

CONCEPTS OF GAME INNOVATION:  
A VIEW FROM THE HISTORY OF DIGITAL GAMES

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In this thesis I will examine the history of game innovations. There are three questions I am seeking answers for: 1) what is game innovation, 2) what is the nature of game innovations, and 3) how innovations have evolved during the history of digital games. The main research data used in this study is game history books and game guides. Supporting material from interviews with game professionals and a small survey for game players are also used. These materials are analyzed to find the most acknowledged innovative games and examine them more closely to discuss the nature and evolution of game innovations.

The results show that it is not enough to create something new to become an acknowledged game innovation, but the overall quality and content of the game, as well as the reception, context, and influence of the game matter. Usually it is not the first games introducing new features that are acknowledged afterward, but the ones rising above others have typically had forerunners. The definition of innovation somewhat supports this view: According to it innovation is the first successful implementation of an invention. However, the general understanding of innovation often connects innovation to invention or the very first attempt to create something new. Therefore there is a conflict between the understanding of innovation as a concept and the games that are seen innovative afterward.

The formed main categories for game innovations are technological, gameplay, presentation, and narrative innovations. When examining the evolution of game innovations with the help of these categories, each decade so far seem to have their own characteristics. The 1970s, the beginning of the industry, was the time of scarce, but very well known innovations, concentrating on technological and gameplay innovations. The 1980s was the time of the industry crash, but also the richest decade when it came the number of innovations. The narrative innovations were on the rise while technological innovations diminished. Technology aspect came back in the 1990s stronger than ever, and dropped again in the 2000s when the gameplay and narrative innovations rose as the most important categories.

Keywords: digital games, innovation, history, innovation categories, innovation concept

## Foreword

The process to complete this thesis has been much longer than I originally hoped for. There has been many challenges along the road, but fortunately when asked I have received all the support and help I have needed, and several times even before I have understood to ask for it myself.

I want to thank the Games and Innovation project team and especially our project manager Annakaisa Kultima for providing not only the whole initial spark for the subject of this thesis but also for many discussions, support, and motivation. Similarly I express my gratitude to the whole Gamelab team at the University of Tampere for comments and inspiration. Special thanks go of course for my supervisor Olli Sotamaa for valuable feedback, guiding, and for the motivation boosts I got after every meeting. Family and friends, thanks for every once in a while asking me "Is it ready yet?" and simultaneously showing love and support along the whole way. Now I can finally answer you: "Yes, it's ready!"

Tampere 7.6.2011

Kati Alha

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# 1 INTRODUCTION

”Innovation's dead.” – Michael Patcher, 2005.

This sentence about innovation in games by a well-known game industry analyst is from an interview in GameSpot magazine (Sinclair 2005) and is descriptive when discussing about games. The lack of innovation has been on the table almost since the beginning of the industry, and there has been accusations of developers not making innovative games, publishers not funding them, and gamers not buying them.

The statistics support the presumption of industry's infamous tendency to use existing intellectual property to publish a great deal of licensed games and sequels. This is concretized for instance in the most sold console games in 2009: Of the top 20 list, only two games are not sequels or based on existing game characters (The Entertainment Software Association 2010).

At the same time, the term “innovation” seems to be everywhere in the current society – people talk about innovation journalism, innovation management in companies, innovation universities... All in all, it could be said that we live in an innovation society. And in many industries, innovation has become a must. Simple adoption to changes is not enough anymore, but in the long term, firms have to lead rather than merely respond to demand (Readman & Grantham 2006).

This is true also and especially in the game industry. The game industry is a unique mixture of business, arts, and technology (Peltoniemi 2009), and is characterized with volatility, growth, and opportunities (Williams 2002). Customers expect new experiences. If in any industry, in the game industry the importance of differentiating oneself with innovation is crucial.

What then explains this contradiction between the reputation as a self-repetitive industry and the clear need for innovation? For sure, there has been a huge evolution in games from the 1970s' simple paddle-and-ball and space shooter games into today's realistic cinematic experiences, so innovation has certainly been present at some points of the way.

Industry started with many highly innovative solutions. Still, even then a lot of copying went on, seen for example from the amount of various *Pong* (1972) clones that were

distributed at the time. In spite of that, a lot of original games were made, and most of today's main game genres' roots trace back to the 1970s and the 1980s.

What then happened after the innovative start? At least it did not die. The whole timeline from the first games to the latest ones include numerous interesting innovations, and they are under inspection in this thesis, as is our understandings of the concept of innovation. Then again, considering the more recent years, the new distribution channels, such as Xbox Live, Steam, and App Store, have now brought up many changes with downloadable games. The possibility to make games easily available to customers has shuffled the deck, as the easy and affordable way to distribute games of all sizes through the Internet has made it possible for many independent game companies to develop and distribute innovative games.

The study of history of games is challenging, one of the reasons being the lack of academic research in the area (Mäyrä 2008, p. 30). Although there is an increasing amount of good popular literature explaining the history of digital games, the conversation is lacking an academic understanding of game innovations and their development in the past. For instance, the existing academic research handling design advancement focuses mostly on technological innovations or on subject matter innovation such as *serious games*<sup>1</sup> (Fullerton et al. 2006).

This lack of research in the area is one reason behind the subject of this thesis. There are however many reasons, personal and practical, why this particular subject ended up inside these covers. For one, I see game research as an important and interesting research area. For a gamer such as myself the chance of studying something that you are passionate about is a privilege.

What comes to game innovations, the hunt for the greatest game innovations in the history felt like an exciting task. Even though the emphasis shifted from merely trying to find the innovative games to examining the more abstract level of game innovations, the aspect of examining the innovative games that I have played and the games I have missed during my personal gaming history feels satisfying and makes me want to return to those times to refresh memories and fill in the gaps. Seeing what have been the big

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<sup>1</sup> By serious games I mean games which primary purpose is something else than entertainment, such as educating.



innovations long before the time I had touched the controller is personally rewarding as well.

Furthermore, I see this as an important opportunity to stop to consider what is this innovation we all constantly talk about, and why, or even if it is something worth trying to achieve. With this thesis I want to bring my own contribution to that.

As it seems the term innovation is not very well comprehended, especially when talking about games, the first research question is:

- *What is game innovation?*

I will approach this question first by examining how innovation is generally defined in academic literature, and furthermore how innovation is understood among game industry professionals. After examining the nature of existing game innovations, I will return to this question and try to answer it from that point of view. The aim is not to create an exact definition for “game innovation”, but to bring out meanings it has been given in the light of the source materials.

The second research question goes beyond the mere definition, and tries to see more closely what the existing innovations are. The question is phrased as:

- *What is the nature of existing game innovations?*

This question is extensive, and I will approach it from a few standpoints. Firstly, I will try to find out *what* are the existing innovative games. Secondly, I will examine *why* those games have been selected, or what has made them innovative. Thirdly, a categorization is formed to see what *types* of innovations there are.

The third and last research question concerns the evolution of game innovations:

- *How has innovation evolved throughout the history of the game industry?*

This question puts the game innovation list as well as the formed categories into practical use. The purpose is to see if and how game innovations have changed during the decades, and consider the reasons for the changes. The results of my analysis are reflected to game history events.

This study is structured as follows. This chapter's function is to serve as the introduction to the subject and to explain the research questions. In the second chapter I will go through the essential terms and theories for the thesis. As this thesis mixes both game and innovation research, they both are approached in that chapter. The third chapter concentrates on the methodology, which is mostly qualitative, although it has some quantitative characteristics as well.

The fourth chapter is devoted to cover the meanings associated with the term innovation in the academic literature and from the game professional's point of view. Parts of the subchapter 4.3 has been published earlier in a conference article (Kultima & Alha 2010). The chapter provides some answers for the first research question. The fifth chapter handles the method, analysis and results for the second research question. The most acknowledged innovative games are discussed, and why they are the ones that are brought up. Furthermore, the chapter introduces and discusses the categories for game innovations. In the end the concept of innovation is approached once more, as the chapter has given more thoughts on it.

The sixth chapter discusses the evolution of game innovations and tries to answer the third research question. The different game innovation categories and the game innovation list are used to examine what types of innovations have existed during different decades, and the changes are discussed and reflected with game history events and industry life-cycle theory. Finally, the seventh chapter is used to sum up and discuss the findings and the potential shortcomings of this thesis as well as bring up some ideas for future research needs.

## 2 THEORETICAL BACKGROUND

This chapter will go through the most essential theories and concepts for this thesis. The first subchapter will introduce some game research aspects, and the second subchapter will discuss the point of view of innovation studies. Finally some combined aspects are reviewed.

### 2.1 Game research

From the game research point of view, the subchapter 2.1.1 will go through some basic divisions of game studies, while the next two subchapters consider a couple of basic terms in focus in this thesis: *game* and *game genre*.

#### 2.1.1 Game studies as a multidisciplinary field

Although there has been some game research at least since the early 1900s, game studies is still young as its own academic discipline (Mäyrä 2008). So young actually, that Espen Aarseth (2001) called the year 2001 as the “Year One” in computer game studies. Indeed, the number of academic publications considering digital games started to rise considerably in the early 2000s (Bryce & Rutter 2006). As a young research area, it is still evolving and taking its form, and whether or not it still is or even should be its own discipline has been argued over.

Games can be studied from various aspects, but at least three major areas can be identified when considering the target of the research: we can study games, players, and game design and development (Mäyrä 2008). The different areas have different scholarly backgrounds and tend to draw from methodologies typical for their origin.

Humanistic approach concentrates on games and their structures such as controls, mechanics, and visual representation. The approach has drawn influences from the literary and media studies which have given tools such as text and discourse analysis to examine games. Examining game history is also a part of the humanistic approach. (Ibid.)

The social science studies game players and their play behaviors, and can answer to questions like who play games, when and how games are played, or what effects games may have on players. Methods are typically for instance surveys, interviews and ethno-

ographies. Game development can be studied from several traditions, such as artistic or technological side. (Ibid.)

The areas naturally overlap and interact within all the three main areas. As this thesis covers games, their structures, and the history aspect of games, it is strongly located in the humanistic part of the studies, although other areas are touched as well. As the games are not under direct examination, but studied from secondary sources, namely books, players and game professionals, and take into account people's personal experiences, opinions and attitudes, the social science aspect is touched. The economics, which is also located in social sciences, is part of this thesis through innovation studies (discussed in subchapter 2.2).

### 2.1.2 Game

There has been a lot of discussion about how a game is defined. For the purposes of this study, no exact or comprehensive definition is needed. There are good overviews of existing definitions, so there is no need to go through the various definitions (see Salen & Zimmerman 2003, Juul 2005). However, it is useful to discuss the nature of games in some extent. Jesper Juul (ibid.) has formulated the following definition based on some of the previous definitions:

A game is a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable.

Games that do not fulfill all of the characteristics, such as pen and paper role-playing games as they have flexible rules or games of pure chance, Juul classifies as borderline cases (ibid.). Many of today's social games, such as *FarmVille* (2009), and MMORPGs<sup>2</sup> such *World of Warcraft* (2004) are these types of cases, as they "never end" and have no final outcome.

For this thesis, Juul's definition is a good baseline. However, the "borderline games" such as the Facebook games are treated similarly as other games. Moreover, this thesis concerns digital games, and the term game is used to refer specifically those digital games, and other games are left outside of the scope of this study. Digital game is a

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<sup>2</sup> Massively multiple online role-playing game, see for instance [http://en.wikipedia.org/wiki/Massively\\_multiplayer\\_online\\_role-playing\\_game](http://en.wikipedia.org/wiki/Massively_multiplayer_online_role-playing_game)

game that is developed for and played with a digital device, whether it is a computer, a game console, a mobile phone, an arcade machine, or other digital device.

### 2.1.3 Game genre

A genre is a style category of art forms, such as movies, paintings, literature and so on. Game genres are a classification of different types of games, and it has been said that they are characterized with a group of gameplay features rather than visual or narrative elements (Apperley 2006). However, other factors contribute to game genres as well, for instance even the name of the first-person shooter (FPS) genre signals that the view in a game is from the first-person angle. In some genres realism is more important than in others, and narrative elements are in some genres, as in role-playing games, more important than in others.

There have been many genre classifications, and genre categorizations can be approached at least from popular, design, and academic point of view (Järvinen 2008). So far none of the genre classifications is the standard to be used across the media or research. For instance, in an Internet video game database, Moby Games<sup>3</sup>, there are eight genres: *action*, *educational*, *role-playing*, *sports*, *adventure*, *racing/driving*, *simulation* and *strategy*. In a comparable Internet site, GameSpot<sup>4</sup>, there are much more genres and many of them are more precise, such as *historic first-person shooter*, *sci-fi first-person shooter*, *sci-fi real-time strategy*, but they have also more general genres, such as *adventure* or *racing*. On the research side, the genre categorization depends on the purpose of it. There can be for example very profound genre classifications, such as in Wolf's classification of 42 different genres (2001).

Where genres for instance in movies are already relatively stable, in games they keep evolving and changing and completely new genres still appear. An established genre classification is therefore not even purposeful. Even if there would be a coherent genre classification, many times games tend to be mixes of several genres or borrow some characteristics from others. Instead of trying to find the right compartments for every game, some game sites (such as the before-mentioned Moby Games) have started to use

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<sup>3</sup> <http://www.mobygames.com>

<sup>4</sup> <http://www.gamespot.com/>

genre classifications as tags, and one game can, and usually does, belong to several genres.

## 2.2 Innovation studies

Considering the innovation studies, the next subchapter will shortly describe the field of innovation studies. The subchapter 2.2.2 will introduce the *industry life-cycle theory* and subchapter 2.2.3 the concept of *dominant design*. The definition of innovation is central in this thesis, but as it is covered in more detail in the next chapter, the concept is not defined here separately.

### 2.2.1 The field of innovation studies

As games, innovation too has been studied in various different disciplines. Innovation studies is not an academic discipline as itself, but different fields have studied innovation from their own perspective. Some most notable fields studying innovation include economics, psychology, sociology, and engineering.

For this thesis, the economics aspect is an essential approach, as its theories and concepts, most notably the industry life-cycle theory, are used to interpret the results of some parts of the analysis. Economics is more interested about innovation from a larger point of view, as a multiple-actor "game" or a system rather than focusing on particular individual innovators (Gopalakrishnan & Damanpour 1996). In this thesis as well the found innovations are used more to see the state of the whole industry instead of using them to examine for instance the organizational level.

### 2.2.2 Industry life-cycle theory

Industry life-cycle theory is used to describe and predict the changes and phases of an industry during the course of time. James Utterback and William Abernathy (1975) introduced three main stages which an industry's processes and products will go through. These are summarized in Table 1.

Table 1. Industry life-cycle stages (Utterback & Abernathy 1975)

	<b>Process</b>	<b>Product strategy</b>
<b>Stage 1</b>	Uncoordinated	Performance-maximizing
<b>Stage 2</b>	Segmental	Sales-maximizing
<b>Stage 3</b>	Systematic	Cost-minimizing

In the first stage, there is a great product diversity among firms, and the process is unstandardized and fluid. The system is organic and adaptive, but also inefficient and uncoordinated, and the product change may be rapid and margins large. Innovations would mostly be market-stimulated and have uncertainty about their potential. Innovation may arise from unexpected sources and is stimulated by new market needs and opportunities. The innovator is often an individual or an organization familiar with the needs. Information is gathered more from external and diverse sources than in other stages, and the firms are small new firms or old firms from completely different market, and there are relatively few firms. The markets are poorly defined, the products non-standard. (Ibid.)

In the second stage, price competition is more intense, and production becomes more mechanistic and rigid. Process moves to automation but may still have manual subprocesses and in so have segmented quality. Market uncertainty is reduced, and some product designs will begin to dominate. Competition based on product differentiation increases, and replacing products become more common than creating entirely new products. Customers develop preferences and loyalties, and for instance marketing, distribution, and advertising demand more standardization. (Ibid.)

In the third stage, the process has become more highly developed and integrated, and on the other hand, changes to process may be costly. Products too become standardized and competition shifts to product price. Innovations both on product and process may be expected to be mostly incremental. Innovations may typically come from equipment suppliers. (Ibid.)

