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Consolidating Fun
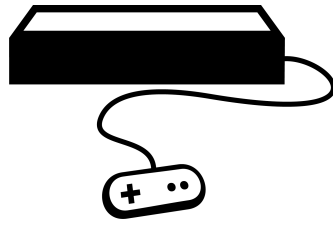
Mikolaj Dymek

Consolidating Fun

- Economies of Game Consoles

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Introduction

This paper will study the so-called "console economies" created by game consoles. Game consoles are purpose-built sophisticated computers, which can only be used for playing video games on a TV. Consoles are sold at a loss in order to be subsidized by revenues from video game sales, a business model usually called the "razor and blades" model. By resolving the technological and economical instability inherent in the PC game platform, game consoles have now become the most dominant platform in the game industry. This stability attracts game development, which then reinforces in a positive spiral the attractiveness of the console leading to the creation of a console economy. Managing a successful console economy is consequently a complex trade-off between several aspects and processes such as console development, console production, marketing, console pricing, game sales, license fees, and game development strategies. These issues will be elaborated in this paper. It will be argued that game consoles are mainly part of the entertainment industry, and not only IT industry as believed by many (Schilling 2003). As a way to understand this dynamic set of factors and their interrelationship, a new metaphor will be proposed: the medieval marketplace. This metaphor better, compared to the "razor and blades" metaphor, highlights the complex technological/economic balance and the dependence on third-party game developers that create the console economies.

This paper will begin with a section that contextualizes the game industry. Then follows a chapter describing the characteristics of game consoles. In the section called console economies the specifics of these economies will be described. A life cycle analysis of game consoles will be presented in order to illustrate the business strategies employed in the game console industry, followed by a discussion and conclusions. Two in-depth cases of Sega and Xbox will also be presented.

Game industry

The game industry is a young industry – what is considered to be the first computer game ever, *Spacewar* (Kent 2001: 15), was created in 1962 by a MIT student called Steve Russell. The first commercial computer games were introduced during the 1970's with arcade game hits like *Pong*, *Pac-Man* and *Space Invaders*. During the 1970's the first computer game devices for the home, so-called game consoles, appeared on the market with the arrival of Magnavox Odyssey and Atari 2600. Several other game consoles were introduced until the market, and the game industry as a whole, crashed in the beginning of the 1980's due to an oversupply of mediocre games and the introduction of the personal computer. In 1985 the game industry recovered and made its global breakthrough when a Japanese company called Nintendo introduced a game console called Famicom in Japan and NES (Nintendo Entertainment System) in the rest of the world. Nintendo was long the undisputed ruler of the game industry, until Sega effectively challenged its position in the beginning of the 1990's. Since then many companies

have tried to conquer the temporary market leader. Some (Sega, Sony) have succeeded, while others (Sega, 3DO, Atari, Matsushita, Microsoft) have failed.

In the middle of the 1990's computer games stopped being just a niche market and became a vital part of the strategy for the electronics industry. Just in 1992, Nintendo earned, on its console business, more than all the major US film studios, and more than Apple, IBM and Microsoft (Scheff 1999: 5) Today the industry is growing with up to 20% annually (Dymek and Rehn 2003) with a market size of around $20 billion which is expected to reach $30 billion by 2007 (RocSearch 2004).

The game industry enjoys pointing out that it challenges the film industry in terms of revenues or growth (Darnuth 2001; Fahey 2004). This claim is however slightly skewed since only box office revenues are taken into account, while in reality video, DVD and TV revenues make up the majority of the film industry's revenues (Takahashi 2002b: 27). At the same time the game industry has substantial "spillover effects" as well with Pokèmon (originally a game) as most prominent example – a game that has produced 4 movies, several TV series, one comics magazine, branded lollypops and numerous other branded products. Regardless of which industry really is the biggest, the game industry has in two decades achieved what almost took a century for the film industry to achieve.

Despite its huge success that has affected millions of people all over the world, the game industry has a secondary position to industries such as film, music, and IT. The industry is not seen as serious or businesslike. Games are generally considered for children or at best childish adults and thus not for serious people. Often people tend to associate games with colourful *Mario*, blood-spattered *Doom* or some tedious fantasy monster – in other words something for children. Games are seldom associated with art or seen as a new form of expression on the same level as film, music or theatre.

