broader context of 'aimless' play or in a narrower game-like context (Fleming, 1996).

There is an extensive literature on the role of play in society. Plato defined play as 'that which has neither utility nor truth nor likeness, nor yet, in its effects, is harmful, can be best judged ... by the pleasure it affords (cited in Poole, 2000:27).' Later, Huizinga (1949) wrote that play has developed alongside the development of human cultures and sees no fundamental difference between the play of animals and the play of humans. He calls mankind 'homo ludens' and traces the term 'play' to the Latin term 'jocus' meaning joking and jesting. Play is characterised for him as something which is freely undertaken, involves stepping outside real life, is temporal, spatially limited, involves uncertainty, rules, and leads to the formation of communities (1949:28). Huizinga suggests that in Germanic languages play terms were regularly applied to battles and armed strife (1949:40). The conceptualisation of play as 'a struggle with fate limited by certain rules' certainly suggests that there are historical reasons why the most common games developed for all game platforms based around conflict. While Huizinga explores the extent to which play is found across all aspects of society, others have explored why people play. McLuhan in a chapter from *Understanding Media* argues that games '(act as) counter-irritants or ways of adjusting to ... stress' (1964:250). Game designer Chris Crawford suggests that play is a form of learning and a safe form of fantasy fulfilment (Crawford, 1984).

Lantz and Zimmerman (1999) suggest a three-tier model to understanding all games acknowledging the inter-relationship of games as sets of rules, as play/experience and as culture. For them, games are more than formalised play and can only be understood in relation to the aesthetic, psychological, social and material experience that the players encounter. They point to the formal similarities between digital and non-digital games, most apparent in relation to interactivity, arguing that 'games are among the most ancient and sophisticated forms of designed interaction (1999)'. This viewpoint is supported by a contemporary games designer who suggests that digital game developers have much to learn from non-digital games including boardgames, miniatures, branching story books and plays (Costikyan, 1998).

Digital games clearly combine traditional game forms with digital technologies (computers, mobile phones, arcade machines, telecommunications technologies) but they also extend traditional games to provide new experiences. Ryan (1999:7-9) sees computer games as 'a new environment for the use of text' which combines many different electronic genres like interactive drama and hypertext. For Darley (2000) the key characteristics of computer games are their digitality, their graphic realism, their simulation and the 'impression' of agency that they provide. While he acknowledges that digital games borrow from 'prior and adjacent cultural forms' (2000:147) he argues that they have developed new ways of soliciting participation from end users. For him computer games are an important component of contemporary visual culture and symptomatic of shifts within culture from the cult of the author and stable meaning to the power of the reader, endless signifiers and surface spectacle. For Lev Manovich (2001:244) the most innovative new media works in the 1990s were two computer games: *Doom* (Id Software, 1993) and *Myst* (Cyan, 1993), examples which challenged contemporary understandings of narrative and navigation. He argues that new media were born from the convergence of computing and media technologies but unlike Darley he warns that the terms digital and interactive are too broad to characterise them (Manovich, 2001:27-48).

Clearly we need to be careful about how we define interactivity. Chris Crawford (1984) has suggested that computer games are characterised by their ability to respond to the choices made by the end user. Others have argued for an approach which differentiates between different levels of interactivity: social, technological and textual (Jankowski and Hanssen, 1996). These approaches try to differentiate between merely turning on and off a technology, clicking on links in a text and the user having a meaningful influence on the outcome of a story. Juul (1999) tries to distinguish between interactivity at the level of the discourse (e.g. a hypertext) and interactivity at the level of the story. For him the latter, while always subject to predefined constraints, is the most

interesting. Kücklich (2001) differentiates between interactivity, as 'the frequency of the player's interaction with (the) world' and openness as 'the range of different interactions offered by the game.' Clearly the response of a digital game to a user is largely pre-programmed and bestows greater agency rather than authorship on the player. Despite the technological potential to provide greater agency to the end user both traditional and new media companies still limit this; some argue to protect their hegemony and profitability (Rieser, 1997).

The empirical investigation of player involvement/engagement with digital games requires much more empirical and theoretical work than has been done to date although initial findings indicate that playing a game may be quite different from the user experience of a hypertext, print or audio-visual object (Turkle, 1984; Friedman, 1995; Aarseth, 1997; Juul, 1999). Juul (1999:chpt 5) notes that the player is active in their influence on the game world and 'this is a conscious act, that he/she tries to get better at. The reader does not influence the text as text, but performs an interpretation that basically works according to sub-conscious principles.' Furthermore, a game consists of materials and a programme. The programme controls the combination of materials accessed by the player. Espen Aarseth (1997) calls the combination of elements provoked by the actions of the player a 'cybertextual process' and he argues that this process goes well beyond traditional reading. As such, he coined the term 'ergodic' from the Greek words ergon and hodos meaning 'work and 'path' and he uses this to signify the non-trivial effort required (1997:1).