Later on the theory has been revisited, as by Michael Gort and Steven Klepper (1982), who suggested that there are usually five stages instead of the three for new industries. Looking through entries and exits of producers, in the first stage the number of producers is small, while in the second stage a substantial number of new producers enter the industry. In the third stage the net entry is low, and decreases to negative in the fourth stage. In the fifth stage the net entry is again low and the product market mature. (Ibid.)

The sales are low in the beginning in the cycle, keep growing and reach the peak in the maturation of the industry, and in the end turn into a decline (Ryan & Riggs 1996). The cycle is not necessarily simple and straightforward process, but may have new growth phases and may be disturbed by changes in market structure (Gort & Klepper 1982, Ryan & Riggs 1996).

### **2.2.3 Dominant Design**

Dominant design is a concept introduced by Abernathy (1978). In the beginning of an industry, there is variable products on the market that differ substantially from each other, as the life-cycle theory states. Once a dominant design emerges, it enforces product standardization, and products no longer radically difference from each other. (Ibid.)

A dominant design improves the efficiency of the production, but make it more difficult for the firms to create radical innovations. There are still innovations once the dominant design has emerged, but the innovations tend to be more incremental than radical. (Ibid.)

## **2.3 Combined views**

The purpose of this subchapter is to introduce some earlier studies combining the two views: game research and innovation studies. The first subchapter will go through some previous studies crossing these research areas and the second opens up some previously defined game innovation categories.

### **2.3.1 Previous studies**

There is not much innovation research conducted considering cultural industries, such as games, movies or music industries generally, let alone the game industry specifically. F. Ted Tschang has specialized in this area, and has been writing several articles about the subject (see e.g. Tschang 2003, Tschang 2007, Tschang & Szczypula 2006).

Tschang (2007) has suggested that game genres could be considered as dominant designs, meaning that in the game industry there are always several simultaneous dominant designs. Furthermore, Tschang (2007) has suggested that the game industry has reached its maturation point as no new dominant designs had appeared for several years. Since then, the situation has changed as the recent years have brought us several new genres, most notably party games and social games. In addition to the emergence of new genres, the continuous growth, large number of actors, and high amount of entries and exists of firms indicate that the game industry still has not reached the point of maturation (Peltoniemi 2009).



Close to the focus of this study, Mirva Peltoniemi (2009) has combined economics and game research as she has used the standard industry life-cycle tools to examine the evolution of the game industry.

Peltoniemi found out, that the game industry differs from industry life-cycle theory in the respect that in the game industry innovation activity has still not leveled off. Compared to cultural industry, technology is in a big role in the creative development process in the game industry, while in many other cultural industries it is not so. Concerning cultural industries generally, Peltoniemi's analysis supports the earlier findings that where in standard industries there is an alternation of radical and incremental innovation, in cultural industries the workload is usually divided so that the major companies produce incremental innovations while the independents create radical innovations. (Ibid.)

### **2.3.2 Game innovation categories**

Considering specific game innovation categories, Peltoniemi (2009) uses two main categories for classifying game innovations: technological and stylistic. Technological innovations are further divided to three types: graphics, which improve the appearance of the game; simulation, which improve the physical realism; and gameplay, which allows new kinds of game experiences. Stylistic innovations include characters, styles, gameplay and the formation of new genres. (Ibid.)

Stylistic innovation is introduced by Cappetta et al. (2006), where it is described as resulting "from the reassignment of social meaning to an existing product and/or from the change of the aesthetic characteristics of a product generating both a new product – from a physical point of view – and a new meaning" (ibid. p. 4). The stylistic innovations are not necessarily more efficient or functional, but they are promoted for an "élite". Later on they may be targeted to other consumer groups as well. (Ibid.)

Outside research, Ernest Adams (2007), a veteran game designer, consultant, lecturer and writer, classifies his list of 50 greatest game innovations to five categories: gameplay, input, presentation, genres, and play styles. With play styles Adams means the different ways people play, and innovations facilitating them include for instance save games, networked play and party games.

Despite the individual approaches, there are no established categories for different types of game innovations. Peltoniemi's and Adams' categorization differ from each other in that Peltoniemi's categories approach the games more from the developers side as Adams' categories are thought more from of the end user's perspective. Adams' list of the greatest innovations is based on his subjective opinion, as he states himself. However, coming from an acknowledged professional with a long-time experience in the game industry, it can be taken as an expert's opinion. This thesis tries to take the best of both sides when examining the game innovations and categorizing them, as in taking to notice the special nature of games' structure as well as reflecting the results to existing studies.

### 3 METHODOLOGY

As mentioned in the previous chapter, the methods of this thesis do not look directly at games but use secondary sources to examine games. The main source is game history books and game guides, and supportive material was collected as an Internet survey for game players as well as from interviews with game professionals. As there are several source material and variable analysis of them, the methods have been explained in more detail in connection to each of the analysis and results. The purpose of this chapter is to explain the methodology from a more general level and discuss the methodological choices.

The secondary sources have been selected, as the aim has been to gather information about games that are recognized as innovations throughout the game history. Therefore collecting the thoughts from variable sources rather than through own experience is justified. Even after finding the games, there is not enough resources to examine them directly and analyzing the games by playing them. Therefore, the same source material is further analyzed to find the factors that make those games innovative and to form the innovation categories.

Basically the methods used in this study are of qualitative nature. Qualitative methods are used to describe or interpret a phenomenon or incident, or understand certain activity. Here the purpose is to describe and interpret what can be meant with game innovation and what kinds of elements it has. Furthermore, the history of game innovations is described and interpreted.

Qualitative and quantitative methods should not be seen as opposite forces or enemies, but both complement each other, and many studies have features of both (Alasuutari 1999). In this thesis, some light quantitative features have been used to support the qualitative method. The count of how many times a game has been picked from the source material is taken advantage of, as well as are the occurrences of different game innovation categories among the selected games.

Qualitative research can be divided into two main phases: simplifying observations and solving the riddle (Alasuutari 1999). Here, the biggest effort has been the collection of the innovative games from the books. The source material in that case has been first all

the texts in the books, and then only the parts of those texts that handle the selected games. In this phase, the collected data has been sorted into themes and types.

It is not enough to describe a phenomenon, although it may be interesting as such, but it is crucial to think the reasons and explanations behind the findings (Alasuutari 1999). This is also the riddle-solving phase. In this thesis the riddles are tried to solve for example by explaining why the selected games have been the ones that have been brought up and on the other hand what are the reasons behind the different divisions of innovation categories during different decades.

The approach here is inductive, meaning that it constructs the categories from the source material instead of pre-existing theories. This decision was made because there is not yet enough research that there would be established game innovation categories. However, the analysis is never completely inductive, nor it should be, or it will be left disconnected from the earlier studies and from scientific discourse. In this thesis too, the earlier research has inevitably influenced the analysis and the results. The earlier research is also reflected to the results of this thesis.

The analysis, including asking the material the right questions, has not been a straightforward process. There has been interaction among the research questions, observation of the data, and the analysis process, and they all have changed each other. In the beginning the focus was supposed to be larger considering not only games but also game consoles and accessories, but as it was revealed during the analysis process that the picked console innovations were scarce and different by nature from the game innovations, they were dropped out.

This kind of interaction is part of the hermeneutic circle, which states how during the research process the researcher learns more about the big picture by learning about the details, and learning about the big picture helps to further understand the details better. The hermeneutic circle is actually like a spiral, circulating between the observation and data, analysis, interpretation, and theory and understanding. (Mäyrä 2008, p 153.)

## 4 WHAT IS INNOVATION?

The purpose of this chapter is to give some answers to the first research question considering what game innovation is. The first two subchapters will examine the academic definition of innovation and its division to different categories. The third subchapter takes a different angle by considering game professionals' opinions and understanding of innovation.

### 4.1 Definition of innovation

The term innovation is used in common language quite often; it has become a sort of a buzzword. However, the meaning is not always clear, and people tend to mix it with other terms, such as invention (Tidd et al. 1997). In this subchapter I will look into the different definitions of innovation in academic literature.

Innovation is not an easy term to unfold, especially as its definitions differ (Goldsmith & Foxall 2003). There are various approaches to innovation from many different branches of sciences, such as economics, design, technology, and sociology. The meanings have also changed throughout time (Cumming 1998), making the exact definition even more difficult to form.

A good place to start is comparing innovation to that close term, invention, as Jan Faberberg (2005) does: “Invention is the first occurrence of an idea for a new product or a process, while innovation is the first attempt to carry it out into practice.” The lag between the two can stretch for decades, as turning invention to innovation requires resources for working out ideas and implementing them. In some cases, invention and innovation can occur very close to each other, making it hard to distinguish one from another. (Ibid. pp. 4–5.)

As Faberberg's definition states, innovation holds the requirement of being something new. Goldsmith and Foxall (2003) assert that newness can have at least three different points of view: recency, originality and similarity. With recency, it is meant that something is new when it has been encountered or acquired recently. Originality refers to unfamiliarity, something being new to somebody. Finally, similarity means how similar or different something is from existing things of the same type. (Ibid.) In addition, it is

worthwhile to consider to whom the innovation should be new. Some research concentrates on the firm's perspective, while others think innovation should be new to the world, the adopting unit, industry, the market, or the customer (Garcia & Calantone 2002).

Another feature that innovation must achieve is success. To be called an innovation, it has to be useful and most of the time successful in economic terms (Lemola 2000). According to Brian S. Cumming (1998), innovation is "the first successful application of a product or a process" (p. 22). Invention becoming an innovation needs not only implementation, but also marketing and distribution. Therefore many games that could be seen as highly innovative do not match to this definition. This view might be seen problematic, and might partly be the reason for some of the confusion behind the concept.

The innovation process includes the steps from ideation to the application (Goldsmith & Foxall 2003). Cumming (1998) specifies three steps that usually precede innovation: (1) idea generation; (2) the successful development of that idea into a usable concept and (3) the successful application of that concept (p. 22). It is difficult to define exactly at what point of the process the innovation emerges (Rehn & Vachhani 2006). Another model of the process of innovation goes into more detailed view: (1) Recognition; (2) Idea formulation; (3) Problem solving; (4) Solution; (5) Development and (5) Utilization and diffusion (Marquis 1988), showing that the innovation process does not end when the product or service is ready, but includes the deployment of it.

The most creative phase of innovation process is in the beginning at idea conceptualization, and less creativity occurs in the rest of the product process (Tschang 2003). Innovation process can also mean the iterative process, including the introduction of a new innovation and the later, improved innovations (Garcia & Calantone 2002).

## **4.2 Categories of innovation**

If the definition of innovation itself is difficult, there can be even more confusion in how different types of innovations are categorized. There are many ways to sort innovations. One basic categorization is to divide innovations to *product*, *process*, and *administrative* innovations. Process innovations are firm's methods in delivering products or services, while product innovations refer to the end product and administrative innovations reflect the change in the characteristics of organizational or institutional elements.

(Carayannix et al. 2003, p. 117.) In this thesis, I will concentrate on the first two, considering the emphasis on the industry and market points of views, not individual firms.

In addition, innovations are usually divided into groups based on how original they are. Perhaps the most common categories are *radical* and *incremental* innovations. Radical innovations are introductions of totally new types of items as new game genres, whereas incremental innovations are continuous innovations on existing products, which for example develop the old genre slightly. The radical innovations can be seen more valuable than the incremental innovations, but Jan Faberberg (2005) states that usually the cumulative impact of incremental innovations can be as great or even greater than single radical innovations (pp. 7–8). In today's game industry, design innovations have been said to be usually incremental, or feature advancements within existing game genres (Fullerton et al. 2006, p. 51).

In addition to the categorization between radical and incremental, there are numerous different categories and scales. Some are situated between or to either end of the axis of incremental and radical innovations, such as incremental/new generation/radically new (Wheelwright & Clark 1992) or incremental/radical/transformation (Tidd et al. 1997). Some concentrate on additional qualities as *sustaining/disruptive* innovation, in which disruptive innovations are unexpected innovations creating new markets (Christensen 1997). Others have similar extremes as incremental and radical innovation, but with different labeling, such as *continuous/discontinuous* (Tushman & Anderson 1986), *evolutionary/revolutionary* (Utterback 1996), or *deepening/widening* (Breschi et al. 2000) innovation.

The oversupply of categories may be a problem, as seen in Garcia and Calantone's article (2001), where they identified fifteen constructs in only 21 empirical studies. The constructs are used inconsistently even in academic literature. What one researcher calls certain type of innovation, can another researcher call different. The reasons for inconsistencies and overlapped labeling of different types of innovations may originate from the many scholastic communities researching innovation and them overlooking findings from other fields. (Ibid.)

Furthermore, innovation can be divided into at least four concepts: *the process*, *the content*, *the context*, and *the impact* of innovation. Carayannix et al. (2003) relate their classification and some other concepts to these dimensions as shown in Table 2.

Table 2. Dimensions of innovation and relation to different categorizations by Carayannix et al. (2003)

Process	Content	Context	Impact
Evolutionary	Incremental	Continuous	Non-disruptive or
	Generational	Continuous	Disruptive
Revolutionary	Radical	Discontinuous	Non-disruptive or
	Architectural	Discontinuous	Disruptive

Innovations can also be classified to game specific categories. Tschang (2003) introduced three categories: *piecemeal creation*, *new genre creation*, and *imitation*. Creating a new genre is considered as a radical innovation, while piecemeal creation, namely evolving an existing genre, is considered as an incremental innovation. The new genre creation is rare because it is risky and needs resources. (Ibid.)

Considering the last two subchapters, we can sum up that innovation is something that forms through a process starting with ideas and ending up with the successful introduction of a new product or process. One cannot say if invention will eventually become an innovation beforehand, but it can only be seen after it has come to the market. This is the perspective that this thesis takes on innovation: A game can have many original features in it, but it is only an innovation by definition when it succeeds.

### 4.3 Industry professionals' views

This subchapter will go through game professionals' understandings of innovation. Subchapter 4.3.1 explains how the industry professionals' opinions were gathered and analyzed. The subchapter 4.3.2 goes through the findings including how innovation is described, how innovation is positioned with success, and how innovation is compared to other close terms. The last subchapter discusses these findings and compares them to the academic definitions.

The text in the subchapter 4.3.2, under the title “Describing innovation”, has been previously published with some modifications in Kultima & Alha (2010). The text is originally written by me. Most of the following parts about collecting the data, motives behind the selection of the interviewees and the description about the backgrounds of the interviewees in subchapter 4.3.1 have as well been included in the same paper. These parts are collaboration of Kultima and myself.



### 4.3.1 Method

The previously introduced definitions in academic literature are only one viewpoint to innovation. Especially when talking about games, innovation is brought up often in the public, and how innovation is understood in general speak is important to take into account. To get some ideas how innovation is perceived in the game industry, I analyzed interviews on game industry professionals.

The interviews were conducted as a part of game research project Games and Innovation (GaIn)<sup>5</sup>. GaIn was running during 1.1.2008–31.3.2011 from which I was involved starting from 1.5.2008 until the end. The project's objective has been to create methodologies and tools for generating, refining, evaluating and managing game ideas in a systematic manner.

The interviewees were selected from the speakers of three game conferences in 2009: Game Developers Conference (GDC) in San Francisco, USA, Nordic Game Conference (NGC) in Malmö, Sweden, and Game Developers Conference Europe (GDCE) in Cologne, Germany. As these conferences are major industry events, they bring together leading professionals, and as such are favorable events from the research point of view. As all of the speakers of these conferences are either selected by a strict evaluation process or by invitation, all interviewees have been professionally acknowledged in their field.

Total of 28 game industry professionals were interviewed. I conducted three of the interviews myself, and two other researchers of the project did the rest. Most of the participants were interviewed face to face during the conferences and five of the interviews were conducted by phone afterward. All of the interviews were audio recorded, which I transcribed afterward.

Interviewees' experience in the industry varies from 1 year to over 20 years. Almost all platforms and game genres are represented, from casual browser-based games to core computer and console games, either as the interviewees' current development focus or in terms of their domain experience. The interviewees' positions in their company are mainly focused on leadership and development, although publisher, education and consultation side of the industry are also represented (see Table 3).

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<sup>5</sup> <http://gamesandinnovation.com>

We selected the interviewees to represent different roles and tried to cover as large as possible a domain of games, experience level (see Table 4), and age and nationality (see Table 5), and representatives from both genders (see Table 6).