The source to most of these opinions is related to the fact that games are associated with entertainment, frivolity and vanity – the total opposite to hard and serious work. Games are entertainment and entertainment is associated with leisure and relaxation, not with the daily work. Games are simply put not treated seriously. Children quickly embraced games. Nintendo, who targeted children, quickly became the brightest star of the industry. Unfortunately this only made things worse as it reinforced the opinion that games are not serious – as well as labelling them as childish. Nintendo is now, almost two decades later, one of the game industry's oldest and most experienced players, a company that even people who never play games recognize. Equally famous is the old image of the game industry created by Nintendo–childish and frivolous. However, over the last years the game industry has changed drastically. The game market doesn't consist only of children anymore, but mainly youths and young adults. Sales and revenues have reached gigantic proportions compared to its humble beginnings. There are more than 140 000 people working in the game industry in the USA and Europe alone (Spectrum Strategy Consultants 2002: 20). The game industry is no longer a silly toy industry but a global industry. The bad reputation nonetheless still remains.

The game industry's bad reputation has partially influenced academic research. Only during the last couple of years computer games have captured the attention of the traditional academic world (Svedjedal 2003). Little or almost no research is dedicated to the business or management aspect of the game industry. This hasn't stopped researcher from other parts of the academic world to study the game industry, mainly its social, cultural, psychological, technological and narrative aspects. While this research has produced very interesting results, the business and management aspects have been left aside. It is intriguing that much game research is ignoring the fact that it is often studying companies, products and intriguing economic processes and not only "computer games" as such.

The interesting question regarding game industry management research is not *why* but rather *why not*. Should management researchers ignore the game industry only because it is considered to be "silly"? Why is it more legitimate to study the microelectronics industry than the game industry when the former is to a large extent powered by the demand created in the latter? The cause behind most of these opinions is the rationality of seriousness that overshadows economic logic. Economic activity according to this logic should be useful, strict and above all serious (Gustafsson 1994). Economic research should therefore also be guided by these principles. Games are the total opposite of this logic. Games are based on play, entertainment and frivolity. This doesn't, however, change the fact that games are also great business. As mentioned above the game industry is already of substantial size and it is growing at an explosive pace, challenging the size of other much older "entertainment industries" such as the film and music industries.
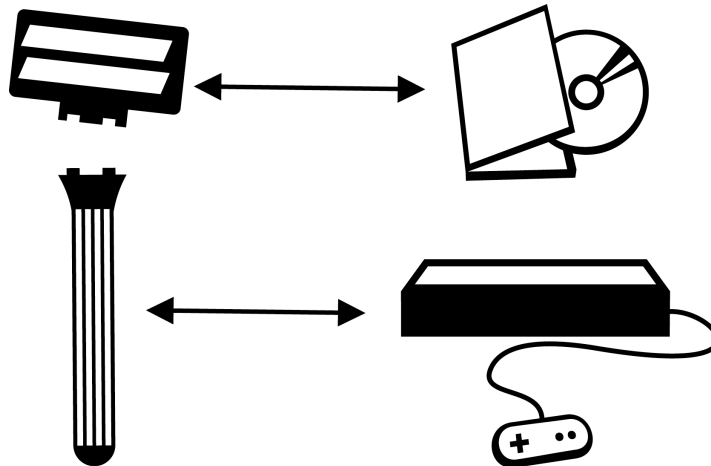
Game consoles

Concept
The concept behind game consoles is fairly easy: a device that people can use in their living rooms to play video games. A console connects the to the TV since this lowers the price (no extra display device needed). The console is easy to use with no software, driver or hardware installations. Low pricing of the device attracts many consumers. Many games made by both the game console manufacturer and third-party game developers create a wide selection of interesting games. Game console prices are low, but manufacturers charge in contrast generous margins on the actual games. These economical conditions have led to the development of the so-called "razor and blades" strategy, where the software subsidizes the price of the hardware.

Business model
The "razor and blades" metaphor is used due to the similarity to the console industry. The business model was allegedly invented by the razor manufacturer Gillette. Razors, such as Gillette Mach3, are sold at loss in order to be subsidized by revenues from high margin razor blade sales. The razor represents the console and the razor blades the games. The sharpness of the blades represents the short but intensive popularity of games. Furthermore the meta-

phor also shows that the razor market, i.e. the console market, is not profitable without revenues from the razor blade market, i.e. the game market.

Game genres

Consoles are in a way a compact home version of arcades – providing fast and intensive entertainment. Consequently the usage pattern of game console players is substantially different from PC players. Game consoles provide short and intensive entertainment with action, sport and adventure games as most dominant game genres. Puzzle, role and strategy games have traditionally been absent from the console market.

