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The Danish Computer Game Industry
Annual Mapping 2005

Copenhagen Business School
May 2005

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Preface

The present report is part of a series of mappings of Danish creative industries. It has been conducted by staff of the international research network, the Danish Research Unit for Industrial Dynamics, (www.druid.dk), as part of the activities of *IMAGINE.. Creative Industries Research* at the Copenhagen Business School (www.cbs.dk/imagine).

In order to assess the future potential as well as problems of the industries, a series of workshops was held in November 2004 with key representatives from the creative industries covered. We wish to thank all those, who gave generously of their time when preparing this report. Special thanks go to Søren Sørensen, President and CEO, Interactive Television Entertainment ApS; Christian Majgaard, CEO, World Simulation Software; Morten Borum, CFO, IO Interactive; Peter Juhl Nielsen, Investment Manager and Associate Partner, BankInvest; Morten Nielsen, Marketing Manager, Electronic Arts Denmark; and Jesper J. Lange, Partner, Rønne & Lundgren. Numerous issues were discussed including, among others, market opportunities, new technologies, and significant current barriers to growth. Special emphasis was placed on identifying bottlenecks related to finance and capital markets, education and skill endowments, labour market dynamics, organizational arrangements and inter-firm interactions.

The first version of the report was drafted by Anders Mehlbye, Copenhagen Business School, during the autumn of 2004 and finalized for publication by Julie Vig Albertsen, who has done sterling work as project leader for the entire mapping project. Moreover, the project owes much to Charlotte Appelgren, MEDIA Desk Danmark, who has kindly provided material and put an effort into ensuring the solidity of the present report. Together with similar mappings of a variety of Danish creative industries and summaries of the workshops held, the report constitutes part of the underpinning for the associated policy memo and for subsequent work within *IMAGINE..*

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Copenhagen Business School, May 2005

Executive summary

- The Danish game industry primarily comprises the five relatively large and 20-40 smaller game developers in the country. The five large game developers in Denmark, IO Interactive, Interactive Television Entertainment, InterActive Vision Games, World Simulation Software, and Deadline Games employed a total of approximately 250 people in 2003 and had an estimated total turnover in 2002 of EUR 23.6 million.
- In comparison, the total US based turnover from games was estimated at EUR 5.7 billion in 2003. In 2000, the US game industry grew at a rate of 15 per cent a year, while the growth rate for the US economy as a whole was 6 per cent a year.
- The Danish industry expects 3-7 newcomers and a 60 per cent increase in its workforce to arise from the launch of the next generation of consoles, which are expected to increase the demand for games as well as the demand for advanced and costly development.
- Denmark is maturing as a market for game consumption. Denmark is characterized by a high penetration of PCs and broadband connections. In 2003 there were approximately 1 million PCs in Danish households used for gaming, and children aged 8-18 typically spend more than an hour a day playing computer games.
- The games launched by Danish developers have all reached an attractive segment of the international gamer environment, embodied in massive successes such as IO Interactive's Hitman. However, at the same time, the Danish industry must satisfy a number of critical conditions for growth in the future, in particular by discovering new funding opportunities, solving the problem of negotiation of intellectual property rights, and dealing with the limited size of the employee base.
- The problem with regard to funding arises from the risky nature of the game development process, which is both lengthy and expensive. Large investements are needed even before publishers and hardware format holders have committed themselves. This situation often ends in a vicious circle since this way of conducting business and the typical progression of events in game development have very little appeal for investors.
- Intellectual property is at the heart of turnover streams, and the negotiations of rights become vital. Negotiations are often a costly affair—especially for small Danish game developers. This creates a push towards more network cooperation among small developers in order to share specialized negotiation units and thus to create some economies of scale.

- Internationalization of the workforce is necessary in order to meet the growing demands for a skilled workforce in the future and to increase the scope of developments within the field in Denmark.

Table of contents

1 The Danish game industry

In recent decades, video and computer games have become an integral part of 'Western' culture, and the game industry has become a multi-billion dollar business. This paper sets out to identify the potential of the Danish game industry as well as barriers to its growth. The Danish game industry—dominated by only a few key players within game development—has in recent years received noteworthy international recognition and has achieved considerable economic success in terms of numbers of employees, turnovers and exports. Danish developers have succeeded in establishing themselves as highly reputable developers delivering high-end games when measured using parameters such as cost of production, level of game sophistication and retail price.

The history of the Danish game industry goes back to the early 90s, when Interactive Television Entertainment (ITE) had its breakthrough with the computer animated character "Hugo", which appeared as a main feature in a nationally broadcasted TV show. Hugo laid the ground for significant spin-offs and ITE's current wide-spanning portfolio of related "Hugo" products. More recently, IO Interactive attracted massive public attention, when the English publisher Eidos paid EUR 34.5 million (DKK 256 million)[1] for the know-how and creativity of around 100 Danish employees. There are several other examples of Danish success.

For example, Deadline Games recently announced a DKK two-digit million deal with a US-based company to develop a top-notch game for PlayStation 2 and PC in 2004. Another company, InterActive Vision Games was one of the first Danish developers and now boasts an impressive portfolio of games. The company is part of the IAV Group, which consists of different companies working with, among other things, games and application development, project management services, sales and marketing activities and 3D visualizations[2]. Like these companies, World Simulation Software is in the midst of a process of radical development. Recently, the company launched the game "GANGLAND", which belongs to the mafia game play universe and which introduces a new gaming style that combines the three genres of real-time strategy (RTS), role-playing game (RPG), and simulation (SIM) with a high level of action. Moreover, a multiplayer demo version of "GANGLAND" has been

[1] Exchange rate of 01.07.2004 of DKK 1 = EUR 0.13460. As this report publishes value growths in fixed euro terms, EUR values in each historical year (i.e. 2002) are re-stated rather than actual—i.e. the values stated throughout does not inflate according to currency exchange changes.

[2] http://www.iavgames.com/company/

launched to meet the increasing demand for Online Multi Player Games[3]. One of the characteristics that makes World Simulation Software attractive to investors is that they are a diversified developer with a broad portfolio, embracing, among other things, traditional board games. This secures multiple streams of turnover and expands the possibilities of financing.

On the international level, the future bodes well for the Danish game industry. Turnovers from the international game industry are on the verge of surpassing those of the more mature film industry. The worldwide turnover from video game hardware and software alone has been estimated at EUR 22.8 billion (USD 27.8 billion) in 2003 and is forecasted to reach EUR 24 billion (USD 29.3 billion)[4] by 2008. The US turnover alone was estimated at EUR 5.7 billion (USD 7 billion)[5] in 2003; in comparison, the Danish total market turnovers for 2003 were estimated at approximately EUR 24 million (DKK 175 million)[6].

Nevertheless, it is apparent that despite several optimistic worldwide forecasts and despite its success so far, the Danish game industry faces several barriers to growth in the future. Among the most critical barriers are funding opportunities, the protection of intellectual property rights, and the growing demand for skilled employees as the industry continues to grow.

[3] http://www.whiptailinteractive.com/news.php

[4] Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

[5] Source: www.theesa.com, October 2004. Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

[6] Peter Nyholm (2003): "New action hero taking over from Hitman" ("Ny actionhelt i Hitmans fodspor"), in *Børsen*, 25 March 2003. Exchange rate of 01.07.2004 of DKK 1 = EUR 0.13460.

2 Definitions and data sources

The focus of this paper is primarily on development of offline related products of the game industry—that is, games developed for hardware platforms such as PCs or video consoles and not played online at the Internet. Moreover, the focus is on the *modern* gaming industry, which is fairly new. Modern games are characterized by a high level of three-dimensional effects, a high level of player interactive features, and Internet compatibility, making it possible to connect and play online against other players around the world. Modern games typically involve a high level of development and marketing costs in the range of EUR 1.5+ million.

Since the Danish players in the game industry are mainly developers, they are the main focus of the paper. Currently, there are no more than five relatively large game developers and 20-40 smaller ones of which the majority are probably unable to make a living from game development. The game industry market is still a young and fairly immature market and data is therefore sparse. This paper draws upon a mix of sources:

- Existing analyses of the Danish game industry
- Interviews with key Danish actors in the industry
- Annual reports, where available
- Data from Statistics Denmark

Among existing analyses of the Danish game industry this paper draws in particular on the publication, *Digital Games,* by Charlotte Appelgren for Media Desk Denmark in 2003. Furthermore, the international research company IDC has been helpful in discussing the data as well as in providing vital information[7].

It should be noted that the data made accessible by Statistics Denmark are problematic to use. This is mainly because Statistics Denmark classifies data according to two systems: the Classification of Economic Activities in the European Community (*Nomenclature générale des activités economiques dans les Communautés Européennes*) (NACE); and DB03[8]. This latter system is a detailed Danish nomenclature of economic activities based on NACE and covering a wide range of activities related and non-related to games. The most common problem is that video and computer games are grouped with traditional toys. This

[7] Interview with Research Manager, Anders Elbak, IDC Denmark.