Table 3. Position in the company

CEO/President/Director	11	39 %
Creative Director	4	14 %
Developmental role	8	29 %
Other (non-developmental role)	5	18 %

Table 4. Game industry experience in years

1 to 2 years	2	7 %
3 to 5 years	4	14 %
6 to 10 years	10	36 %
11 to 20 years	9	32 %

Table 5. Region

USA	14	51 %
Canada	2	7 %
Europe (excluding Nordic countries)	6	21 %
Nordic countries	6	21 %

Table 6. Gender

Female	5	18 %
Male	23	82 %

The interviews were semi-structured and consisted of various themes, including thoughts about innovation, tools for innovation process, possible tensions within game design teams, future sights, and interesting future research topics. Interviews lasted from 20 to 90 minutes each.

In this thesis, I examine only the parts of the interviews that deal with the participants' understandings of the concept of innovation. The analysis of the transcribed interviews was conducted by classifying the material into different themes: direct definitions and descriptions of innovation; how new or original innovation should be; innovation's relation to success; and innovation's relation to other close terms. I went through the themes and classified different approaches into types on each theme. In the next subchapter I will go through the results of the analysis. The quotes from the interviewees have been modified to a more formal language to enhance the readability. The code after the quotes is the distinctive numbers for each interviewee.

## 4.3.2 Results

### Describing Innovation

The terms used to describe innovation in the interviews are as follows: *change, different, evolution, invention, new combination, going off the trail, breaking patterns, breaking new ground, rethinking*, or even *indy* or *play*. Usually innovating was seen as *creating* something new, but also *finding* or *trying* something new. In some occasions it could also mean coming up with new ideas or concepts.

Some connect innovation to values, seeing that it is not enough for innovation to be something new, but it needs to have other properties: *quality, feel, being meaningful, being interesting, working, making something better, making difference*, something that *needs to be seen* or *making it for the audience*.

For me it is like, well it is never been seen before, but it needs to be seen, because it adds something to the human experience. *I21*

I do not know if it is very innovative if your ideas are so wild that they do not actually work. *I26*

On the other hand, some thought that games could be too innovative and it is possible to innovate poorly. Innovation for innovation's sake was many times seen as a negative thing.

But there's no point in trying to come up with new system for the hell of it, just innovation for innovation's sake is a dangerous thing. *I1*

Innovation was naturally strongly connected to something new. Differences arose about how new or big innovation should be. Four different states were identified: (1) innovation always builds on something existing, (2) innovation defines itself against existing, (3) innovation is something completely new, and (4) there are different scales in innovation, some more incremental, some completely new. These views are explained in the following.

Many think that innovation is always constructed on something existing; it can be a refinement, new combination of existing things or combination of old and new. According to this view, innovation can never be something completely new, because nothing comes from nothing:

[T]here is no such thing that has been seen before that is not generated from something that is already there. *I02*

In some cases, innovation is comprehended as something that breaks existing conventions and defines itself against them. In this view, old is seen more as an enemy to the new than as something that is built upon:

So innovation defines itself against things that are more traditional or more fixed or more rigid and innovation is the free play. *I03*

Well, to me, to understand how to innovate, you have to have a thorough knowledge of the conventions, in order to break them. *I13*

Some think that innovation can be only something completely new. In one case, because of this presumption that innovation is not based on anything existing, the whole existence of innovation was questioned:

So innovation is about essentially throwing out all formula, all logic, all paths that have been traveled before, and finding something new. Something beyond that what you know and that is the problem, because you cannot innovate before you know... How do you create something that you do not know. How do any of us actually innovate? Do we ever innovate, do we just come up with an idea that is a combination of other ideas that we already have in our heads? *I07*

This view also brings up some interesting views about how to innovate. One interviewee states explicitly that you cannot innovate while thinking about innovation, because then you are already thinking something existing.

[T]he secret of innovation, secret to innovation is to do stuff. [--] it's impossible to think innovation, actually. That's the trick, you can't think about innovation, because the moment you start thinking, then you're working with things that you've already done. So it's always that, the art of innovation is to not think about it. *I07*

In many occasions, both completely new and incremental innovations are seen as something that co-exists. Innovation is seen as something that has different scales, some with more radical and some with smaller changes. However, the more innovative the product is, the more risks it involves, as they fail more often. Innovation is not necessarily first in the world, but can be contextual. Smaller innovations are not necessarily seen as less valuable than big innovations:

I guess I would say there are sort of two levels of innovation. There is the kind of big innovation, the "hey, here is a type of game we have not seen before", and that is the type of stuff that generally gets acclaimed. It gets praised in the industry, wins awards. But there are also kind of small bits of innovation you do, where you sort of tweak little things in the game, in ways that other games in the genre have not done, it makes the game into being more fun, in a way that people do not always understand. *I23*

## **Innovation and Success**

Commercial success is surprisingly never seen as a requirement for innovation, though in some cases success is seen very important.

I think, to me [commercial success] is essential because innovation for innovation's sake doesn't matter. Innovation that really affects people matters. *I13*

Opinions differed on how innovation and commercial success was connected. Some see no connection between them, and some think that there is a strong connection. Furthermore, the connection can be positive or negative; innovation either brought success or it reduced it. One view to the matter is, that there are people who still are not served, and innovating in new areas can thus bring success.

Yeah, I think there is a direct connection, I think. I think there's so much room to grow, and there's such large untapped market right now, that games that are unique and innovative have access to huge audience that isn't being served. *I10*

Sometimes the consumers are seen as not looking for new things, but playing the same old games even when you try to innovate. Couple of the interviewees felt frustrated about the fact that innovation was not rewarded in the marketplace.

You know, I know that we often spend a lot of time working on, you know, a very innovating or creative [--] games, and your audience ends up still playing most of the time [--] a game that they already know. And I think that can be a little frustrating as a developer. *I23*

Usually the balance between new and old is seen as the best recipe for success. In some interviews innovative games are stated of having a bigger risk to develop, because they fail more often. However, if innovative game succeeds, it has potential to succeed in a larger scale than an imitative game.

If you innovate well, and it's playable to the mass audience, I think the potential to be really big is much greater than staying at the safe zone and just sort of cloning and replicating or deriving from what's been done before. [--] But then of course the more you innovate, there's also the larger risk that you fail and it won't be accessible and successful. *I19*

Many other factors that affect the success are not seen as a part of innovation. However, marketing, good timing and the good use of the innovation are seen important by some, sometimes even possibly more important than the innovation itself. Interesting point is given by one interviewee, who states that innovating takes a lot of patience and persistence, because most innovations fail, and you need to redesign and iterate a lot to bring your innovation to success.

## **Innovation and close terms**

*Creativity* is strongly linked with innovation in the interviews. Some believe that creativity is something that precedes innovation. Other view is that innovation is “more” than creativity, that innovation has for instance higher quality level. Sometimes creativity is linked to creating ideas or as a property of a person, while innovation is what came out of that. In some cases, creativity and innovation are seen as almost the same thing.

Right, I think [being innovative] is being uniquely creative. *I10*

I generally suit [innovation and creativity] as the same. [-- T]he more creative you are, the easier it is to come up with something innovative. But not always. *I23*

[C]reativeness is more in the meaning of some artistic, artistic industry or artistic decisions or something like that. Whereas innovation maybe has a little bit more of a technical ring to it, to my ears. *I16*

The term *invention* was also seen very close with innovation in the interviews. Similarly as with creativity, invention is something closely linked to innovation. However, there is some confusion how they are related. Sometimes they are seen almost as synonyms. Some think that invention precedes innovation, as the academic literature suggested, but some others see innovation as the creative spark and invention the more concrete product. In one case invention is linked to more radical innovations. In any case, there seems to be some uncertainty about the terms.

So not all inventions are innovations but I guess all innovations are inventions or new inventions or something like that. So I think they're very similar words but there are nuances, I would imagine. *I19*

To me the invention seems to be a necessity for the innovation. [-- I]t starts with invention, it starts with hard work. And sum of it all leads to innovation. *I18*

[A]n invention is essentially the application of some sort of innovation you made, or an idea. So invention is just the physical result of the idea or innovation you thought of. *I24*

### **4.3.3 Discussion**

When compared to the definitions provided by the academic literature, there are some major differences. First of all, innovation is often mixed with other close terms, such as creativity or invention. Innovation may also be seen only as a radical innovation, and the smaller, incremental types are not seen as innovations at all. From the game pub-

lisher's and developer's aspect, it may be important that their own products are described as innovative.

Furthermore, although innovation may be seen as something that can have a connection with commercial success it is not seen as a requirement for innovation. Marketing or distribution is not seen as part of the innovation, but as separate factors influencing the success. As most of the interviewees work in the game development, it may feel natural that the perception of a game being innovative or not is not dictated by "outside" game properties, such as marketing.

All this is not to say that the game industry would have wrong conceptions of innovation. However, what can be more problematic is that the game industry professionals have contradictory definitions for innovation when compared to each other. Therefore it is not clear what is meant when someone talks about innovation. It seems that everyone has some conception of innovation, but those conceptions can vary, and when not explicitly expressed the message can be interpreted very differently than how it was intended. Furthermore, it seems that even though innovation and innovating are constantly present in the game industry, the concept and its meanings are not something that are thought about that much.

## 5 INNOVATIVE GAMES

The purpose of this chapter is to discuss what is required for a game to become acknowledged as innovative and what innovation is in the realm of games. To achieve this, the chapter goes through the most acknowledged innovative games in the history of digital games by presenting the results of a text analysis conducted on game history books and game guides. It is further discussed why and how certain games are brought up more frequently while others are not. These games are further analyzed to see what makes them innovative, and in so trying to examine the concept of innovation in the context of games. A categorization of innovation types in games will be formed, and finally the concept of innovation is reviewed in the light of the results.

### 5.1 Material and method

The main method to examine past innovations is to conduct a text analysis on game history literature. There are seven books that are used as source material:

- Steven L. Kent: *The Ultimate History of Video Games* (2001)
- Rusel DeMaria and Johnny L. Wilson: *High Score!* (2004)
- Van Burnham: *Supercade* (2003)
- Mark J.P. Wolf (ed.): *The Video Game Explosion* (2008)
- Bill Loguidice & Matt Barton: *Vintage Games* (2009)
- James Newman & Iain Simons: *100 Videogames* (2007)
- Matt Fox: *The Video Games Guide* (2006)

The first four books are game history books: *Supercade* concentrates only on the early years of digital games, while others take in at least the first three decades of the game industry. DeMaria and Wilson's as well as Kent's books are widely quoted in academic literature, and are valid choices for this list. Mark J.P. Wolf in turn is a notable game researcher, and a game history book edited by him is a good addition to the selection. Van Burnham's history book concentrates on the beginning of the industry, but depicts the games of those years in detail.

*Vintage Games* introduces 25 games that the authors describe as having had "the most potent influences on both the videogame industry and the culture that supports it" (Loguidice & Barton, p. ix). At the same time, most of them are innovative as well. *100*



*Videogames* and *The Video Games Guide* are game guides with a big amount of games with short descriptions of them.

It should be noted that most of the authors of these books are gamers themselves, and the books reflect more or less subjective views. I try to tackle this problem by bringing together several books from different perspectives. The history books are a bit more objective than game guides while the guides bring out more personal views and opinions about games. Then again, the history books tend to bring up the same games with each other, and by choosing the game guides I attempt to bring a variable perspective into the picture. Most of the books have been published in the United States, and thus the emphasis is on the US game industry.

The games themselves were selected from the books based on the style in which they are discussed in them. Some of the games are directly called innovative, but most games had to be chosen on different grounds. Some are described to have taken something to a new level, defining something, or been the first to use some technology. The amount of text devoted to a single game or naming chapter titles after a specific game also influenced the selection.

The selected games, including the year of publication, the developer, and the developer's country were listed in a table. The games that were picked only from one book were dropped out for two reasons: to make the list a bit easier to handle, and because games that are mentioned more than once can be thought as more widely recognized. The final list consists of 168 games, and is shown in Appendix 1.

As the book selection mostly consists of game history, the more recent years are naturally left to a lesser attention. To cover this deficiency, two other sources are used to reinforce the main source. Firstly, the interviews with the game industry professionals discussed in the subchapter 4.3 were analyzed, and the games that the interviewees brought up as innovative were picked and listed.

Secondly, a small Internet survey was conducted to ask the game players what they see as innovative. The survey was a simple Internet form (see Appendix 2) asking what the respondents conceived as the biggest game innovations, as well as the reasons why they mentioned the ones they did. The form included a maximum of eight slots to insert innovations, but it was instructed that not all of them needed to be filled.

The survey link was spread in altogether nine Internet forums, which were selected from various sites connected to gaming. The objective was to select different types of sites: hardcore gaming sites, general gaming sites, as well as casual gaming sites, but the casual sites were quickly dropped from the list as they either did not have a forum, or the administrators denied including links to surveys into them. This policy in casual gaming sites could be due to marketing firms trying to gather data from the ever-growing casual game audience, and therefore all questionnaires are excluded. The forums that provided at least some informants are:

- <http://www.mobygames.com/>
- <http://www.ign.com/>
- <http://www.gamezebo.com/>
- <http://www.retrogamer.net/>
- <http://store.steampowered.com/>
- <http://www.ugoplayer.com/>

The question concerning one's preferences about innovative games may be a hard one to answer, and this may have affected that not many people filled the survey despite of attempts to keep the discussions visible for extended period. In the end, there were 27 answers, from which three were removed from the analysis due to inappropriate answers.

As many of the responders mentioned more than one innovation, in the end there are 39 different games. In addition, some game consoles and innovations without mentioning a specific game, such as online play or saving games, are brought up. As the focus of the thesis turned solely on games during the process, these were left out from the analysis. The data is smaller than originally was aimed at, but as the main source material is extensive, it was seen as sufficient support for it. The broader and more precise study of players' view on innovations is left as a matter for future research.

Considering the informants' backgrounds, the material is biased as expected. Only one of the respondents is over 40 years old and female, and one third from respondents are from the United States, another third from the United Kingdom. From game genres, clearly most popular among the respondents is first-person shooter with 14 mentioning it as a genre they play. Role-playing games are a good second with nine answers, while

other genres have one to four occurrences among the answers. The respondents are also more active gamers than the average player, as ten of the respondents report that they play games more than ten hours a week, and seven are playing 5 - 10 hours a week.

With this background information, it can be stated that the answers are mainly from hardcore gamers. This was expected, as for one, the answers are collected from gaming sites, which attract mostly game hobbyists. Furthermore, enthusiast gamers are presumed to answer a questionnaire concerning games more likely than others – especially when the query focused on a topic that supposedly inspires especially gamers with a longer period of gaming history behind them. The games from the Internet survey were listed with the same information as the other lists. The more frequently picked games are listed in subchapter 5.2.

To examine what are the attributes that make games innovative and to stand out, some of the games were taken into a closer examination. Nine most frequently selected games were chosen for this purpose, and as some of the less widely brought up games might have some different aspects to innovation, ten random games mentioned three times were added to the analysis to cover that side. The purpose is to find out what are the factors that make a game into an innovation. The texts describing the games and the reasons why the game is seen innovative were gone through and the reoccurring characteristics were grouped into categories. The results are discussed in subchapter 5.3.

With a similar method, innovation categories and subcategories were formed based on the innovation types found among the games. The categories are introduced in subchapter 5.4. Each game mentioned three times was located into one or more categories.

## **5.2 The most innovative games**

Of the games that were picked from the books, 168 games were selected at least twice. When looking at games that were selected from more books, the amount decreases quite rapidly. 69 of the games were selected from three or more books, and 30 from at least four books. These 30 games are listed in Table 7. Only two games were picked from all seven books: *Pac-Man* (1980) and *Space Invaders* (1979).