Technology

Technically speaking game consoles provide sophisticated "cutting edge" technology extremely adapted to a limited purpose: to play games on a TV. These devices are the size of small VCRs. They connect to the TV, which is used as a screen but also as a speaker system. The controller units, which connect to the game consoles with cables and are used to control and affect the computer game itself, are devices that the players hold with both hands and contain a relatively high number of buttons, e.g. the Sony Playstation2-controller has 14 buttons and 2 mini-joysticks. Games are usually stored on established and standardized storage media formats such as CD-ROM or DVD-ROM. Hence many game consoles can also be used as CD or DVD players.

Digital convergence

"Digital convergence" is the business and technology merger of the IT with consumer electronics industries. Game console are considered to be a vital part of this development, and an alternative approach to the traditional division between IT and consumer electronics. With the latest generation of consoles (Sega Dreamcast, Sony Playstaion2, Xbox and Nintendo GameCube) manufacturers attempted to take part in this development by providing new (network) technologies. These technologies allow connecting the console to home electronics, external accessories (e.g. keyboard, hard drives, mouse) and networks/broadband. Increasingly pervasive attempts by the IT industry (such as Windows CE, Windows Media Edition, Java, set-top boxes), telecommunication industry (interactive TV services) and the consumer electronics industry to provide "digital hubs" (devices/technologies that control and connect to various media devices in the home) show the massive support for the vision of the

digital convergence. However, these inventive attempts have not made any significant inroads and the vision of convergence is still far off. The latest generation of game consoles did not become "digital hubs" with *Eyetoy* (a small camera that plugs into Playstation2 allowing players to participate "on screen" in different games) and *Windows Media Center Extension for Xbox* (a program allowing the Xbox to access media content on a Windows PC) as few exceptions.

Online games

In the current generation of consoles Microsoft (with its *Xbox Live* service claiming more than 1 million subscribers) and Sony have the most advanced online strategies. Online games have the potential to overthrow the entire structure of the game industry, making game distributors, retailers and possibly publishers unnecessary. What kind of business model will then be applied: pay-for-play or subscription? What kind of position will telecommunication companies have in this new model? Despite the promises of online technologies the limited bandwidth of current network technologies have limited the success of online games. Hence current generation of console online services serve more as community/multi-player platforms than distribution platforms.

Console economies

Many products and services heavily on each other and exist in a symbiotic relationship. Mobile phones and cellular networks, cars and petroleum, razors and blades, CD players and CDs are a couple of popular examples. Not surprisingly the game industry is one of those markets, where the platform manufacturer is strongly dependent on the game producers and vice versa. Initially this wasn't the case – in the beginning Nintendo exclusively created all the games for its own platform. Theoretically a console manufacturer could maintain this business strategy. However history has shown that this isn't a successful way of doing business. Creating good video games, it turns out, is a completely different business than the production of high-tech video game consoles. Console manufacturers continue creating games but have turned for help to independent third-party game developers to provide a wider selection of games.

Games and consoles

The relationship between games and consoles can be described as a spiral. Good games drive sales of more consoles, more consoles lead to a larger market, a large market generates more game development and more game titles, which lead to more console sales. In this way the positive spirals continues, driving sales of consoles and games.

Better games

More game development

Larger market

More consoles

Good games
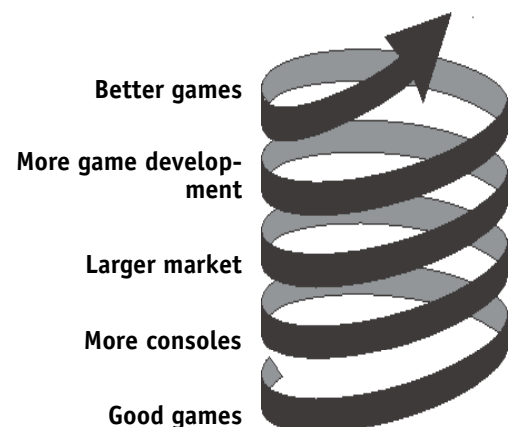
Case: Sega

A negative spiral is a failure for a game console. A famous example of a negative spiral is Sega. This Japanese company was once a leading manufacturer of consoles, arcades and games. During the end of 1980's Sega introduced a console called *MegaDrive/Genesis*. This console targeted a slightly older age group with more violent games, which were not available on the market leading Nintendo NES. Sega created a "cooler" console that dominated the game industry for one console generation. Many independent game publisher and developers supported Sega MegaDrive. Problems arose when Sega decided to introduce hardware upgrades of MegaDrive called *MegaCD* and *32X*. These upgrades failed in the market since there was not sufficient interest among game publishers for these modified versions of the MegaDrive. Weak support by game publishers lead to a smaller selection of games, which negatively influenced sales of MegaDrive consoles and games. The problems continued with Sega's next console Saturn that competed with Sony Playstation – a console which totally dominated the console industry. When Sega finally launched their last console Dreamcast in the end of the 1990's, publishers and developers had lost faith in the console and Sega.