[8] These classifications identify the principal activity of a unit, i.e., the activity that contributes most to the gross value added of the unit.

categorization does not encapsulate games as a mass media phenomenon. Hence, rather than clearly indicating developments in the game industry, the data provided by Statistics Denmark only vaguely indicate trends. A proposal to DB03-categories encompassing activities related to the game industry is listed in the table below.

Table 1: Sector categories according to NACE/DB03 by Statistics Denmark that embrace the Danish game industry

NACE/DB03	Description of activity
Development of offline products/video games	
36.50	Manufacture of games and toys. This includes electronic games; video games etc., whereas computer games are excluded from this activity class
72.20	Software consultancy and supply
72.21	Development of standard software, which includes development, production, distribution and documentation of 'ready-made' software, and development of computer games
72.22	Development of customized software and consultancy related to software
Reproduction of offline products/video games	
22.32	Reproduction of video recording. Reproduction from master copies of records, compact discs and tapes with motion pictures and other video recordings
22.33	Reproduction of computer media. Reproduction from master copies of software and data on discs and tapes
Wholesale trade with offline products/video games	
51.84	Wholesale trade with computers, software and telecommunications equipment
51.84.10	Wholesale trade with computers and ICT equipment
51.84.20	Wholesale trade with telecommunications equipment
Wholesale trade with consoles	
51.84	Wholesale trade with computers, software and telecommunications equipment, cf. above conc. wholesale trade with offline products
Retail trade with offline products/video games	
52.48	Other retail trade in specialized stores
52.48.50	Retail trade with toys and games. This activity includes retail trade with video- and computer games
52.48.66	Retail trade with computers and standard software
Retail trade with consoles	
52.48	Retail trade from specialized stores
52.48.50	Retail trade with toys and games
52.48.66	Retail trade with computers and standard software

Source: Statistics Denmark 2004.

It should be noted that the main source employed in this paper of Statistics Denmark, *General Enterprise Statistics,* in 1999 replaced the former *Enterprise Statistics* produced for the years

1992-1999. Both statistics have gathered information at enterprise level, usually corresponding to the legal unit. But whereas the previous Enterprise Statistics only contain economic and employment information concerning the private sector enterprises registered as compulsory to pay value added tax (VAT), the General Enterprise Statistics embrace all activities and sectors. Moreover, the newer General Enterprise Statistics only cover real active enterprises, where the statistics up to 1999 covered all VAT paying enterprises in the private sector, if they were engaged in even the smallest activity. Active companies include companies that have at least a turnover corresponding to 0.5 full-time equivalent employment registered. Consequently, active enterprises covered for example in 2000 only 284,000 enterprises of the total of 521,000 registered enterprises. This means in principle that only approximately 1 per cent of the VAT turnover is covered.[9]

All in all, this makes up a considerable change in report methods of Statistics Denmark with two major consequences to bear in mind when reading this report. First, it obstructs the continuity in enterprise statistics when the period reported starts before 1999. Second, one could expect that the criteria of 'active enterprises' will rule out several of the smaller one-man operations such as freelancers especially predominant in creative industries.

[9] Statistics Denmark: *Declarations of content: Genereal enterpise statistics,* downloaded from www.dst.dk, January 2005.

3 Industry performance

The five major game developers in Denmark: IO Interactive, Interactive Television Entertainment, InterActive Vision Games, World Simulation Software, and Deadline Games employed in total approximately 250 people[10] in 2003 and had an estimated total turnover of approximately EUR 24 million (DKK 175 million)[11] in 2002. In comparison, the total turnover from games in the US was estimated at EUR 5.7 billion (USD 7 billion)[12] in 2003, and the US gaming industry grew at a rate of 15 per cent per year in 2000, while the US economy as a whole had a growth rate of 6 per cent per year[13].

3.1 Key economic figures

Table 2 below presents key economic figures (number of enterprises, turnover, export rates, and number of full-time employees) for offline products and video games, which embrace games developed for PCs, consoles (Sony, Microsoft and Nintendo), and handheld devices. It shows a considerable growth in the activities related to offline products, especially with regard to turnover and exports, which almost doubled their value from 1993 to 1999. Moreover, it is more than likely that the growth has continued during the recent years.

The reservations noted above regarding data from Statistics Denmark on the game industry should be reiterated in this connection. That is, the sector categories are very broad, including game-related as well as non-game related industries.

[10] IO Interactive Annual Report 2002, interview with ITE, World Simulation Software, Deadline Games and Multi Medie Foreningen

[11] Peter Nyholm (2003): "New action hero taking over from Hitman" ("Ny actionhelt i Hitmans fodspor"), in *Børsen*, 25 March 2003. Exchange rate of 01.07.2004 of DKK 1 = EUR 0.13460.

[12] www.theesa.com/pressroom.html, October 2004. Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

[13] Interactive Digital Software Association (IDSA), *Economic Impacts of Demand for Playing Interactive Entertainment Software*, 2001

Table 2: Number of enterprises, turnover, exports and employment in the Danish off-line[14] game industry 1993 and 1999

NACE/DB03	Number of enterprises		Turnover (Million EUR)		Exports (Million EUR)		Number of full-time equivalents	
	1993	1999	1993	1999	1993	1999	1993	1999
Development of offline products/video games:								
36.50	138	127	596	582	454	489	3,937	4,138
72.20	5,653	7,520	1,120	3,454	194	571	14,981	20,072
Reproduction of offline products/video games:								
22.32	10	13	21	16	8	8	109	107
22.33	4	34	1	17	0	0.4	5	143
Wholesale trade with offline products/video games								
51.84.10	-	-	-	-	-	-	-	-
Retail trade with offline products/video games:								
52.48.50	466	466	102	78	2.4	0.8	731	992
52.48.66	-	-	-	-	-	-	-	-
Total offline related activities	6,271	8,160	1,841	4,147	659	1,069	19,763	25,452
Total private sector*	338,559	326,820	195,225	260,922	44,578	60,734	1,011,226	1,158,556

Source: Customized data, Statistics Denmark 2003, based on Statistics Denmark, Enterprise Statistics 1993 and 1999.
Note: Exchange rate of 01.07.2004 of DKK 1 = EUR 0.13460. As this report publishes value growths in fixed euro terms, EUR values in each historical year (e.g. 1999) are re-stated rather than actual—i.e. the values stated throughout does not inflate according to currency exchange changes.
For 51.84.10 and 52.48.66 data are not yet available.
* Comprising NACE 15-37, 45, 50-74, 92, 93

3.2 Entrepreneurship

The game developer industry is intrinsically bound up with what could be framed as a genuine interest in making entrepreneurial and innovative games combined with the ability to deliver a sound and profitable business. Key players in the industry believe that within the next couple of years the industry will experience 3-7 newcomers[15]. This is just an estimate, since several small game developers—probably somewhere between 20 and 40—are already struggling to raise sufficient capital and find the right type of funding.

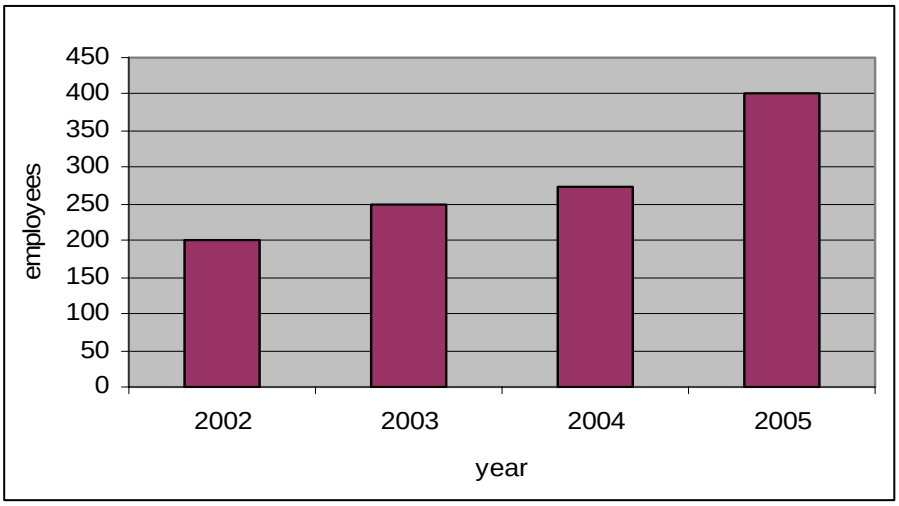
[14] The notion of "offline activities" is employed in order cut off activities associated with the fairly different genre of online gaming at the Internet.

[15] Computerworld Top 100, 2004.