Other writers have argued that narrative and graphical realism are the key characteristics of digital games. Murray (1997:28 & 284) argues that digital games provide new storytelling formats, noting that the computer is 'a representational medium, a means for modelling the world that adds its own potential properties to the traditional media it has assimilated.' Juul (1999) feels that representation is not key to digital games given the existence of many abstract games with no mimetic relationship to the real world and no main characters. *Missile Command* (Atari 1980) and *Tetris* (Alexey Pazhitnov: Spectrum Holobyte, 1985) are examples of games where the game world is novel and the player is not represented on the screen in any way. One only sees the results of one's actions in the game. With regard to graphic realism Aki Järvinen has identified three different audiovisual styles in games ranging from photorealism to caricaturism and abstractionism. While the trend for photorealistic games was dominant in the 1990s, he notes that photorealism in games may have reached saturation point and new styles are emerging (Järvinen, 2002:113-128).

What emerges from this review of literature is that both non-digital and digital games may be conceptualised as forms of interactive fiction many of which promote sociability. Digital games provide players with both old forms of entertainment in new ways and new forms which are only partially understood. Games have, traditionally, been a cheap and highly accessible form of entertainment that were available to all, regardless of their educational background or 'cultural capital'. Indeed this observation may serve to highlight why digital games have been largely ignored within academia. As Simon Frith points out, 'entertainment' is a term that always seems to be used with a hint of disdain' (Frith, 1996). Since the 19th century commercial games have been associated with mass popular culture as opposed to high art. Commercial interests and mass-market appeal rather than notions of public service, education or artistic merit drive the digital games industry.

Origins and Growth of the Digital Games Industry

The digital games industry emerged alongside a complex set of socio-economic and political changes associated with the emergence of post-industrial economies. The industry is built upon a cluster of technological inventions, including the

microprocessor and the cathode ray tube, which were transformed by a range of factors into a number of inventions including mainframe computers, televisions and game machines. In the emergence of these commodities, the development and growth of media networks, higher participation rates in education and the playful tinkering of a number of 'hackers' one finds the origins of the digital games industry.

The digital games industry began with mainframe computers, computer programming enthusiasts and artists. As with any technological history there are conflicting origin stories.[2] Hertz (1997) and Friedman (1995) give the honours to Steve Russell and a group of student engineers in the Artificial Intelligence research department in the Massachusetts Institute of Technology (MIT). By 1966 they had developed a game to both amuse themselves and to test a mainframe computer donated to them by DEC. *SpaceWar* was a science fiction shooter where two spaceships battled against each other in a silent 2D space.

> 'It was the size of about three refrigerators, and it had an old-fashioned computer console with a whole bunch of switches and lights..and it had a cathode ray tube, and it had a typewriter. ...Space was very hot at the time – and it was just when satellites were getting up and we were talking about putting a man on the moon' (Russell quoted in Herz, 1997:6).

Russell and his co-inventors gave their game away free. *SpaceWar* was played widely in the US during the 1960s and is remembered fondly not only as the first game, but also as the reason why many people were attracted to computer programming. Even at this stage it is clear that these first games were created by a group of people who were driven more by the 'intrinsic pleasure of experimenting' than the search for profit (Haddon, 1993). Haddon notes that Steve Russell was an avid science fiction reader and a fan of pinball, a popular arcade game at the time. Darley (2000: 11-24) lists a number of artists who experimented at this time with computer graphics and imaging. Crucially, these games demonstrated that computers could be fun and helped to translate these new technologies from a calculator into a communications and entertainment medium. Throughout the 1960s digital games were developed and played by a small, highly technical and male-dominated group of people.

The high cost of computers in the late 1960s and 1970s suppressed the diffusion of digital games. It is not surprising therefore that the first mass consumption spaces for digital games were the arcades and with the spread of television it was only a matter of time before someone invented a home system too.