With low confidence among game publishers and a market impatiently waiting for the Sony Playstation2, this became the beginning of the end for Sega as console manufacturer. Sega was loosing substantial amounts on subsidies of the Dreamcast and decided 2000 to phase out the Dreamcast and close its entire console business, followed by a large reorganization of the company. What remained was a wide range of good and successful game franchises that had been created during the years by Sega's in-house game publisher and developers. These games were quickly transferred to its former competitor's consoles from Sony, Nintendo and Microsoft. Sega is now one of the world's largest game publishers and develops many popular game franchises.

Competing game platforms

The dependence on third-party game developers have caused video game consoles to develop, similarly to computer operating systems, into platforms – not only technological but also (and foremost) economic platforms. This has proven to be a very successful business strategy and has overthrown the PC as the dominant gaming platform and is consistently diminishing the role of the PC as a commercial gaming platform. In Europe 45% of all games sales are PC games, but in Japan only 6% (Spectrum Strategy Consultants 2002). To explain the economic rationale of game consoles it is important to know why the PC is decreasing in importance.

A PC can be combined into almost an infinite number of configurations of both hardware and software. To be able to play computer games a PC primarily requires special graphics cards, which are extremely adapted to the specific graphics calculations required by computer games. Graphics cards are technologically advanced, expensive and are continuously revised and updated at least every 6 months.

In these fluctuating conditions it is difficult for game developers to adapt their game software to one specific hardware setup due to the endless number of possible configurations. Game developers usually then adapt their software to a generic setup, or are forced to make several versions for different setups. In addition, for many years the PC platform lacked software tools and industry standards for creating games. Game developer had to "reinvent the wheel" in software for every new game, increasing the time and cost of game development. Nowadays there are several industry standards (such as *DirectX*, *OpenGL*) and numerous software tools available, which considerably simplify the process of creating games for the PC platform. However, in order to keep up with the changing technological environment these software tools also evolve very quickly.

The rapid development in game hardware and software quickly makes PC games obsolete, and forces the industry and gamers into a cycle of continuous upgrades. This endless configurability causes instability both for game developers and players. It produces a financial risk for all parties in the PC game industry, which has caused the failure of the PC as the leading gaming platform. The PC will of course not completely cease to exist as a commercial game platform. It will continue as the platform for game fanatics and as a marginal platform for people with casual interest in games.

Advantages of game consoles

The business concept of the game console is to solve all the above-mentioned disadvantages of the PC. PCs are technologically complicated, technologically diverse, hard to use, expensive, often unaesthetically design and have low barriers to entry for game developers.

Console manufacturers have hence created devices that are technologically simple, technologically consistent, easy to use, cheap, aesthetically designed and have high barriers to developer entry.

- **Technologically simple.** Game consoles are equally as technologically complicated as PCs and in many cases even more. Consoles instead try to hide the technology from the users. The technology in consoles is designed for one purpose: to play games on a TV. Hence consoles do not require upgrades or advanced settings – they are designed to be equally as easy to use as a TV.

- **Technologically consistent.** Stability in the shape of standards is essential for all technological development (not only game development), which often is not the case in the PC industry where almost all standards are the results of a long and confusing war between competing standards. A game console platform is the total opposite with a predictable and stable set of standards. This creates a stability that is not available on the PC platform. It is important to stress that different game consoles are not compatible and are hence competing standards – but unlike the PC every console platform is a set of strictly defined hardware and software standards defined by one manufacturer.

- **Easy to use.** The fact that PCs are not perceived as easy to use shouldn't come as a surprise for many users. Regardless of the efforts of software engineers, cognitive psychologists and user interface experts, most users utilize a minimal percentage of a computer's possibilities. The rest of the functionality disappears in a tangle of bad technologies and user interfaces. Personal computers (PCs) are relatively hard to install, hard to use, and hard to modify. Console manufacturers on the other hand have made game consoles as easy as possible to use. To install a console one cable is connected to a TV and another to the power outlet. Then the ON/OFF button is pressed, a CD/DVD (containing the game) inserted and the gaming can begin.