3.3 Employment

The five large game developers in Denmark: IO Interactive, Interactive Television Entertainment, InterActive Vision Games, World Simulation Software, and Deadline Games employed approximately 250 people[16] in total in 2003. Within the whole industry there are no more than 1,000 in the workforce[17].

Figure 1: Development and expectations for future total employee base in the Danish game industry[18]



The figure above illustrates the expectations for future employment based on assessments by the industry itself. The high expectations for 2005 are mainly due to the launch of the next generation of gaming consoles, which are likely to boost the gaming industry and thereby also employment. This boost could, however, be less dramatic than sketched above due to positive developments in productivity. That is, all respondents of the Danish game industry have very high expectations of productivity due to an estimated increase in output combined with the re-use of programming and other basic processes. It should be noted that the estimates above are solely rough calculations and only embrace developments in the core companies of the game developer sector, for which game development is the primary business. Accordingly, some players in the gaming industry see this forecast as too optimistic.

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[16] IO Interactive: *Annual Report 2002*, interview with ITE, World Simulation Software, Deadline Games and Multi Medie Foreningen

[17] Westergaard, Astrid (2004) "Ways to become a game developer are few" ("Vejen til en karriere som spiludvikler er uhyre smal"), *SAMDATA magasinet*, nr. 04/04.

[18] IO Interactive Annual Report 2002, interview with ITE, World Simulation Software, Deadline Games and Multi Medie Foreningen

3.4 Education

Game development makes high demands in terms of both the creative and technical skills of its workforce. For example, the programmer often needs not only advanced degrees in programming, but also a talent for story telling and for visualizing scenes—that is, for thinking in terms of game. As a CEO of one of the big Danish development companies expresses it, "you should be able to make jokes about equations at lunch *and* you'll have to be a gamer yourself, in order to possess the passion for games needed". The bullet points below highlight some of the origins and competencies of Danish game developers, and demonstrate the huge variety in the skills in demand.

On the management level, the most common examples of educational background are[19]:

- Art direction and project management
- Master's degrees in economics and finance
- Technical engineering
- Graphic design
- Master's degrees in marketing and distribution
- Master's degrees in accounting
- Master's degrees in law

At other levels in the game business, common examples of educational background are:

- Public Relations
- Accounting
- 3D modelling
- New media productions
- Architecture
- Programming
- Photography

Entering the game development business is thus complicated by the high demands on both technical and creative skills. In Denmark, the following paths of education and training are currently recommended by the industry[20] to potential future employees:

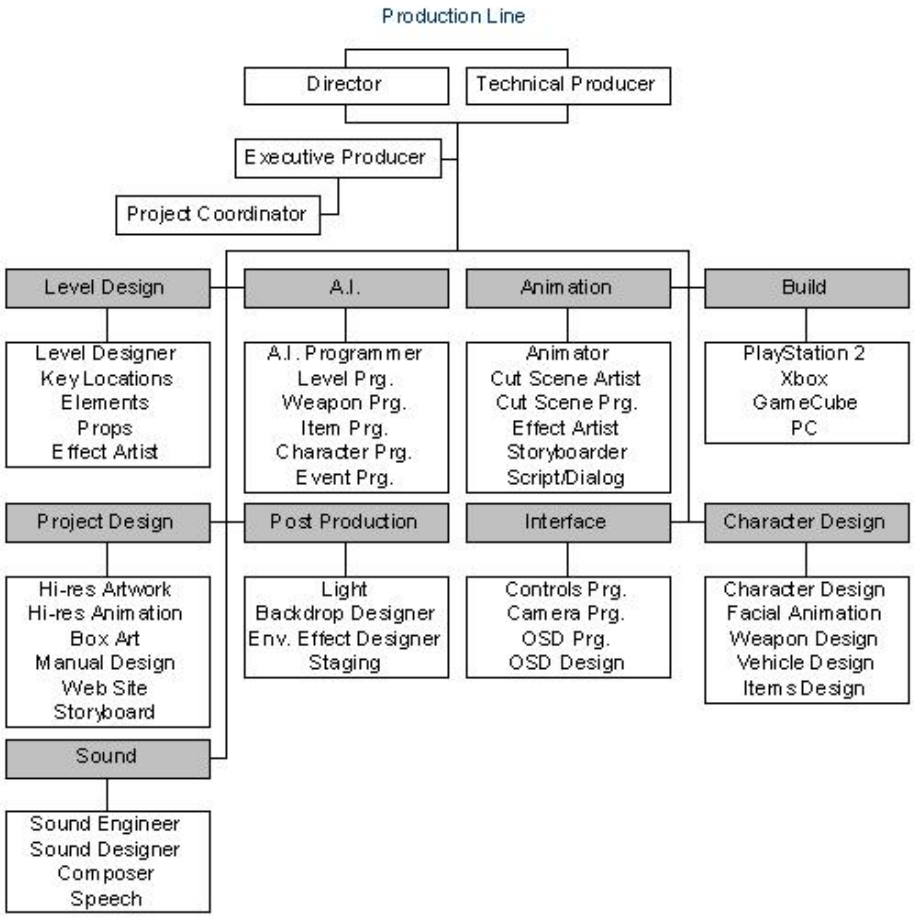
- Programming at the Technical University of Denmark (DTU) or the newly established game developer education (www.dadiu.dk)
- Jobs as a tester in game companies in order to build up a personal portfolio of games
- Networking in the environment—since the Danish game environment is small and it is therefore vital to become well known
- Exhibition of talent on websites, for example, web portals such as www.spiludvikling.dk or www.cgchannel.com

[19] Interviews with game developers in the Danish industry.

[20] Astrid Westergaard: "Ways to become a game developer are few" ("Vejen til en karriere som spiludvikler er uhyre smal"), *SAMDATA magasinet*, nr. 04/04, an interview med Director Søren Sørensen, ITE.

The production line of games provides an example of the wide range of key functions and competencies used in creating a game. Figure 2 illustrates the production line of an IO Interactive project.

Figure 2: Production line of a typical IO Interactive game



Source: Janos Flösser, CEO, IO Interactive. Presentation at Louiz, Copenhagen, 26 November 2002, displayed in Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark.

Creating and developing games involves a large number of highly specialized people with very different abilities, including both "technological" and "creative" experts. "Technological" competencies are typically held by programmers, software engineers and mathematicians with considerable experience in game programming and 3D graphics. "Creative" functions, on the other hand, are typically carried out by game play designers, level designers, graphic designers, writers, art directors, sound and music, etc. It is important to note that both production methods and the structure of the production team vary greatly from company to company since the Danish game industry—as opposed to other creative industries—is still a somehow immature industry.

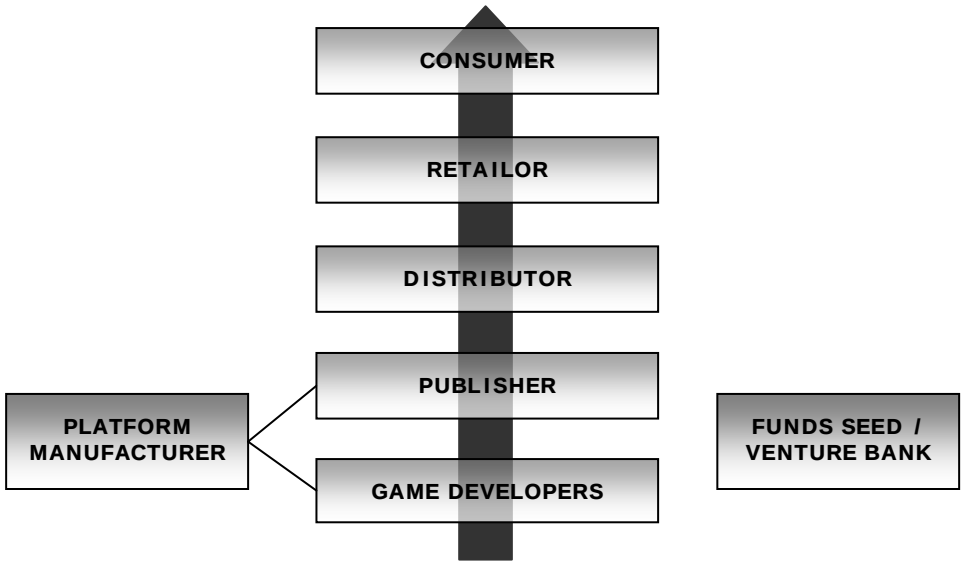
4 Industry structure[21]

The Danish game industry is mainly made up of the game development sector, characterized by only a few large players and a great many small teams of collaborators creating and developing games. There are about 20-40 small game companies, of which the majority are probably not able to make a living from game development. Moreover, in the periphery of the game development business there are several companies for which "games" is a secondary business, for example, companies involved in television or film animations, developing "advergames/commercials" and other services for the advertising industry.

4.1 The value chain

The figure below illustrates the value chain of a game development process.