The first entrepreneur to make a commercial profit from a digital game was Nolan Bushnell, a *SpaceWar* enthusiast and engineer who had worked in amusement parks. He licensed *SpaceWar* in 1971 and made a coin-operated (coin-op) version in association with a pinball machine company Nutting Associates. While his first effort was not a commercial success, his second game, *Pong*, a tennis game developed at home in his apartment in California, lead to the establishment of one of the first digital games companies, Atari, in 1972. *Pong* was a commercial success for Bushnell and machines were installed in numerous bars and arcades across America. Four years later he was able to sell his company to Warner for $28 million, despite loosing a patent case to Magnavox (Philips US division) and having to pay a royalty on every game sold (Poole, 2000:34). Apparently, Ralph Baer, manager of a military electronics company, had developed a tennis game to be played on a home console connected to a standard TV set in September 1966. The equipment was built at Sanders Associates in 1967 (the "Brown Box") and licensed to Magnavox in 1970. It appeared as the Odyssey 1TL200 in the US in May of 1972.[ii] The almost simultaneous invention of both arcade and domestic game machines, as well as the development of similar types of games indicate that the time was right for such an invention. It also suggests that other factors might have come into play.

[2] For some the first game using digital power was developed by William Higinbotham at the Brookhaven National Laboratory, a US government nuclear –research facility. Higinbotham set out in 1962 to develop an entertaining exhibit for visitors to the nuclear facility (Poole, 2000).

[2] What is often ignored is that these early home game systems were essentially early forms of interactive television (Finn, 2001).

Arcades draw upon a long history of public entertainment spaces from the coffee houses and amusement arcades of 19th century Vienna, to the dioramas and coin-op arcades of the next century. Public amusements have always aimed to satisfy the public's hunger for fantasy, spectacle, illusion and entertainment in an accessible manner (Darley, 2000; Nasaw, 1993). Early public amusements developed alongside the burgeoning industrial towns in many countries. Various sports, fighting and exotic dancers dominated the content and the audience was primarily male. When digital games emerged arcade owners seized the opportunity to move away from their 'sleazy' image.

Another driving factor behind the spread of games and arcades in the United States was the development of shopping malls from the 1970s. Arcades re-positioned themselves as safe places for parents to drop off their children while they shopped and arcade owners, bars and shops replaced their pinball machine with cabinets housing skill and action games like *Pong, Pac-Man* and *Space Invaders*. Increasing participation rates in secondary education in many countries assisted in this trend. The development of both television systems and computer do-it-yourself kits also helped to create a generation of computer 'hobbyists' who treated the computer like a toy and were increasingly familiar with video as a form of entertainment. By the early 1980s arcade machines were swallowing 20 billion quarters annually (Herz 1997). Darley (2000) points out that arcades were important to the development of the early hardware and software industries because they could afford the most powerful game machines. In addition, they were seen as a great social leveller which required no advance tickets and no cultural capital from the users.

Haddon (1993:129) notes that during the 1970s companies from a variety of sectors including leisure specialists, semi-conductor companies, toy manufacturers and pinball manufactures produced arcade, console and personal computer hardware for the digital games market in the 1980s. This period saw the emergence of the Sinclair and the Commodore computers in the UK but the domination of Nintendo, a company that began its life as a producer of Japanese flower cards in 1889 and diversified into digital hardware and software licensing in the mid 1980s, stands out. The development of a home console with significant computer power but disguised as a toy: with soft corners, bright colours and a joystick instead of a keyboard, was significant in relation to the domestication of this technology. Indeed, the first consoles stored their games on cartridges so that players would not have to deal with computer disks.

Nintendo developed both home consoles and handheld technologies which anyone could use. But they also recognised the importance of software in relation to selling their hardware. Sheff (1993:35) reports that Nintendo sold its hardware at half the price of its competitors and at cost price. The strategy however was that the hardware was merely a tool to sell software and that in-house artists, not programmers should make the initial games. Nintendo's first big hit was designed by Shigeru Miyamoto, for some the George Lucas of video games. *Donkey Kong* (1981), his first game, starred a carpenter, a gorilla and a damsel in distress. Since then Shigeru Miyamoto's video games have sold in excess of 250 million copies (Mowatt, 1998). *Super Mario Bros 3*, a game whose main character is a plumber, grossed $500 million by 1990 and helped Nintendo to supplant Toyota as Japan's most successful company. Others have noted how Nintendo has built up a studio of stars and carefully licenses them for both traditional merchandise and more novel products like snack foods (Herz, 1997:133).

Nintendo may also have been responsible for Sony's entry into the console market. Poole (2000:18) reports that Nintendo entered talks with Sony to develop a CD-ROM drive for the Super Nintendo Entertainment System (SNES) in 1989. The deal floundered and Sony went on to develop the Sony PlayStation, which was launched in 1995 (Parisi, 1993). The launch of the Sony PlayStation was significant for Ireland.