- **Cheap.** PCs are relatively expensive. Despite falling prices, due to an extremely competitive market, the price of a PC is significantly higher than most other game platforms. To reduce prices manufacturers have created cost-effective game platforms tailored for gaming purposes only. This strategy has not however reduced the price sufficiently for the target audience (traditionally children and young adults). For example the production cost of the latest game console Xbox is a well-kept secret, but according to some sources it is slightly above $300 (Takahashi 2002b: 105). Therefore console manufacturers choose to reduce the price below the production cost, i.e. to sell with a loss, to later recoup with revenues from license fees and in-house games. In this way console manufacturers have managed to lower the selling price to less than $150 (in late 2004). The goal is to reach a price level within the range of impulse and gift purchases for the target audience.

- **Aesthetical design.** PCs are, according to many, unaesthetically designed clearly expressing that they are not intended for entertainment. Game consoles from the 1980's mainly looked like the grey or black home electronics in those days. During the 1990's console manufacturers became more daring with some interesting designs, but grey still dominated. With the last generation of game consoles the manufacturers have attempted to create original designs. Nintendo's GameCube is shaped like a cube and is available in many vibrant colours. Nintendo's designs have always tried to communicate entertainment and playfulness. Sony began rather unadventurously with a grey Playstation, but with a totally new type of controllers. Sony's sequel, Playstation2, was slightly more adventurous with a black futuristic hi-tech design that could be placed vertically (as opposed to horizontally as all other game consoles). The design of the Microsoft Xbox is based on an "X" to allude to the name and the logotype. Originally the designers wanted the console in the shape of a big silver-coloured "X", but that concept was abandoned due to cost reasons.

- **High barriers to entry**. No company or organisation owns or controls the entire PC platform and hence there are no (economical) barriers to entry. Low entry barriers attract many developers possibly creating an overcrowded market with low quality games and imitated concepts. This was exactly the case in the beginning of the 1980's when the game industry crashed due to an oversupply of low quality games

(Herz 1997: 19). The PC game market today can also be characterized as being over-supplied. Console manufacturers therefore impose quality requirements on third-party game developers by increasing the barriers to entry for game developers and publishers. These barriers are e.g. expensive software development kits, license fees and quality controls performed by the console manufacturers. Basically console manufacturers create a "walled garden" where only games of a certain quality level are allowed to exist.

Business strategies of the console industry

In order to illustrate the business strategies employed in the game console industry a chronological description of a game console's life cycle will be presented.

Development

2 to 4 years prior to a new console introduction and predecessor phase out, the game console manufacturer initiates hardware and software development for the new game console. Reliable industry data is scarce, but according to some sources (Gibson 2002) Sony invested $1.9 billions in development of Playstation2 up to 1999, its launch year. Microsoft is said to have planned investments between $900 millions and $3.3 billions during the Xbox's planned life of 6 years ((Takahashi 2002b: 183-184). Sony in cooperation with IBM and Toshiba is investing $400 million into development of a next generation graphics chips called "Cell" intended for the next generation Playstation, projected for release 2005-2006 (Spooner 2002). In other words development of console hardware is an extremely capital intensive process with colossal entry barriers. In order to maintain its technological competitiveness during the entire life span console technology must be considerably more sophisticated at introduction compared to competing technologies in the PC industry and elsewhere, which significantly increases the development costs. Usually within one to two years the PC competitors catch up and surpass with superior technology.

As game consoles depend on the availability of a wide variety of good games, which can only be provided in cooperation with third-party game developers, console manufacturers have to take into account important game developers' opinions regarding software and hardware expectations. Without support among game developers a console is doomed in the market. Cooperating with the game developer community thus becomes a crucial aspect in the development process of a game console.

Case: Xbox development

While console development requires massive investments it is counterbalanced by a clear ambition to reduce development and production costs since these directly affect the price of the game console (or rather reduce the size of the subsidy). Consequently game consoles become unconventional combinations of sophisticated (and expensive) technology and cost reducing solutions. Illustrating this trade-off is the case of Xbox.

Microsoft began its venture into the game industry with a software technology called *DirectX*. This set of software packages facilitates game development on the PC platform. It also positioned Microsoft's operating system Windows as a game platform, which previously had been more or less ignored by game developers. Microsoft's technology successfully introduced greater stability in the technologically volatile market for PC games and became the *de facto* software standard for PC game development. DirectX did not however manage to compete with the explosively successful game consoles such as Playstation. As a response Microsoft quickly entered the game console industry in order to capture a slice of this increasingly important market segment. Its console was based on the DirectX technology – hence the name X-box as in Direct-X. Microsoft's strategy focused on quickly transferring its leverage, technology and third-party game developers from the PC to the console, by replicating (or "porting") the successful DirectX technology to a new hardware platform.