Table 7. Innovative games from literature

<b>Game/Console</b>	<b>Year</b>	<b>Developer</b>	<b>Country</b>	<b>Picked</b>
Pong	1972	Atari	USA	6
Home PONG	1975	Atari	USA	4
Breakout	1976	Atari	USA	4
Space Wars	1977	Cinematronics	USA	4
Atari Football	1978	Atari	USA	4
Space Invaders	1978	Taito	Japan	7
Galaxian	1979	Namco	Japan	4
Asteroids	1979	Atari	USA	6
Berzerk	1980	Stern Electronics	USA	4
Defender	1980	Williams Electronic	USA	5
Battlezone	1980	Atari	USA	5
Pac-Man	1980	Namco	Japan	7
Tempest	1981	Atari	USA	4
Donkey Kong	1981	Nintendo	Japan	6
Dig Dug	1982	Namco	Japan	4
Robotron 2084	1982	Vid Kidz	USA	5
Pole Position	1982	Namco	Japan	5
Lode Runner	1983	Douglas E. Smith	USA	4
Dragon's Lair	1983	Advanced Micro-computer Systems	USA	6
Punch-Out!!	1984	Nintendo	Japan	4
Tetris	1985	Alexey Pazhitnov	Russia	5
Super Mario Bros.	1985	Nintendo	Japan	5
Metroid	1986	Nintendo	Japan	4
Street Fighter II	1991	Capcom	Japan	6
Myst	1993	Cyan Worlds	USA	6
DOOM	1993	id Software	USA	6
Tomb Raider	1996	Core Design	UK	4
Super Mario 64	1996	Nintendo	Japan	4
Final Fantasy VII	1997	Square	Japan	4
Dance Dance Revolution	1999	Konami	Japan	4

The fact that there are no games from the last decade in the list is because the books mostly cover the earlier years. The case is exactly the opposite when looking at the games from the interviews of game professionals, as seen in Table 8. The games mentioned by more than one interviewee are listed.

Table 8. Innovative games from the interviews

Game/Console	Year	Developer	Country	Picked
Tetris	1985	Alexey Pazhitnov	Russia	2
The Sims	2000	Maxis	USA	3
Halo	2001	Bungie Studios	USA	2
Katamari Damacy	2004	Namco	Japan	3
Guitar Hero	2005	Harmonix	USA	2
Call of Duty 4	2007	Infinity Ward	USA	2
World of Goo	2008	2D Boy	USA	4

Games that are mentioned by one interviewee are *Audio Surf*, *Bejeweled*, *BioShock*, *Black&White*, *Braid*, *Call of Duty*, *Deja Vu*, *Devil May Cry*, *Diner Dash*, *Elite*, *Everquest*, *Fable 2*, *Far Cry 2*, *Farmtown*, *Fez*, *God of War*, *GTA*, *GTA III*, *Half-Life*, *Ico*, *Left4Dead*, *Little Big Planet*, *Loco Roco*, *Music Pets*, *Parappa the Rapper*, *Peggle*, *Pikmin*, *Restaurant City*, *Shadow of the Colossus*, *Spore*, *Star Raiders*, *Starfox*, *World of Warcraft*, and *Zuma*. All in all, 41 games are mentioned.

In the Internet survey data, from the 39 games only six games are mentioned more than once. These games or features are seen in Table 9.

Table 9. Innovative games from the Internet survey

Game/Console	Year	Developer	Country	Picked
Wolfenstein 3D	1992	id Software	USA	2
Metal Gear Solid	1998	Konami	Japan	2
Half Life	1998	Valve	USA	2
Halo	2001	Bungie Studios	USA	2
GTA 3	2002	DMA Design	UK	2
Portal	2007	Valve	USA	2

Within the web query no game rose above others. Compared to the interviews, this may be partly because of the different situations in which the questions were asked. While the game professionals were not specifically asked to name any games, some used them as examples of what they thought innovation is or can be. Gamers were particularly asked to name game innovations. It can however also tell about a more shared view of valuation for certain games among game developers compared to game players.

Most of the games the professionals mentioned are from the past decade and many of them are relatively small games, such as independent games and Facebook games. In the case of gamers, less than half is from the last decade, and almost as much are from the 1990s. One interpretation of this is that the professionals have to follow more pre-

cisely the contemporary games, while gamers more openly bring up games that they have played and loved earlier in their gaming history.

One thing that catches attention is that among all of the games, there are almost no other countries among the developers than USA and Japan. Almost complete lack of European games is a bit surprising. The United Kingdom is one of the largest game software markets in the world (Izushi & Aoyama 2006), and still only a couple of games made it into the top lists.

As said, the selected books are mostly American, so it may influence the emphasis on American games. However, an even bigger reason is that the video game industry was born in the USA, gradually growing into a big industry. UK came into the picture later, with a background in computing and “bedroom coders,” and it was not until the 1990s when the UK game industry started to grow substantially (Izushi & Aoyama 2006).

Japan, on the other hand, came strongly into the picture in the late 1970s. The Japanese video game industry drew its creativity and technological talent from the toy industry, and was influenced by the well-developed manga and anime industries (Izushi & Aoyama 2006). This has resulted in very different types of games than the games from anywhere else in the world.

Overall, the resulting games are not surprising as such, as they are well-known, successful games. Even though many of the top games are seemingly very different from each other, they have much in common as well. They all have distinguished themselves from the games that existed before them. *Space Invaders* for instance appeared when most games were *Pong* (1972) variants while *Pac-Man* was published at a time when most games were about space shooters. *Tetris* (1985) was invented when games were starting to evolve and get complicated and story-driven – *Tetris*, however, pushed through by being really simple and without a real story, but with a very addictive gameplay.

*Street Fighter II* (1991) and *DOOM* (1993) both popularized game genres that are still extremely popular today. *Street Fighter II* took fighting games a giant leap forward, introducing the use of various game characters with unique combos and made the game a good example of the “easy to learn, difficult to master” mindset. *DOOM* popularized perhaps the most popular game genre of all time: first-person shooters.

## 5.3 What makes a game an innovation

This subchapter discusses the factors that seem to make a game an acknowledged innovation. There are numerous things that are mentioned when describing the innovative games in the books. Roughly they could be categorized into five main groups: *game compared to existing games*, *game as such*, *context*, *reception*, and *influence*. Basically, only two of these aspects were covered in the definitions of innovation in subchapter 4.1: Being something new (game compared to existing games) and being something successful (reception). These categories are not clearly distinct but have a lot of overlapping and interaction between them.

### 5.3.1 Game compared to existing games

It is important to note that a game does not become an innovation just by being as different as possible from the games before it, not even when the changes are seemingly good ones. It is important to balance the familiar with the new. When *Computer Space* (1971) was released, it was the first arcade game and people were not yet used to playing such games. It was new in many ways, and it also had rather complicated controls and instructions, and that was a big reason why it was not successful. When *Asteroids* (1979) arrived a few years later, it had a similar control scheme as *Computer Space*. However, the audience had meanwhile played other arcade games and become more accustomed to them, and more complicated controls were no longer an obstacle for success. (Kent 2001.)

A product is not an innovation, however, if it does not bring something new to the picture, and the actual core of the innovation is the novelty factor. Many of these games are described somehow as the first of their kind. However, when you dig deeper, they usually have forerunners, and the acknowledged are rather the first ones to achieve commercial success.

Many of the games examined here represent improvements to previous games. Area where improvement happens can vary: it can be graphics, gameplay, technology, or essentially any part of the game. Especially in the beginning of the industry, when gaming was still a niche market, many innovative games rose to their stature by attracting new audiences. The same phenomenon has happened later on a larger scale with the success

of casual and social games, which have made playing games something that almost everyone does.

### 5.3.2 Game as such

”Game as such” points to the game’s intrinsic properties, which are not necessarily new or even better than other contemporary games. For an innovative game, it is not only important to be a pioneer in some area, but the game needs to be good enough in other areas as well. It is also important that the whole game supports the innovative part. The quality of a game is of course an important factor, and may be the one thing that stands between a game becoming an innovation or not. The quality can be, for example, the quality of the graphics or of the gameplay.

Most innovative games were top quality at the time, but there are some exceptions as well. If the game was exceptionally good in some area, it could be successful even though it did not do that well in other areas. *Dragon’s Lair* (1983) was mentioned in most books, and it was a huge success. Its graphics and animations were completely above the standards of the games of the time. However, its gameplay is described as being quite poor, consisting merely of making choices of what the on-screen character would do next. If the player chooses correctly, the game continues and a bit more of the story is revealed, otherwise the game ends. The story of the game was described as not very original either. (DeMaria & Wilson 2004.)

Many of the games are described as having certain values, making them stand out or making the game experience better. It can be *simplicity* in some games, *depth* in others (sometimes even both in one game!). Other value features mentioned are for instance *variability*, *modifiability*, *challenge*, *humor*, *cuteness*, *excitement*, *beauty*, *tension* or even *brutality*, *violence*, and *anxiety*. Of course, it depends on the game which features are seen valuable and which are not.

### 5.3.3 Context

Even though the environment into which the game is launched is not something a game developer can affect that much, it is in many cases a crucial factor for a game to be considered innovative. Basically, environment is a factor influencing the success of the game, and an important factor for any game. Especially for innovations it is crucial, as – being somehow different than contemporary games – they involve risks and may have



higher chance to fail. The contextual factors may be at least cultural, as an ongoing trend, economic, such as the state of the game industry, or political, for instance a negative view to game violence.

The timing of the competitors is a big factor as well, as can be seen when Mattel Intellivision came out in 1979. The console was superior in graphics, had the best sports games and was on its way to become the number 1 console. Then Atari released *Space Invaders* for the VCS, and the game company Activision was formed, releasing great third-party games for the VCS. These events guaranteed VCS's place as the most successful console (Wolf 2008, pp. 57-58). A changing environment gives challenges for innovation, and on the other hand, constant innovation is needed to keep up in the changing business of games.

Larger media trends of the time can have an effect as well: *Space Invaders* would not have been as successful if *Star Wars* (1983) had not been as popular at the time, creating a science fiction mania (DeMaria & Wilson 2004). Similarly, many sports games are tied to real-world sports events.

By doing market or trend research companies can affect the innovations they are producing. The publishers may have more resources to do market research and so influence developers' innovation processes (Readman & Grantham 2006). In different areas different types of innovations get acknowledged more easily. In Japan, the genre of role-playing games has evolved, as the market for the genre is much bigger in there, while in Europe the strategy games tend to do better than elsewhere.

#### **5.3.4 Reception**

Even though not always seen so, the reception of the game is a part of the innovation's definition. All the games picked are more or less successful in some way. The game does not have to be successful necessarily in sales, but can be otherwise distributed widely or critically acclaimed, for example. There are of course many things that affect the success of a game, and on the other hand, a successful game will have a greater influence on other games and the industry.

To be a success, a game must usually be widely distributed. Especially in the days of the arcade industry this was essential. However, distribution channels and methods are important in other games as well. *Doom* was distributed as shareware on the Internet, and

it would never been so popular if it would have been sold only off the shelf. This has happened more recently as well, as the new distribution channels of for instance Steam and AppStore are changing the way innovations occur today, making it possible to spread games more easily among players.

Even if people have not played a certain game, they may have heard about it. This is the case of many innovative games. Everyone recognizes the characters of Pac-Man or Mario even if they have not played any games. If a game rises to a certain status in the gaming community, it is more likely to be remembered as an innovation as well. Some terms describing a high status in the books are *an archetype*, *an icon*, *a classic*, or *a symbol*.

### **5.3.5 Influence**

One important element that innovative games have is influence. Influence can be recognized on various levels: how certain game mechanics function, how a story is told in a game, more generally on the development of a certain game genre or even the whole game industry itself. When the industry was still young and not yet as popular as today, individual games could have a critical role in the survival of the industry.

When a new, innovative game comes to the market, it is bound to attract followers. On one hand, people start to copy something that sells, and on the other hand, a successful game often produces sequels and creates franchises. Really strong innovative games may popularize a whole genre, evolve it substantially, or set other standards that future games will follow.

## **5.4 Game innovation categories**

In this subchapter, I will try to open up what types of game innovations there are and create a categorization for them. While the last subchapter uncovered the factors that *make* games innovative and influence them becoming innovations or to be recognized as ones, this subchapter explicates *the types* of game innovations. Here the concentration is on the core of the innovation, the *new* part of it which defines what the innovation is like.

The purpose is to create a categorization that will help to examine game innovations. In the chapter 6, the categories are used to examine the history of game innovations. They

could also be used for instance to examine what types of innovations or innovation combinations are most successful or as practical tools when innovating in a certain area.

The subchapter 5.4.1 will explain the method used to get these categories, while the next four subchapters will describe the categories. The subchapter 5.4.6 discusses the relations between these categories, and 5.4.7 the relations between this categorization and the existing ones. Last subchapter will introduce a distinct category called “extra-game innovation” as it covers aspects not directly in the game design.

### **5.4.1 Method**

The games picked from the books, the interviews and the Internet survey are used in this examination. Combining such diverse research data is problematic, but here it is seen as the best possibility to get a whole overview of the history of digital games.

Due to limited resources, the amount of games under examination is limited. The games that are picked at least from three books, interviews or survey answers altogether are included in this examination. At the same time, this restriction makes the selection more valid, as the more widely picked games are more acknowledged innovations. The downside is exactly the same – it leaves out some of the less known or recognized innovations, which could provide a different, perhaps also useful view to the matter. With these restrictions there are altogether 83 games to be reviewed.

The games are classified into groups on the basis of what the books, the interviews and the survey answers say about them and from what perspective they are perceived to be innovative. In the end, there are four main categories, which further divide to subcategories. Each of the games is placed at least into one category, but many games on the list are conceived to be innovative in more areas than one, and therefore belong to multiple categories.

The four categories identified are *technology*, *gameplay*, *presentation* and *narrative*. In addition, there are innovations that are not game-intrinsic. These innovations include things like distribution, marketing or tools for the customers to modify the game. In the following subchapters the categories and subcategories are explained. The mentioned game examples are from the gathered list, unless explicitly said otherwise.

## 5.4.2 Technological Innovations

There is a constant technological advancement going on in the game industry. The advancements can basically be divided into two subcategories: *hardware* and *software*. Hardware innovations include concrete machinery like new processors and input devices, while software innovations include for instance more advanced graphics.

The line between the two is however not always that straightforward. Hardware innovations need software to work properly, and software innovations need the hardware to function as well. For example, new graphics can be made possible by a new type of screen or graphics card. To simplify things, the hardware–software issue is handled from the perspective of the end user: concrete items that the player can touch, such as controllers, are considered to be hardware, and the intangible things, for instance what the player sees on the screen, is regarded as software.

As the machines that run the games, such as consoles or computers, are traditionally seen as hardware and the games for them as software, the focus here is more on the software side. However, some hardware innovations are recognized from the game side as well. *Auto Race* (1976) as the first handheld can be thought as a game hardware innovation. *Mr. Do!* (1982) is the first arcade game sold as a kit rather than a complete arcade machine, and the game could be used to modify existing arcade machines. A battery inside the game cartridge to allow game saving in *The Legend of Zelda* (1986) is an example of a different kind of hardware innovation. *Atari Football* (1978) with the first trackball controller, *Robotron 2084* (1982) with dual joysticks, and *Dance Dance Revolution* (1999) with the dance mat are all hardware innovations as well.

Four subcategories are identified on the software side: *graphics*, *audio*, *artificial intelligence*, and *physics*. Most of the technology innovations seem to be graphical innovations. In the case of artificial intelligence innovations, only few cases were identified. Two of them are *Zork: the Great Underground Empire* (1980) and *The Hobbit* (1982), which are both text adventure games. The innovations however are not about the non-player characters' artificial intelligence, but about text parsers for the game to better understand what the player means and to allow more versatile use of language. They make the computer seem more intelligent, and therefore are identified as AI innovations. The third identified game in this category, *Half-Life* (1998), is more about the artificial intelligence of the non-player characters.

*Doom* (1993), *Quake* (1996), and *Half-Life 2* (2005) were brought up because of their physics. Physics is more relevant and visible in the shooter genre, although it is an important aspect in many other games as well. However, only these games from the list are identified from the physics innovations.

Audio is an important element in most games, but not many games were highlighted because of their technologically innovative use of audio. *Berserk* (1980) with synthesized voice is one of these games, and *Myst* (1991) is the other with its extensive use of sounds made possible by the CD-ROM technology.

The graphics of digital games have witnessed many great innovations. Considering graphics quality, *Home PONG* (1975) brought color graphics and better resolution than before, and *Space Wars* (1977) and *Speed Freak* (1978) made the graphics more sharp with vector graphics. Vector graphics were further enhanced by *Tempest* (1981) including colors into them.