> 'the games business in Ireland came alive about five years ago,
> August 1995, PlayStation One was released in Ireland and that
> kicked off the business. .... the one idea they had when they

> marketed it was that it was gong to be like the Sony Walkman, everybody would have one, every house would have one, and they have virtually done that in Ireland. Ireland has the highest rate of PlayStation ownership outside Japan, we are second only to Japan in the world, per head of population, which is unbelievable, we are ahead of the States per head of population (Neary, 2000).

The key to Sony's success with the PlayStation has been the quality, quantity and cost of the games they supplied with it. These games were aimed at a slightly older age group (18-25) than existing console games and bolstered by considerable and novel marketing techniques the company almost single-handed created a broader consumer market for digital video games (Poole 2000). In 1996 Eidos published *Tomb Raider*, an adventure game created by Core Design from the UK for PlayStation One. The digital games industry had its Marilyn Monroe. And an exclusivity deal meant that the next three *Tomb Raider* games appeared only on the Sony PlayStation.

The early digital games software industry was a cottage industry based around individual programmers working from home on a commission basis. By the end of the 1980s games production had become industrialised and was based around teams of programmers and artists, while marketing, merchandising and licensing was largely controlled by multinational publishing companies. The development of Nintendo's, *The Legend of Zelda: Ocarine of Time*, released in 1998 involved a 'team of more than 100 programmers, designers, artists, testers and others ... for three years, at a cost of more than $10 million' (Mowatt, 1998). The latest PlayStation title from Sony-owned Naughty Dog cost $12 million and up to 36 people to develop (Smyth, 2001).

So far this paper has identified factors which have helped the digital games industry to expand. However, there have also been significant brakes also. Throughout the short history of the digital games industry legal issues surrounding licensing and intellectual property rights have proved particularly contentious. Between 1989 and 1991 Nintendo was involved in an anti-trust lawsuit and counter-suit in the US for patent infringements and exclusionary practices including their policy of forcing third party developers to develop exclusively for their platform. When the case was settled Nintendo was forced to ease its licensing restrictions on independent developers (Sheff, 1993:274). By the early 1990s, and in response to a number of fatal school shootings, US Senate Commerce Committee ran hearings on the issue of violence in film, music and games.[3] The testimonies point to very real moral and ethical issues and efforts by a number of actors to shape the digital games industry (Lumby, 1997).[4] In response, the industry formed the Interactive Digital Games Association (IDGA) to organise and monitor an Entertainment Software Rating system. In Ireland, the industry operates a voluntary age rating system and game publishers are expected to submit all adult games to the Film Censor's Office (Healy, 2000).

The 1990s saw the continued growth of personal computer games invigorated by the potential provided by online and mobile technologies. Massive multiplayer online games like *EverQuest* (Sony) have over 400,000 subscribers and up to 100,000 simultaneous players at peak times.[5] This segment of the market is comprised of hard-core gamers, average age 29, highly educated and with a high rate of disposable income (IDSA, 2001b). The console market is younger in profile and in 2001 the PlayStation One and Game Boy accounted for two thirds of the global installed base (DataMonitor, 2002). The last two years has seen the launch of Sony's PS2, Nintendo's GameCube and Microsoft's X-Box which offer non-technical users a powerful, affordable and accessible route into games. The latest consoles are hybrid machines which also play music CDs, DVDs and provide online connectivity.

Overall the age profile of gamers is aging and according to a survey carried out for the IDSA, 43 per cent of gamers surveyed were women. Despite these figures research points to considerable differences in game usage, an industry dominated by male game producers, male representations and male tastes (Schott and Horrell, 2000; Jenkins and

[3] http://www.senate.gov/~commerce/hearings

[4] In China the government brought in legislation to ensure that arcades would not be located less than 200 metres from schools and they compared digital games to 'electronic heroin' (ChinaOnline, 2000).

[5] http://eqlive.station.sony.com/

Cassell, 1998; Kerr, 2002b). Indeed, reviews of last year's E3 festival noted that 'the soft-porn fixation embarrassingly displayed at computer gaming's biggest convention, E3, is dooming the $6 billion industry to the nerd-geek ghetto (Wagner, 2001).' This is despite the best efforts of female entrepreneurs and organisations like the IDGA. Meanwhile, arcades continue to provide a useful role as a site to premier games and offer access to expensive 'virtual reality' technologies. Internet cafes, PC rooms and local area network (LAN) parties have also emerged as consumption sites, particularly important in countries where online access charges are relatively high.