Figure 3: The Value Chain of the Game Industry



Source: Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark

[21] This chapter is mainly based on Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark.

Platform Manufacturers. The platform manufacturers produce the hardware platform on which games are played. There are two types of platforms for offline games: video consoles and PCs. The main market is the console market, while the PC entertainment market is declining in terms of both units and value. Hence, we shall in the following mainly focus on the video console manufacturers. It should however be noted that the market for consoles and videogames related to consoles on the one hand, and the market for PCs and videogames related to PCs on the other hand are two relatively independent markets.

Among the video console manufacturer, three major players dominate: Microsoft with Xbox, Sony with PlayStation and PlayStation 2, and Ninentendo with GameCube and Game Boy Advance. Sony is the leader of the stationary console market, while Microsoft is considered the runner-up with their console Xbox, which was launched at the same time as PlayStation 2, as it continues to gain market shares. Nintendo has published GameCube and is probably the least advanced of the three. The next generation of consoles will probably enter the market in 2005/2006.

The platform manufacturing is considered 'heavy' business with high entrance barriers, since the success of a single console is estimated to begin at 20 million units sold, which is a turnover in excess of EUR 3.3 billion (USD 4 billion)[22]. Console manufacturers' business models typically consist of three main income flows: First, turnover from hardware sales (consoles are often sold at a loss to obtain volume and market share); second, sale of own software; and third, non-refundable royalty fees for each copy of the game that is manufactured for sale and used on their console.

The position of the console manufacturer is highly privileged since it allows exclusive access to the users. That is, in order for a game developer or publisher to obtain a license to publish a title on a specific console, the game developer or publisher must get approval from the manufacturer. Thus console manufacturers have a great deal of influence on which types of games are produced and distributed. Moreover, the publisher must get all game discs manufactured at the platform manufacturers' press and pay an advance (and non-refundable) royalty of approximately EUR 7-10 per unit. This amount will typically be deducted from the gross income when calculating the net income that forms the basis for the calculation of royalties for developers.

Game Developers. The game developers create the game—i.e., embracing the process from the initial steps of concept development, through prototype production and, ultimately, producing the game (i.e., including designing, programming, and testing). As noted earlier, game developers come from a wide range of educational and practical backgrounds ranging from game designers, producers, graphic designers/artists, art directors, level designers, computer programmers, photographers, to musicians. A large number of game development studios are located in the US and Japan, whereas the European game developers mainly are

[22] Alain Le Diberder and Frédéric Le Diberder, *La création de jeux vidéo en France en 2001*, Développement culturel, Bulletin du Département des études et de la perspective, Ministére de la culture et de la Communication, Paris, 139, July 2002 cited in Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark.

located in the UK and France, while to a lesser extent the Nordic countries. The game development studios have anywhere between 5 and 200 employees.

The game development sector can, roughly put, be divided into independent studios and the in-house studios of publishers. The Danish developers belong to the former. In the case of the independent studios/developers, the traditional funding model starts with the developer creating a convincing concept/demo/prototype. Based on this work and the company's track record, the company approaches a publisher with the aim to sign a contract, including advance royalties. This is the standard procedure for the development of titles, known as 'original content titles', which are designed by the developer/publisher themselves, whereas other titles are on a license basis (e.g., Spiderman, Harry Potter, Lord of the Rings) ordered by the intellectual property right owner such as Dreamworks or Warner Bros. Inc. Moreover, some titles are targeting a single platform, while others target a cross-platform strategy (for example including PlayStation 2, Xbox, Nintendo and PC at the same time).

Publishers. The main activity of the publisher is to continuously search new titles that fit the publisher's profile—or to order new titles—and to provide production funds and market titles successfully to distributors, retailers and the consumers. The international game publishing houses have either their own worldwide distribution set-up or have partners to execute distribution.

In recent years publishing in general has undergone a period of consolidation in order to deal with an increasingly global and competitive market. The big publishers, which count only about a dozen worldwide, are dominated by US, Japanese, French and UK giants, which employ hundreds and thousands of people all over the world. The US based, Electronic Arts, founded in 1982, is the biggest independent (i.e. not a platform manufacturer) game publisher in the world. The number two worldwide is also a US publisher, Take-Two Interactive Software. Key players in Europe include Atari (FR), Ubi Soft (FR), EIDOS (UK), Titus (FR), Vivendi Universal (FR/IE/US) and Mindscape (UK/FR). The French based Atari (former Infogrames) is among the five largest publishers of interactive entertainment when all its major subsidiaries—among others American—are taken into account. Yet another French publisher, Ubi Soft, is among the largest game publishers in the world. Apart from its own products, Ubi Soft develops and distributes many games under license from other companies such as Dreamworks, Warner Bros. Inc., Disney Interactive, Lucas Learning Ltd. and Playmobil[23].

Distributors. The distributor functions as the connecting link between the publisher and retailer. The bigger publishers have in-house distribution units, which distribute titles to retail trade all over the world–-e.g. American Electronic Arts and French Atari or Ubi Soft. Other publishers issue licenses for the distribution. Sony, which has a multifunction as a platform manufacturer, publisher, and distributor, mostly carries out its own distribution activities. However, Sony has issued a license to the Danish company Nordisk Film Interactive (Egmont Group), to carry out distribution in a number of countries.

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[23] Peter Kofler and Christian Fonnesbech: *The Interactive culture industry*. KPMG for the Danish Ministry of Culture, 4 July 2002.

The distribution network is thus dominated by global publishing houses or global conglomerates of rights (e.g. Sony) with the vast advantages of economies of scale. This tendency towards dominance by multinational distributors—a tendency also known from other creative industries with global distribution such as for example the music and film industry—is pushed even further by the fact that marketing and promotion expenses for games are still increasing. The standard is set by the major companies seeking the safe bets—i.e. the proven hits. Consequently, standards are internationally homogenized, which means that games are released in almost identical form and at the same time around the world. This latter point of timing is crucial in creative industries with global reach such as film, music, and games since the power to time the product is the key to success. As an example, it is crucial in order for a genre game such as for example a mafia game that it launches not only *before* similar games or competing genres, but in proper time in advance in order to gain a critical mass of products sold, and perhaps at the same time as a film centered on the mafia environment.

Retailers. The retailers buy games from distributors and resell to consumers. As with most products it is essential to obtain the best possible display in a shop–-and hence the retailer used to hold a favorable position when negotiating. However, with the increasing use of Internet shopping, the consumer no longer has the only possibility of purchase the product physically from the retailer but can buy the "offline games" online. Another tendency is for retail trade to skip the distribution and deal instead directly with the publishers, a policy pursued by, for example Toys "R" Us.

Examples of retailers include: toy shops, computer, TV, and music shops (or a combination thereof), bookstores, video rental shops, supermarkets, specialized game shops, etc. As regards the European retail sector, despite increasing internationalization, each country is still dominated by its local chains, which means that the retail structure in each country is still unique.

Consumers. Games of today reach a very broad audiences. That is, games have become an integral part of 'Western' (youth) culture. In addition, as the children born in the 1980s "game age" grow up, and as the 'playing age' in general expands along with an increasing demand for (engaging) entertainment, games are evolving into a mass media phenomenon alongside the Internet, TV and films.

Consumer preferences in regard to choice of genres are hard to systematize—partly because there is such a vast array of game genres, which are often mixed. Statistics from the US illustrate the following game purchasing patterns[24]:

- Console game players most often purchased: action (25.1%), sports (19.5%), and racing titles (16.6%), followed by edutainment (7.6%), role-playing games (7.4%), fighting games (6.4%), first person shooters (5.5%), and adventure games (5.1%).
- Computer gamers, however, most often purchased: strategy games (27.4%), children's games (15.9%), and shooter games (11.5%), followed by family