From a technological point of view the DirectX technology requires other hardware and software technologies such as Microsoft Windows and PC hardware (e.g. CPU, hard drive and RAM) in order to work properly – basically demanding a complete Windows PC. When converting the DirectX technology from PC to console Microsoft faced two strategic options: creating a new cost-effective and proprietary hardware platform (requiring modifications of the DirectX technology itself), or leaving the DirectX technology intact and adapting the hardware to a console format. The first alternative would involve large hardware development costs. Sony and Nintendo adhere to this strategy and thus possess the competence, capacity and experience to develop a new hardware platform. Being a software company Microsoft lacks this competence since it is not in the business of hardware development. Furthermore this option would interfere with the primary objective of transferring leverage from PC to console, since the DirectX technology would have to be revised. This time-consuming option would also be unsuitable given that a fast time-to-market was needed.

Microsoft in cooperation with Flextronics instead opted for a solution that could be characterized as a low budget PC. Xbox has an Intel processor, RAM, hard drive, modified version of Microsoft Windows 2000, and a graphics processor from Nvidia (the leading graphics card manufacturer in the PC industry). By relying on the unmodified DirectX technology and on the established PC platform Microsoft reduced the hardware and software development costs of the Xbox. A similar strategy was used when the DVD standard was chosen as storage media format – it was cheaper in development and game reproduction costs, and reduced inventory risk for publishers. Seemingly counterintuitively a relatively costly hard drive was included. This option on the other hand reduced the development time and avoided modifications to the DirectX technology. Lower development costs, shorter development process and DirectX compatibility was prioritized instead of lower production costs, resulting in a slightly more expensive console.

The case of Xbox shows how factors such as cost reduction, time-to-market, hardware and software technology issues, and corporate strategy among others dynamically affect the design and development of game consoles.

Production

Sony managed to sell 980 000 Playstation2 consoles during the first 3 days after the premiere in Japan 2000 (Becker and Fried 2000). Evidently an efficient production process is required to satisfy such great demand. According to rumours Sony is said to have invested $1.2 billion into establishing sufficient fabrication facilities to ensure volume production of Playstation2 and its components. Despite these investments Sony had huge difficulties satisfying demand when Playstation2 was introduced in the USA and Europe. Microsoft outsourced its entire production to the outsourcing giant Flextronics, but they also faced production problems.

During the life span the entire console construction and production process is continuously improved. The strategy is to reduce the production cost in order to minimize the subsidy loss for every unit, or in the case of a price war with competitors, maintain the subsidy level but reduce the price.

The table below illustrates the production capacity required to satisfy the demand of the market.

Total number of game consoles (mil.) in Q1 2004	
Sony Playstation	100,0
Sony Playstation2	71,3
Nintendo64	32,9
Microsoft Xbox	15,5
Nintendo GameCube	14,6
Sega Dreamcast	7,9
Source: Microsoft (2004), Nintendo (2004) and Sony (2004) Annual Reports, DTI	

Marketing and sales

Massive marketing campaigns are employed when launching new game consoles. Microsoft's marketing budget for the Xbox during its launch year was $500 million (Wong 2001). Until the beginning of the 1990's the industry primarily concentrated on children, but has now re-focused on an older segment, 18 to 28 year olds. Sony's innovative marketing strategy in the middle of the 1990's targeted, as opposed to earlier consoles, an older age group, which had been brought up with video games. This pioneering marketing strategy opened up an entire new (or rather old) market, and turned the Playstation to the most successful (in terms of number of units sold) console ever.

For every new console generation the size of the market significantly increases. Generally the market is segmented in two target groups: newcomers and gamers (previous console owners). Hard-core gamers will buy the console at practically any price, however, the majority of gamers must be persuaded to buy a new console, abandoning the old. Statistics from Sony (2004) show that on average a Playstation2 owner buys 8 games corresponding to approximately

$400 in console investments. In addition there is the cost of the console itself, $200-$500, and in many cases accessories for about $100, in total about $1000.

This investment causes a so-called "lock-in" effect (Cf. Shapiro and Varian 1998: 103-171). Lock-in effects are desirable for the dominating console by increasing the transition cost to a competing platform/console. Disadvantageous lock-in effects arise for competing consoles, but also between new and old generations of consoles from the same manufacturer. In an attempt to reduce negative lock-in effects between Playstation (old generation) to Playstation2 (new generation), Sony introduced the possibility to play old Playstation games on Playstation2 consoles, creating bridges between the old and new investment.