Key characteristics of the Digital Games Industry

The digital games industry exhibits patterns of organisation and power distribution which closely resemble traditional media organisations. The STeM research project (Kerr, 2002a; Kerr and Flynn, 2002) found that the digital games industry is structured like the movie, book and music industries:

- Costs of production are high, and increasing, while demand is highly uncertain

- Reproduction costs per CD-ROM are relatively low

- Publishing and marketing are critical functions in the overall value chain

- The console market is oligopolistic with increasing vertical integration

- In all sectors scale is becoming increasingly important

- There are significant barriers to entry facing new entrants, especially to the console market

To date, the digital games industry has not been widely researched. Cornford, Naylor and Driver (2000) identified the unequal relationship between large powerful financial/distribution companies and small production firms in the games industry in the UK as crucial to understanding the business. More recently, Alvisi et al (2002) and Gallagher and Park (2002) note the importance of the network effect, i.e., the more quality games available on a platform the better a console will sell. Larrue et al (2002) found that the relationship between publishers and developers in this market was akin to the book publishing or movie industries and that small studios have a high attrition rate. Commercial market research reports also compare the industry to other entertainment industries, especially the film industry (Screen Digest, 2001a; DataMonitor, 2002) (Deutsche Bank (2002) cited in Larrue). Meanwhile Williams (2002) identifies some differences between this industry and traditional media companies. The digital games industry does not deliver audiences to advertisers and it uses proprietary, non-interoperable hardware. However, he admits that development is like the movie industry while publishing and distribution is more like the book and music industries.

The 'editorial model' identified by Garnham (2000) is particularly useful for understanding the digital games industry:

> Editorial produces individual cultural goods – books, records, films etc. – financed largely by direct sale to the end consumer where the problem is (a) the management of highly skilled creative labour working under artisanal conditions, and (b) the uncertainty of demand. Because the nature of the product demands constant renewal – new books, new recordings, new films – for which demand is highly unpredictable, it is necessary to exploit economies of scope

> through managing what Miege calls a catalogue. In an economy of hits and flops you can only survive if you produce a range of products wide enough to ensure high enough statistical probability of achieving the one in ten hit. It is control of the catalogue and its distribution that is crucial and much of the direct labour can be subcontracted to 'freelancers (Garnham, 2000:51-52).

The editorial model of media organisation corresponds to the dominant model in the digital games industry.[6] The industry is comprised of digital game developers, publishers, distributors and retailers. Development companies are the source of creative ideas and they rely on independent or console manufacturer/publishers for an advance or commission. After launch they may receive royalties after the advance and costs are paid. Costs of production are high including high research and development (R&D) costs for new technologies, licenses and marketing costs. At the same time, retail prices for games have been falling with increased competition so the break even point has been rising. A game that cost $3 million to develop would need to sell almost 400,000 units for the publisher to break even if they were not a distributor - some estimate that almost 80 per cent of games do not break even. As a result publishers rely on a small number of 'AAA' games, the equivalent of a block-buster movie, to carry losses made on other games in their catalogue.

In order to differentiate their products publishers are spending more and more on marketing. Proprietary and independent game magazines and websites, advertising in traditional media outlets and innovative new types of marketing are the norm. Poole (2000) details how Sony set out to establish a lifestyle link between their product and the club scene in the early 1990s in the UK by advertising on flyers and establishing PlayStation rooms in clubs. In Ireland the PS2 launch was accompanied by a *Vib Ribbon* campaign in nightclubs around the country and a press and television campaign. Sony is also unique in terms of the extensive marketing presence it maintains in Ireland in contrast to other major players like Nintendo. From a retailer's point of view this strategy has been crucial to the success of Sony PlayStation in Ireland.

Given that game publishers do not have the same diversity of revenue as film majors, economies of scale are becoming increasingly important in order to minimise risk and maximise profits. Back in 1983-4 Leslie Haddon (1993) found that game publishers were merging. Recent analysis by Kerr and Flynn (2002) found that the games industry has restructured around a core of between 10 and 20 major publishers. During 2000 more than six specialist game publishers were bought out by larger specialist publishers including GT Interactive and Hasbro Interactive by Infogrames, Neversoft and Raven by Activision, Dreamworks Interactive, Kesmai, PlayNation and Pogo.com by Electronic Arts (Pham, 2001). By 2001 four of the top ten independent publishers were from the US, three from Japan and three from France. Indeed seven of the top ten console titles in the US in 2000 were published by Nintendo with the other three by Activision and Sony (IDSA, 2001b). PC Games publishing was slightly more diverse with the top ten including Electronic Arts, Disney Interactive, Hasbro Interactive, Blizzard and Microsoft.