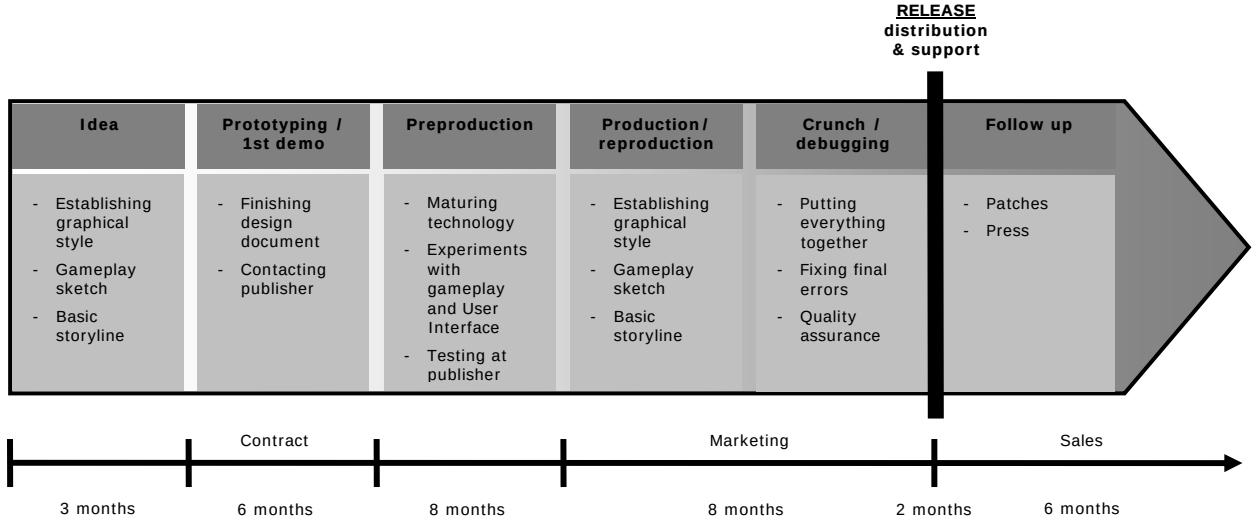
[24] Interactive Digital Software Association (IDSA). Press release, www.idsa.com/1_27_2003.html.

entertainment titles (9.6%), role-playing games (8%), sports (6.3%), racing (4.4%), simulation (4.1%), and fighting games (0.1%)

4.2 The process of developing a game

Developing a new game is an extensive and expensive process, which often takes at least a year. When developing a game for PlayStation, for example, the general rule is that a game developer will use at least 15 people for a year. The largest Danish game developers develop approximately 1-2 new games a year, developed for different consoles and PCs. The figure below presents a model of the process, which may, of course, vary from project to project.

Figure 4: The process of developing a game



Source: Based on Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*. Copenhagen: Media Desk Denmark.

The idea comes either from the developer or from a publisher who "orders" it from a developer. In the latter case, where the game developer gets an idea, the developer can choose to finance the development itself or aim for a contract with a publisher. Contracting with a publisher is usually preferred, and in order to present the game for a publisher, the game developer needs *a prototype*. Prototype development alone is often a long and costly process, ranging from EUR 0.7 - 2.7 million (DKK 5 - 20 million). Once the publisher has approved, production can start.

In Denmark there are two main organizational set-ups for the relation between developer and publisher:

a) Contract with publisher and preservation of IP rights in-house

b) Contract with publisher and sale of IP rights to publisher

When making a contract with a publisher, one of two courses of action may be followed. In the first case (a) the game developer has the authority to decide when the game is done; in

other words, the intellectual property rights (IP rights) are kept in-house. In the second case (b) the game developer sells the IP rights of the game to the publisher and thereby the authority to decide on the final version of the game as well as future spin-off products. In both cases, the developer will be paid some amount of non-refundable royalties up front. This will in part finance the costs connected with developing the game.

Subsequently, console format holders need to approve that a game meets their standards of quality. *A master copy is produced* and sent to, for example, Sony or Microsoft, which makes sure that the game complies with all their rules. This process can take up to five weeks and will be repeated if Sony or Microsoft finds anything that needs to be changed. After a master copy has been produced comes the *reproduction* phase, that is, the copying of the master game to games to be sold. If the game developer has a contract with a publisher, the publisher will take care of reproduction; otherwise, the developer needs to arrange it. If the game is developed for PlayStation or Xbox, for example, Sony or Microsoft takes care of all reproduction. When the game has been reproduced, the game is *distributed* to retail. Since the publishers and distributors are often the same, the developers often have distribution included in their contract with the publisher/distributor.

Testing a game is an ongoing activity throughout the whole creation process, and substantial resources are allocated to this area. Surprisingly, the European developers do not systematically use the free testing of gamers, which is a common way of getting qualified feedback in the US game environment. Danish developers are characterized by the sole use of a highly educated workforce. The follow-up process (corrections, upgrades, etc.) depends on the platform chosen. That is, games designed for PCs can be continuously upgraded, whereas games developed for consoles are rarely upgraded.

4.3 Cross-cutting the process and minimizing risk

There is a considerable risk adhering to the *process* of production rather than to the content of production—that is, the process of first investing in prototype development, which is only finally accepted by a publisher, and second, producing a master copy, which is not reviewed by console format holders until towards the last phases. The game industry itself holds the opinion that game production needs the same level of support as is available for film and television production if it is to thrive, grow and fulfil its true potential. The UK game industry, which is a competitor for the Danish industry, has now begun taking the first steps towards realizing such a system of support.

A grand initiative has been taken by two UK-based games trade alliances in a programme called "Game Republic Integrated Prototype Production" (GRIPP)[25], which has worried Danish developers. GRIPP seeks to minimize risk by cross-cutting the traditional and costly process of production by uniting, for the first time, developers, format holders (Sony, Microsoft, Nokia), and a vast range of publishers. The initiative could thereby easily revolutionize the way of conducting business within the games business. GRIPP aims to

[25] Games Press, 20 November 2004: http://www.gamesindustry.biz/news.php?aid=5422

provide developers with *format holder concept approval as well as guidance* prior to full development. Thus, throughout the programme it becomes possible to have a game approved and guided by all parties involved even before investing money in the development of a prototype. This minimizes risk for both developers and investors, in the end making game projects more attractive to venture capital.

5 Dynamics of the market

The games market is characterized by being highly internationalized. Danish game developers tend to have international publishers, and Danish games, moreover, tend to have an international target due to high production costs creating a need for a broad circle of consumers and, moreover, due to the fact that there are so few international providers of hardware platforms.

5.1 The global market

In the future, the console-based game sector is expected to become a crucial driver for growth, while the value of PC games tends to remain constant. Online gaming and mobile gaming are moreover expected to become important growth contributors, offering new opportunities for developers and publishers. An example of a new and emerging market is related to games developed for Nokia's N-Gage cell phones. According to a study by IDC[26], the launch of next-generation platforms in 2006 will drive market growth through 2008, when total worldwide turnovers are forecasted to reach EUR 24 billion (USD 29.3 billion)[27].

Table 3: Global market turnovers in 2001 and 2006

EUR billion	2001	2006
Console software	7,906	15,038
PC software	5,842	6,829
On-line	466	4,631
Mobile	625	9,027
TOTAL	14,839	35,525

Source: Informa Media Group, cited in Charlotte Appelgren (2003):
Digital Games. A Danish Perspective, Copenhagen: Media Desk Denmark, p. 5
Note: Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

[26] IDC (2004): *Worldwide Videogame Hardware and Software 2004-2008, Forecast and Analysis: Predicting the Future*

[27] Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

Table 4: Worldwide video game hardware and software turnover 2003-2008

EUR million	2003	2004	2005	2006	2007	2008
Hardware	6,553	4,893	4,581	5,244	9,857	9,968
Growth (%)	*-25.7*	*-25.3*	*-6.4*	*14.5*	*88*	*1.1*
Software	16,281	18,342	15,646	10,476	11,068	14,049
Growth (%)	*36*	*12.7*	*-14.7*	*-33*	*5.6*	*26.9*
Total	22,834	23,235	20,226	15,720	20,925	24,016
Growth (%)	*9.8*	*1.8*	*-12.9*	*-22.3*	*33.1*	*14.8*

Source: IDC 2004, *Worldwide Videogame Hardware and Software 2004-2008, Forecast and Analysis: Predicting the Future*
Note: Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

Table 5: Western Europe video game hardware and software turnover 2003-2008

EUR million	2003	2004	2005	2006	2007	2008
Hardware	2,163	1,788	1,521	1,470	3,191	2,850
Growth (%)	-6.5	-17.3	-14.9	-3.4	117.1	-10.7
Software	4,192	4,739	4,138	3,220	3,163	4,251
Growth (%)	46.8	13.1	-12.7	-22.2	-1.8	34.4
Total	6,355	6,527	5,660	4,690	6,354	7,100
Growth (%)	22.9	2.7	-13.3	-17.1	35.5	11.7

Source: IDC 2004, *Worldwide Videogame Hardware and Software 2004-2008, Forecast and Analysis: Predicting the Future*
Note: Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

First and foremost, it should be noted when reading the tables above that video game hardware and software turnovers are often complicated to extract from computer and video hardware and software turnovers in general. Thus the numbers provided by IDC depict tendencies rather than exact sizing.

With the launch of the next generation of consoles in 2005/2006, sales of computer and video game hardware are expected to reach new heights. While the turnovers from hardware have been markedly lower than software generated turnovers up until now, turnovers from hardware and software seem likely to converge in the near future. Thus, while hardware generated almost EUR 10 billion less in turnovers than software worldwide in 2003, hardware turnovers are expected to generate only EUR 4 billion less than software in 2008. The Western European turnovers from video game hardware and software were estimated at EUR 6.4 billion in 2003 with a growth rate of 23 per cent from the year before. According to calculations made by IDC, turnovers are expected to reach EUR 7.1 billion in 2008—that is, a growth rate of 12 per cent in the period 2003 to 2008.