Technology can reduce lock-in effects but the primary effect is created by the price of the console. In a situation with fierce competition and low console prices manufacturers utilize subvention as means of competition. To finance this business strategy console manufacturers turn to their second revenue source: game sales. A fee is added to the game price in order to pay off the subsidy. Its size is determined by two factors: subsidy size and subsidy structure. According to some sources (Takahashi 2002a) the console production costs of a Xbox is subsidized by $150. This subsidy is then divided by the average number of games purchased by console owners – the so-called *tie-ratio*. According to Sony (2002) its tie-ratio is 7.9, Xbox has a tie-ratio of 5.7 and GameCube 5.5. By dividing the size of the subsidy with the tie-ratio a license fee is calculated. It is applied to every console game sold.

In order to secure the tie-ratio, which in the case of Xbox is around 9 (Takahashi 2002b: 185), console manufacturers develop and publish exclusive in-house games on their platforms. These games provide a competitive advantage, but also ensure faster recoupment since in-house developed games generate higher margins. Consequently these in-house game titles are prioritized, and constitute a strategic factor in the subsidy model calculations.

Additional ways to guarantee a good tie-ratio is by arranging exclusive game titles from independent third-party game publishers. Exclusive titles are growing in importance in a crowded console market with increasing difficulties to differentiate consoles and target different market segments.

Marketing and PR is not only limited to consumers but also targets third-party game developers and publishers, since these create, in cooperation with the console manufacturer, the success of the console. Demonstrations, developer conferences, launch parties, (occasionally) financial support (free software kits or initial development financing), industry contacts are provided to market the console with game developers.

Phase out

A console life span is usually about 6 years and depend mainly on technological factors: the first two years the console is introduced while the last generation is slowly phased out. The next two years are usually the console's peak in terms of popularity and sales. Finally the con-

sole goes through a period of declining/saturated sales and finally a transition phase into the next generation of consoles. During the phase-out production of the console is continued, and it is often remarketed to poorer markets. The table on page 13 clearly illustrates that 5 years after the introduction of Sony Playstation2 and the phase out of Sony Playstation, the latter console still is globally by far the most popular console. Simultaneously with the launch of Playstation2 in 1999 a revised Playstation, called Sony PSone, almost half the size of the original Playstation was introduced. Approaching its phase-out the Playstation2 has similarly been reworked to almost half its previous size.

Discussion

In the previous chapters, by describing the characteristics of game consoles and their life cycles, the console economy has been explained. The analysis clearly illuminates that the game console industry is not solely a hardware business, but primarily a set of connected markets and businesses. As mentioned previously this "console economy" usually is illustrated by the "razor and blades" metaphor. This metaphor effectively represents many similarities between razor and game industries. Unfortunately it does not sufficiently reflect many important aspects of the console industry, such as the complex technological/economic balance and the dependence on third-party game developers.

A more fitting way to depict these features is proposed, namely to view the console/game market as a medieval marketplace. In this metaphor a thick wall surrounds the marketplace. Salesmen have to enter through a gate and pay a substantial entry fee to be able open their market stalls. Buyers on the other hand must pay a relatively low entrance fee. For each sold item the salesman pays taxes to the patron who owns the marketplace. Buyers can find a wide selection of goods, salesmen can increase their sales, and the patron generates revenues from entrance fees, taxes and sales from his/her own in-house salesmen. The patron depends on foreign salesmen since they provide exotic goods not available in the region.

The patron is interested in maximizing the marketplace profit. A price war with a neighbouring marketplace has reduced entrance fees to a level where they can no longer cover the wall construction expenses. The patron must now decide the following factors: investment in wall construction, size of entrance fees, size of taxes, how to attract salesmen and buyers, and finally how many in-house salesmen to employ.