In the United States publishing is concentrated in California and 32 publishers account for nearly 90 per cent of game revenue. While publishing is concentrated geographically the 'development community, the creative community is more dispersed' (Lowenstein, 2001)'. In theory the developers can be anywhere, particularly if they have already produced a hit title. This opens up opportunities for small companies in unusual locations, including Ireland. Herz suggests that 'digital construction workers are the most technologically sophisticated migrant labour force the world has ever seen. Demand for their skills is at al all-time high … the crackerjack video-game jobs are increasing happening in out of the way places' (1997:97). Cornford et al (2000) found that in the UK development companies tended to favour slightly remote locations while publishers tended to cluster around the greater London area in close proximity to retail and conference outlets. Interestingly, once a game developer is successful they are often bought into or bought out by a publisher. While operationally the development studios

[6] Apart from massive multiplayer online games and gameshorts. However it is believed that the development community will in future operate more on a project-by-project basis rather than employing full time staff.

maintain their autonomy, the trend towards vertical integration gives the publisher more control over production schedules and deadlines.

In digital games the main platforms are: consoles based on proprietary standards (e.g. Sony PlayStation 1&2, Nintendo GameCube, Microsoft's X-Box), personal computers (PC) based on open standards, mobile devices (mobile phones, personal communication devices, handhelds) and arcade. The very large players like Nintendo, Sony and Microsoft (are hybrid players who) use technological innovation, economies of scale and extensive networks of third party and in-house developers to compete for market share. Despite attempts by these players to establish a de facto console standard each new generation of technology brings new players. With the withdrawal of Atari, 3DO, Mattel, Sega, and NEC from the platform market only Nintendo appears to be able to carry over market share from one technological generation to another. Today Nintendo, Sony and Microsoft operate in every stage of the value chain, producing everything from the console machines to the peripherals and games. The "big three" in the console market operate at a scale that dwarfs the $1.5 billion in annual revenues of the largest independent publisher, Electronic Arts (although not those of French owned giant Vivendi Universal Publishing).

Hardware development has been a strategic move by all these three companies in order to gain market share and higher profits from content sales. Sheff (1993:35) reports that Nintendo sells its hardware at less than cost price in order to capture market share. This claim would certainly be borne out if one examines the technologies and the price charged for it. The X-Box, which was released in the US on Nov. 15th 2001, contains a Pentium III chip, 64 MB RAM, a 20 Gbyte hard drive, a DVD/ROM drive and a 100-Mbit ethernet port. Following a high initial price point it now sells for €199.99 in Ireland although it costs €359.40 to produce each unit.[7] One could conceptualise the hardware battle as a struggle between competing technological frames within which different configurations of players are enrolled (Bijker, 1995). Much of this enrolment is played out through licensing third party developers to develop content which best displays the qualities of each system and through global advertising and marketing.

[7] The X-box cost €499 in Ireland at launch. The Gamecube cost €249.99 at launch. By 2003 these prices had dropped to €199.99 and €199 respectively. The PS2 costs €269.99 currently

The advertising and marketing battle is not solely based on competing technical characteristics but on a broader struggle between the meanings and values associated with each system. Thus Nintendo represents the GameCube as the 'gamer's machine' while Sony represents its system as a complete home entertainment system. Microsoft is emphasises the gaming potential of its machine but in contrast to Nintendo the company is targeting a slightly older market. This objective is embodied in the product's chic black and green design and is in sharp contrast to the more playful cube shaped purple box from Nintendo. The winner of the console battle may control the home entertainment system of the future in every living room.

A further characteristic of the digital games industry is the development of game genres. Herz (1997) identifies eight genres: action, adventure, fighting, puzzle, role-playing, simulations, sports and strategy. Poole (2000) identifies nine including shoot-'em ups, racing, platform, beat-'em ups, god games, real-time strategy games, sports, fantasy/magic and puzzles. Poole suggests that these genres are gradually being erased and many games include elements of two or three genres. Interviewees for the STeM project suggested that larger publishers were generally conservative and when a title is successful there are numerous sequels and merchandising spin-offs. The emergence of successful game brands has led to the extensive use of licensing in the digital games industry; both real world elements and successful properties from other media e.g. real world elements like David Beckham (secured by Rage), Starsky and Hutch (secured by Empire) and established brands like *Who Wants To Be A Millionaire*, *Toy Story* and *Harry Potter* (Kerr and Flynn, 2002). A recent report cited on the European Leisure Software Publishers Association (ELSPA) website notes that:

> Last year, licence-based titles accounted for 45 per cent of the all-
> formats UK top 100, …Overall, the licence looks set to increase its

power over the business as publishers use intellectual properties to buy consumers' attention and throw marketing money at these products in a bid to return their investment' (Screen Digest, 2001a).