3D graphics in games have been developing for a long time. Already in 1980 *Battlezone* generated 3D polygon-based environment, and two years later *Zaxxon* was played from isometric 3D perspectives. *I, Robot* had full 3D polygon graphics in 1983, while *Elite* brought 3D wireframe graphics to the home computers a year later. In the next decade the 3D graphics were taken to a new level with *Doom*'s proper 3D textures. The first fully 3D games, *Super Mario 64* and *Tomb Raider* were published in 1996.

The third main field of improvements in graphics is animations and videos in games. The arcade game *Dragon's Lair* (1983) had exceptionally impressive animations for its time, and during the next year on the PC side the *King's Quest: Quest for Glory* (1984) had an animated character walking over background. *Prince of Persia* (1989) evolved the character animations by using rotoscoping, a technique to create realistic animation by recording the movements of a human and transporting it for the game character. *The 7th Guest* (1993) and *Final Fantasy VII* both took advantage of the storage space provided by the CD-ROM technology. The first included live action video, and latter had impressive cut scenes.

The fact that so many technological innovations are identified from the graphics category is likely partly because the graphics easily draw the player's attention. In addition, graphics innovations are a versatile group with many types of advancements: 3D graphics, animations, resolutions, colors, sprites, textures, and so on.

### 5.4.3 Gameplay

Gameplay has been described as the most important part of the game: A good game requires good gameplay, and even if other parts of the game are not so good, an excellent gameplay can still make the game playable (Björk & Holopainen 2005). As stated before, it is in many cases the gameplay that basically defines the genre the game belongs to.

Gameplay has been defined as the implementation of game mechanics or the game rules (see for instance Rouse 2001, Salen & Zimmerman 2003). The main difference between game mechanics and gameplay is that game mechanics are the implemented rules of the game, while gameplay is what happens when the game is played. Gameplay can be designed, while it is the game mechanics that are programmed into the game. Gameplay can be said to be the consequence of the interaction of game rules and the player's strategies and competence, and therefore seemingly similar game mechanics may generate very different types of gameplay experiences (Juul 2005).

For the same reason, although gameplay is something that game designers can plan, it is not always known what types of gameplay will arise from the game mechanics until the game is released. Not even a thorough game testing can usually go through all the game states and ways of playing, and the game may end up being played in ways that were not intended by the designers. This brings up the question if innovation in gameplay can be an accident and something unexpected, such as a game style that has not been intentionally tried to achieve when designing the game.

The gameplay innovations could be divided into many subcategories, as there are many gameplay features described among them. To avoid too detailed categories, I ended up dividing the gameplay innovations further to *mechanics*, *controls*, *level design*, and on a bit different level, *play style*.

A variety of different mechanic innovations exist, and they can be innovative in many different ways. *Pong* (1972) has simple mechanics, that managed to do many gameplay-enhancing improvements. Simply fastening the game pace as the game advances and counting the angle differently considering which part of the paddle the ball hits managed to make the gameplay much more enjoyable than that of its predecessor on Magnavox Odyssey console (Kent 2001). Many of the early games had simple mechanics,

but also some more recent games are brought up because of their simple mechanics. Such are games like *Tetris* or recently many indy games, like *World of Goo* (2008).

Control innovations are often connected to physical controllers, such as the the ones mentioned in technological innovations considering controllers in games like *Atari Football*, *Robotron 2084* and *Dance Dance Revolution*. They can also be new ways of using controls in the game, and can be as simple as alternatively hitting two buttons as fast as possible as in *Track & Field* (1983).

Innovative level designs can be found in the huge levels and secret areas of *Super Mario Bros.* (1985) or *Metroid* (1986). *Wolfenstein 3D* (1992) has innovative level design too with power-ups and enemies scattered in the area. The freedom of the world and sandbox gaming of *Grand Theft Auto III* (2001) is another example of level design innovation.

Play style innovations mean new ways or strategies of playing made possible by the game's design. The different styles of play, such as stealth in *Metal Gear Solid* (1998) or killing frenzy of *God of War* (2008) are instances of play style innovations. Adding seemingly simple game feature, such as allowing to input three letters when you got a high score in an arcade game *Asteroids* (1979) created more competitive style of play when people wanted their initials in the top of the list of an arcade machine. In another example the possibility to save the game in *The Legend of Zelda* (1986) changed the play style, as the player needed not to start over after losing the game, but could start again from the last save point.

Gameplay innovations could be divided in many ways. Björk & Holopainen (2005) for instance introduce over 200 patterns, which explain different types of gameplay found in games. The patterns are divided into ten different categories on the basis of their gameplay aspects: 1) game elements, 2) resource and resource management, 3) information, communication, and presentation, 4) actions and events, 5) narrative structures, predictability, and immersion, 6) social interaction, 7) goals, 8) goal structures, 9) game sessions, 10) game mastery and balancing, 11) meta games, replayability, and learning curves. In the approach I have taken, several of the categories are included in the mechanics, and some, like narrative and presentation, outside the gameplay category altogether.

#### 5.4.4 Presentation

Game presentation includes how the player sees and hears the game. Presentation innovations further divide into *visual* innovations, which include the graphics, videos and animations of the game, *audio*, which include music, sound effects and speech, and *view*, as in the perspective the game is viewed from, including the in-game perspective and the screen solutions.

Visual innovations are by far the biggest group among the presentation innovations. This, along the graphical technological innovations, further highlights the centrality of visuals for digital games. There is a variety of different types of visual innovations. Different kinds of coloring options considered innovative have been more frequent in the earlier years with *Home PONG's* (1975) colors, *Galaxian's* (1979) colorful graphics, *Centipede's* (1980) pastel colors, *Tempest's* (1981) neon colors, and so on. The more complicated visuals, such as in the early racing game *Speed Freak* (1978), which has oncoming cars and objects on the side of the road, are also part of this category.

Other visual innovations have been about more photorealistic visuals, such as in *Prince of Persia* (1989) or *Virtua Fighter* (1993), about violence, like *Mortal Kombat* (1992) and *Wolfenstein 3D* (1992), different moods conveyed by visuals, for instance darkness in *Metroid* (1986) or the cheeriness of the cartoon-like graphics in *Donkey Kong* (1981). Animations and videos are brought up for example in the cases of *Dragon's Lair* (1983), *Final Fantasy VII* (1997) and *Metal Gear Solid* (1998).

The early audio innovations go as far as *Pong* (1972) and its resonating sound of the ball touching the paddle, whereas *Sea Wolf* (1976) innovated in audio with its sonar sounds suitable for the submarine game it was. One of the most famous example of audio innovations is *Space Invaders* (1978) and its rhythmic sound effects, which add to the game's tension and are a big part of the game's attraction. *Berzerk* included synthesized speech already in the year 1980 and *Super Mario Bros.* (1985) was among other things very advanced from its musical composition. Not only the better and bigger sound effects and music are seen innovative, but a minimalist audio design can be equally effective. An example of this is *Ico* (2004), which has no music and manages to influence on the overall mood especially with the absence of it.

Presentation view refers to the angle the game is perceived from, as in *Battlezone's* (1980) first person view. The games with new types of screen solutions are categorized



in this group as well. These include for example *Adventure* (1979) with multiple screens, *Defender's* (1980) scrolling screen and four-way scrolling in *Ultima* (1980). The view can be something more concrete as well, like watching the screen through a physical periscope, as in *Sea Wolf*. The view can also refer to something more abstract, as being purely textual like in *Adventure* (1976), the first text adventure game.

In principle presentation innovations could cover other perceptions than just visual and audio, although this does not come up in the data, as it is still very rare. Some games can present game states in smells (Childers & Coleman 2010), touch (e.g. vibrating of controllers), or pain<sup>6</sup> to name a few.

#### 5.4.5 Narrative

Narrative innovations are elements that mediate the story and are further divided to *story* itself as well as *characters*, *game world*, *theme*, and *dialogue*. Theme in a game can be thought to be less constructed than a whole story, being more like a topic. It can be the naval theme of *Sea Wolf*, eating in *Pac-Man* (1980), and the morality in *Black & White* (2001)

Earliest game world innovations are recognized from the text adventure games *Zork: The Great Underground Empire* (1980) and *The Hobbit* (1982), as at the time a comprehensive world was easier to describe textually than graphically. From graphical games, *Super Mario Bros.* (1985) had a huge cartoon world for its time.

As for character innovations, there are a lot of known examples of original characters. Two probably best-known characters are Pac-Man and Mario. Some other memorable characters include Sonic from *Sonic the Hedgehog* (1991) and Lara Croft from *Tomb Raider* (1996). First female character appeared in *Ms. Pac-Man* (1981), and *Metroid's* (1986) main character's development included a surprise as in the end of the game the character is revealed to be a woman. In *Street Fighter II* (1991) there are multiple characters for the player to choose from, all with unique look and background story as well as special attacks, as ever since in the fighting game genre.

The story innovations can be mediated in several ways: through dialogues, cut scenes or gameplay to name just a few. The story can be a very simple one, as the one in *Donkey*

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<sup>6</sup><http://www.painstation.de/>

*Kong*, or comprehensive as in *Final Fantasy VII*. As the games have evolved, story innovations have become usually more complex, but among them a minimalist story of *Ico* can be seen as innovative. A touching story can be conveyed without words as in *Shadow of the Colossus* (2005). Stories can also be made by the player, as in *The Sims* (2000).

#### 5.4.6 Interplay of game innovation categories

The innovation categories are presented in Figure 1. Many individual innovations within a game can belong to two or even more categories. For instance, an innovation in graphics may be an innovation in both presentation and technology. Some of the categories seem to be more connected to each other than others. The thickness of the lines connecting the categories to each other in Figure 1 represents the strength of the connection between them. The figure is not a result of quantitative analysis, but rather of qualitative, repetitive observations of the used source material. Furthermore, the thicknesses of the lines are not in scale, but are drawn to visualize the differences between the strengths of the connections.

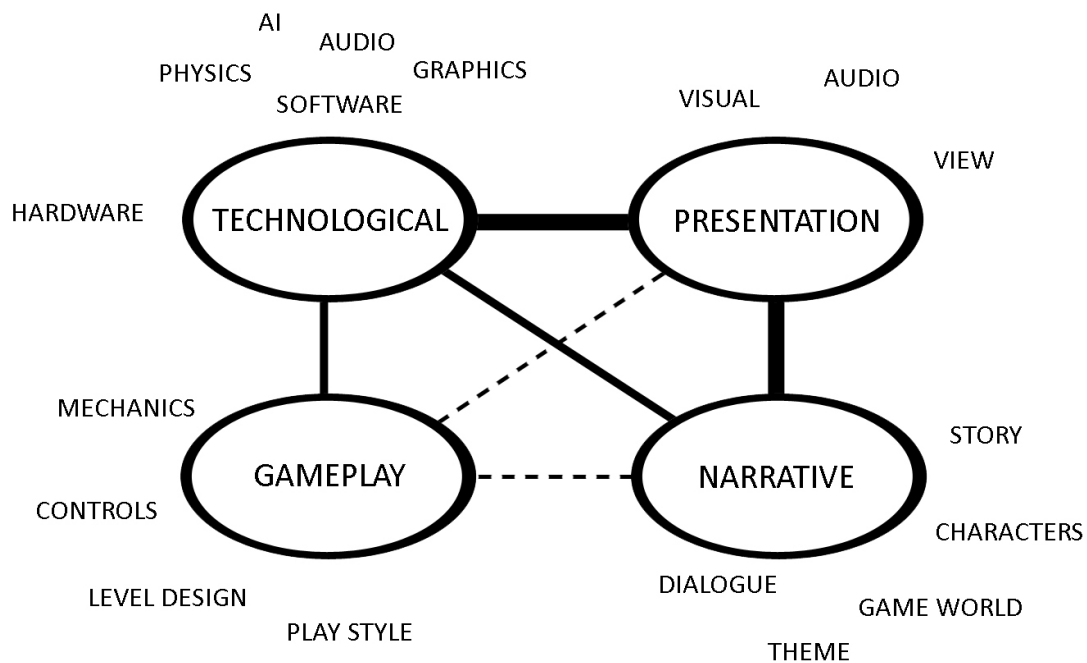


Figure 1. Game innovation categories

Technological innovations are often other types of innovations at the same time, as many of the technological innovations enable innovations of other types. The closest connection is between technological and presentation innovations, as many graphical

and audio advancements can be seen as innovations in visual and audio side of presentation category as well. Furthermore, technological innovations can enable gameplay and narrative innovations, and be simultaneously those types of innovations as well. New types of controls influence new type of gameplay, and innovations in artificial intelligence might make a new way of conveying a story or presenting more believable character possible.

Another close connection can be found between the presentation and narrative innovation categories. Narration is presented with graphics, text or audio, and sometimes the methods to mediate the story are presentation innovations as well. However, gameplay innovations seem to have only weak connections to both presentation and narrative innovations. Although gameplay can be seen as distinct from the story elements, they can and should still back each other up. Story can be told by gameplay elements, and the mood of the music can follow what the player is doing in the game, such as in *Myst* (1993). However, the same innovation does not usually belong to both gameplay and narrative or presentation innovations.

#### **5.4.7 Reflection to other game innovation categories**

In comparison to game innovation categories presented in subchapter 2.3.2, both similarities and differences can be found. The categorization presented here is more detailed than the one in Peltoniemi's (2009) work: She has two main categories instead of the four introduced here.

The technological innovations are relatively similar in both categorizations. Basically the stylistic innovations could cover the rest three categories, although I hesitate using stylistic innovation for gameplay innovations. Gameplay is a unique and important property for games, and considering the high number of gameplay innovations among the data it should have its own category. Furthermore, it does not fit the description of stylistic innovations being elitist (Cappetta et al. 2006) – innovations in gameplay are necessary for the games to evolve. Presentation and narrative innovations on the other hand could be discussed as stylistic innovations.

Peltoniemi further divides stylistic innovations to genre creation, characters, styles, and gameplay. Characters are a natural part of narrative innovations, while style could be a part of the presentation.

Genre as its own category has been intentionally left out from this categorization. There are no games in the list that have created a genre by themselves. Instead, genres evolve in steps, many games pushing them forward. Therefore, to generalize, basically all of the gameplay innovations can be seen also as genre innovations, as they somehow do things differently than have been previously done in the genre in question. Some of these changes are bigger and will give a genre a leap forward or a spark for a new genre, while others may broaden the genre.

Considering Adams' (2007) categories of gameplay, presentation, play style, input, and genre, there are many similarities with the categorization presented here. Gameplay and presentation innovations are found in both. Adams keeps play style as a separate category, while here it is under gameplay. Input innovations are here under gameplay, technological, or both of them depending what kinds of innovations they are, while Adams keeps them separate from others. In addition, Adams also mentions genres as a separate category.

#### **5.4.8 Extra-game innovations**

In addition to the innovations that are tied directly to the game itself, there are innovations that spawn from outside the actual game development process or outside the gaming experience. The different extra-game innovations found are *modding*, *distribution* and *marketing*. These are briefly explained in this subchapter.

Modding means that the game players themselves modify the game afterward by adding, editing or removing content from the game. It has become more common as the game developers have handed out more and more game editors to be used by the players. The end results of modding innovations can actually be innovations of other categories. Some of the games being the forerunners of giving players tools are *Lode Runner* (1983), *DOOM* (1993) and *Quake* (1996).

Distribution innovations consist of new ways of bringing games to the players. A classic example of efficient distribution comes from *Wolfenstein 3D* and *DOOM*. They were released as shareware, meaning people could download a free, playable version and upgrade it to a full game later. Recently online distribution has been revolutionizing the industry both in computer and console games, as anyone can put up a game for anyone to download and play. This view is not unproblematic either, as it simultaneously leads to a mass of low-quality games and often low payments for the developers. Developers

may also have difficulties to bring their game to the big public without big investments on marketing.

Marketing innovations came up only rarely when analyzing the list of innovative games. The marketing innovations are a world of their own, and not so much discussed in the game history books. However, the use of famous stars in game comes up, first used in 1984 in *Dr. J and Larry Bird Go One-on-One* basketball game, and is now a much-used marketing tactic.