To balance all these factors in order to maximize long-term (until the next marketplace has to be built) profit is a balance act similar to the console industry. The building of a marketplace wall represents the development and production costs of game consoles. Buyer entrance fees represent the console price. Entrance fees for salesmen correspond to the cost of software development kits and quality control fees. Taxes, by far the largest revenue source, relate to the (tie-ratio) license fees. The patron's in-house salesmen are equivalent to the in-house game developers of console manufacturers. Marketplace goods of course represent games titles. Balancing all the above-mentioned factors is similar to the situation of a console manufacturer when a new console has to be launched.
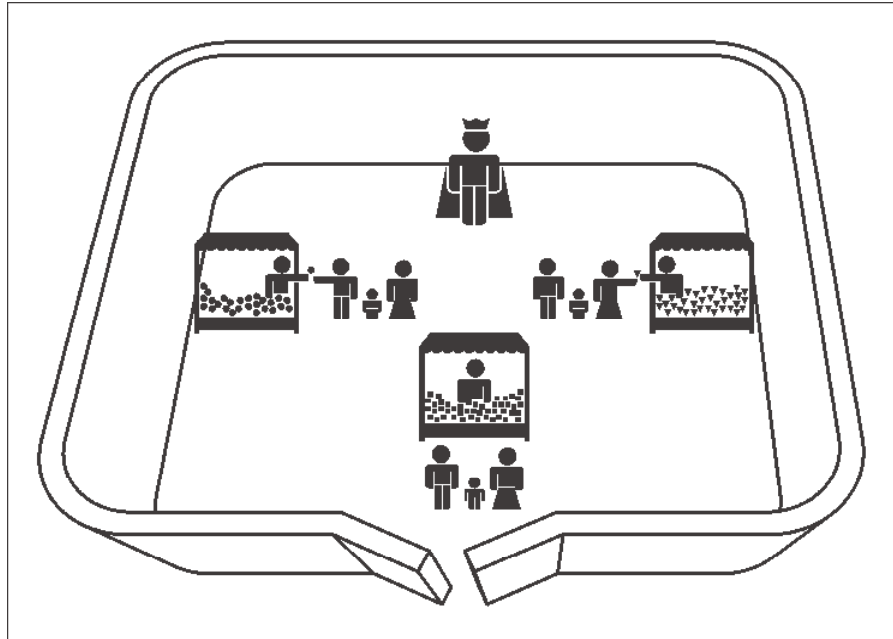
If the patron builds a smaller marketplace the initial investment risk will be lower. The resulting low entrance fee may attract more buyers. However, a too small marketplace can displease salesmen. Too expensive of a market wall may impress, but entrance fees and taxes may become too steep and fend off both salesmen and buyers. Consequently the patron must predict the number of buyers and adapt its size and cost accordingly. The patron has also discovered that in-house salesmen with attractive goods generate more revenues, thus improving profits and attracting buyers. Too many in-house salesmen might however upset independent salesmen. It is imperative to advertise the marketplace in surrounding villages where the majority of buyers live. Good relationships with independent salesmen are crucial since they generate the majority of revenues.

The marketplace metaphor shows to a larger extent, than the "razor and blades" metaphor, how many factors that have to be balanced and their interdependence. The metaphor stresses that consoles are small economies where the market strategy and structure affect the dynamics and development of these economies.

Conclusions

This paper has shown how game consoles, using a "razor and blades" business model derived from the symbiotic relationship between consoles and games, have successfully managed to conquer the game industry, by resolving the technological and economical instability inherent in the PC game platform. Furthermore, a life cycle analysis, have exposed that game consoles constitute "console economies" that rely on a complex balance between aspects such as console development costs, production capacity, marketing costs, console price, subsidy size, tie-in ratio, license fees, in-house game development, and relationships with third-party game developers. As a way to understand this dynamic set of factors and their interrelationship, a

new metaphor is proposed: the medieval marketplace. This metaphor better highlights the complex technological/economic balance and the dependence on third-party game developers that create the console economies.

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Pink Machine is the name of a research project currently carried out at the Department of Industrial Economics and Management at the Royal Institute of Technology, Stockholm. It aims to study the often forgotten non-serious driving forces of technical and economical development. We live indeed in the reality of the artificial, one in which technology has created, constructed and reshaped almost everything that surrounds us. If we look around us in the modern world, we see that it consists of things, of artefacts. Even the immaterial is formed and created by technology - driven by the imperative of the economic rationale.

As Lev Vygotsky and Susanne Langer have pointed out, all things around us, all these technological wonders, have their first origin in someone's fantasies, dreams, hallucinations and visions. These things, which through their demand govern local and global economical processes, have little to do with what we usually regard as "basic human needs". It is rather so, it could be argued, that the economy at large is governed by human's unbounded thirst for jewellery, toys and entertainment. For some reason - the inherent urge of science for being taken seriously, maybe - these aspects have been recognised only in a very limited way within technological and economical research.

The seriousness of science is grey, Goethe said, whereas the colour of life glows green. We want to bring forward yet another colour, that of frivolity, and it is pink.

The Pink Machine Papers is our attempt to widen the perspective a bit, to give science a streak of pink. We would like to create a forum for half-finished scientific reports, of philosophical guesses and drafts. We want thus to conduct a dialogue which is based on current research and which gives us the opportunity to present our scientific ideas before we develop them into concluding and rigid - grey - reports and theses.

Finally: the name "Pink Machine" comes from an interview carried out in connection with heavy industrial constructions, where the buyer of a diesel power plant worth several hundred million dollars confessed that he would have preferred his machines to be pink.

Claes Gustafsson
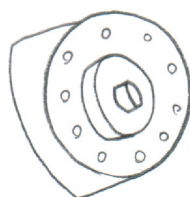
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