The early 1990s saw Hollywood studios try to develop digital games but a number of spectacular failures saw the period dubbed 'Siliwood.' Today Hollywood is less directly involved in games production but licensing to third party independent developers and film tie-ins are significant businesses. For example, Vivendi Universal will publish games based on recent Universal films including *The Scorpion King* and *The Mummy Returns* in 2002 but also on 1982's *The Thing* and 1993's *Jurassic Park* (Bloom, 2002). Significantly, however, Vivendi licences the properties and publishes the games while the development is outsourced to third party developers. Indeed, as the digital games business grows game characters like *Lara Croft* are likely to be increasingly visible on other platforms (Kerr and Flynn, 2003).

With the growth of the Internet it was widely believed that small development companies would be able to bypass the main publishers/distributor gatekeepers. With notable exceptions, like *Doom,* the prevailing trend points to the contrary. The top three producers for the online market are global corporations: Microsoft's *Asheron's Call*, Vivendi Universal's *battle.net* and Sony's *EverQuest*. With the growing concentration in publishing it would appear that the greatest potential for new entrants lies in development. This is borne out by research conducted by Sunny Yoon about the growth of online games in South Korea since 1997. While the most popular games are still developed in the US and Japan, the Korean government actively supports domestic games producers and the industry is growing steadily (Yoon, 2000). This situation has been replicated in Texas, Scotland and Australia. Given the success that these regions have had in supporting the growth of game development communities, the STeM project went on to examine the digital games industry in Ireland.

Patterns of industry growth in Ireland – environment, strategy, key players

Digital games companies, while similar in organisational terms to traditional media companies, are heavily dependent on developments in computer hardware and software. Despite this, digital games have only recently been seen as strategically important to economic development and they are seldom spoken about in relation to cultural development. This section will locate the industry economically in relation to more mature media industries and explore the emergence of digital games companies in Ireland.

Locating the digital games industry economically is fraught with problems given the lack of independent information available. Deutsche Bank estimate that the sale of game software was worth $ 14.8 billion worldwide in 2001. Adding sales of hardware and peripherals they estimate the industry to be worth a total of $23.6 billion with the US accounting for 41 per cent of this, Japan 33 per cent and Europe 26 per cent. (Deutsche Bank cited in Larrue et al., 2002). Meanwhile Datamonitor put global games software sales in 2001 at $17.7 billion (DataMonitor, 2002).

The Interactive Digital Software Association (IDSA), the industry association in the United States, estimated that sales of digital game software in 2000 in the US reached $6.35 billion. Video games (i.e. console and arcade games) constituted $4.6 billion of that total and computer games $1.75 billion (IDSA, 2002). To place this in context US domestic box office in 2000 took $7.7 billion (Motion Picture Association of America, 2002). Add to these figures film sales to cable, video rental, DVD and merchandising and the digital games industry figures seem less impressive. However, the digital games industry is far from mature and estimates put annual growth at between 8 and 15 per cent.

ELSPA commissions Screen Digest, an international media research company, to annually assess growth in the European leisure software market. The total leisure software market in the UK in 2000 including arcade, TV, handheld, console and home software for PCs grew to £934.4 million /$1.33 billion, of which PC and video games constituted £800 million/$ 1.14 billion (Screen Digest, 2001b; 1999; ELSPA, 2001; Digest, 2001). The sales of entertainment software in the UK thus surpassed the revenues grossed by cinema box-office (£583.4 million in 1999) but not UK video rental and sales (£1.4 billion in 1998) (European Audiovisual Observatory, 2000). In terms of the European leisure software market Screen Digest estimated that it was worth a total of $5.8 billion in 2000 with the UK constituting $1.54 billion of this followed by Germany with $1.3 billion.

While there are variations in figures depending on the source they all point to the growth of a significant new entertainment sector which in Germany, France, the UK and the US is growing rapidly but is still smaller than cinema and video. The strength and proximity of the UK and US development industries has had a significant impact on the development of the Irish digital games industry and throughout the 1980s many 'would-be' developers emigrated to these countries.

The digital games industry in the UK employs 21, 399 in total of which 8,534 directly in development and publishing (Green and Keen, 1999). The IDSA estimate that the US digital games industry employs 124,500 people directly in information related jobs with a further 95,100 indirect jobs in trade and transportation (IDSA, 2001a:5).