## 5.5 What is game innovation?

After finding definitions for innovation from the academic literature, gathering views of innovation from game professionals, and going through game history books and game guides, this subchapter introduces one more approach to the elusive concept of innovation.

Even while the most acknowledged innovations listed in this article have been forerunners from many aspects, it is interesting to note that not one of them has actually pioneered a game genre. Although some have popularized genres or evolved them significantly, they all have had forerunners. The game that is ultimately remembered as bringing something new to the industry is usually not the first of a kind. *Pac-Man* was not the first maze game and *Street Fighter II* was not the first fighting game. *Tetris* was very different than any game before it, but it was not the first puzzle game. Sometimes the acknowledged game is not even the first widely known game. For instance, *DOOM* is often stated as the founder of the first-person shooter genre, while many remember *Wolfenstein 3D* (1992) as the first one. In reality, the roots of the genre begin much earlier than that.

This gives some interesting notions to the concept of innovation. The pioneers of genres have many times become lost to history as mediocre games or outright failures. This reflects several things about innovation. First of all, when doing something very new, there is a big risk to fail. As it is something never done before, many things can go wrong. The pioneer may not have enough marketing power to make the product widely known or it may not have good playability, although it may be something very original. It may also be too original or the audience may not be ready for it, and the game may fail because of that.

This is not a completely new issue. In his list of 50 greatest game innovations, Adams (2007) tries to correct the tendency of forgetting the original innovator by mentioning both the well-known innovators as well as the original innovators. Trying to find the first ones can be hard, however, if not impossible.

Furthermore, if we attach the most radical innovation to new genre creation (Tschang 2003), then not one of the collected innovations is indisputably a radical innovation. This view would not seem reasonable. The genre aspect is insufficient also in the sense that many influencing innovations may innovate on technology or other aspects instead of the actual design of the game, and may not as such evolve the genre. Game genre is also problematic as a metric as there are no established genre classifications. A game rarely anymore belongs to one specific genre; instead, games tend to combine elements from several classifications. Therefore I would suggest separating the game innovation categorization from new genre creation, and try to look at it as more generally breaking away from used conventions.

On the other hand, it has been suggested that the first instances of new types of games are the radical innovations while later games that have popularized the genres are the refinement innovations to those genres (Peltoniemi 2009). Many times innovation is defined as the first successful implementation of something new (Cumming 1998), and therefore the view would be exactly the opposite, meaning that the games popularizing the genres and bringing them to the big audience for the first time are the ones that are the radical innovations, while the first instances would not be innovations at all, being perhaps a part of the innovation process at most.

The game industry is by no means the only industry that gives the credit for innovating to someone else than the first inventor. The general view still often states that innovation does not necessarily have to be successful, as seen from the game professionals' interviews. In common speak innovation can sometimes be a failure or poorly developed. There is a conflict between what we understand as innovation and what games we ultimately see as the innovations.

The pioneers are still crucial for the game industry by trying new concepts and making the way clear for the innovations. Writing and studying the history of games is challenging (Mäyrä 2008), but we need more effort around describing how games evolve. Seeing only the games that make major breakthroughs and are found as the biggest innova-

tions gives a distorted view of how innovations evolve. The original games, the stepping stones that pave the way and may make these breakthrough games possible, are too easily forgotten.

## 6 THE EVOLUTION OF GAME INNOVATION

In this chapter the game innovation categories are used to see how game innovations have changed during the course of years. The same games that were used in the formation of game innovation categories are used here, and the same restrictions go for this analysis too: only the games mentioned at least in three sources are included. The first subchapter will explain the method while the next two subchapters will go through the findings. Finally, the findings are further discussed and some thoughts about the current and future innovations are presented.

### 6.1 Method

Each of the games was placed into the categories formed in the last chapter. The placement of games was made on the basis what the books, interviews and survey answers say about them. Many games on the list are conceived to be innovative in more areas than one, and belong to multiple categories.

The purpose of the analysis is to use the categories as a tool to examine the history of game innovations. It should be noted, that the results are not statistically valid and caution should be used in interpreting them. It has however been the best possible available material, and based on it, some real observations can be made and discussed.

Most of the reviewed games have multiple innovation types. On the basis of the analysis, one game has innovations on average in a bit fewer than 2.5 categories. When there are four categories, the number seems quite high. This suggests that to get widely recognized, the game has to innovate in many areas.

The case is not as straightforward. First of all, as said before, one innovation can simultaneously belong to multiple categories. For instance, a game can have innovative, realistic graphics, which could be recognized as technological innovations, but also as presentation innovations. On the other hand, one game might have several innovations that belong to one category, but these are only counted as one encounter. Therefore the number of occurrences of different innovation types in a game does not directly tell how many innovations one game includes.



Furthermore, this analysis does not tell if the innovations are radical or incremental. Even if the innovations could be sorted into radical and incremental ones or into other categories mentioned earlier in this thesis, it is obvious that the listed ones would be more from the radical end as they are the ones that are most often recognized as innovations.

The most important thing that can be examined with the help of the analysis is the distribution of the innovations into categories as a whole and separately in different decades. Especially the change from a decade to another is interesting and allows us to consider what has caused the different distributions. As the data from the last decade of the examination is mostly only from the interviews and survey, it is inevitably diverge from others, which is taken into account when discussing the results.

The roots of digital games go well beyond the 1970s. Before digital games there has been board and card games as well as mechanical games such as pinball machines. Among the first digital games are *Tennis for Two* (1958) and *Spacewar!* (1961). However, besides some isolated pioneers, the actual game industry can be said to start from the 1970s along with the first commercial digital games. Therefore the timeline of this analysis proceeds from the 1970s to the 2000s.

## **6.2 Amount and distribution of innovation types**

As mentioned earlier, an innovative game has innovations in 2.5 categories on average. In the 1970s, the average number was 2; this number keeps growing as the industry develops, from 2.3 in the 1980s to 2.6 in the 1990s. Considering how games have become bigger productions, this increase makes sense. In the 1970s the games were small, simple, and relatively similar to each other, while in the 1980s games had more content in them, making it natural to have innovations in several areas. The same growth of game production continued in the 1990s and into the 2000s. However, during the 2000s, the average of categories per game is 2.1, almost as low as in the 1970s.

There are a few possible reasons for the drop of innovation types in the last decade. One of the clear reasons is the different source material: Many of the history books do not cover the last decade, and the interviews and the survey answers presented here

have an emphasis on the last decade. Because of this, the data may describe only some sides of the games while the books cover a bigger variety of aspects. Other reason could be the almost complete lack of technological innovations, which can be seen more precisely later in this chapter.

There can, however, be other explanations for the drop in the number as well. For example, the time of the most radical innovations may be over at this point. Thus, innovations are more incremental and only the biggest innovations in a game are considered. On the other hand, the rise of casual gaming and new distribution channels has provided a basis for the rise of smaller innovative games during the last years.

The overall distribution of innovation types can be seen in Figure 2. The pillars represent the relative amounts of innovation occurrences in each category among all of the reviewed games. Each of the pillars is formed by counting the overall number of the instances in that category and dividing it by the number of games. As many games have innovations in multiple categories, the sum is over 100 %.

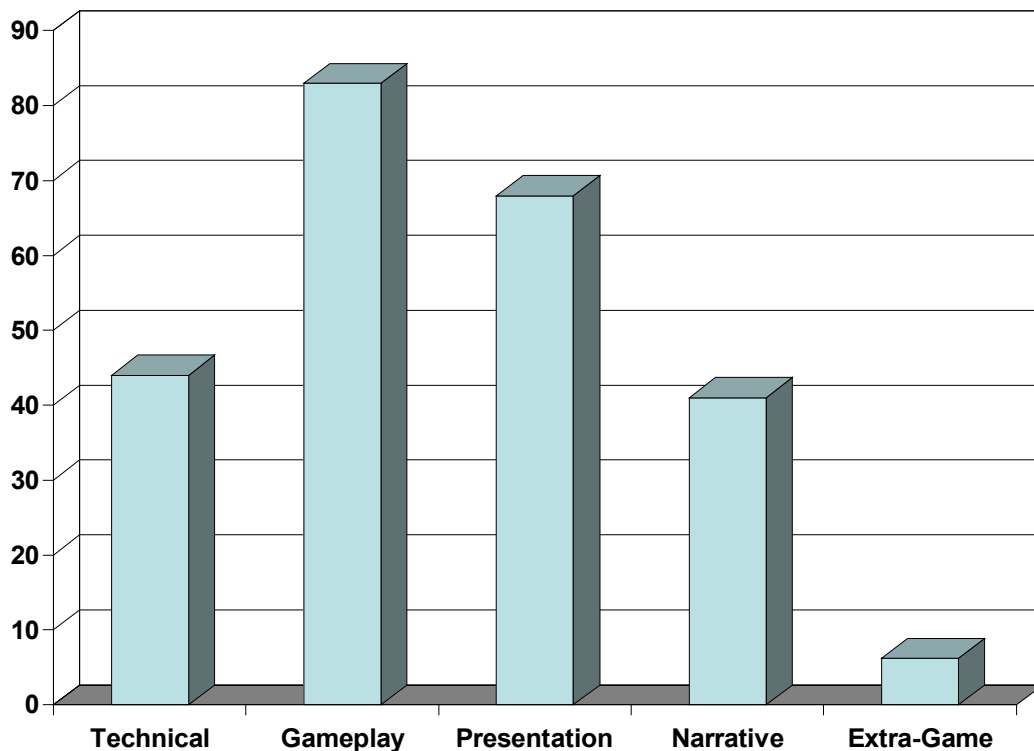


Figure 2. Relative amounts of the innovation categories

As seen from the chart, gameplay innovation category is the most prevalent, with about four out of five games in the list being mentioned in this category. Presentation

innovations are the second-most frequent, and technological and narrative innovation categories are substantially smaller.

This observation reflects a number of insights. First, technological and narrative innovations may actually be scarcer than innovations in presentation and gameplay. Gameplay innovations may also be valued in the source material used here more highly than the other innovations. In the case of narrative innovations, the story has not played such an important role in games until later in the industry's history. This insight possibly reduces the total amount of narrative innovations.

The extra-game category is by far the smallest one, but not many conclusions can be drawn from this. The extra-game innovations are not brought up in the source material in a similar manner as the more game-intrinsic innovations, and very few (only five games) belong to this category. This does not mean that there would be so few innovations related to distribution, marketing, or modifications. Because of the underrepresented occurrences of the categories, they are left out from the more precise examination of the historical evolution of innovations. The following sections will, therefore, concentrate on the four main categories of innovation types.

### **6.3 The development of innovations**

To see how innovations have changed throughout the decades, the relative amounts of innovations in each innovation category are reviewed by decades (see Figure 3). The numbers for each decade were counted by taking the instances of innovations in a category and dividing it by the amount of all instances of innovations during that decade.

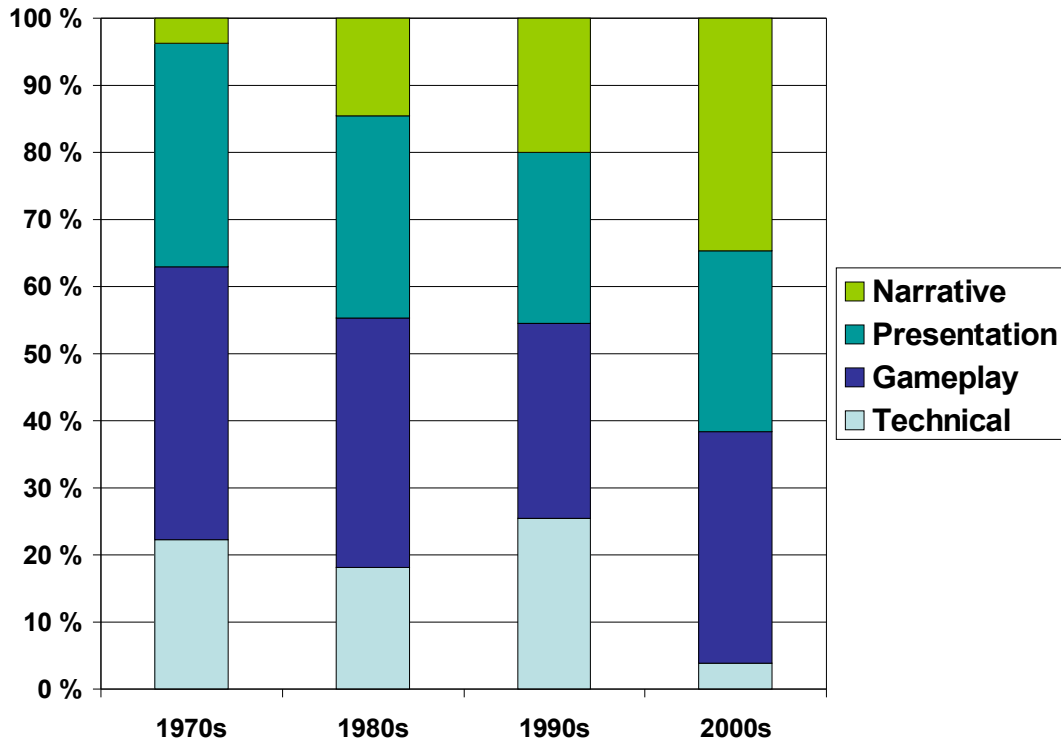


Figure 3. Relative amounts of the innovation categories by decades

What is most striking in the chart is the steady but considerable growth of narrative innovations. This goes along with expectations, however, as games have become more massive and complex as the industry has matured. This has made it possible to create more complex stories and game worlds. The growth further supports the prior interpretation of the smaller portion of narrative innovations. Other categories have not changed as consistently, but there are some other points to be noted as well. The division of the categories in each decade and the factors influencing it will be considered in more detail in the following subchapters.

### 6.3.1 The 1970s: The beginning

The 1970s have more gameplay innovations and fewer narrative innovations than any other decade. The relative amounts are presented in Figure 4.

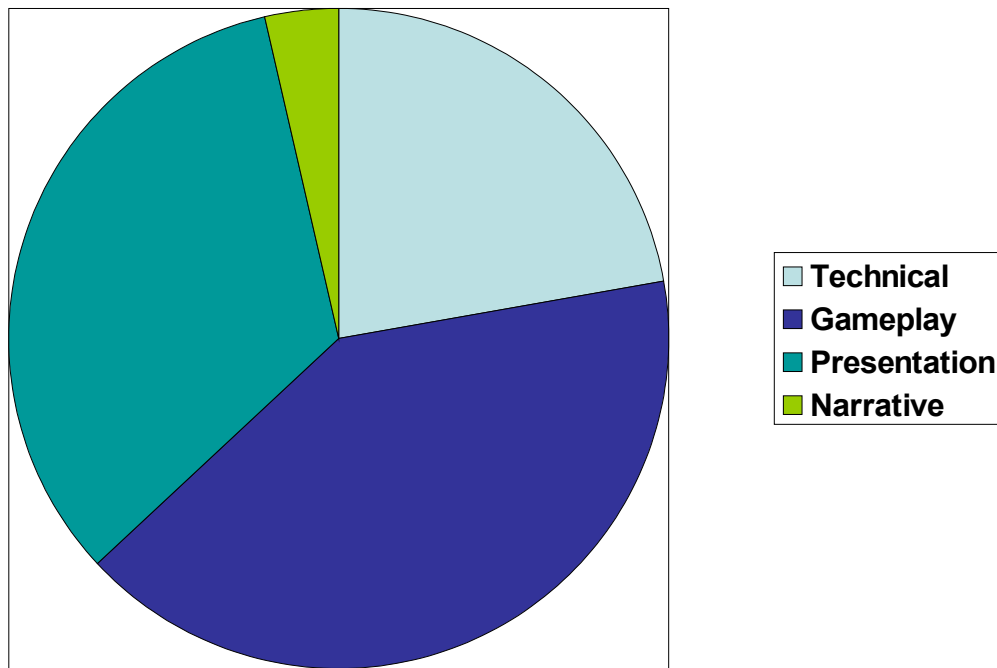


Figure 4. Division of the innovation categories in the 1970s

The very small amount of narrative innovations is the consequence of the simple fact that games were not yet very narrative. Furthermore, the characters were mostly impersonal, such as cars, spaceships, or nameless stick figures. The only game from the list that is recognized as a narrative innovation is *Sea Wolf* (1978). The naval theme of the game was described as innovative at a time when most games were still *Pong* variants or space shooters.