Today, digital games are the most favoured entertainment media in the USA and have now exceeded growth rates of all other parts of the entertainment industry. The US market for

interactive leisure software[28] was estimated to be worth approximately EUR 6.2 (USD 7.5 billion) in 2002, whereas the Japanese market was estimated to be worth EUR 2 billion (USD 2.4 billion) and the European market, EUR 4.6 billion (USD 5.6 billion), according to Screen Digest[29]. The European market points to similar dynamics in the future. For example, in 2001 total European sales of interactive leisure software (total turnovers of EUR 6.7 billion) were far ahead of cinema box office receipts (EUR 4.9 billion) and video rentals (EUR 2.4 billion)[30].

The UK is, after the US and Japan, the largest retail market for games worldwide. In Europe, in 2001, in terms of value, the UK was the biggest market for interactive leisure software, followed by Germany, France, the Nordic region, Italy and Spain/Portugal.[31] However, despite similar dynamics in the US and Europe, the US market for games is far ahead and has demonstrated some remarkable developments. Some key figures illustrate the American state of affairs, for example[32]:

- 50 per cent of all Americans age six and older play computer and video games
- 39 per cent of game players are women
- 60 per cent of parents say they play interactive games with their kids at least once a month
- The vast majority of people playing games do so with friends and family

5.2 The global market for hardware

The market for console hardware is undergoing rapid development with expected European growth rates above 100% in the near future (as reflected in table 4 and 5). This development will also influence the Danish game industry. In Denmark and Western Europe, the trends follow in general the world market trends. Figures from a study by the global market intelligence and advisory firm in the information technology and telecommunications industries, IDC[33], provide a detailed overview of video game software shipments by platform from 2003 to 2008 (the PC platform is not included). Flat growth in 2003 and 2004 indicates that the market is at the peak of the cycle. Growth will, however, begin cycling downward by 2005, following historical patterns.

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[28] The term "interactive leisure software" refers to both games playable on dedicated hardware (consoles) & PCs, in addition to "edutainment" (e.g. children's fun learning titles), but not "reference" (e.g. encyclopaedias on CD and DVD-ROM. Online and mobile gaming are not included either.

[29] Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark, p. 5. Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

[30] http://www.isfe-eu.org cited in Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark

[31] European Audiovisual Observatory (2002): "Multimedia and New Technologies", *Yearbook 2002*, Volume 4.

[32] "Entertainment Software Association 2003", presentation by Søren Sørensen, ITE Aps, held in February 2004.

[33] IDC (2004): *Worldwide Videogame Hardware and Software 2004-2008, Forecast and Analysis: Predicting the Future*, December 2004.

Currently the console market has three key players among which there is intense competition: PlayStation 2 by Sony, Xbox by Microsoft, and GameCube by Nintendo. This is remarkable since, for the first time in the 25-year history of video games, three independent and non-compatible console producers have proved able to survive at the same time despite speculations that Nintendo would exit the console hardware market in 2004. According to data from IDC, Sony's PlayStation 2 is currently the global market leader with a share of 60 per cent in 2003. Nintendo's GameCube held 15 per cent of the market while Microsoft's Xbox had a similar share of 13 per cent. The future competition will without doubt be dominated by the next generation of consoles, which are predicted to attain 70 per cent of the global market. In comparison, Screen Digest estimates that by the end of 2002, Sony had sold more than 40 million PlayStation 2 machines. In Western Europe by the end of 2002, Sony had sold more than 11.5 million PlayStations compared to 1.4 million Xbox'es, and 1.3 million GameCubes[34].

On the *global market for handheld gaming*, Nintendo is according to IDC data currently a nearly solo player, sitting on 98 per cent of the market in 2003. Nintendo dominated the market, first with Game Boy and then with the 2001 introduction of Game Boy Advance. However, expectations of the next generation of handheld game consoles as well as Sony's PSP are high and thus both types of consoles are expected to gain on the current solo market leader, Nintendo.

The PC entertainment market, on the other hand, of PCs and games related to PCs is considered independent of the market for consoles and games related to consoles—that is, sales on one market do not seem to influence sales on the other market significantly. The PC entertainment market is presently dominated by four publishers, EA, VU Games, Infogrames and Microsoft, which according to data provided by Statistics Denmark together represent 62 per cent of the US market.

The PC entertainment market share has remained relatively constant during the last four years. The PC entertainment market on the whole has declined. In the US, the PC entertainment market experienced a decline in units and value respectively of 10 per cent. In Europe, PC entertainment software turnovers reached approximately EUR 1.15 billion (USD 1.4 billion), which is a one per cent increase from EUR 1.1 billion (USD 1.3 billion) in 2001. Apparently, no type of game has altered the PC gaming landscape more than the "Massive Multiplayer Online Games", where anywhere from thousands to hundreds of thousands of players join together to share an online experience or even shape a digital world.

5.3 The Danish / Nordic market[35]

Denmark is maturing as a market for game consumption. Denmark is characterized by a high penetration of PCs in the households and the large amount of broadband connections.

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[34] Ben Keen: *Interactive Leisure Software: Global market assessment and forecasts to 2006*. Screen Digest, March 2003.

[35] This chapter is mainly based on Charlotte Appelgren (2003): *Digital Games. A Danish Perspective*, Copenhagen: Media Desk Denmark.

According to IDC, there were nearly 1 million PCs in Denmark used for gaming in 2003. To put this into perspective, 7.5 million households in the Nordic region had a PC in 2002, which is expected to increase to 8.49 million in 2006. The number of Danish households with a game console was around 400,000 in 2003. On a worldwide basis this is one of the highest penetration rates compared to the number of inhabitants.

As for the Nordic market, Screen Digest's calculations show that by the end of 2002, Sony had sold approximately 730,000 PlayStation 2s compared with sales of 120,000 units of Xbox and 40,000 units of GameCube.

Table 6: Hardware installed base in households and forecasts in Nordic countries (Denmark, Finland, Norway, Sweden) in the period 2000 to 2006

EUR million	2000	2001	2002	2003	2004	2005	2006
Sony PlayStation /Psone	1.26	1.42	1.44	1.45	1.45	1.45	1.45
Nintendo N64	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Sega Dreamcast	0.09	0.11	0.11	0.11	0.11	0.11	0.11
SonyPlayStation 2	0.03	0.29	0.73	1.25	1.58	1.82	1.91
Nintendo GameCube	-	-	0.04	0.08	0.11	0.14	0.14
Microsoft Xbox	-	-	0.12	0.28	0.39	0.46	0.50
Total 256-bit consoles	-	-	-	-	-	0.28	0.92
Game Boy	1.50	1.68	1.70	1.70	1.70	1.70	1.70
Game Boy Advance	-	0.21	0.41	0.68	0.99	1.24	1.47
PC	6.79	7.22	7.53	7.80	8.05	8.29	8.49

Source: Ben Keen*: Interactive Leisure Software: Global market assessment and forecasts to 2006*, ScreenDigest, March 2003.

In overall value terms, Screen Digest estimates that the total Nordic leisure software market was worth approximately EUR 476 million in 2002, and will grow to EUR 545 million in 2006. As shown in the table below, PC software sales, on the other hand, are expected to decline in the years to come. In 2003, the PC games market accounted for approximately 38 per cent of the total leisure software market in value terms—this market share is expected to decline bt approximately 30 per cent by 2006.

Table 7: Annual sales value and forecasts of "software" in Nordic Countries (Denmark, Finland, Norway, Sweden) in the period 2000 to 2006

EUR million	2000	2001	2002	2003	2004	2005	2006
Sony PlayStation /Psone	126.3	86.3	34.4	9.8	2.4	0.0	-
Nintendo N64	21.8	9.0	0.8	0.0	-	-	-
Sega Dreamcast	16.8	11.1	2.1	0.7	0.0	-	-
Sony PlayStation 2	6.7	52.5	152.2	186.4	192.6	140.9	97.1
Nintendo GameCube	-	-	9.2	15.7	16.9	14.1	8.3
Microsoft Xbox	-	-	26.4	56.7	57.3	41.5	28.1
Totol console	171.5	159.0	225.1	269.4	269.1	252.6	325.9
Game Boy	21.1	19.6	8.5	3.6	0.8	0.0	-
Game Boy Advance	-	17.0	33.9	48.5	47.3	42.5	36.3
Total handheld	21.1	36.6	42.2	52.1	48.1	42.5	36.3
PC games	208.1	202.7	180.0	178.2	176.0	173.2	166.5
PC edu. / reference	50.0	37.5	28.8	24.5	21.0	18.6	16.5
Total PC	258.1	240.3	208.8	202.7	197.1	191.8	183.0
Total games	400.7	398.4	447.6	499.6	493.3	468.3	528.7
Total leisure software	450.7	435.9	476.4	524.2	514.3	486.9	545.2

Source: Ben Keen*: Interactive Leisure Software: Global market assessment and forecasts to 2006*, ScreenDigest, March 2003.