A survey of the digital games industry in Ireland in 2001 identified a number of multinational and indigenous players and a number of company failures. Two patterns emerge. Firstly, there is a high rate of attrition with the lifecycle of Irish companies corresponding with the five-year cycle of different game platforms. Indeed, none of the companies established in the late 1980s or 1990s have survived (Kerr, 2002a). Secondly, while the multinational players were attracted to Ireland by government incentives, there is now a group of indigenous start-ups that have emerged in the last two-three years. These companies are targeting emergent sectors of the market with less barriers to entry including PC/online, mobile, internet and digital TV as well as specialist services to the industry such as middleware and animation. In total there are about 50 people employed directly in game development in Ireland and a further 220 in specialist services like middleware, animation and localisation[8].

Without a proven track record these start-up companies have had to secure investment capital in Ireland combined with personal finance, debt finance and money from bespoke developments. Kapooki, for example obtained venture capital from Campus Companies Venture Capital Fund and Enterprise Ireland in 2000 and employs 15 people in Dublin developing games for the Internet and portable devices. Meanwhile TainTech, a Dundalk based start-up company was not so lucky. After initial public and private investment and a year's work the company failed to secure sufficient development finance from a publisher to proceed. The company is now dormant. By 2002 Ireland had one PC/online game developer, seven developers of game shorts for mobiles, Internet and digital TV and two companies who provide specialist services to the games industry. Significantly, Ireland has no presence in the largest segment of the market, i.e., console games or in the crucial publishing business[9].

By mid-2001, a small number of indigenous digital games companies had established themselves in Ireland. A one year post-leaving certificate course in games production has been running successfully for most of the 1990s and Ireland has exported talented developers to companies like Codemasters in the UK and Shiny Entertainment in the US (McGreevy, 2001). Based on interviews with people in the industry and public sector bodies, the STeM project identified three drivers in the Irish context: strong international demand and growing domestic demand for games, Irish success in software and traditional media industries and the economic confidence inspired by the Celtic Tiger. However, there were nine clear barriers to growth including:

[8] By 2003 a similar number were employed in game development, 178 in specialist services and 21 in sales and marketing by international players in Ireland.

[9] By 2003 Ireland had two PC game developers, five developers of game shorts, four publishers of mobile content, three specialist service companies, two multinationals localising games and three multinationals marketing games in Ireland of particular interest in the growth in mobile content aggregation and publishing.

the extent of concentration in the console market, the power of publishers as gatekeepers in the value chain, the lack of appropriate labour, the lack of capital resources, the inadequacy of infrastructure, especially telecommunications, the lack of public knowledge about the industry, the lack of specialised support from education or public agencies, the absence of a role model and, amongst certain sections of the population, a negative perception about digital games (Kerr, 2002a:27).

Conclusions

This research project found that the digital games industry is a highly skilled, internationally traded product and service industry – combining computer hardware, software and design skills. However despite the rapid growth of the Irish economy between 1993-2000 digital game companies experienced difficulties establishing and sustaining businesses in Ireland. Interviewees in 2000/2001 also perceived a largely negative attitude towards their industry from key industrial development and educational institutions.

This perception may be set to change. Enterprise Ireland (EI), the agency with responsibility for developing the digital media sector in Ireland has commissioned two consultancy reports on the digital media sector in the past three years: one by Farrel Grant Sparks (FRS) in 1999 and another by Price WaterHouseCoopers (PWC) in 2000. It is worth noting their recommendations. Both reports note the potential for growth in the digital media sector and the FGS report notes specifically the potential in the digital games sector. The FGS report identified the video and game industry as 'a high growth market' which was 'the fastest growing segment of all entertainment industries in 1998.' However, it noted that 'games have not traditionally been a strong area for Irish new media industry aside from the provision of localisation services' going on to add that the 'games market is an attractive sector due to the intensity of high-end media skills used (Farrell Grant Sparks, 1999).' A key finding of this report was that the level of 'co-ordinated support available to companies in relation to information, research, technology and networking is much weaker than in key competitor regions' (1999:executive summary).

As Ireland enters a difficult economic climate there is greater pressure on industrial development agencies, educational institutions, and initiatives like the Digital Hub to offer co-ordinated support to emergent digital media industries. At the time of writing all the main industrial development agencies are conducting strategic reviews of the digital media sector. This research project is a contribution to public knowledge about this industry both globally and in Ireland. Its findings point to the usefulness of examining the media/content aspects of the sector as well as the digital aspect.

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