Almost half of the 1970s innovations are categorized as gameplay innovations. This does not come as a surprise, as the games are minimalist by today's standards. The games were more about core game mechanics. Although there actually were not that many different types of games yet in the 1970s, many of today's game genres have roots in that decade.

The performance and the graphics were developing in big steps as well, which is indicated by the relatively large percentage of technological innovations. The first color games and vector graphics-based games are from the 1970s, as are the first handheld games.

The high number of presentation innovations may come as a surprise as the games were still so crude and simple. When we take into account that many of the technological innovations are related to their graphics, however, it begins to make sense. The innovations in graphics technology often indicate innovations in visual representation. Even if they may seem crude today, many of the games looked and even sounded impressive to the players of that time.

Even if the sample is small (only 14 games from the 1970s are on the list), it seems to describe the development of the early game industry quite accurately. The industry was just forming, and there were a lot of clones around, but the few games that broke out of the mold became instant classics. Those games are quite widely recognized as innovations, as 3 out of the 14 games that are mentioned on the broader list of innovative games 6 or 7 times, which is 25 % of all the frequently picked games, yet the 1970s games altogether comprise only 10 % of the list.

Considering the industry life-cycle, the results go hand-in-hand with the theory. The number of producers was small, and the diversity in products is evident in the first years, although a lot of clones were around as well.

### **6.3.2 The 1980s: The industry spreads**

In the 1980s, the gameplay innovations and presentation innovations have relatively similar portions of the innovations as in the 1970s. The portion of technological innovations has diminished, however, and that of narrative innovations has grown. The amounts are shown in Figure 5.

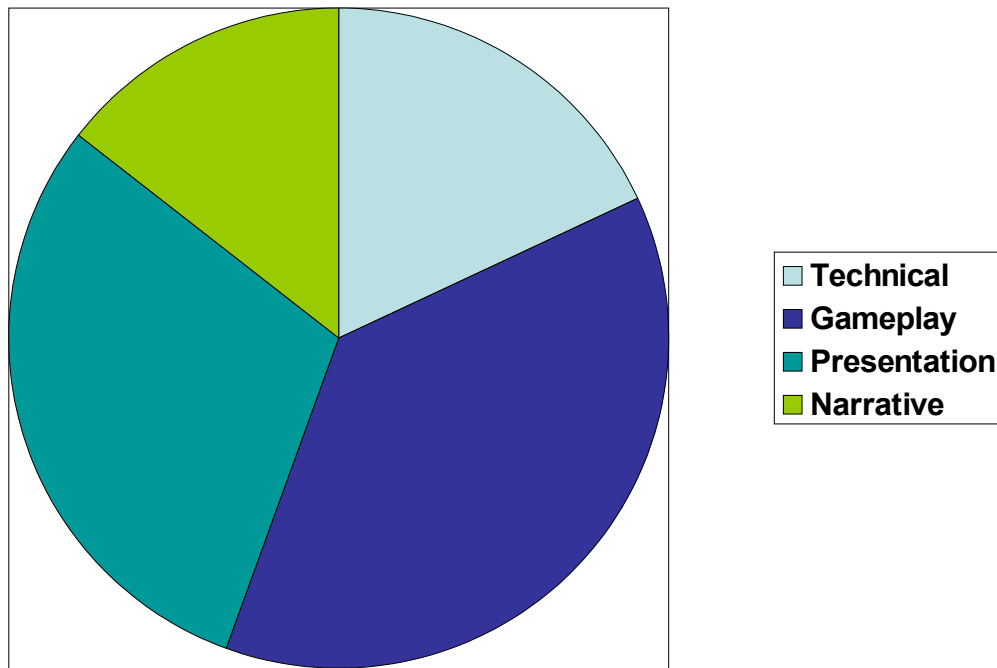


Figure 5. Division of the innovation categories in the 1980s

The growth in narrative innovations is easy to explain. The first “personal” game characters were introduced, and the game worlds were more complex, giving the possibility to innovate more within them. The text adventures, that had a predecessor in *Adventure* (1979), started to have more complicated game worlds in *Zork* (1980) and *The Hobbit* (1982). The game worlds started to grow significantly with games like *Super Mario Bros.* (1985), *The Legend of Zelda* (1986), and *Metroid* (1986). The stories became an important part of many games as well.

The drop in technological innovations is harder to explain. Perhaps the emphasis was turning from the technological aspects to the content of the games. Still, there were many innovations on the technological side as well. Similarly to the 1970s, many of them were in graphics technology. The first “3D” games came to market in *I, Robot* (1983) and in *Elite* (1984), and game animations took big leaps forward in games like *Dragon’s Lair* (1983) and *Prince of Persia* (1989).

On the broader list of innovative games, 35 of the games are from the 1980s. This is a larger number than that of any other decade. This was the time when the game industry started to move from niche markets to wider audiences, and new genres were still forming. One more observation can be made related to the distribution of those

innovations: 27 of them are from the first half of the decade, and there is a big drop after 1984. A big contributor to this is that video game industry crashed in 1983. The video game industry was producing more and more games, but many of them were of poor quality. This mass of poor quality games has been said to be the major reason for the crash (Kent 2001, DeMaria & Wilson 2004).

Even considering the crash, the drop is quite steep, and the number of innovative games does not rise to the same level again later. If the 1970s is characterized by a few widely acknowledged “big” innovations, the 1980s – and especially the early years – could be characterized as the “mass production” of innovations.

From the end of the 1970s to the crash, the firms in the game industry were rapidly growing and, as can be seen from the large number of games, there were a lot of different types of games available. According to the industry life-cycle theory, the crash followed by a shake-out of companies signals that the peak in the number of the producers in the field had been maximized and would drop in the future (Utterback & Abernathy 1975). After the shake-out, however, the industry recovered and by the end of the 1980s the number of innovations rose again.

### **6.3.3 The 1990s: It’s all in the looks**

In the 1990s, the portions of each category are distributed more evenly (see Figure 6). The most striking thing about the 1990s, when compared to other decades, is the peak in technological innovations. After diminishing from the 1970s to the 1980s, they represent a bigger portion of innovation in the 1990s than in any other decade.



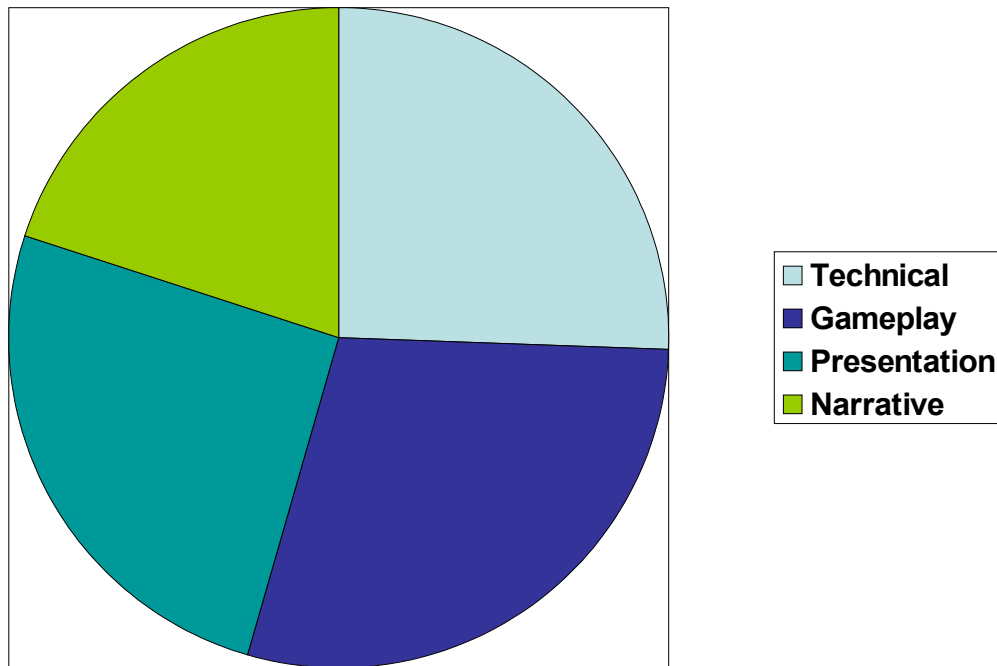


Figure 6. Division of the innovation categories in the 1990s

The rise in technological innovations is partly due to CD-ROM technology. By making it possible to have much more content in a game than cartridges or floppy discs ever allowed, CD-ROM technology enabled many technological innovations especially in graphics and audio. The extra space on CD-ROMs brought impressive graphics to home computers and consoles in the form of *7<sup>th</sup> Guest* (1993), *Myst* (1994), and *Final Fantasy VII* (1997). There were other technological advancements in graphics as well, as the first proper 3D games, *Super Mario 64* and *Tomb Raider*, were released. The technological improvements in graphics are reflected in the presentation innovations as well. On the basis of the data it seems clear that the look and sound of games was especially important in the 1990s.

Some games were distributed over the Internet, and this distribution method along with networked play made games such as *DOOM* much more popular than they would have been without the Internet. *Wolfenstein 3D* and *DOOM* popularized the FPS genre, which has been one of the leading game genres ever since. During the 1990s one FPS game came out after another and quite a few of them innovated in

graphics and physics, taking the technology rapidly forward. Many of them innovated in gameplay and even in story as well.

Looking at other innovation categories, there were relatively few gameplay innovations compared to other decades. This can be a result of a greater emphasis on more realistic graphics and physics and overall on how the games looked and sounded. Even with the emphasis on the technology, narrative innovations kept growing from the previous decade.

The game industry crash was long gone by the 1990s and games were more popular than ever before. The industry sales were far higher when compared even with the best years of the 1980s<sup>7</sup>. Still, the amount of innovative games selected for the broader list is nowhere near the 1980s: 21 games from the 1990s were included compared to 35 from the 1980s. One reason is that one of the books only covered the earlier years of the industry and did not reach the 1990s. However, it does not explain the drop completely.

A more likely reason is the maturation of the industry. It is normal for industries, even for creative ones, to become more market driven as they mature (Tschang 2007). Even if the developers still want to make original games, it might be hard to convince the publishers to fund them (Fullerton et al. 2006). Economic aspects, difficulties in predicting product acceptance, short product life-cycles, and the hits-oriented nature of the game industry have fostered incremental innovations over radical ones (Tschang 2007). Therefore, while there have still been a lot of innovative games, they have likely been more incrementally innovative, and not as widely recognized and not as coherently brought up in the source material.

#### **6.3.4 The 2000s: A new beginning**

The last decade's innovation distribution can be seen in Figure 7. Extra caution should be used when comparing the first three decades with the 2000s, however. Most of the games from the three first decades are from books, while games from the last decade have a stronger contribution from the survey and the interviews used to build the broader list. As the people who participated are from different backgrounds and the

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<sup>7</sup>[http://vg-sales.wikia.com/wiki/Video\\_game\\_industry](http://vg-sales.wikia.com/wiki/Video_game_industry)

situations of describing innovation are different as well, it might affect the types of games that are mentioned. Nevertheless, it is useful to examine the distribution of innovations in this decade.

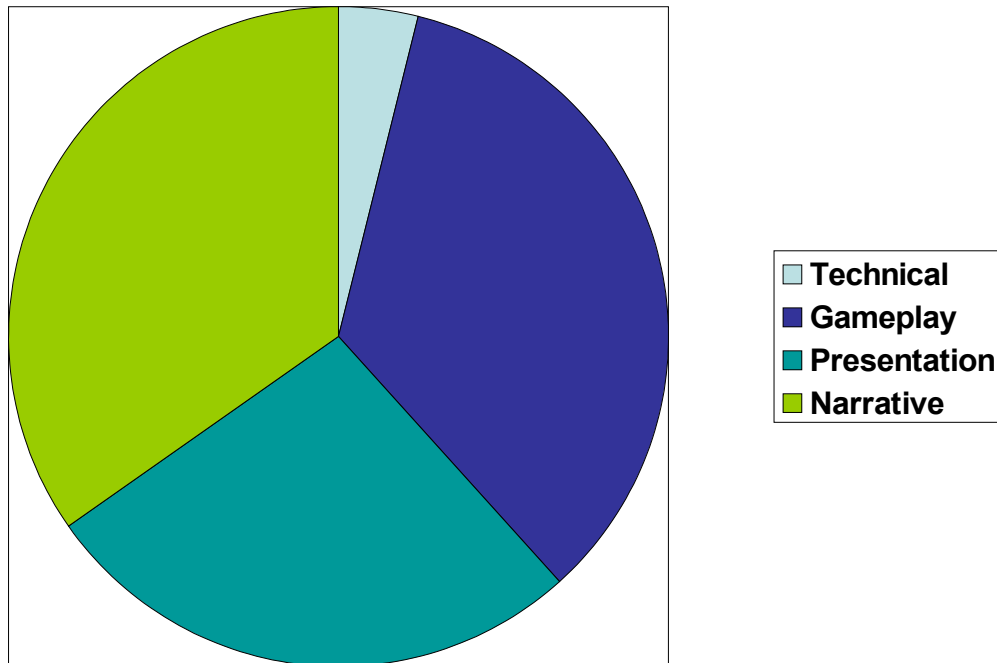


Figure 7. Distribution of the innovation categories in the 2000s

There is quite a drop in technological innovations in the 2000s, which deserves closer examination. The focus of what is important varies across different source materials, diminishing the technological side of innovation. Still, it should be noted that in the earlier years of the industry there are striking technological innovations, and even in the 1990s the graphics and physics were developed in substantial steps. During the more recent years the technological progress is subtler and more incremental.

During the 2000s, we reached the point where games already looked so advanced, that it was not so important or even possible to constantly have big technological advances in that aspect. At the same time it still mattered how the games looked: The visual innovations were no longer so much technological than artistic. The minimalist visuals in *Ico* (2001), the goofy ones of *Katamari Damacy* (2004), or the simplicity of *World of Goo* (2008) are examples of these innovations.

From narrative innovations, powerful experiences such as *Ico* and *Shadow of the Colossus* (2005) have made it to the list, as have *Deus Ex* (2000), *Halo* (2001), and *Half-*

*Life 2* (2004) with original storylines. It seems that stories and games as emotional experiences are valued more than ever.

Innovations in gameplay seem to have diminished a bit over the course of the three first three decades, whereas their role has grown again in the 2000s. This shift may signal the rise of smaller and more independent games in recent years. However, as true as this may be, there seems to be only one independent game, *World of Goo*, on the broader list. This is somewhat related to the small amount of games in the list from the 2000s: Only 13 games made it, and only 3 of them are from the last half of the decade when the rise of independent game companies has had the biggest impact on the industry.

The independent companies are more likely to bring radical innovations and influences from outside the industry, whereas the majors concentrate more on incremental innovations (Peltoniemi 2009). Where the 1990s was dominated by big game productions, both major and small-scale games seem to have their role in the 2000s. On one hand the industry is still growing with big game productions and incremental innovations, and on the other, smaller games are on the rise, bringing back the importance of gameplay innovations. Games like *Wii Sports* (2006), *SingStar* (2004), or *FarmVille* (2009) have massively increased the number of people playing games.

When comparing this evolution to the industry life-cycle theory, even at the end of the 2000s, the theory's predicted low exit and entry rate of firms (Utterback & Abernathy 1975) does not seem to be actualized. Instead of a few established dominant designs or genres, the game types are still getting more versatile and diverse, with whole new genres still forming.

## **6.4 Overview: Where from here?**

In this chapter the history of game innovations has been reflected by using the innovation categories and their occurrences in the source material. Especially the growing emphasis on narrative innovations and the diminishing of technological innovations during the last several years is interesting. It does not necessarily mean that technological innovations are decreasing as such, but other innovations in games are getting more attention, respect, or acknowledgment while technological innovations have be-

come more discreet. At the time of writing, there are some interesting technological innovations in progress. Microsoft has published controller-free gaming with its Kinect and the next generation of 3D technology in games has been brought to market in the form of Nintendo 3DS.

In a similar manner, the growth of narrative innovations can be seen as a signal that games are respected more as stories too, not simply as game mechanics. The results also suggest that the history of game innovations has not been a straightforward evolution, but each decade has different characteristics in innovations as well.