The tables below give a peek into the future of game "consumption"—a future where games reach a still broader audience, and where games along with film, TV, and the Internet become an integral part of Western entertainment culture. In the future, games are likely to become an integral part of our culture in general. For example, an experiment in the UK using fairly simple games distributed via cable TV showed that more than 50 per cent of the users were women.

Table 8: Electronics in a child's own room in Denmark

Share with electronics in own room (%)	Ages 5-7	Ages 8-10	Ages 11-12	Ages 13-15	Ages 16-18
TV	37.6	50.5	64	72.4	76.1
PC	7.5	17.0	20.0	27.9	34.1
PC games	7.4	16.4	17.0	23.7	24.4
PlayStation	13.5	24.7	25.4	18.8	10.1
GameBoy	18.9	38.0	42.9	28.5	13.1
Nintendo	2.4	5.9	8.9	5.6	1.7
Dreamcast	0.0	0.0	0.0	2.1	1.1
Other console	1.5	4.8	6.2	4.4	2.0
Mobile phone	1.2	3.6	23.4	36.7	29.7

Flemming Hansen (2002): *The raising of children as consumers* (Børns opvækst som forbrugere), Copenhagen: Samfundslitteratur.

The table above shows that it is just as normal to have a mobile phone at the age of 11-12 as it

is to have a PlayStation—and it is even more normal to have a GameBoy, which 43 per cent of the children have. In the age group of 8-10, half of the children have their own TV, while 38 per cent have a GameBoy.

Table 9: Electronics in Denmark according to type of household

(%)	Percentage of all households	Percentage of all households with children ages 5-18	Percentage of all 5-18-year-olds' own room	Percntage of households of 19-30-year-olds (young adults)
TV	94.7	93.4	59.8	95.4
PC	62.6	82.5	21.4	81.0
PC game	-	70.6	17.8	49.9
Mobile	63.7	42.4	20.0	79.8
GameBoy	-	39.5	27.3	6.0
PlayStation	-	35.2	18.0	18.9
Nintendo	-	9.2	4.6	3.0
Other console	-	7.9	3.6	1.4

Flemming Hansen (2002): *The raising of children as consumers* (Børns opvækst som forbrugere), Copenhagen: Samfundslitteratur.

The table above shows the vast use of game products in households with children aged 5-18. Seven out of ten households have PC games, 40 per cent have GameBoys, and more than one-third of the households have PlayStations. The table also demonstrates the expanding playing age since half the young Danish adults aged 19-30 years have PC games, and almost one-fifth have PlayStations.

5.4 Externalities

Various types of mass media entertainment have increasingly become interdependent—often pushing or pulling each other. The demand for online gaming has pulled development of the Internet and broadband connections, and the virtual reality of games enters both film and TV documentaries throughout advanced animations. The next generation of mass media entertainment will be entirely interactive. For example, interactive films or interactive TV, such as the Dogma experiment with "D-Day". Examples of spill-over arise when box-office movies such as Spiderman 2, Lord of the Rings, Harry Potter or The Hulk, to name but a few, are developed for computer games and sold, or vice-versa, when films are based on games such as the computer character, Lara Croft, in Tombstone. This also indicates the valuable innovations at the borderlines of the various creative industries, for example, making music for games, making games based on movies, and so forth. This could lead to enhanced international visibility.

Another crucial effect of the game industry is the pull of technological development. For example, gamers wishing to play online were central drivers for the development of broadband, game developers critically test computer software and hardware when they test their games, and the game industry has had a major pull on the development of animations for film and TV. Examples of the latter are more or less animation-based films such as

Spiderman or The Lord of the Rings, or the TV channel, Discovery Channel, which now shows computer animated historic documentaries in which historic milestones are reconstructed by adding, for example, Hitler's face to an actor playing Hitler.

5.5 A young market: consolidation

Despite the fact that the industry is new, many consolidations have recently been made through mergers & acquisitions (M&As). The table below shows the most recent publicly accessible M&As in the US industry.

Table 10: Merges and acquisitions in the US game industry in 2002

TARGET	PURCHASER	PURCHASE PRICE	ANNOUNCEMENT DATE
Rare Ltd.	Microsoft Corporation	EUR 307.5 million (USD 375 million) cash	24 September 2002
Shiny Entertainment, Inc.	Infogrames, Inc.	EUR 38.5 million (USD 47 million) cash	24 April 2002
Angel Studios, Inc.	Take-Two Interactive Software, Inc.	EUR 23.4 million (USD 28.5 million) cash plus 235,679 shares of restricted Common Stock valued at approximately EUR 5.7 million (USD 6.95 million)	20 November 2002
Barking Dog Studios Ltd.	Take-Two Interactive Software, Inc.	EUR 2.5 million (USD 3 million) cash plus 242,450 shares of restricted Common Stock valued at approximately EUR 4.1 million (USD 5 million)	1 August 2002
Shaba Games LLC	Activision, Inc.	258,621 shares of Common Stock valued at approximately EUR 6 million (USD 7.3 million)	2 April 2002
Gray Matter Interactive Studios	Activision, Inc.	Purchased 60% of the Company for 133,690 shares of Common Stock valued at approximately EUR 2.6 million (USD 3.2 million)	14 January 2002
Luxoflux Corporation	Activision, Inc.	Price Undisclosed	11 October 2002
Massive Entertainment	Vivendi Universal Games	Price Undisclosed	3 October 2002
Incog Inc.	Sony Computer Entertainment America	Price Undisclosed	5 August 2002

Source: Goodmans Venture Group: *Emerging Financial Opportunities in the Interactive Media Industry,* March 2003
Note: Exchange rate of 01.07.2004 of USD 1 = EUR 0.82.

The Danish industry has only experienced one major acquisition when the UK-based publisher Eidos acquired IO Interactive for the price of approximately EUR 34 million (DKK 250 million). Industry sources believe that the merges and acquisitions (M&A) trend will continue in the future in order to secure market positions. Furthermore, the sources point out that the reason for future M&As is the increased difficulty in finding funding partners. Lacking funding opportunities, the developer turns to the publisher who then acquires the

developer. This way the developers get access to funds through the publisher. Whether this model is beneficial to the market is as yet unclear.

6 Critical conditions for growth

The games launched by the Danish developers have all hit an attractive segment of the international gamer environment consisting of both hard-core gamers and more mainstream people playing challenging computer games. As it has become possible to play over the Internet with players located all over the world, the games have increasingly gained a global reach. However, the Danish industry must deal with several critical factors if it is to grow in the future, among which the most crucial ones are:

- Need for funding opportunities
- Negotiation of intellectual property rights
- Relatively small employee base

6.1 Funding

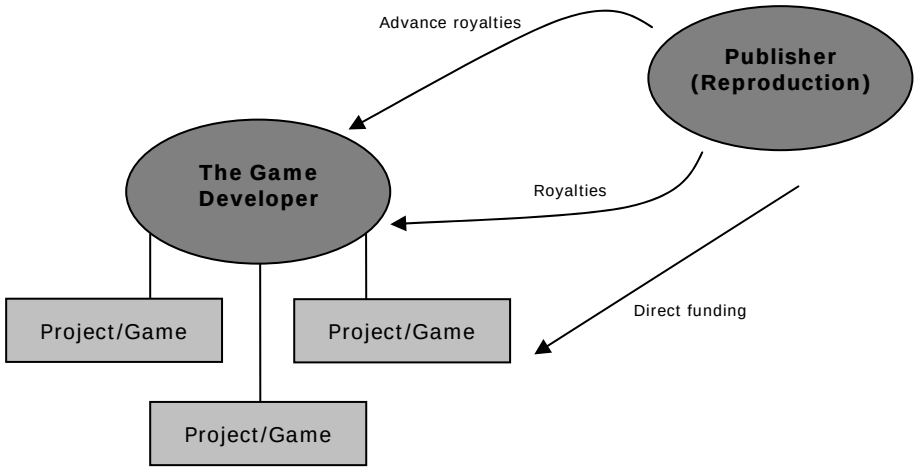
Key players in the industry point to funding as the by far most critical condition for growth. Especially small developers without a track record need investors. In Denmark there has until now been no investment in game developers from the institutional players such as pension funds. All in all, it is clear that the Danish game industry finds it difficult to establish funding despite the growth rates and the expected future growth rates. Many small and upcoming game developers in Denmark would obvious benefit from more positive and engaged funding options.

When a company needs financial support, they normally turn to venture capital in order to get financed. This has been the case in many different industries including the game industry. However in the game developer industry the scene is somehow different. This is due to the link between developer and publisher that gives the publisher an opportunity to fund the developer[36]. Different types of funding are present in the market.