It is impossible to predict where this will lead us in the future, but the last years have shown us the power of game experiences in both small and big packages, with games such as *Braid* (2008) or *Heavy Rain* (2010). Of course, the games on the iPhone or on Facebook, for example, have been rapidly spreading. *CityVille* (2011) on Facebook managed to gather over 100 million players at its peak. The possibilities for independent game companies to innovate through small games have provided a lot of fresh games.

In the future, however, as the new distribution channels see more and more games pushed through, it may be that the big companies will take more control of them as well. This is already the case with Facebook, where there are so many games that the new games need to put big amounts of money into marketing to get enough players to make the games profitable. Game companies like Zynga have the consumers and the money to bring their games to the top easily, while companies just starting out may have difficulties to find players for their games. The aspects of marketing will be in a more crucial role with these types of games than before.

It seems we might be going through another phase as in the 1980s with a lot of games being published, and the industry might be facing another shake-down of companies. The future will show whether we will have another “1990s” moment in regard to the new distribution channels’ games, and reach the level where innovations turn more incremental in this area as well. In any case, the last decade has given a lot of fresh points of view to gaming, and after it had seemed that just a few years ago the game industry was settling, the times look really interesting once again.

## 7 DISCUSSION

### 7.1 Summary

The aim of this thesis has been to examine game innovations from several aspects. The different perspectives have been to shed light on what the concept “innovation” can mean when talking about games, examining the acknowledged innovations and their evolution in the course of time. The research questions were:

1. *What is game innovation?*
2. *What is the nature of existing game innovations?*
3. *How has innovation evolved throughout the history of the game industry?*

The first question considering what game innovation is was approached from several angles. Firstly, the academic literature’s definition of innovation generally was gone through. Secondly, game professionals’ interviews on the topic were used to see how they see innovation. Thirdly, the examination of descriptions of existing innovations was considered from this perspective.

As a conclusion, game innovation is a difficult term, and it is not always clear what is meant when someone is talking about innovation, nor can one be sure how it is interpreted. The academic literature’s definition basically suggests that innovation is the first successful application of an invention. The games that were picked from the source material seem to be the ones that have indeed been successful in their innovation. However, the game professionals do not see success as a part of innovation's definition. Indeed, considering the views of game professionals, innovation is sometimes seen as same as an invention, and innovation can be something that may fail.

One interesting finding, if not extremely surprising, in this thesis is, that many of the games that have originally pioneered game genres and other major inventions are not widely known, but a later follower, which perhaps implements the invention or the game around it better, markets it more efficiently or for other reasons becomes the game that gains the innovation status and gets acknowledged.

To answer the second research question, game innovations were searched from game history books, game guides, game professionals, and game players. The found game innovations were further analyzed to see what are the factors that make them innovative and what types of innovations there are. The found aspects that make the game an innovation are *games compared to existing games*, *games as such*, *reception*, *context* and *influence*. The main point here is, that it is not enough that the game has a great innovation in it, the formation of innovation is a multilateral process that needs various factors to work as a whole.

The main game innovation categories formed are *technological*, *gameplay*, *presentation*, and *narrative* innovations. These categories have interaction with each other and an innovation can belong to several categories at the same time. In addition to these categories, some *extra-game* categories were identified: *modding*, *marketing*, and *distribution*.

These categories as well as the games picked from the source material were used to examine the evolution of game innovations and the game industry, and so to receive some answers for the third research question. It was seen that the game industry has had emphasis in different innovation areas in each of the past decades of digital game history.

To summarize these findings, the 1970s was the time of scarce, still well-known big innovations, which focused on gameplay and technology. The 1980s was the time of a vast amount of innovations, which started to focus more on narrative aspects and less in technology. The 1990s showed some signals of maturation of the industry, and the innovations were mostly on the technological side. Finally, the 2000s were more about gameplay and least about the technology. The signs of maturation were reducing, and the industry keeps on evolving.

When considering the notions in the beginning of this thesis about the lack of innovation in games, these findings are showing that this is not necessarily the case. The sequels and proven concepts are very successful and hold most of the top ranks, but there is still constant innovating going on in the industry. Furthermore, people's misconception that innovation is always something completely new is probably one of the biggest reasons for the accusations of the lack of innovation in the industry.

## **7.2 Limits of the study**

The research questions have been quite extensive for one master's thesis, and it might have been useful to focus on a narrower subject. However, the research questions have supported each other well and given perspective to the whole picture.

The research material has its limitations, as has been noted. The history books combined with game guides give a certain picture of the games and stress some periods of times and individual games more. The supportive material helps to cover parts of this, although the scale of the supportive material was left in a minor role. One has to remember, however, that there is no way to get completely objective material about the history of game innovations, as such a thing does not exist.

## **7.3 Future Research**

Although I have used an approach that uses various resources to find the innovative games, there are still some perspectives that could be enhanced. The survey considering players' views of the biggest innovations is small in scale and should be explored further. The different aspects of how innovation and innovative games are perceived is intriguing, and the players' and professionals' views should both be examined more deeply in the future.

One aspect that has not been touched in this article, but would be useful and interesting to see, is the attitude and perspective of the media regarding innovation. What are the games that are regarded as innovative in game reviews, for example, and are those games the same ones that are remembered several years later as well? How soon can a game be considered as a landmark innovation? Looking through the history of innovations from this angle and comparing that data with the history books would give answers to these questions.

The properties of innovative games would be interesting to study from other perspectives as well. One relevant issue is combining sales into the analysis, and seeing for instance how many of the commercially successful games are innovative. However, from an historical aspect this analysis may be problematic, as dependable and comparable sales statistics is hard to find.



Furthermore, one direction for future studies could be made by tracking some innovations, as the forming of some genres, in more detail. By trying to track the different landmark innovations and the stepping stones for those would open up the process how game innovations are born.

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## APPENDIX 1: SELECTED GAMES FROM BOOKS

Game	Year	Developer	Country	Picked
Computer Space	1971	Nutting Associates	USA	2
Pong	1972	Atari	USA	6
Gotcha	1973	Atari	USA	2
Space Race	1973	Atari	USA	2
Tank	1974	Kee Games	USA	2
Home PONG	1975	Atari	USA	4
Adventure	1976	William Crowther and Don Woods	USA	3
Auto Race	1976	Mattel	USA	3
Breakout	1976	Atari	USA	4
Sea Wolf	1976	Midway	USA	3
Night Driver	1976	Atari	USA	2
Simon	1976	Ralph H. Baer and Howard J. Morrison	USA	2
Space Wars	1977	Cinematronics	USA	4
Subs	1977	Atari	USA	2
Atari Football	1978	Atari	USA	4
MUD1	1978	Roy Trubshaw and Richard Bartle	USA	3
Space Invaders	1978	Taito	Japan	7
Speed Freak	1978	Vectorbeam	USA	3
Adventure	1979	Atari	USA	3
Asteroids	1979	Atari	USA	6
Galaxian	1979	Namco	Japan	4
Lunar Lander	1979	Atari	USA	2
Warrior	1979	Tim Skelly	USA	2
Akalabeth	1980	Richard Garriott	USA	2
Battlezone	1980	Atari	USA	5
Berzerk	1980	Stern Electronics	USA	4
Centipede Coin-Op	1980	Atari	USA	3
Defender	1980	Williams Electronic	USA	5
Pac-Man	1980	Namco	Japan	7
Ultima	1980	Origin Systems	USA	3
Zork: the Great Underground Empire	1980	Infocom	USA	3
Mystery House	1980	On-Line Systems	USA	2
Rogue	1980	Michael Toy and Glenn Wichman	USA	2
Space Panic	1980	Universal	USA	2
Missile Command	1980	Atari	USA	2

Phoenix	1980	Amstar Electronics	USA	2
Star Castle	1980	Cinematronics	USA	2
Crazy Climber	1980	Nichibutsu	Japan	2
Donkey Kong	1981	Nintendo	Japan	6
Ms. Pac-Man	1981	Bally/Midway	USA	3
Tempest	1981	Atari	USA	4
Galaga	1981	Namco	Japan	2
Scramble	1981	Konami	Japan	2
Frogger	1981	Konami	Japan	2
Dig Dug	1982	Namco	Japan	4
Hobbit, The	1982	Beam Software	Australia	3
Mr Do!	1982	Universal	USA	3
Pole Position	1982	Namco	Japan	5
Q*bert	1982	Gottlieb	USA	3
Robotron 2084 Coin-op	1982	Vid Kidz	USA	5
Zaxxon	1982	Sega	Japan	3
Xevious	1982	Namco	Japan	2
Pitfall!	1982	Activision	USA	2
BurgerTime	1982	Data East	Japan	2
Joust	1982	Williams Electronic	USA	2
Pengo	1982	Coreland	Japan	2
Sinistar	1982	Williams Electronic	USA	2
Choplifter	1982	Dan Gorlin	USA	2
Dragon's Lair	1983	Advanced Micro-computer Systems	USA	6
I, Robot	1983	Dave Theurer	USA	3
Lode Runner	1983	Douglas E. Smith	USA	4
Spy Hunter	1983	Bally/Midway	USA	3
Track & Field	1983	Konami	Japan	3
Mario Bros.	1983	Nintendo	Japan	2
Star Wars	1983	Atari	USA	2
Astron Belt	1983	Sega	Japan	2
M.A.C.H. 3	1983	Gottlieb	USA	2
Elite	1984	David Braben and Ian Bell	UK	2
Karate Champ	1984	Technos Japan	Japan	3
King's Quest: Quest for the Crown	1984	Sierra On-Line	USA	3
Marble Madness	1984	Atari	USA	3
Punch-Out!!	1984	Nintendo	Japan	4
Jet Set Willy	1984	Software Projects	UK	2
Paperboy	1984	Atari	USA	2



Dr. J and Larry Bird Go One-on-One	1984	Electronic Arts	USA	2
Gauntlet	1985	Atari	USA	3
Super Mario Bros.	1985	Nintendo	Japan	5
Tetris	1985	Alexey Pazhitnov	Russia	5
Little Computer People	1985	Activision	USA	2
Commando	1985	Capcom	Japan	2
Habitat	1985	LucasFilm Games	USA	2
Legend of Zelda, The	1986	Nintendo	Japan	3
Metroid	1986	Nintendo	Japan	4
Sentinel, the	1986	Geoff Crammond	UK	2
Thrust	1986	Jeremy Smith	UK	2
Maniac Mansion	1987	LucasFilm Games	USA	2
John Madden Football	1988	Electronic Arts	USA	3
Prince of Persia	1989	Brøderbund	USA	3
SimCity	1989	Maxis	USA	3
Populous	1989	Bullfrog	UK	2
Secret of the Monkey Island, The	1990	LucasFilm Games	USA	3
Wing Commander	1990	Origin Systems	USA	2
Sonic the Hedgehog	1991	Sonic Team	Japan	3
Street Fighter II	1991	Capcom	Japan	6
Lemmings	1991	DMA Design	UK	2
Super Mario World	1991	Nintendo	Japan	2
Alone in the Dark	1992	Infogrames	France	2
Mortal Kombat	1992	Midway	USA	3
Dune II: The Building of a Dynasty	1992	Westwood Studios	USA	2
Wolfenstein 3d	1992	id Software	USA	3
Championship Manager	1992	Intelek	UK	2
Ecco the Dolphin	1992	Novotrade International	Hungary	2
Super Mario Kart	1992	Nintendo	Japan	2
Ultima Underworld	1992	Blue Sky Productions	USA	2
7th Guest, The	1993	Trilobyte	USA	3
DOOM	1993	id Software	USA	6
Myst	1993	Cyan Worlds	USA	6
Virtua Fighter	1993	Sega	Japan	3
Ridge Racer	1993	Namco	Japan	2
Sam & Max Hit the Road	1993	LucasArts	USA	2
Donkey Kong Country	1994	Nintendo	Japan	3
System Shock	1994	Looking Glass Studios	USA	3
Puzzle Bobble	1994	Taito	Japan	2

Rise of the Triad	1994	Apogee Software	USA	2
Virtua Cop	1994	Sega	Japan	2
Warcraft: Orcs & Humans	1994	Blizzard	USA	2
Descent	1995	Parallax Software	USA	3
Alpine Racer	1995	Namco	Japan	2
Parappa the Rapper	1996	NanaOn-Sha	Japan	2
Quake	1996	id Software	USA	3
Super Mario 64	1996	Nintendo	Japan	4
Tomb Raider	1996	Core Design	UK	4
Resident Evil	1996	Capcom	Japan	2
Time Crisis	1996	Namco	Japan	2
Diablo	1996	Blizzard North	USA	2
Pokémon (Blue and Red)	1996	Nintendo	Japan	2
Final Fantasy VII	1997	Square	Japan	4
Tekken 3	1997	Namco	Japan	2
GoldenEye 007	1997	Rare	UK	2
Ultima Online	1997	Origin Systems	USA	2
Gran Turismo	1998	Polyphony Digital	Japan	2
Legend of Zelda, The: Ocarina of Time	1998	Nintendo	Japan	2
Half-Life	1998	Valve	USA	3
Metal Gear Solid	1998	Konami	Japan	2
Grim Fandango	1998	LucasArts	USA	2
Thief: The Dark Project	1998	Looking Glass Studios	USA	2
Unreal	1998	Epic MegaGames	USA	2
Dance Dance Revolution	1999	Konami	Japan	4
EverQuest	1999	Sony Online Entertainment	USA	2
Vib Ribbon	1999	NanaOn-Sha	Japan	2
Chu Chu Rocket	1999	Sonic Team	Japan	2
Medal of Honor	1999	Dreamworks Interactive	USA	2
RollerCoaster Tycoon	1999	MicroProse	USA	2
Deus Ex	2000	Ion Storm	USA	3
Sims, The	2000	Maxis	USA	2
Shenmue	2000	Sega AM2	Japan	2
Black & White	2001	Lionhead Studios	UK	2
Halo	2001	Bungie Studios	USA	2
Ico	2001	Team Ico	Japan	2
Rez	2001	United Game Artists	Japan	2
Super Monkey Ball	2001	Amusement Vision	Japan	2
Grand Theft Auto: Vice City	2002	Rockstar North	UK	2

Legend of Zelda, The: The Wind Waker	2002	Nintendo	Japan	2
Porrasturvat	2002	Jetro Lauha	Finland	2
Eyetoy: Play	2003	SCE London Studio	UK	2
Prince of Persia: The Sands of Time	2003	Ubisoft Montreal	Canada	2
Half-Life 2	2004	Valve	USA	3
Katamari Damacy	2004	Namco	Japan	2
SingStar	2004	SCE London Studio	UK	2
World of Warcraft	2004	Blizzard	USA	3
Burnout 3: Takedown	2004	Criterion Games	UK	2
Fable	2004	Lionhead Studios	UK	2
Far Cry	2004	Crytek	Germany	2
God of War	2005	SCE Studios Santa Monica	USA	2
Shadow of the Colossus	2005	Team Ico	Japan	2
Fahrenheit	2005	Quantic Dream	France	2
Resident Evil 4	2005	Capcom	Japan	2
N	2005	Metanet Software	Canada	2

## APPENDIX 2: INTERNET SURVEY FORM

### Game Innovations

Recently, innovation in games has been brought up frequently in the media. It has been connected to individual games such as Guitar Hero or Katamari Damacy, or to broader aspects such as the Wii or the Xbox Live. Innovations have of course existed throughout the history of video games, beginning with the first arcade and console games of the 70's. Some do think that the best innovations are exactly from the earlier years of the industry.

I am interested in what do YOU think: which innovations in digital games do you remember and consider most important?

The innovations can be games, game consoles, technologies, features, or other applications in any aspect of computer and/or video games.

Try to think of innovations from different time periods, including the older innovations from the past as well as the more recent ones. List as many innovations as you feel like - there is no need to fill out all of the fields.

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Innovation:

What makes it innovative?

Background information

Age:

Gender:

Country:

How much do you play?

What genre(s) you like to play most?

The results will be stored and used solely for research purposes. Results cannot be tracked to individual respondents. If you have any questions or comments concerning the questionnaire or the study, please send me an e-mail at [kati.alha\(at\)gmail.com](mailto:kati.alha(at)gmail.com).

Proceed

Save