The one briefly touched upon here is the scenario in which the publisher functions as the funding company. When a contract is negotiated between a developer and a publisher, the payment is a mix of both an upfront payment and payments per game sold, called royalties to the developer. The choice is typically between either receiving a large sum of advance royalties and small ad-hoc royalties or vice versa. This correlation is described in figure 5. As the figure shows, the relation between the developer and publisher is fairly complex as there are a number of different ways to negotiate a deal with a publisher.

[36] Goodmans Venture Group: *Emerging Financing Opportunities in the Interactive Media Industry,* p.11

Figure 5: Publisher and game developer funding relations



Funding individual product developments (single titles) directly is becoming increasingly common in the industry. Often the developer is forced to search for additional funding if the advance royalties are not high enough to carry out the whole development of the game. However, the developer may negotiate a good contract, securing funding from the publisher during the development process in addition to a small royalty per game sold. This presents, of course, somewhat of a dilemma, which will have to be dealt with in time.

An alternative to publisher funding is funding by venture capitalists, which involves financial aid in exchange for shares in the company or seats on the board or management. This method has been widely used for years and has proven successful in other innovative industries as well as in the game developer industry. The developer receives funding in exchange for shares and managerial influence. In this way, different and important competencies are brought into the company. In return, the owners give up shares and influence, which could lead to a negative development of the game developer in such a way, that the company loses touch with the directions in which the industry is moving.

6.2 Intellectual Property Rights[37]

In general, the complexity of Intellectual Property Rights (IP rights) and their protection can be a costly affair for small game developers. Therefore, the lack of protection and later loss of IP rights might result in future streams of turnover. There exists a vast array of different categories of IP rights related to a single game production.

Examples of the most common rights are listed below:

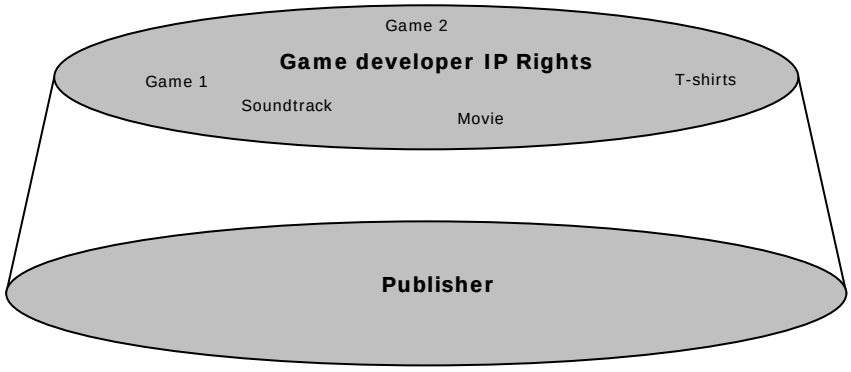
[37] This section is inspired by the report "Intellectual Property Rights and the Video Game Industry" published by IGDA, 2003.

- Copyright
    - Game codes
    - Displays as graphic work
    - Sounds as music songs
- Trademarks
    - Game/Company name
    - Logos
    - Names and designs of characters
    - Unique weapons
- Patents
    - Applied algorithms
    - Control functions
    - Compiling techniques
    - Translation methods
    - Many other areas
- Trade Secrets
    - Source codes
    - Machine/Engine codes
    - Firmware
    - Customer lists
    - Many other areas

It is important to note that internationally there are differences in the protection of IP rights, in particular between the EU and the US market. These differences need to be dealt with before engaging in partnerships. The problem of IP rights is related to problems of funding. In the case where a publisher either funds or acquires the developer, IP rights are usually a substantial part of the deal. Through the funding processes the publisher acquires some of, or a significant part of, the IP rights. The IP rights are regarded within the industry as the intangible assets that make the individual game developer unique. The protection of IP rights ensures the game developer future possible spin-offs, for example, by making a movie or a soundtrack based on a successful game. This means that in any case where the IP rights have been sold to a publisher, the game developer would not be able to take advantage of a movie or soundtrack since these productions would infringe upon the use of the IP rights related to the game.

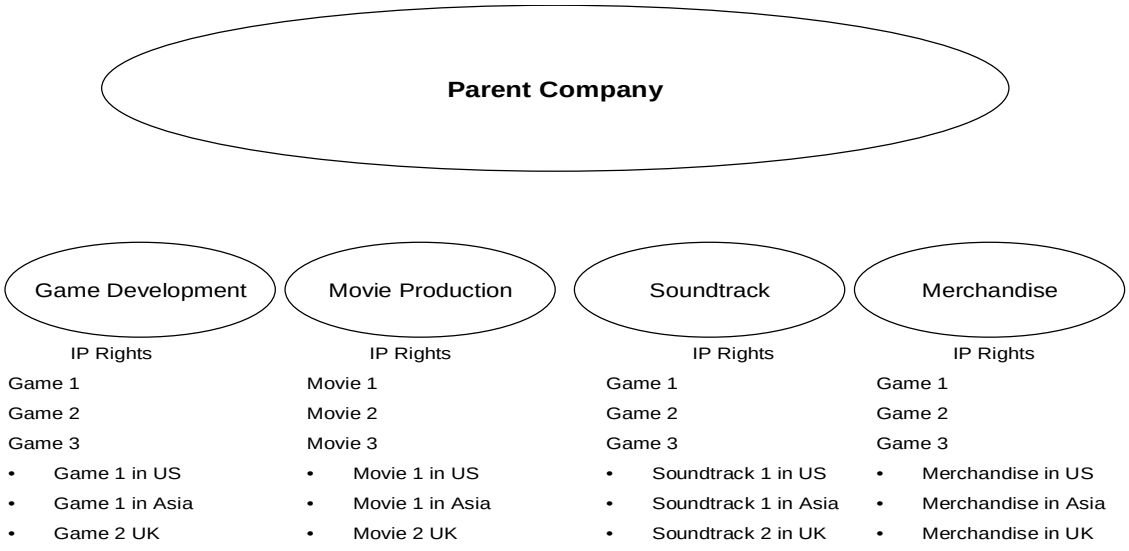
The business structure with a majority of small game developers then becomes a barrier for growth for the industry as a whole, since the IP rights of the smaller developers are put under pressure through hard negotiations. The model simplifies the current dominating business model of game developers:

Figure 6: Structure of IP Rights



The problem occurs when all IP rights are located in a single company. In this case, the publisher could acquire most of the IP rights including the rights to develop spin-off productions such as a movies or soundtracks. The publisher could then decide to develop a movie originated from a successful game or to sell the IP rights to a third party, excluding the game developer from any further streams of turnover. Therefore, key players and legal advice companies recommend using different business structures which would put the game developer in a better position when negotiating in terms of the IP Rights. One of the business structures pointed out is simplified below.

Figure 7: Cutting up the IP Rights



In this way, by dividing up the IP rights among different companies under a parent company, the game developer is able to negotiate the IP rights on a more detailed level. This detailed negotiation prevents a future loss of IP rights and opportunities for future spin-off areas. However, due to complex taxation rules this transition will become even more complicated and costly for an already established game developer.

6.3 Workforce competencies

Within the Danish gaming industry most employees are graduates of a mix of information and communication technology programmes and/or are recruited from other creative industries such as graphic design, music and photography, to name but a few. Given the current growth rates, the industry expects a shortage of skilled employees in the future.

In 2004, a number of educational institutions joined together to establish "Det Danske Akademi for Digital, Interaktiv Underholdning" in order to meet the increasing demand for game developers. The institutions involved are: the National Film School of Denmark, Danmarks Designskole, Karakteranimatoruddannelsen at the Animation Workshop under the University College CVU Midt-Vest in Viborg, the IT University of Copenhagen, the University of Copenhagen, the Technical University of Denmark, The Danish University of Education, Aalborg University, the University of Aarhus, and IT-Vest. The academy offers two-year Master's programmes in, among other things, game design, character animation and programming. The Danish game developer environment has high expectations of the academy and expects to have most of their most urgent workforce problems solved by it.

However, it is important to note that the established Danish game industry is currently trying to attract game developers from abroad both *defensively*, due to the lack of a sufficient skilled workforce in Denmark and, most important, *offensively*. In order to get some of the best people to develop Danish games, thus broadening the scope of Danish business potential. As part of an offensive strategy, internationalization of the workforce is a necessity—despite the improvements in education in Denmark. As things stand now, hiring foreign talent is complicated, if not impossible. The industry points to the fact that the Danish game industry is mistakenly perceived in the Danish system of game developers as comprising regular technicians rather than technological chief designers with a unique talent. Therefore, employment of foreign talent is often obstructed since game developers are typically categorized within the general information and communication technology workforce, and it is seen as preferable to upgrade unemployed Danes, rather than employing foreign workers.

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